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Food Safety Policy and Management in UK and KSA hospitals

A thesis submitted by

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Abstract

Outbreaks of foodborne illness continue to present major challenges for hospitals. This is a particular issue for Saudi Arabia whereby food handlers can be employed despite not having relevant certification or training in food safety processes. The purpose of this study is to critically analyse food safety and hygiene in seven state hospitals in Riyadh, Kingdom of Saudi Arabia so as to establish the knowledge, behaviour and attitudes of Ministry of Health Hospital supervisors, contracted catering supervisors and contracted catering workers engaged in these hospitals. In order to come to these conclusions, this research has first made a comparison of the food safety policies of five NHS Trust hospitals in the UK to identify examples of best practice. It has then surveyed 242 people working as either catering workers, catering supervisors, or MOH supervisors in seven hospitals in Riyadh in order to understand their knowledge of food safety management systems, such as HACCP. Comparing and contrasting knowledge on food safety processes enables a better understanding of how and why foodborne illnesses emerge and is believed to be the first comparative study of all type of hospital staff in Saudi Arabia. Finally, a policy for food safety management has been created based on this research, and in consultation with a community of practice, with the hope that it will be implemented in Saudi hospitals.

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Abbreviations

CAC	Codex Alimentarius Commission
CIEH	Chartered Institute of Environmental Health
CPD	Continual Professional Development
DEFRA/ UK	Department for Environment Food and Rural Affairs
EHA	Environment Health Administration
EHO	Environmental Health Officer
EHPs	Environmental Health Professionals
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDA	U.S Food and Drug Administration
GDPH	General Department of Preventive Health
GMP	Good Manufacturing and Practice
GOTEVT	General Organisation for Technical Education and Vocational Training
HACCP	Hazard Analysis and Critical Control Point
ISO	International Organization for Standardization
KAP	Knowledge Attitudes and Practice
KSA	Kingdom of Saudi Arabia
MOH	Ministry of Health
NASA	National Aeronautics and Space Administration
PRPs	Prerequisite Programmes
SFDA	Saudi Food and Drugs Authority

Chapter 1: Introduction

1.1. Introduction

Food safety and hygiene issues have become important across the world due to the persistence of foodborne outbreaks. These outbreaks occur when food is prepared under poor conditions that fail to follow basic safety procedures. The World Health Organization (WHO, 2017b) estimates that 600 million people suffer from foodborne illnesses annually. Hussain & Christopher (2013) have argued foodborne outbreaks are on the increase as a result of globalisation and the impact this has had on the food trade, particularly in terms of food processing and distribution methods.

Food hygiene, as defined by Article 2 of Regulation (EC) No 852/2004 of the European Parliament (Regulation (EC), 2004), is the various measures and conditions necessary to control hazards. Although there are many factors that can create these hazards, Castro (2015) found handling practices were responsible for the majority of outbreaks. The key risks identified as causing foodborne illnesses by the US Food and Drug Administration (FDA) were: poor hygiene of staff and inappropriate equipment; food being sourced from 'unsafe' suppliers; and failure to prepare cooked food to the correct temperatures (Hertzman, J. and Barrash, 2007).

To address these issues and promote greater awareness of microbial, chemical and physical hazards in food production, the WHO created The Five Keys to Safer Food as a global health message. This later informed the WHOs first ever global estimate of foodborne diseases and an updated advice guide on how to prevent common problems (WHO, 2015). Making guidelines available for the preparation of specific types of food in kitchens is one way in which the risk of foodborne outbreaks can be limited and food hygiene safety improved (Läikkö-Roto, 2016). Another is developing

systematic surveillance techniques that enable foodborne outbreaks to be measured and controlled. The data produced from such systems is then able to inform future behaviour. Systematic surveillance systems are seen to be particularly relevant with regards to developing countries, and are seen as an essential part of food safety systems (World Health Organisation, 2018).

The majority of food poisoning incidences do not happen at home as you may expect - given that ordinary people are not food hygiene experts, but rather in public places where food is served by trained staff. Restaurants, schools, and hospitals, are the main places for outbreaks (Health Protection Scotland, 2015). This is of particular concern as an outbreak in a public space means that the likelihood of it spreading is dramatically increased. Needless to say, appropriate training in all areas of food production and adherence to Food Safety Management Systems (FSMS) as well as compliance with industry regulations are vital in ensuring these outbreaks are kept to a minimum. It is reassuring to note that hospitals, in comparison with other food-related businesses, represent a relatively low percentage of the total incidences of foodborne outbreaks. In Poland, for example, hospitals accounted for 1.5% - 6% of total foodborne outbreaks between 1985 and 1999 (Zaręba Krzysztof, 2003). In a study of the Netherlands in 2002, the figure was slightly higher, with hospitals responsible for 9% of gastroenteritis outbreaks (Van Duynhoven et al., 2005). It is worth emphasising that although these outbreak figures are low, their impact is still high.

The reporting of foodborne outbreaks in Saudi Arabia officially began in 1984 when a national policy was developed that required any incidence of 'bacterial food poisoning' to be reported and recorded and relevant authorities notified. Todd (2017) reports that there were 264 reported foodborne outbreaks in 2010 with 1647 people affected and one death. The 264 reported outbreaks were from households and commercial sources,

with commercial sources responsible for 62% of those who fell ill. By 2011 the number of outbreaks had dropped slightly to 255. However it has been calculated that 2066 people were affected (Al Mutairi, 2013). Todd (2017) is keen to stress that these figures are most likely higher as "many incidents remain undocumented because people do not attend health institutions for medical treatment, or because of acknowledged inaccuracies in sampling, analysis and investigation". The most common outbreak is *Salmonella* which has predominantly been found in chicken, meat, and rice – all of which are part of a regular Saudi diet. Needless to say, guidelines for culturally specific food is one way in which such problems can be addressed immediately.

Food handlers play an important role in the transmission of foodborne disease outbreaks. A food handler is defined as "any person who directly handles packaged or unpackaged food, food equipment and utensils, or food contact surfaces and is therefore expected to comply with food hygiene requirements" (Codex, 2003). An estimated 816 foodborne illness outbreaks around the world were caused by food handlers. These outbreaks had an incredible impact, affecting 80,682 cases between 1927 and 2006 (Todd et al., 2010).

Foodservices staff are expected to have the required level of knowledge and the ability to put this knowledge into practice in order to be able to effectively control and avoid hazards during food processing. Training and education are vital in ensuring these standards are met. Sharif & Al-Malki (2010) have argued that the best way to control hazards are through Knowledge, Attitudes and Practice (KAP) although they also found that numerous studies have found no correlation between the level of education (knowledge) and good practice. However, research in this area has tended to avoid attitudes in 'developing' countries, such as Saudi Arabia (Alamri, 2010). Therefore, it is the intention of this research to fill this void by offering possible suggestions in how food safety management processes

can be adapted to ensure better food safety standards in Saudi Arabia and how these processes may be monitored in order to ensure better standards and training for everyone involved within food production in hospitals.

There are many factors that can affect the impact of training on performance. Walker et al (2003) have identified: a high turnover rate for staff, challenges in terms of language, literacy and education, a lack of motivation to perform the job to the required standards, and poor financial resources, often represented by poor working facilities, all of which contribute and create a culture of poor hygiene practices within the workplace. However, Walker et al (2003) are also keen to emphasise that such factors will vary in impact across sectors and nations. Hospital catering relies on foodservices employees both internally and externally, and from different agencies. Finding appropriate training to match individual needs presents many challenges, as will be discussed later in chapter six. At present, it is not a requirement for individual catering workers to hold a certificate for food handling training in Saudi Arabia. However, the manager of a catering service is expected to have a certificate in HACCP training. This does raise an immediate question of whether responsibility should be invested in one person or whether foodborne outbreaks would be reduced if there was a greater sharing of responsibility among staff at all levels.

In order to monitor and control the presence of potential hazards at various stages in a food production system, the application of HACCP is vital. HACCP is closely related to good hygiene practices (GHP) and good manufacturing practices (GMP) (FAO, 2018b). Therefore, in Saudi Arabia the Ministry of Health (MOH) has made it a requirement that the HACCP procedures must be respected in all state hospitals so as to prevent the most common types of food contamination; including physical, chemical and microbiological, in order to protect the patients, staff and visitors. This role to supervise each phase of food preparation and nutrition in state hospitals was granted to the MOH in 1981. As a result, the Ministry issued a comprehensive contract

including guidelines to be used by all government hospitals. In addition, private companies are contracted to cater for all such hospitals by providing fresh and dry food, beverage and meal ingredients, which are used in food preparation in hospital kitchens (Ministry of Health Kingdom of Saudi Arabia, 2018).

The contractors are responsible for all the relevant staff, such as chefs, dieticians, nutritionists and other food delivery staff including the drivers and the staff that are responsible for catering for the patients. The MOH has been proactive in ensuring full contract implementation and engaged additional food technicians and dieticians to supervise on a daily basis all the food, diet and nutrition related processes in each hospital. Therefore, it is clear that the Saudi MOH has a centralized contract with the suppliers. The contract between the MOH and bidders has been detailed in a comprehensive regulatory document titled (Ministry of Health Kingdom of Saudi Arabia, 2018). It consists of nine chapters, with the first chapter explaining the requirements the MOH has set for companies bidding to obtain a permit to provide hospital food services by the Ministry of Trade and Ministry of Municipalities. Such contracts have many rules, including: all supplied meat must be fresh and should bear a stamp providing the type of meat, whether it is cold or frozen, the production and expiry dates, all supplied sheep to have a stamp after slaughter, which is provided by the city council and provides the date and day of slaughter. Fresh vegetables and fruits, which are under the supervision of the Ministry of Municipal and Rural Affairs, should be freshly purchased from local markets. Food manufacturing is the responsibility of the Saudi Food and Drug Authority.

Given all of the these factors the MOH has created a contract for organisations responsible for providing food services for all public hospitals, to ensure compliance with these standards (Ministry of Health Kingdom of Saudi Arabia, 2018). The contract comprises nine chapters. The first chapter looks into contract signing procedures, including instructions to

bidders and the main contract document. The second chapter focuses on food specification and the general and accounting terms. The third chapter highlights special terms for the nutritional services and for the HACCP system. Chapter Four deals with labour in relation to the food companies. Chapter Five is related to equipment, repairs and hygiene. Chapter Six considers foodstuffs and food specifications. Chapter Seven reflects on meal requirements and parties requiring food services. Chapter Eight outlines sanctions and penalties for non-compliance. The last chapter gives information on the specifications for food preparation and dietary requirements.

Despite the very specific aims and detailed explanations outlined in the contract, it has still not been implemented successfully. This dissertation will, therefore, analyse the core roots to the problem of poor implementation of hazard analysis systems and good manufacturing practice, including HACCP and ISO22000 implementation in the city of Riyadh's (KSA) large public hospitals with over 300 beds, medium size hospitals 100-300 beds and small hospitals with less than 100 beds.

1.2. Research questions, hypothesis, aims and objectives:

1.2.1. Research Questions

The main purpose of this study is to evaluate and enhance the Kingdom of Saudi Arabia Hospital Food Safety and Hygiene Practices through a comparison study between England NHS Hospital Food Safety and Hygiene Policies, and practices, knowledge and attitudes of Patient Food Handlers, MOH Supervisors, and Contracted Company Supervisors in Saudi state hospitals.

The dissertation aims to examine the causes of the inadequate implementation of HACCP food safety measures in state hospitals in Riyadh, KSA. It addresses these questions:

1. What is the quality of pre-requisite programme (PRP) adopted in state hospital food service departments in Riyadh, KSA, and how does it affect staff knowledge and behaviour related to good food safety and hygiene practices? In other words, to what extent are foodservice departments in MOH hospitals in Riyadh trained and ready to implement a HACCP system?
2. Can England's NHS Hospital Food Safety and Hygiene Policies serve as a model for the design of the KSA MOH Policy on Hospital Food Safety and Hygiene?
3. Does the quality of foodservices and management provided in several Riyadh's MOH hospitals depend on the hospital size and, if so, to what extent can these variations influence PRPs, and implementation of the new nutrition contract based on HACCP?
4. What kind of training in Food Safety and Hygiene is required in Saudi state hospitals to enhance the Food Handlers', MOH and Contracted Company Managers' practices, knowledge and attitudes?

1.2.2. Hypotheses

NHS Trust Hospitals in England and large MOH hospitals in the Kingdom of Saudi Arabia have a sufficiently high standard of knowledge to be able to successfully implement HACCP. However, there is a lack of food safety and hygiene training programme specifically designed for staff and food handlers in MOH hospital kitchens. Similarly, HACCP has not been successfully implemented within all areas of the catering services in MOH Hospitals in Riyadh (KSA), in particular in small and medium-size hospitals. This thesis will compare and contrast five Trust hospital food safety policies to identify examples of best practice. This information will then be applied

to the results of surveys conducted with catering workers, catering supervisors, and MOH supervisors, in seven hospitals in Riyadh, Saudi Arabia. From this, the research will identify key training requirements and suggestions that will better help raise food safety standards in KSA hospitals in terms of employees' food hygiene knowledge, behaviour and attitudes. This includes developing a policy, based on the research findings, that if implemented in Saudi hospitals will help to improve and maintain food safety standards.

1.2.3. Statement of the problem

Over the past decade hospital staff have complained about lack of hospital food nutrient monitoring, lack of food safety management systems and lack of training for hospital staff. To date, in Saudi Arabia there is no national published data concerning the patients' satisfaction and the safety of hospital food service. The main aim of food service in hospitals is to prepare food and serve the food according to the nutritional needs of the patients and medical staff of the hospitals. However, this is counterproductive if the food is not prepared safely and standards are not being implemented or monitored. Unsafe food may cause an individual to experience varying degrees of foodborne diseases. The Brazilian Health Surveillance Agency published recommendations that provided information about Food Safety in Feeding Services. This legislation ensures safe production of the food at Brazilian food service sites through good practices and procedures (de Freitas Saccol et al., 2016).

In economically developed countries, such as the United Kingdom and North America, food and catering service quality and staff support are evaluated frequently. Surveys are useful tools for assessing the ways in which clients view the food and services provided by dieticians. Dietitians in continuing-care settings need to focus on a few specific characteristics related to what is eaten and how food is presented, rather than on patient-

specific variables, when trying to maximize satisfaction with hospital food. Hospital-catering systems should be tailored to meet the demands of the different patient groups to optimize nutritional intake (Wong et al., 2012). In order to ensure that Saudi hospitals provide the best services in terms of nutrition, palatability and quality of food served during the stay of the patients in the hospital, there is the need for proper hospital food standards which will provide detailed information on nutritional needs for each patient group, menu standards, menu planning etc. These standards must then be followed, using appropriate and individual training.

1.2.4. Aims

1. To determine the extent to which PRPs and food safety systems are executed in hospitals in Saudi Arabia and the UK.
2. To compare knowledge, attitudes and behaviours of hospital workers in KSA hospitals to identify training needs.
3. To design a pre-standardisation food safety and hygiene training policy to be implemented across KSA hospitals.

1.2.5. Objectives

1. To carry out a survey on seven state hospitals in Riyadh, KSA to measure the implementation of PRPs and food safety systems.
2. To survey the staff working in Saudi Arabia to establish the existing level of their food hygiene knowledge, their monitoring and attitudes to hygiene.
3. To make a comparison of Food Safety and Hygiene Policies in five NHS city hospitals in England so as to design a suitable model policy for KSA state hospitals and standardise the knowledge, self-monitoring and attitudes of catering managers (MOH and contacted ones) and food handlers working in Saudi state hospitals.

4. To have the newly designed Food Safety and Hygiene Policy evaluated and validated by the community of practice in the KSA, in readiness for the use in Riyadh's MOH Hospitals.

1.2.6. Significance of the study

This study will be useful for monitoring the improvement in food safety in hospitals in Saudi Arabia, an area that is currently under researched. It is clear that there is a lot of space for better implementation and compliance of HACCP in state hospitals. More specifically, this is the first study to compare and contrast the knowledge, attitudes and behaviours of three types of employers involved in food safety in KSA hospitals. These are: catering workers, catering supervisors, and MOH supervisors. From this research, a new food safety policy will be suggested with the hope that it will bring greater standardisation of process across KSA hospitals. An additional significance of this study is it will also analyse the food policies of five NHS hospitals in the UK and attempt to incorporate elements of best practice into the proposed food safety policy for KSA hospitals.

Taking into account the fact that food safety and hygiene are particularly important in healthcare, this study will represent a useful document for the MOH in Saudi Arabia detailing the present situation in hospitals with regard to food hygiene. It will examine pre-requisites programmes in selected MOH hospitals prior to introduction of newly designed training regarding implementation of HACCP system. Furthermore, this research will assess the attitudes, knowledge and practices of all foodservices staff and food handlers, as well as identify some limitations of hygiene training which minimises the implementation of HACCP system in Saudi state hospitals. It will, therefore, increase the awareness of the officials in MOH about the need for training design and development in relation to food safety issues in hospitals.

The study may encourage the SFDA and Ministry of Municipal Affairs to establish private training organisations. In addition, it may motivate the education sector to develop new programmes on food safety and hygiene training. Finally, all governmental and private agencies and hospital administration dealing with food hygiene and safety will become aware of the importance of training programmes and will monitor their contribution to the effectiveness of HACCP implementation in state hospitals.

1.3. Structure of thesis

This thesis is structured around eight chapters. As we have seen, chapter one is an introductory chapter that provides context to the study, outlining the purpose of the research and the hypothesis informing the study.

Chapter two is the literature review, which is structured around three sections: The first explores hospital food guidelines and food services in the UK. The second section looks at the role of the MOH in Riyadh as the MOH are responsible for implementing HACCP procedures to prevent the outbreak of foodborne illnesses. The final section explores rules and regulations for food services in Saudi Arabia.

Chapter three looks at the methodology and outlines and explains the research methods used in this study. These were surveys conducted with catering supervisors, MOH supervisors and catering workers in seven hospitals in Riyadh, Saudi Arabia. The questionnaire survey is based on the parameters for hazard control of KAP. The other form of data analysis is comparing and contrasting the food safety policies of five foundation trust hospitals in England.

Chapter four looks at the five NHS food safety policies in detail, outlining the roles and responsibilities of staff involved in food production. The

purpose of this chapter is to provide context to the five hospitals in terms of structure and organisation.

Chapter five is a functional discussion of the Food Safety Policies of five NHS Hospital Trusts in the UK. This chapter compares and contrasts the policies in detail, exploring issues such as organisational structure, monitoring procedures, and quality assurance assessments. The purpose of this chapter is to determine best practice within the UK Trust hospitals with the aim of applying similar principles to Saudi food management systems.

Chapter six provides details of responses to the questions given to catering workers, catering supervisors, and MOH supervisors in the seven hospitals in Riyadh. This chapter includes graphs for each question so that the reader has full access to the data.

Chapter seven is a discussion of the survey results at the seven Riyadh Hospitals. In this chapter the responses from the catering workers, catering supervisors, and MOH supervisors are interpreted and analysed. By comparing and contrasting workers at all levels, this chapter is able to understand the extent to which government hospitals in Riyadh respect the standards set within the contract approved by the Ministry of Health in Saudi Arabia (Ministry of Health Kingdom of Saudi Arabia, 2018).

Chapter eight provides a Food Safety and Hygiene Management Model Policy for KSA hospitals that it is hoped will be implemented to help improve food safety procedures. Based on the research from the five UK Trust hospitals and the results of the surveys conducted within Riyadh hospitals, a form has been created to be used by workers within nutrition departments or food service departments with Saudi hospitals.

Chapter nine concludes the thesis, reflecting on the issues raised.

Chapter 2 : Literature review

This chapter is split into four sections. The first explores hospital food guidelines and food services in the UK. This includes looking at personalising services within the NHS, hospital food standards panels and the role of Environmental Health Professionals. The purpose of exploring the NHS is to understand what processes are in place and what lessons can be learned. This section also looks at the role of international bodies, such as Codex, in helping to inform policies and raise standards. The second section looks at the role of the Ministry of Health (MOH) in Riyadh as the MOH are responsible for implementing HACCP procedures in Saudi hospitals to prevent the outbreak of foodborne illnesses. The third section examines rules and regulations for food services in Saudi Arabia. This section is more comprehensive and includes challenges implementing HACCP standards and PRP programmes, developing appropriate food safety training for a diverse workforce, outbreaks of foodborne illnesses, and an evaluation of training processes and models. As far as I am aware, this is the first comprehensive study conducted on design and development of food safety policy and management to inform training programmes for state hospital staff in Saudi Arabia. The chapter concludes by examining principles to consider when constructing a template for a national food safety policy. This in turn has influenced the design of the food policy which is discussed in chapter eight.

2.1 Hospital food guidelines and food services in England

There are many factors that help influence and shape a food safety policy in the UK, none more so than the outbreak of foodborne illness. In 1984, 355 patients and 106 staff in a London hospital were infected in an outbreak of *Salmonella typhimurium* that resulted in 19 deaths. The investigation identified that, cross-contamination between raw and cooked foods, poor

food preparation and storage facilities and insufficient staff awareness to follow the basic rules of food hygiene practice were the main factors contributing in the outbreak (WHO, 1986). Many of the factors that inform food safety policies are reactions to food safety crisis, such as the Salmonella outbreak, from consultation with experts and relevant stakeholders, and as a result of regulation. In 2003, all four home countries within the UK signed up to resolutions suggested by the Council of Europe on food and nutritional care in hospitals. This resulted in implementing recommendations outlined in the report 'Food and nutritional care in hospitals' (Council of Europe, 2002). The report identified nutrition as a particular problem, and, according to Wilson (2006: 365) was expected given that the NHS recipe book created in 1975 was not updated until an NHS Plan (2000) public consultation in 1998/9 and that the general public's unhappiness with the quality and diversity of hospital food led to the government's Better Hospital Food project in 2001.

The Council of Europe made 100 recommendations which fit under five broad categories:

- **Nutritional assessment and treatment in hospitals** – how screening can help identify patients at risk of malnutrition
- **Nutritional care providers** – Outlines responsibilities, knowledge and capabilities of hospital staff with regards to nutrition
- **Food service practices** – how patients experience food services
- **Hospital food** – monitoring of nutrition through menus, meal patterns, food content.
- **Health economics - s**trategies to avoid food waste

The findings from this research were given added weight when the provision of food and nutritional care was seen to be a human rights issue (Age Concern, 2006) The government's Better Hospital Food Project in 2001 also led to six action points which are still in force today and are also used in regulatory terms by hospital inspections carried out by the Patient Environment Action Team (PEAT). These are:

- Implement a 24-hour food service consisting of 'the ward kitchen service', 'The NHS snack box' and 'The Light Bite'
- Meet or exceed acceptable standards in the range of meals offered in the mealtime service
- Adopt and use the design format for the new NHS menu
- Use the specially designed box for providing the 'Snack Box' offering in the 24-hour catering service
- Move the main meal of the day to the evening
- Use the range of dishes designed especially for the NHS by Lloyd Grossman and the Leading Chef team

What this demonstrates is that there are various ways in which nutrition can be understood and to ensure patients receive proper nutritional care, various steps and processes need to be identified. These processes have been further supported by implementation of standards by international organisations such as Codex.

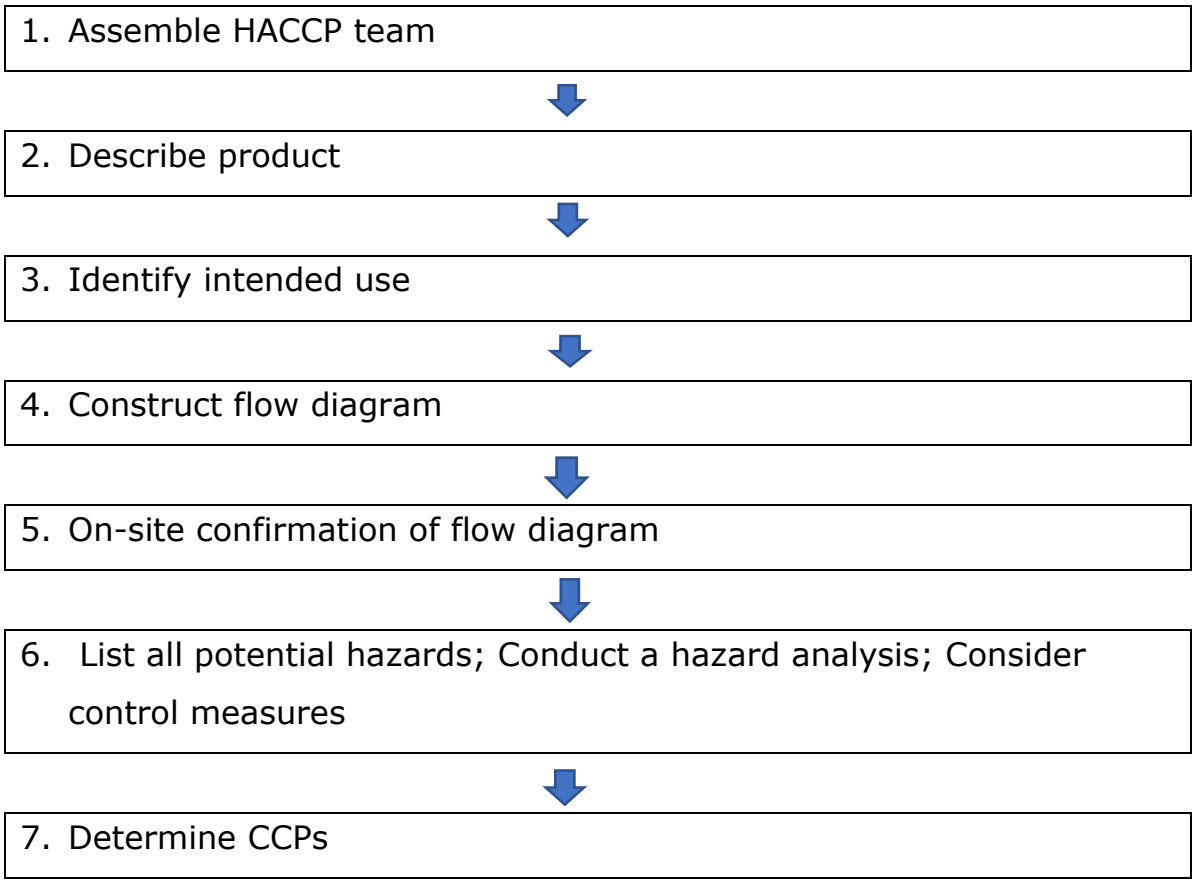
2.2. Codex Alimentarius Commission

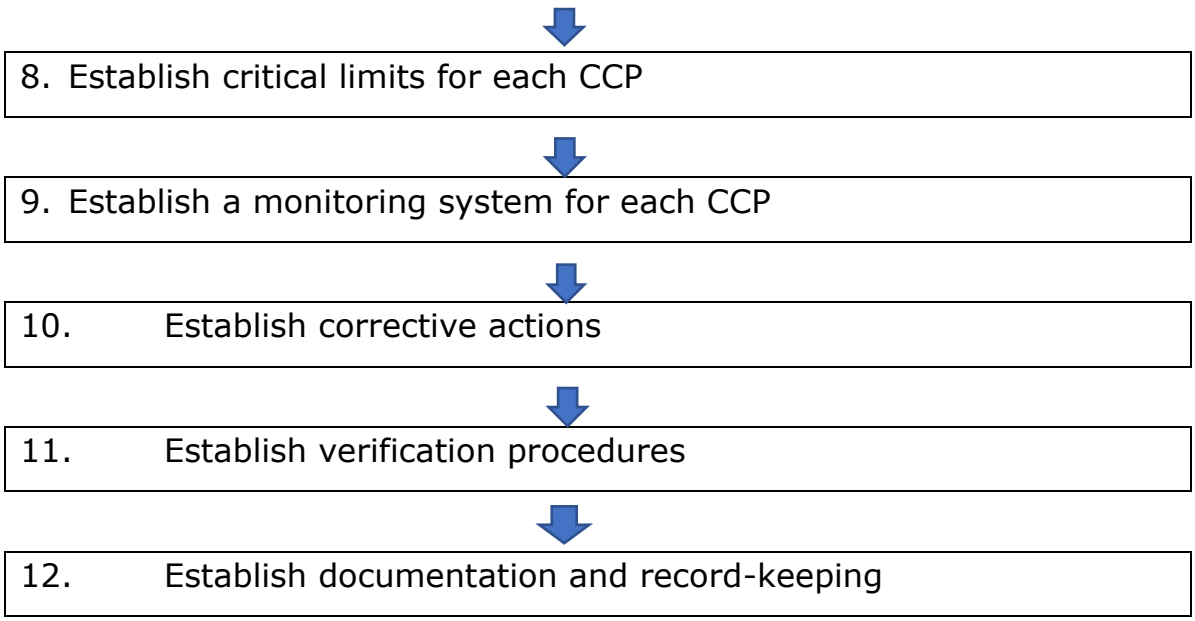
The Codex Alimentarius Commission is an intergovernmental body that consists of over 180 members and fits within the framework of the Joint Food Standards Programme. This programme was established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). The aim of the framework is to protect the consumer health and ensure fair practices within the food industry. Codex also functions to coordinate food standards work produced by all forms of food organisations. The Codex is a collection of adopted food standards and codes of practice that provide guidelines and recommendations, as well as analysing how rules and regulations on food hygiene are developed and applied. Codex recommends an HACCP-based approach wherever possible and provides a comprehensive breakdown of every process involved in food production. The Codex General Principles of food hygiene are:

- identify the essential principles of food hygiene applicable throughout the food chain (including primary production through to the final consumer) to achieve the goal of ensuring that food is safe and suitable for human consumption;
- recommend an HACCP-based approach as a means to enhance food safety;
- indicate how to implement those principles; and
- provide a guidance for specific codes that may be needed for sectors of the food chain, processes, or commodities to amplify the hygiene requirements specific to those areas.

(WHO, 2009, page 4)

CODEX identifies a logic sequence for application of HAACP. The order in which these sequences should be followed are listed below (WHO, 2009, page 31).





If we go through these stages, we can better understand their use and what issues need to be considered when developing the food safety policy for Saudi Arabia, to be discussed in chapter 8.

Assembling HACCP team is to ensure 'appropriate product-specific knowledge and expertise is available for the development of an effective plan.' (page 26) A multidisciplinary team is preferred as this will encourage greater rigor. Where this is not available the organisation should source expertise or sources from elsewhere.

Describe product typically involves a relevant safety information, packaging, durability, storage conditions and how it will be distributed.

Identify intended use anticipates the expected uses of the product. This is important as an end user, such as an elderly or vulnerable person, may require more support.

Construct flow diagram is the responsibility of the HACCP team. The flow diagram should cover all processes and once these processes have been identified, can be applied to other products.

On-site confirmation of flow diagram acts as a double guarantee that the flow diagram is working. This might mean that the flow diagram in the previous step needs to be changed if confirmation of processes is not as expected.

List all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards ensures all possible hazards are listed prior to each step from production to consumption. This should then be followed by the HACCP team who will perform hazard analysis to eliminate or reduce the hazards.

Determine CCPs A decision tree will help determine a CCP in the HACCP system. 'If a hazard has been identified at a step where control is necessary for safety, and no control measure exists at that step, or any other, then the product or process should be modified at that step, or at any earlier or later stage, to include a control measure' (page 28).

Establish critical limits for each CCP requires that critical limits must be specified and validated for each step. There will be different criteria for each CCP, depending on the product or operation.

Establish a monitoring system for each CCP states that monitoring of any CCP is relative to its critical limits. Monitoring should take various factors into consideration, such as loss of control of a CCP. This information should be provided in due time to ensure adjustments can be made to the process to prevent it reaching critical limits.

Establish corrective actions. Each CCP in the HACCP system requires a specific corrective action.

Establish verification procedures All procedures require verification and auditing methods, including tests and random sampling to ensure the overall HACCP system is working.

Establish documentation and record-keeping. This is vital so that all procedures can be tracked, and relevant actions planned. Documentation typically includes: hazard analysis; CCP determination; critical limits determination. Records include: CCP monitoring; deviations and associated corrective activities; verification procedures; modifications to the HACCP plan.

2.3. Personalising services within the NHS

The NHS provides a food service that is personalised to a patient's specific needs (kosher, halal, vegan, etc). It is down to the patient to inform the hospital of their dietary requirements through provided forms. Patients may also be referred to a dietician if they are suffering from certain problems, such as weight loss. Food is provided using a "protected" mealtime system so that patients can be assisted by staff if required. Likewise, ward activities stop during this period. Patients can bring in their own food but there are restrictions on what (food) and where this is stored (ward fridge). They have access to fresh water at all times (Committee Quality Assurance & Nutrition Leicestershire, 2018).

The NHS website (Department of Health, 2014) enables patients to compare hospital productivity according to a set criteria, such as waiting times, facilities, etc. In terms of food, they can compare food services and the quality of food across hospitals using a Food Choice and Quality Indicator. Patients can also rate individual services at hospitals, as well as

review more detailed performance indicators. There is an interactive map, as well as a Hospital Food Standards Panel (HFSP) report (UK, 2018), all of these options offer a degree of reassurance as to the service patients will receive. What these examples illustrate is greater patient control over their own health and better access to personalised data. These are important factors that will be considered when designing a food safety policy for Saudi Arabia.

2.4. Hospital Food Standards Panel (HFSP) report

The HFSP was set up by a former parliamentary under-secretary of state for health with the aim of examining existing food standards, monitoring procedures, and establishing suggestions for the future. The most recent HFSP report was published (Department of Health, 2017), updating the previous report of 29 August 2014. The report on Standards for Food and Drink recommends that "all NHS hospitals should develop and maintain a food and drink strategy. This should include:

- The nutrition and hydration needs of patients
- Healthier eating for the whole hospital community, especially staff
- Sustainable procurement of food and catering services

The Panel also recommends that the 'Five required hospital food standards' become required practice across NHS hospitals. These standards are:

- The 10 key characteristics of good nutrition and hydration care from the NHS England
- Nutrition and Hydration Digest (The British Dietetic Association)
- Malnutrition Universal Screening Tool (British Association of Parenteral and Enteral Nutrition) or equivalent validated nutrition screening tool
- For staff and visitor catering - Healthier and More Sustainable Catering Nutrition Principles (Public Health England)
- Government Buying Standards for Food and Catering Services from the Department of Environment, Food and Rural Affairs"

2.5. Environmental Health Professionals

Environmental health professionals (EHPs) are integral to public health and cover five main areas of public health and wellbeing. These are: noise and environmental pollution; food safety and hygiene; workplace (occupational) health; housing standards; public health. EHPs work to meet statutory regulations within their particular area. Entry requirements vary depending on the level of seniority of the role advertised. For example, the healthcare website (Bloss, 2017) states that an enforcement officer needs GCSEs and considerable experience of working in environmental health whereas more senior roles require some form of relevant further qualification. To work as an EHP in England, Wales or Northern Ireland, applicants must have a higher degree that is accredited by the Chartered Institute of Environmental Health (CIEH). It is expected that qualified EHPs who are members of CIEH must undertake continual professional development (CPD) throughout their careers to accommodate changes within their working profession. CPD can include courses, attending events and conferences, awareness of new legislation. This training is recorded and evaluated to ensure that a minimum amount of CPD is taken each year. By stipulating that training is an ongoing and essential part of the job ensures that training is valued and that ultimately this will benefit both the patient, individual and organisation that they work for.

2.6. The Ministry of Health (MOH) in Riyadh, Saudi Arabia

The Ministry of Health (MOH) in Saudi Arabia is in charge of the implementation of HACCP procedures in all state hospitals. Its aim is to eradicate or minimise physical, chemical and microbiological food contamination, so as to ensure staff, patients and visitors' safety. The MOH was given the supervisory role for food preparation as well as nutrition in general in Saudi hospitals in 1981, whereby they produced a contract

which contains guidelines for state hospitals, called Nutrition Service Programme for State Hospitals - (Ministry of Health Kingdom of Saudi Arabia, 2018). What is more, the Ministry contracted several private businesses to provide food and drinks and other ingredients used in food preparation in state hospitals. These companies employ their own staff and therefore ensure their staff are suitably educated and trained. A number of dieticians and food technicians have been employed to monitor the food related processes in individual hospitals. This means that the MOH has the same type of central contract with all the suppliers.

The contract consists of nine parts. The initial part provides the requirements for the bidding businesses and explains how they can get the necessary permit offered by the Ministry of Trade and Ministry of Municipalities, which will allow them to work in hospitals in the fields of food provision and service. In addition to MOH, the Ministry of Municipal and Rural Affairs is in charge of meat and fresh food, such as vegetables. Food manufacturing is closely monitored by the Saudi Food and Drug Authority.

Selected catering companies provide foodservices in Saudi's hospitals, each of which is supervised by the general administration of Nutrition in the MOH. The foodservices department is divided into four divisions, each of which performs a specific service:

1- **Division of nutrition tenders** – oversees nutrition tenders and contract specifications.

2- **Division of catering services –** ensures caterers comply with the contract standards.

3- **Division of catering companies classification** – evaluates efficiency of potential catering companies before applying to the nutrition tenders.

4- **Division of food safety and quality** – ensures food safety and hygiene standards are applied in hospitals kitchens. Helps to plan and devise strategies and recommendations for food control systems.

The government of Saudi Arabia has invested a considerable amount of money on the foodservices sector in healthcare institutes. In 2010 MOH hospitals served 19.2 million meals with an average of 53,952 daily meals, including breakfast, lunch and dinner (Ministry of Health Kingdom of Saudi Arabia, 2018). As of the time of writing there are more than 25 Saudi Arabian foodservice companies in Saudi Arabia that specialise in healthcare catering. These companies are selected via a tendering process. The contracts can vary in provision, consisting mainly of providing food, materials, detergents, equipment and appropriate workers. Workers typically include chief catering officers, nutritionists, cooks, waiters and waitress, food technicians, storekeepers and cleaners. The staff are from around the world and so it is expected that they are suitably educated for specific roles. Qualifications are checked by the nutrition department prior to work commencing. Catering staff are also expected to successfully renew a health licence every six months. The health licence validates that the employer is free from any infectious diseases.

Here is a breakdown of some of the roles in the foodservice departments.

- **The Location Manager** ensures contract requirements are met, such as managing supplies and overseeing staff. It is expected they are educated to degree level in a relevant subject (hospitality, food and nutrition sciences).
- **The Chief Cook** manages the team of chefs and has the overall say regarding food quantity and quality.
- **Nutritionists** (or food technicians) plan meals to suit diets.
- **Waiters/waitress** distribute the meals for patients, staff and members of the public visiting relatives.
- **Store keepers** maintain stock and orders supplies where necessary. They are also responsible for maintaining the cleanness of store areas and cold rooms.

Failure to comply with contractual agreements can result in a variety of sanctions and punishments, depending on the violation. Therefore, contracts are for a specified time, usually three years, so that the process and working conditions can be reviewed to ensure all parties are satisfied with the arrangement and that MOH conditions have been adhered to. To further improve food standards, contracts now require caterers to implement HACCP system in hospitals kitchens. These are overseen by the hospital nutrition management team.

2.7. Rules and regulations for food services and HACCP Standards

Hazard Analysis and Critical Control Points (HAACP) is a systematic preventive approach to food safety that aims to reduce the risk of biological, chemical and physical hazards in food production (Schmidt, R.H. and Rodrick, G.E., 2003). It can be applied to all stages of a food chain, such as food production, preparation, packaging and distribution. HACCP can be traced back to the 1960s when the National Aeronautics and Space Administration (NASA) consulted the Pillsbury Company, one of the world's largest grain and foodstuffs producers based in America, to help them design food for space flights. From that point onwards, HACCP became recognised internationally as an efficient and scientific system for food safety systems. By reducing food production to a series of stages, food industries have been able to calculate and allocate costs accordingly to each stage, thereby allowing safe and responsible auditing. In 1994, the HAACP Alliance was formed. This was initially created to service US meat and poultry industries but since then membership has expanded to cover other industries, such as cosmetics and pharmaceuticals.

The HACCP system is guided by seven basic principles which must be considered in any premises where food is produced. These principles are:

1- **Conduct a hazard analysis:** The analysis will help identify any food safety hazards (biological, chemical, or physical properties) and possible preventative measures to control the hazards.
2- **Identify the critical control points (CCPs):** These are the steps in the food production process where control can be applied and subsequently the food safety hazard will be prevented, eliminated or the risk will be reduced to an acceptable level.
3- **Establish critical limits for each CCPs:** The critical limits places a value on the minimum or maximum levels of the hazards.
4- **Establish CCP monitoring requirements:** Monitoring ensures each process is controllable at the relevant CCP.
5- **Establish corrective actions:** When monitoring identifies a deviation from a CCP the corrective actions identify what needs to be done to bring the CCP back to an acceptable level.
6- **Establish procedures to ensure the HACCP system is working as planned:** Various forms of verification are applied to ensure the system is functioning as intended. Verification of processes serves to validate the accuracy of the HACCP system and so may also include system reviews.
7- **Establish documents and records to demonstrate the effective application of the above measures**: HAACP regulation requires documentation of all processes (monitoring, critical limits, verification activities, reviews, etc) to ensure correct processes are being used.

The above seven HACCP principles are now included in ISO 22000 FSMS, which has enabled standardisation specifically for food safety. However, it is worth mentioning that some organisations have been hesitant in implementing this system because it is considered too bureaucratic ISO 22000 FSMS (ISO, 2018).

2.8. The role of Prerequisites Programmes (PRP)

PRPs are defined by the World Health Organisation as "Practices and conditions needed prior to and during the implementation of HACCP and which are essential for food safety" (World Health Organization, 2006). PRPs are a broad range of good practices and typically perfect processes such as Good Manufacturing Practices (GMP) and Good Hygiene Practices (GHP), all of which provide the foundation for the HACCP system (Wallace, C. and Williams, T., 2001). GHP compliance covers the minimum sanitary and hygiene practices for food processors and therefore should be thought of as standard operating procedures (SOP). Therefore, in any area of food hygiene effective PRPs are a good indicator that a HACCP system is ready to be implemented. Toure (2009) warned that disregarding PRPs prior to designing a HACCP system will most likely result in a waste of finance, resources and effort. In the worst scenario this could lead to unsuccessful HACCP implementation. It is best to view PRPs and HACCP as integrated processes that ensure effective food safety control.

2.9. Integration of HACCP and PRPs in Food Businesses

Any operation providing food in the public sector can be defined as 'food businesses'. Article 3 of Regulation (EC) No 178/2002 of the European Parliament and of the Council (European Parliament, 2002) identifies food business as: Any undertaking, whether for profit or not and whether public or private, carrying out any of the activities related to any stage of production, processing and distribution of food. In the UK, a registration is required for every premises where food businesses carry out food operations. This can include your home, and mobile or temporary premises such as stalls and vans. These need to be registered 28 days before any food operation is undertaken (GOV.UK, 2016).

As it has been suggested by Jevsnik, Mojca & Hlebec, Valentina & Raspor (2008) that HACCP is not understood well in a number of food businesses, PRPs act as a useful starting point for food businesses that are yet to consider or implement HACCP. There are lots of reasons why HAACP may not have been implemented by a food business. Hyde, Richard & Hoflund, Bryce & Pautz (n.d.) outline some of the main reasons that HAACP is not implemented by all food businesses as due to high staff turnover rates with a lack of food hygiene management training, lack of financial resources, and a failure of government support. These factors may vary culturally and could also be influenced by other factors. For example, challenges for small companies are likely to be due to greater financial restrictions, more complex food-handling practices, and lack of technical expertise (Williams and Wallace, 2001). Despite PRPs acting as a solid foundation for HACCP, some countries tend to utilise HACCP without regard to PRPs (Williams and Wallace, 2001). This may be due to specific rules within that country or industry. For example, the Food and Drug Administration (FDA) requires HACCP only for seafood production while PRPs are for all food producers (Wallace and Williams, 2001). HACCP has been required in large and medium food production and processing plants within the EU but as of 1 January 2006, small food businesses can apply GMP/GHP which are based on the PRP's (Article 5 of Regulation (EC) no 852/2004 and Food Standards Agency). Staff are vital to the success of HACCP as they are responsible for controlling food handling and therefore need to be suitably educated to be able to identify and control hazards. Some studies conducted to assess the implementation of GMP, GHP and HACCP in food businesses have found that insufficient knowledge regarding fundamentals of food hygiene have been a contributing factor to failure of HACCP implementation. Hertzman et al (2007) assessed HACCP and PRP implementation within a broad range of 109 food businesses that included hospitals, hotels, takeaways and restaurants. Of these 109 businesses, only eight had implemented the HACCP system. A study in the UK aimed at assessing food hygiene knowledge through face to face interviews within small businesses found

these staff lacking in the necessary knowledge to ensure the effective implementation of PRPs and to HACCP (Walker, E. et al., 2003). Needless to say such disappointing results are often down to poor attitudes from management who should be motivating staff and ensuring they have the necessary knowledge and training.

2.10. Implementing Food Control Systems in Healthcare Sector

Hospitals have a duty of care to patients and therefore food service departments within hospitals must ensure food is free from any contamination. As patients in a hospital are likely to be more vulnerable than healthy subjects, particular attention needs to be taken with regards to microbial contamination (Van Den Heever et al., 2016). Therefore, it is essential that hospitals deploy HACCP systems, especially with regard to PRPs. The problems hospitals face implementing these procedures are very similar to the problems faced by other food businesses, such as lack of financial support, absence of training programmes, and inadequate equipment to perform their job to the best of their abilities (Bas et al, 2005). Hospitals have the additional problem of stocking a broad and diverse range of products, all of which require specific processes and usages. This can potentially limit HACCP implementation as the number of CCPs will be increased (Williams and Wallace, 2001) and the production process is more complex. Research suggests that PRPs are more likely to be successfully implemented in private hospitals than general hospitals. This may be due to private hospitals having greater access to financial resources which inevitably results in better staff training and equipment (Elnaga, A. and Imran, 2013).

2.11. HACCP, PRPs and Food Safety in Saudi Hospitals

Although the HACCP system has been implemented around the world, it has been slower to be implemented in so-called developing countries, such

as Saudi Arabia. Understanding why this is so is complicated. Insufficient PRPs may restrict HACCP implementation in Saudi's hospitals. The reason PRPs are not being implemented in hospitals may include lack of management training, meaning key ideas and core principles are not being passed down to workers and adequate monitoring systems are not being used. This in turn may result in a lack of efficient and modern equipment that enable food handlers to perform their job adequately and to the expected standards. Once more, financial investment may be the reason for this problem. If the MOH does not invest and enforce relevant hygiene training courses it is unlikely that services will improve. Lack of training can result in the employment of staff without the relevant knowledge to perform their job efficiently. Another factor that is having an influence is the employment of multiple foreign nationals, all of whom will have been educated to standards relevant to their home country. This means that approaches will be inconsistent across hospitals and standardisation will be lost. The MOH is attempting to address this problem by ensuring expectations are outlined in contracts and forcing suppliers to apply HACCP as a condition of winning a contract, although this does not resolve the problem of enforcing PRPs as a standard form of bets practice. At the time of writing there is no official data concerning knowledge, attitudes, and practices about food safety and PRPs in Saudi hospitals which is part of the motivation for undertaking surveys and questionnaires of food professionals within this PhD.

2.12. Food safety training for different groups of staff in Saudi Arabia

A recent survey of 300 foodservice staff in four state hospitals in Riyadh found that the main reason that PRP programmes were failing in the four hospitals was due to lack of food safety-related knowledge, attitudes – which informed irregular behaviour and reactions, and a lack of training

(Al-Mohaithef, 2014). Most interesting of all, it found that when new training was implemented it did not have a long-term effect on staff as any knowledge gained was quickly forgotten when tested later on. Although it is clearly a positive to provide training, this training needs to be repeated on a regular basis in order for it to have a lasting effect and become part of everyday knowledge and practice.

2.13. Gender equality among hospital staff.

According to the World Economic Forum (2015) regarding a Global Gender Gap Report, the Middle East and North Africa (MEDA) account for thirteen of the fifteen countries with the lowest rates for employing women in their labour forces. Yemen was rated the lowest, followed by Syria, Jordan, Iran, Morocco, Saudi Arabia, Algeria, Lebanon, Egypt, Oman, Tunisia, Mauritania, and Turkey. These findings are surprising when we consider a report by Dr Ragui Assaad entitled "Equality of Opportunity in Education in the Middle East and North Africa." In the report he found that girls outperform boys academically in the oil-rich nations of the Gulf as well as in Jordan and Palestine. There were some variables in results from different countries. For example, in Saudi Arabia, women do better than men in science and maths, yet this is not reflected in the workplace due to cultural factors. Girls also performed better than boys in mathematics exams in Bahrain, Dubai, Oman, and Qatar. However, it is likely that the males are not as motivated to study as the women as they know that males are favoured by the government when it comes to employment. Assaad explains the disparities between education and employment down to three factors: the patriarchal structure of states in the region; dominant public sector employment and weak private sector employment; the public sector is conservative and therefore makes it difficult for women to feel comfortable and accepted at work.

The over reliance on oil in Gulf nations helps to perpetuate patriarchal family structures. As work and income is guaranteed, citizens lack the motivation to explore alternative revenue streams outside of state patronage. By relying on state patronage, roles for men and women become more rigidly fixed. Patriarchal state institution systems inevitably create dependent private sectors that have little interest in accommodating the needs of female staff (such as funding maternity leave) and this has a detrimental effect on a woman's ability to progress through her career. In terms of an inhospitable business environment, it is worth noting that no Arab country has a legal requirement to enforce quotas of female staff within the workforce and therefore there is not the motivation to change or adapt in order to create more equality within the workforce. However these attitudes may begin to change due to recent developments and studies. In Saudi Arabia, women have recently been granted permission to drive on their own, thereby making access to public spaces easier. As part of ongoing reforms, King Salman has released his 20:30 vision for Saudi Arabia which he hopes will enable it to become a more progressive and transparent society. This represents a historical change in attitudes as to how the country is run while specifically outlining how these goals will be achieved. Clearly this will have an impact on the workforce and attitude towards women. It is worth briefly quoting from the 20:30 vision as this explicitly states a drive towards a more diverse and inclusive society for all.

> We will not rest until our nation is a leader in providing opportunities for all through education and training, and high quality services such as employment initiatives, health, housing, and entertainment. We commit ourselves to providing world-class government services which effectively and efficiently meet the needs of our citizens. Together we will continue building a better country, fulfilling our dream of prosperity and unlocking

> the talent, potential, and dedication of our young men and women (Vision 2030, 2016).

Likewise, a report by the International Monetary Fund (IMF Country Report No. 17/65) on gender inequality in Morocco has found that closing the gender gap is vital in improving the country's economy. Therefore, countries may well try to address these imbalances now that evidence suggests there will be financial benefits. Therefore future research which draws upon issues raised in this PhD may wish to examine the impacts of greater inclusivity within the workforce as a result of the 20:30 vision and IMF report (Vision 2030, 2016).

2.14. Outbreaks of food-borne illnesses in Hospitals

Foodborne illnesses are a global problem that can have a profound effect on the lives of millions of people (WHO, 2017a) which has resulted in food safety being recognised as a global concern for consumers, producers and industry professionals. This has resulted in stricter enforcement of rules and regulations. In Saudi Arabia, food safety is the responsibility of 269 municipalities (Ministry of Municipal and Rural Affairs, 2018) with regulation bodies overseen by various central government agencies. In Saudi Arabia in 2010 there were 264 reported food poisoning outbreaks with 1647 people becoming ill. Of these 1647 people, commercial sources were responsible for 1029 of the casualties. *Salmonella* was the primary cause of the outbreaks (Ministry of Health Kingdom of Saudi Arabia, 2017) By 2011 the amount of reported outbreaks dropped slightly to 255, however this contributed to an increase in affected people with 2066 recorded cases. However, these figures are likely higher as not all cases are reported and due to inaccuracies in sampling figures (Municipality of Riyadh, 2002). Within Saudi Arabia there are several government and non-government organisations whose purpose is to ensure food safety. The government

organisations include: Ministry of Health; Ministry Commerce and Industry; Ministry of Agriculture; Saudi Standards, Metrology and Quality Organisation; Ministry of Municipal and Rural Affairs; Saudi Food and Drug Authority and the Customs Clearance Agency. Non-government organisations include: Saudi Society of Food and Nutrition; Consumer Protection Association and The National Standing Advisory Committee on Food Irradiation. Given the amount of organisations involved, there has been an attempt to introduce standardisation through the introduction of the SFDA in 2003. The primary aim of the SFDA is to regulate and set standards for food and drugs (for both people and animals), as well as ensuring the safety of chemical and biological substances (SFDA, 2017). The SFDA has helped to address specific problems by creating departments and centres that focus on specific risk assessments, such as a national centre for monitoring of food contamination. This enables better control of any possible foodborne illnesses. This knowledge is then communicated to relevant organisations and bodies, such as through rapid alerts (Al-Busaidi, M.A., 2017) Fundamentally they ensure imported and locally grown goods conform to recognised standards. In their organisational, historical and future analysis of food safety organisations in Saudi Arabia, (Al Mutairi, 2013) performed interviews and documentary analysis concluded that a "combination of international concerns related to the importation of foodstuffs and national concerns related to hygiene standards have driven the development of policy and the organisations required to implement and administrate these changes" (2013.p 484) They outline the key elements of the development of the Saudi food safety system reproduced in Table 2.1.

Table 2-1 Key Features of Saudi food safety systems

Elements	**Features**
Joining international organisations like WOH	An expansion of organisational structure

Environmental hazards	The establishment of administrations and departments such as the creation of women's department for food and health inspection in Riyadh.
Economic development	Developing food safety legislations, regulatory guides and local standard specification
Social and cultural diversity	Improving food laboratories
Reduction of commercial adulteration, food fraud and food borne illnesses by ensuring the quality and safety of food.	Shifting roles/functions
An increasing population, food and health businesses that need to be inspected.	Founding health/food safety programmes, training sessions, campaigns and organisational plans
Serious transition in Saudi from traditional to modern society.	Educating members of society and consumers
Growing demand for food that are prepared by food businesses.	Enhancing work quality technically and administratively such as the use of modern devices and new material recourses
	Staff training and doubling the number of officials

also (Al Mutairi, 2013) recognise the benefits of centralising food control systems, such as through the creation of the SFDA, as it helps remove confusion regarding processes and the impact this has on law enforcement officers as well as reducing ineffective management and poor official

communication between organisations which can lead to poor engagement with citizens and business operators. However, the authors warn that the SFDA needs to acquire adequate powers in order to gain full cooperation from other bodies.

2.15. The Important of Training and its Effect on Foodservices Staff

Before exploring the importance of training, it is worthwhile briefly outlining the public education system in Saudi Arabia, which is a segregated system according to gender. There are four levels, under the Ministry of Education: preliminary (1 year – although this is not compulsory), elementary (6 years), intermediate (3 years), and secondary (3 years). In terms of further education outside of this system, the level of education of Food Safety Enforcement Officers varies. This problem began to be addressed in 2011 when generic courses provided by the Ministry of Higher Education and General Organisation for Technical Education and Vocational Training (GOTEVT) introduced smaller and more specific programmes in food safety and environmental protection that provided more advanced training to deal with the new technical challenges of enforcement work. Candidates for these courses required a secondary (high) school certificate for entry. Al-Mutairi (2013) has warned that these graduates account for a relatively small proportion of the present workforce and therefore additional training is required for those who completed training before the educational reforms were introduced.

The main aim of food hygiene training should be to change behaviours that are most likely to cause foodborne disease (Egan, M.B. et al., 2007) by increasing the knowledge of all workers involved in food production and enforcement of procedures. Needless to say, food handlers who are not trained about food hygiene and HACCP pose the most risks Training staff in basic food safety to support implementation of PRPs and HACCP in food premises is vital if set standards are to be achieved. When HACCP plans

have been implemented, workers need to be regularly trained and retrained in order to deal with any expected critical control points (CCPs).

In terms of training, there may be a distinction between operations in small and large businesses. Hotter (2011) has highlighted several studies that demonstrate the financial and technical challenges faced by small businesses that means they are unlikely to comply with the law. (Wilson, S. et al., 2015) found that large food businesses are more likely to comply with the law and regulations than small and medium sized businesses. This may quite simply be because there are greater expectations on a larger business, in terms of prestige and reputation, which makes them more likely to comply. A simple and logical solution to these discrepancies was outlined by Dzwolak (2014) who suggested simplifying communication of processes through things such as flow diagrams.

Management are also integral to raising standards and should support training programmes as well as motivate staff to attend these sessions (Seaman and Eves, 2010). This can be done on the most basic level by allocating time for them to attend training so that it has value. In terms of professional standards, catering managers should actively encourage food handlers to demonstrate knowledge acquired from training (Seaman, P. and Eves, A., 2010) This could simply take the form of feeding back to colleagues during in-house training sessions. This may help address entrenched behaviour patterns of staff who were trained prior to education changes in 2011, as previously noted by (Al Mutairi, 2013). The SFDA is taking large steps in addressing these issues by encouraging greater standardisation of processes, however this is not without problems.(Al Mutairi, 2013) have suggested that the SFDAs current policy of shaming offenders who fail to comply with regulations by publishing their names in the media should be followed up with a reintegration process that gives offenders the opportunity to learn from their crimes.

2.16. Training Models and Evaluation

Food safety education can be broadly defined as "the delivery of facts and skills to any person who handles food at any step in the food system to ensure compliance with food safety issues" (Nyamari, 2013) makes a distinction between food training and food safety education with food safety education being a tutor led course that involves only theoretical information about issues such as foodborne diseases and food contamination, while food training specifically addresses certain duties and areas and tends to have more practical benefits. The important point to recognise here is that staff may be trained to understand a certain point but unless this is enforced and explained in their daily practice, they are unable to apply this knowledge and therefore it is not intuitive. Likewise, training can be delivered by variety of methods from home study, workshops and officially recognised courses. Content of training can include posters, PowerPoint presentations, training videos, booklets and case studies so that knowledge can be tested and applied from a variety of perspectives. (Ball et al., 2010) The ability to recognise what training is needed for individual managers is essential to personalise learning, and why HACCP values record keeping as one of its core principles.

Although training is clearly vital to the success of food hygiene safety, it is worth noting that there are some studies that suggest there is not always a strong correlation between knowledge and practice. Angelillo et al. (2000) interviewed 411 food handlers regarding their everyday food hygiene practices and found that for 50 service staff, a positive attitude does not necessarily support good practice. Likewise, another survey found that even when staff had a high level of knowledge regarding food hygiene that this did not necessarily translate into best practise during food preparation, with basics, such as failing to wash hands before preparation of food, being one of the most common mistakes (Hertzman et al., 2007). Knowledge is enhanced through education and training processes, but nothing can be

taken for granted. Therefore, a variety of training processes, regular updates, opportunities to put knowledge into practice and spot checks are necessary to ensure food hygiene standards are continued to be met.

In chapter six the results of surveys conducted with staff working within Saudi state hospitals will be discussed with the hope of understanding why there is a large disparity in knowledge regarding food safety policies. There are many reasons for this that range from education, cultural identity, and the fact that hospitals rely on a diverse workforce drawn from across the globe, meaning that there are many challenges involved in creating a standardised approach to food safety. This creates a real risk for patient safety in Saudi Arabia and is the reason why research into appropriate training management systems is important. There has been some research into foodservice training by Al-Mohaithef (2014) who evaluated the readiness of Saudi Arabian hospitals to implement HACCP by assessing the pre-requisites programmes in their foodservices departments. This was done via an audit form in four hospitals in Riyadh. Al-Mohaithef concluded there was a lack of training in the Pre-requisite Programs of all four hospitals and so developed a bespoke food safety training programme for food handlers in the participating hospitals. The intention of this research is to take this a step further by conducting a comparison study of food safety policy management systems in five NHS hospitals in England and use this information to develop a suitable policy for Saudi hospitals. Where this research also differs from Al-Mohaithef (2014) is interviews have been conducted with catering workers, catering supervisors, and MOH supervisors, in order to get a broader understanding of issues faced by hospitals in general and how this can be addressed through new food safety policy management systems.

Al-Mohaithef (2014) did not mention ISO 22000 (the International Organization for Standardization) in his research which is vital in ensuring food safety regulations. ISO 22000 is a worldwide federation of national

standards bodies that has developed various legislation, to ensure the successful implementation of FSMS. It is the aim of this thesis to develop new food safety policy management to ensure such principles are implemented and maintained across all hospitals in Saudi. Therefore, ISO 22000 will be discussed in more detail in chapter six, particularly in relation to ISO 22000's suggestion of using the Plan-Do-Check-Act cycle to ensure all procedures are being implemented correctly.

2.17. National Hospital Food Safety Policy

According to WHO (2012) guidelines for developing and implementing a national food safety policy and strategic plan, it is vital that all processes in hospitals are transparent, and that regulations are enforceable to ensure these processes are followed. This is partly ensured by the MOH's long - and medium - term guarantee that they will prioritise and guarantee food hygiene and safety for all stakeholders. By emphasising 'all' stakeholders, food safety is not reduced to one person or department, encouraging greater responsibility among all. This is partly the reason why this PhD research has chosen to survey three sets of workers within a hospital so that attitudes and knowledge can be compared and contrasted and new processes and training developed to ensure better compliance of shared standards. The WHO (2012) guidelines go on to recommend that national policies should provide aims and required standards, processes and resources. They are required to address the following areas of the food provision process in hospitals: product, process, storage, transport and marketing.

It is worth mentioning that endorsements of food safety policies by governments and institutions does not guarantee their implementation, something that appears to be a global problem. In 2007, the WHO Regional Committee for Africa endorsed the Regional Strategy on Food Safety and

Health. This strategy identified key actions to ensure better food safety systems across African nations, but this advice did not translate into action. "While efforts have been made by some countries to develop and implement policies and strategies to improve food safety, survey results show that most national policies and programmes have weaknesses and there are inadequate linkages between strategies to ensure food safety. The WHO Regional Office for Africa has realized that assistance in the preparation of food safety policies and action plans will greatly enhance progress in establishing modern food safety systems WHO (2012)

Clearly there are challenges, and KSA faces similar problems as a 'developing' country – which is why this thesis will argue in chapter eight that creating a standardised food safety management system that is used by all hospitals in KSA may help to eradicate any differences in approach. But for now we can conclude from the WHO that the aim of food safety policies is to enhance control of food provision in hospitals and that such policies in turn raise opportunities for national debates and awareness of national health policy, as well as management of its mechanisms.

Before designing a national food safety policy, the WHO (2012) recommends scientific analysis of the current situation, including recommendations and priorities within that organisation. Research-based evidence should underpin the content with the aims, concepts and strategies, regulations, and practical activities necessary for addressing food safety concerns. The policy should also establish easy to follow lines of responsibilities to ensure that employees are aware of who to direct enquiries or reassurances to regarding their everyday practice.

In order to design my own policy and to better understand how to evaluate the policies of NHS hospitals referred to in this study, this research will use the template below which WHO (2012, page 12) recommends for policy makers designing a research-based food safety policy.

Forward

This part should establish the rationale for the policy design and assurances that the MOH is committed to delivering the best possible services to stakeholders. Government representatives should sign this section to give it greater validity.

Policy Background

This part should provide more supporting information to underpin the need for the policy design and development. These would include concise key findings and summary of recommendations guiding the policy content. This section may also highlight the main challenges to be addressed and the overarching mechanisms and processes involved.

Policy vision, mission and aims

This section needs to explain the main vision, mission and aims of the document, identifying the principle values that inform the policy (e.g. its integration in national health policy; participants; research- based; consumer safety and similar)

Policy guidelines

This part is based on the priorities that have been identified in the previous section. These could include:

a) promotion of the future research on the identified priorities

b) development of workforce to make sure that human resources are capable and qualified for delivering the required level of service and responsibilities

c) regulations and legislation involved in food safety

d) promotion of the related higher education, health education through formal educational system and enhanced communication of health-related information

Implementation framework

This section will include a definition of strategies, followed by actions to ensure that policy principles are applied and action is taken to reach specified objectives. It will define the process of developing a comprehensive national plan for food safety as the main instrument for implementation.

Institutional mechanisms for achieving policy objectives

This section will broadly outline national institutional arrangements and structures to ensure successful implementation of the policy. Institutional structures must provide for effective inter-ministerial coordination to adequately provide support to the national food safety policy.

Control and intervention

The section needs to detail the monitoring mechanisms for evaluation of the degree of performance efficiency of the stakeholders involved in the policy design and implementation.

Funding scheme

This part needs to detail the financial sources and budget owners that will continuously support the implementation of the policy.

It is worth noting that the policy developed for KSA that will be discussed later on in this thesis does not include a 'Funding scheme' section. This is simply because the health service in the UK is devolved whereas funding and management of all activities in hospitals in KSA are paid for by the MOH.

2.18. Conclusion

There are clearly major structural differences between how hospitals are managed in the UK and Saudi Arabia. However, international organisations such as Codex and regulations such as ISO22000 are helping to raise the overall quality of health provision and standards. UK hospitals are transparent in how they provide services and encourage patient control in their own healthcare. These are important lessons to learn from. A food policy will be discussed in chapter 8 that is informed by the issues raised in this chapter, not least the appropriate processes that must be followed in order to ensure better food safety. In chapter four a closer analysis will be made of specific food safety policies at five NHS hospitals. There is very little written about Saudi Arabian hospitals which is why this study has undertaken independent research with three sets of workers to better understand the correlation between attitudes and behaviour with regards to food safety and the subsequent training that is required. The methodology behind this research will be discussed in the following chapter.

Chapter 3 : Methodology

3.1 Research Process

Research is an undertaking that can be characterised as a process which is accomplished over a series of steps. The first of these steps involves the formulation and identification of the topic that will be investigated. In this case, the topic involves an investigation into food safety policies in hospitals and the extent to which these policies comply with HACCP. Any research needs to be done from a certain approach using particular methods which have the capacity to cover multiple-context subjects. The aim of this section is to conduct a discussion of the research methodology that will be embraced in the study. It will provide a comprehensive elucidation of the research approach, research philosophy, research strategy, and the overall research methods. The research process that will be followed in conducting this thesis is summarised in Figure 3.1.

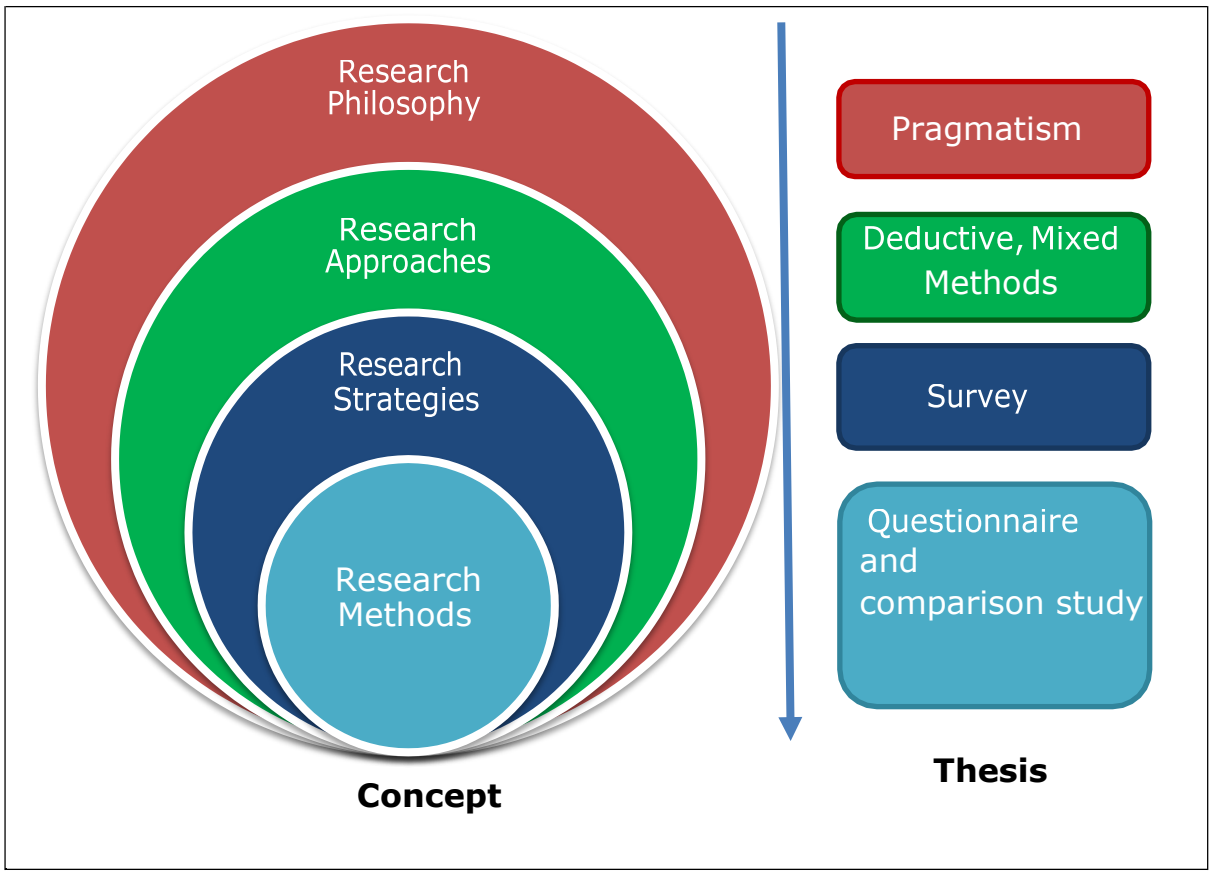


Figure 3-1 Research Process adopted from Saunders et al (2009)

3.1.1 Research Philosophy

According to (Saunders et al., 2009), the concept of research philosophy refers to the guidance and knowledge that will be followed in conducting the study. The same authors note that a number of philosophical standpoints and schools of thought are available for conducting research and can be classified into four primary categories: positivism, pragmatism, interpetivism, and realism.

Creswell (2013a) reports that the interpretivist research philosophy sees the individual conducting the research as being independent of the subject they are investigating. Saunders et al (2009) add that in such a paradigm

when the researcher reports and interprets their findings they do so in a manner that can be defined as being external and independent of social actors.

Sidorova et al (2013) introduce the positivist philosophy which they define as being characterised by the application of mathematical and statistical procedures in the explanation of causes, casualties, and effects of the issue under investigation. Creswell (2013b) adds that the paradigm is usually employed in testing problems that exist using previous knowledge as a basis and that the conclusions drawn can more easily be generalised. According to Creswell (2013b), positivism is mostly applied in settings that include physical and natural studies where reductionism and repeatability are considered as important elements. However, Gonzalez et al (2013) report that some scholars advance the argument that in certain instances, positivist positions may not suit settings where problems are complicated; particularly in the area of social science.

The realist philosophy, similar to the positivist paradigm, employs logic and natural science-based approach to studying phenomenon (Mingers, 2006). According to Saunders et al (2009) it is the view of the realist researcher that reality exists independently of human thoughts. The same author adds that a researcher employing the realist tradition looks at reality as it exists on a number of levels so that the links existing between various social structures like people, organisations, and groups have an impact on the problem being investigated.

Creswell (2013b)introduces the interpretivist research philosophy and notes that it makes the insinuation that whatever is being studied can be understood subjectively based on socially constructed meaning. Sidorova et al (2013) interpret this to mean that the researcher using the paradigm is allowed to study subjects using meanings which people give them as a basis within their natural environments. Based on the reality that meaning

can be understood on the basis of social construction like language, the researcher employing this paradigm can be part of what is studied. Creswell (2013b) also notes that it is usual for interpretivist researchers to use methods which are qualitative in nature when they gather data. However, primary weakness of interpretivism is that it is not easy to generalise the results based on the fact that the collected data is influenced by the points of view and values of both the subjects and the researcher. This, according to Sidorova et al (2013) makes the conclusions drawn from the research only valid in those circumstances where the problem is being studied.

According to Saunders et al (2009), the pragmatist research philosophy permits the person conducting the research to work with numerous assumptions regarding the phenomenon being investigated. This, according to Creswell (2013a) is a position which permits the researcher to choose fitting research methods and approaches depending on the issues that arise in the process of the study; making it possible for the research problem to be investigated from different points of view. It is for this reason that both quantitative and qualitative approaches can be applied in this paradigm. Saunders et al (2009), note that this is a research philosophy which permits the researcher to make inferences regarding the results of the research using both subjective and objective views as a basis. The same authors indicated that this can enrich the findings of the research. This is becoming a popular approach in different types of studies.

This study will embrace the pragmatic view by amalgamating some interpretivist and positivist practices as this delivers a better comprehension of the problem under study in a number of ways. It is the belief of Leidner et al. (2009) that the application of such a philosophy will permit the individual conducting the research to come with certain previous expectations to the analysis of data which emphasizes the positivist philosophy.

This permits the individual conducting the research to do an analysis of the data obtained through questionnaires conducted in MOH hospitals in Saudi Arabia. The questionnaire is based on the parameters for hazard control Knowledge, Attitude and Practice (KAP) (WHO, 2008).

Two different questionnaires were prepared for study purposes. One for the management level (MOH supervisors and catering supervisors) and the other was for catering workers.

1. Questionnaire A: Catering workers (Cooks, Waiters, etc). These are contracted workers that are involved in preparing and serving food within the hospital environment. The questionnaire seeks to record their food safety training and awareness.
2. Questionnaire B and C: Catering companies' supervisors and MOH supervisors; questions included those related to how these supervisors apply food safety management within the hospital.

Each of the participants will specify if they are contracted employees or the MOH supervisor. This will allow the researcher to compare the knowledge and attitudes of contracted employees and MOH supervisors. For instance, it is possible that conclusions may show that the MOH supervisors have better attitudes and knowledge with regards to food safety than do contract staff or the other way around. This has the possibility of having further effects regarding the requirement for training which is standardized.

Also, across the groups (contracted supervisors and catering workers and MOH supervisors), the participants will clarify, on the questionnaire, if they have previously been exposed to food safety training. Answers will enable the researcher to draw conclusions regarding variances in training requirements between each of the groups. This has the potential to provide an idea, not only of knowledge levels but also, of how the knowledge was

obtained. For example, the training could have been obtained formally, using common sense, comments and feedback from the supervisor, or self-training. This could impact on the models for knowledge transfer. It also implies that formal means are not the only ways through which knowledge can be obtained.

The questionnaire will be used to inform decision-makers what the existing practice in Riyadh state hospitals is so that recommendations made will match the prevailing conditions in hospitals. Typical hospital settings will be used for answering the surveys and such answers could differ between respondents who are similar, by preference and owing to varying institutional policies and practices.

Through group sampling, it will be determined whether there is a need for training and other methods of knowledge sharing and transfer of best practice between the groups, and how these impact on each other.

The researcher will address the staff at break times and leave the questionnaires for the staff to collect as they see fit. The questionnaires available will correspond with the target staff groupings identified above. A notice providing the simplified participation information will be placed in a communal area with copies of the information to take away (Arabic and English). This will also be preferably the location of the deposit box. The questionnaires will have no identity codes other than the date of distribution and hospital for reference purposes. The researcher will outline the wider benefits for the improvement of food standards within hospitals, which will also be provided within the introduction note about the project. A statement will be included that participation is completely voluntary and any worker can withdraw at any time without giving any reasons.

3.1.2. Questionnaire principles

The researcher has experience in conducting surveyed due to previous employment at the MOH which required regular interviews with staff in terms of line management duties and in terms of their daily duties. However, nutritional specialists were requested to evaluate the draft questionnaires. In terms of sequencing of questions, these were clustered according to topic. This process was adopted to help guide the respondent and because it made logical sense. The purpose of the survey was not to try to uncover false testimonies or change attitudes but to discover the respondents' knowledge of food health safety and so direct questions were used. The opening questions were about personal data to ease the respondent into the survey and ensure completion. There is no definitive rule about how many questions should be included. Instead, the researcher tried to find a balance between what data was needed and what was a reasonable amount of questions before the respondent became disengaged. Each of these were as brief as necessary to ensure it took the minimum amount of time to complete and avoided 'questionnaire fatigue' (Denscombe, 2017).

3.1.3. The Official Approvals

Considering that the study was conducted in Saudi Arabia, there was a need to interact with authorities with the aim receiving the required authorisation to do the study. In the Ministry of Health, the General Directorate of Medical Research and Directorate General of Nutrition were contacted. The research vision was given to the Directorate General of Nutrition in Saudi Arabia's Ministry of Health (MHO). Considering that all of Saudi Arabia's hospital food services fall under the ambit of the Directorate General of Nutrition, it was necessary for the researcher to obtain guidance and assistance from the authority.

A number of meetings were conducted between the researcher and the director of Nutrition Administration at the MOH. Other meetings were held between the researcher and the manager of Nutrition Administration office of the Health Affairs in the Riyadh region. The authority showed a willingness to give the project its support. The researcher, in consultation with the nutrition administration, proposed seven hospitals in Riyadh for research. However, an official letter of approval had to be obtained from the General Directorate of Medical Research in the Ministry of Health before the research could begin. To be able to grant these documents, the authorities needed a full study proposal together with several other documents. Once the study design had been completed, the researcher had a meeting with the director of the Research Centre in the Ministry of Health in Riyadh city for the awarding of the final approval.

3.1.4. Ethical Consideration

Considering the fact that the study would involve human volunteers, the study could not proceed before a letter of approval had been obtained from the Food Science Faculty of the University of Nottingham. This letter of ethical approval was made available to the Ministry of Health's Medical Research Director so that they could get an idea of the reasons the study was being conducted and the issues that needed to be considered. It was important to maintain the confidentiality of both the respondents and the hospitals they had been selected from. Appendix 1 shows a copy of the ethical review. The results obtained from this project will only be used for academic assessment. However, the researcher has been requested by the General Director of Medical Research in the Ministry of health to provide them with a full copy of the study.

3.2. Sample selection and study population

3.2.1. Participating Hospitals

In order for a hospital to be included in the study, it had to meet the criteria that follows:

1. A catering contract had to be in place in the hospital. This requirement was included for two reasons: As a requirement, HACCP was only being introduced for contracts starting in 2010 and the need to make sure there was continuity for food safety and hygiene practice.
2. Hospitals have to be located in Riyadh where the implementation of the HACCP was being introduced.
3. Hospitals had to be big enough for sufficient members of staff to be assessed. This also ensured that the study paid attention to hospitals with a likelihood to impact on bigger patient numbers which could then be seen as having a higher risk.
4. In order to ensure the hygiene requirements for infrastructure are met, the selected hospitals had to have good facilities.

After being considered, seven hospitals which were perceived to meet the criteria and invited to take part in the project. In order to match the hospitals against the stipulated criteria, the researcher paid a visit to each of the selected hospitals.

3.2.2. Selection of Participating Employees

The data gathering process included the use of written questionnaires which were distributed among employees working for MOH and those working for companies that provided catering services in the hospitals that were selected. Considering the fact that the members of staff have different responsibilities, different knowledge and behaviour requirements where established. This led the participants to be separated into two groups based

on their careers and positions. For each group, a specific questionnaire was designed with questions based on the characteristics of each group.
The groups are:

1. **Group A- Catering Companies Workers**: These included chefs and waiters employed by catering companies. This is the group which was exposed to the training program.
2. **Group B- Supervisors of Catering Companies**: This group comprised of department nutritionists and officers employed by catering companies.
3. **Group C- MOH Supervisors**: Included in this group were supervisors of nutritionists and managers of departments employed by MOH.

3.3. Instrument

Notwithstanding the fact that Saudi Arabia's MOH plans to introduce HACCP system in all hospitals, there has not yet been a serious consideration regarding the readiness of the country's hospitals to make such a system work. With this in mind, a survey was conducted on a sample of hospitals with specific attention paid to hygiene status which included PRPs and staff that serve food. Also, the study analysed how HACCP was being implemented in nutrition departments; especially among food supervisors and managers. Up to now, there is no clear database indicating demographic characteristics of staff. Hence, the study also attempted to gather information about this too. An audit was used to assess the status of the hospital prior implementation of the HACCP system.

Briefly, the aspects below were evaluated for the baseline survey:

1. To determine the extent to which PRP's and food safety systems are executed in hospitals in Saudi Arabia and the UK.
2. To test food safety and hygiene policy specifically designed for hospitals in KSA to standardise the knowledge; self-monitoring and attitudes of food handlers working in Saudi hospital catering.

3.3.1. Questionnaire A

This questionnaire was specifically for those who handle food such as butchers, chefs and their assistants, waitresses and waiters, and stores workers among others. Considering that this is a group which is in direct contact with the food, questions related to knowledge looked at cross contamination, microbiology, and temperature control, and the effect of the training program. Arabic and English were used in the questionnaire. There were 22 questions asked in total to this group.

3.3.2. Demographic characteristics in questionnaire A

In Part A, nine questions were included with four being multiple choice questions and the rest open-ended. Information required in these questions included demographic characteristics like gender, years of service, nationality, age, level of education, and position. Employment contracts and job titles were used for purposes of job classifications. Respondents were asked, for each practice, to indicate how frequently practice was observed in their departments selecting from three options: *always*, *sometimes*, and *never*. All these respondents had duties and tasks that are similar. Two questions linked to food safety training were multiple choice and another eleven for obtaining employees opinions with regards to implementing hygiene and food safety practices were also multiple choice as is shown in the Appendix.

3.3.3. Questionnaires B and C

Staff employed by catering companies and MOH were addressed by this questionnaire. The majority of the staff hold degrees in food and nutrition. The role of the supervisors involves making sure that workers and supervisors employed by catering companies apply the applicable practices and controls. There were 25 questions asked in total to groups B and C.

The questions asked for information about demographics, attitudes, practices, and knowledge. In order for individuals to be employed in both the groups, they need to have a good level of education. Hence the questions reflected this advanced level of education and, therefore, such questions focused on food poisoning, microbiology, hygiene practices, and food safety management.

3.3.4. Demographic characteristics in questionnaires B and C

In Part B and C, there are nine multiple choice questions which collected information on demographic characteristics of respondents such as age, education level, nationality, gender, and position. The other two were open-ended questions whose role was the investigation of nationality and workplace of the MOH supervisor and catering supervisor.

A. **Knowledge Section**

Part B and C were designed in a manner that they would measure the knowledge of the nutritionist and supervisor with regards to food safety. This section comprised of eight multiple choice questions which were reduced, based on the results of the pilot study.

B. **Food Safety Practices and HACCP**

To measure food safety management performance, four multiple choice questions were used. Duties and tasks were used as a basis for designing these questions which were answered by nutritionists and supervisors in departments. The questions specifically related to how food flows, practices of hygiene, supervision of food services and inspection of such food as is represented in the Appendix.

Part four included four questions each related to food supervisors, nutritionists and catering supervisor’s attitudes toward food safety, training

and hygiene management. All the questions were developed by the researcher. In this part, the same questions addressed both groups except questions number (8, 9, 10 and 11) for MOH supervisors and questions number (7, 8, 9 and 10) for catering supervisors.

3.4. Triangulation of data collection methods

In order to overcome any potential bias, this research has adopted a quantitative and qualitative approach to data collection. The main benefit of using multiple methods of data collection is it enables triangulation to take place and therefore assuring greater validity of the research. Cohen et al. (2002) explains that the concept of triangulation "is borrowed from navigational and land surveying techniques that determine a single point in space with the convergence of measurements taken from two other distinct points." This process of cross verification from multiple sources aims to prove that the same result would have been achieved if approached from a different method. For this reason, (Burgess, 2001) has argued that research methods that do not apply a combination of empirical materials or methods, such as sampling, observation and interviews, may lead to accusations of the research being defined as narrow in scope and potentially inadequate.

Although the purpose and definition of triangulation is constantly being refined and debated by scholars (Feldman et al., 2018) has identified four types of triangulation. These are: Data triangulation – in which data is collected across time, space, and persons and from various sources; Investigator triangulation is where multiple researchers operate together in an investigation. This enables research data to be compared and thereby remove any personal bias; Theory triangulation is where more than one theoretical scheme is used in the interpretation of the data. Theories that are often associated with particular disciplines can be adopted across

disciplines; Methodological triangulation involves using multiple methods to gather data.

The approach used for this study is Data Triangulation and Methodological Triangulation as the methodology includes questionnaires, and policy documents, all of which have been conducted over time from three sources of hospital workers (MOH Supervisors, catering supervisors, catering workers). Quantitative and qualitative methods have been adopted to ensure the validity of the data. The questionnaires were conducted with a relatively large sample size have enabled a quantitative method. More specifically, the questions enable data to be collected regarding demographical statistics and educational levels which can then be cross referenced with attitudes towards food safety procedures to determine a relationship between behaviour and attitude. They also enabled comparisons of attitudes and behaviour between the three sets of workers. This has enabled the researcher to identify recurring problems and issues which informed the design of the KSA food safety policy discussed in the chapter seven. In terms of qualitative methods, 5 x NHS policy documents have been analysed, providing an insight into the phenomenon being examined, specifically approaches and procedures adopted by hospitals to reduce outbreaks of foodborne illness. Comparing and contrasting the NHS policies enables patterns to be identified on best practice which will then inform the design of the food safety policy to be used by hospitals in KSA.

3.5. Translation

Based on the reality that the majority of respondents are Arabic and others can speak English, questionnaires were written in both Arabic and English. Supervisors at the MOH are all Arabic while in catering companies there are some employees that speak English.

Overseas workers are common in the workplace in KSA. Many of these will read and write English and will be given the option to make use of an English version of the questionnaire. However, it is anticipated that some workers will not be literate in either language. If these workers wish to participate then their views will be transcribed by the researcher and read back to the participant if he receives such as a request. With the participant's permission detailing the conditions of consent, as indicated within the consent form, will be made clear and that the participant understands and accepts these before any information is collected. The questionnaire seeks to establish training, knowledge, and operating practices of the individual and does not seek to identify illegal practices. However, under these circumstances, it will be made clear that any illegal practice will be reported because the recipients of the food could be vulnerable hospital patients.

3.6. Pilot Survey

Before the main study was conducted, questionnaires were piloted in two of Riyadh's hospitals. The pilot group all worked in the hospital, had different nationalities, and were of varying ages. They felt comfortable with what was being asked but asked for clarification on one question. Therefore, this was rephrased to create greater clarity. This was particularly important as some of the participants in the study, particularly catering workers, would be from a diverse range of countries from around the globe. The priority was that respondents were able to read and understand the questions, and that possible factors preventing this, such as age, intellect, language, and eyesight were taken into consideration. (Denscombe, 2017: 184) The pilot also helped to determine the time needed to complete the questionnaire.

3.7. Data Management

A null hypothesis attempts to demonstrate that between variables there is no variation or that a variable is not different from its mean. If p- value is

less than 0.05 then the null hypothesis is rejected, and the alternative hypothesis will be acknowledged. In other words, rejection of the null hypothesis “p < 0.05" shows that a significant difference exists, and the result is significant.

Once the data collection was complete, some administrative tasks were conducted before starting data analysis (pre-analysis phase). This is where sequential numbers were assigned to study participants in order to uniquely identify them within the documentations for checking purposes. Microsoft Excel sheets were used to save the raw data which were entered by the researcher and checked with the documentation. Any errors during data entry were corrected.

The data management and analysis were performed using Software for Statistics and Data Science (STATA). After checking data inputs on excel sheets, sheets were imported onto STATA and the process of data management started. The next stage involved developing and defining study variables whether nominal, continuous or categorical variables. Some variables were recorded into different formats, such as continuous and categorical, to be prepared for data exploration.

Following this, preliminary data exploration was initiated to check for outliers and missing data through scatterplots and histograms. Descriptive statistics were used to visualize data frequencies among categorical variables and calculate means or medians for continuous variables and their variances. Two-way tables were used to calculate the percentages of different categorical variables between each other, particularly, through their distributions across study settings (hospitals). All these steps were preparation for checking data normality and their tendency from the mean or median. Checking data normality and their distribution is important to decide whether to use parametric or non-parametric statistical tests.

Parametric and non-parametric tests are common statistical methods of data analysis. According to (Habbash, M. and Alghamdi, 2015) non-parametric tests are convenient when there are no assumptions based on any previous data or there is no data. Therefore, in this research non-parametric testing was used (Newbold et al., 2003) since it is appropriate for the surveys like this one, due to the nominal and ordinal data and no assumptions related to normality of the population.

3.8. NHS Comparison Study

In addition to the surveys conducted with food professionals working in Riyadh, a comparative study was made of the food safety policies of five NHS Trust hospitals. The reason that the NHS was selected is because it was ranked the number one health system in a comparison study of 11 countries by the Commonwealth Fund in 2016 and 2017. The report praised the NHS for its safety, affordability and efficiency (Commonwealth Fund, 2017). Their food safety policies are also available online and as this PhD has been completed in the UK it would be relatively straight forward for the researcher to contact these organisations should further information be required. The purpose of comparing the food safety policies of the five hospitals was to try to identify standardisation in processes - such as monitoring, reporting mechanisms, training, and organisational structure. These policies helped the researcher to identify key questions regarding processes and procedures in order to understand the level of proficiency of Saudi health professionals. For example, the policies had a clear chain of command, outlining who, what and where to report various incidences of food-borne illness. This enabled the researcher to create questions that would help identify whether systems were in place and what level of knowledge catering workers had and the level of support provided by supervisors. These are discussed in detail in chapter seven. In addition, identifying best practice across the five policies would help inform the

design and structure of the recommended food safety policy to be implemented in KSA hospital in the future.

To summarise, the purpose of using surveys as a research methodology was to help the researcher better understand the knowledge, attitudes and behaviour of three sets of workers within KSA hospitals: catering workers, catering supervisors and MOH supervisors. This data has then been used to identify training needs and to inform the design of a food safety policy to be used across KSA hospitals to help bring about standardisation. Similarly, comparison of NHS Trust policies has been used to help identify questions for the survey and to identify best practice, all of which will be implemented in the newly formulated food safety policy discussed in the final chapter.

Chapter 4 : Analysis of Food Safety Policies of Five National Health Service (NHS) Hospitals in England

4.1. Comparison of the five UK NHS Food safety and Hygiene policy features

The following five NHS Hospitals in England, UK have been compared in this chapter with the aim to identify the most apposite and efficient parts of their policies and include them, where suitable in the new Saudi Arabia state hospital Food Hygiene and Safety Policy. The hospitals are not listed in any order of preference or importance:

- Nottingham University Hospitals NHS Trust (NUH)
- Northampton General Hospital NHS Trust (NHFT);
- Lincolnshire Community Health Services NHS Trust (LCHS)
- Cumbria Partnership NHS Foundation Trust Size (CPFT)
- University Hospital Southampton NHS Foundation Trust (UHS)

The context and the policies of the hospital policies featured and compared in this chapter are as follows:

1. The Size of the Trust
2. Policy Approval and Revision Period
3. Quality Assurance Assessment and Professional Bodies Consulted
4. Target Audience
5. Aims and Roles with Responsibilities
6. Processes
7. Monitoring, Compliance with the Policy and Reporting Mechanisms
8. Staff Training

First, individual hospital policies will be examined. This will be followed by the comparative analysis of the five hospital policies and a conclusion.

4.2. The Size of the Trust

4.2.1. Nottingham University Hospitals NHS Trust (NUH)

The Queen's Medical Centre is part of Nottingham University Hospitals NHS Trust (NUH). Its 14,277 staff members provide services to Nottingham and the neighbouring areas residents. The Trust consists of three entities: Queen's Medical Centre, where the Emergency Department is located; Nottingham City Hospital, with its Cancer Centre, Heart Centre and Stroke Services; and Ropewalk House, with provision for a range of outpatient services, including Hearing Services. The Trust has 90 wards and 1,700 beds (Nottingham University Hospital NHS Trust, 2017).

4.2.2. Northampton General Hospital NHS Trust (NHFT)

Northampton General Hospital NHS Trust has more than 4,545 staff members. It provides specialist stroke, vascular and renal services to the whole region, with 765 beds (excluding day case and community beds), providing services to four main hospitals with 71 beds in the children's ward and 60 beds in the maternity department. The Trust also has a cancer centre which covers approximately 880,000 people across Northamptonshire as well as some areas of Buckinghamshire (Northamptonshire Healthcare NHS Foundation & Trust, 2017).

4.2.3 Lincolnshire Community Health Services NHS Trust

Lincolnshire Community Health Services NHS Trust covers the following four hospitals: Lincoln County Hospital, Grantham and District Hospital, Pilgrim Hospital Boston and County Hospital Louth. It is also responsible for the hygiene and quality of food, where staff are sent to prepare and cook food in patients' homes as supporting or continuous care in the community. Their healthcare services are delivered by 7663 staff. In an average year, there are more than 150,000 accident and emergency

patients, nearly half a million outpatients, and almost 140,000 inpatients are treated. There are 953 beds at the County Hospital (Trust, 2016).

4.2.4 Cumbria Partnership NHS Foundation Trust Size (CPFT)

Cumbria Partnership NHS Foundation Trust offers health services to approximately 500,000 residents. The thirteen hospitals within the trust are:

1. Alston Ruth Lancaster James Hospital,
2. Brampton War Memorial Hospital,
3. Cockermouth Community Hospital,
4. Furness General Hospital,
5. Keswick Mary Hewetson Hospital,
6. Maryport Victoria Cottage Hospital,
7. Millom Hospital,
8. Penrith Hospital,
9. Ruth Lancaster James Hospital,
10. West Cumberland Hospital,
11. Westmorland General Hospital,
12. Wigton Community Hospital,
13. Workington Community Hospital.

The number of its employees is 4008. The trust offers more than 60 services in over 20 main sites with approximately 180 bases and shared premises (e.g. local health services such as GP practices/ surgeries). The services comprise of: Community, Children and Families, Mental Health and Specialist Services. The Trust has a minimum 400 inpatient beds of which 150 are for mental health and 250 for the community hospital. (Cumbeia Partnership NHS Foundation, 2016).

4.2.5 University Hospital Southampton NHS Foundation Trust (UHS)

The University Hospital Southampton NHS Foundation Trust is made up of three main hospitals:

- Southampton General Hospital,
- Princess Anne Hospital
- Southampton Children's Hospital.

It also has 3 specialist centers:

- Countess Mountbatten House,
- Royal South Hants,
- New Forest Birth Centre.

Their services cover Southampton and South Hampshire, working with a population of about 1.9 million. However, they also offer neuro, cardiac and special care services to about 3.7 million people from the Channel Islands and South England. The trust employs 10,500 staff, who treat an estimated 150,000 local inpatient residents and day patients. Over 585,000 outpatients have appointments in the trust per year. There are around 1372 beds in the hospital (Care Quality Commission, 2015)

4.3. POLICY APPROVAL AND REVISION PERIOD

4.3.1. NUH Trust Food Safety Policy Approval and Revision Period

The most recent NUH Trust Food Safety Policy was approved by Directors' Group on 7th March 2017 and its implementation will be revised in January 2020. Compared to the previous policy from April 2011, it introduced: the Central Production Unit / Kitchen, Food Hygiene Rating System, and Allergen information. The lead executive is the Director of Estates and Facilities. However, since June 2014, Estates and Facilities (E&F) Services at NUH, was run by Carillion, a private UK company. Carillion went into insolvency in January 2018, which will have implications for future services

as well as a possible impact on the provision of service (Nottingham University NHS, 2017).

4.3.2. NHFT Safety Policy Approval and Revision Period

NHFT instigated a specific Food Hygiene Policy and Guidelines, (version 3) from October 2017. It introduced new features, such as parents/carers provision of food for children patients, food brought in by patients, access to ward kitchens, catering providers, extra special measures for food pathogens. They have also instigated a set of Infection Control Policies. Examples include: Hand Hygiene Policy (ICP 001 Hand Hygiene Policy - Review April 16) and The Management of Clostridium Difficile (C.Diff) Policy detailing preventative measures or treatment of equipment (including food delivery equipment) that has been in contact with affected patients (Northamptonshire Healthcare NHS Foundation Trust, 2017).

The most recent version of the Food Hygiene Policy and Guidelines, is held on the NHFT intranet with each member of staff responsible for following the most up-to-date version. Although it is part of a larger document, the food policy is known as The Food Hygiene Guidelines (Code/Number: HSCg002; version 3). The NHFT was ratified by Health, Safety and Risk Committee on 12/10/2017 who are also responsible for implementing the Policy. (Northamptonshire Healthcare NHS Foundation Trust, 2017).

4.3.3. Lincolnshire Community Health Services NHS Trust

The LCHS Food Safety Policy was issued in July 2014 and its review date was in July 2016. It is distributed via the LCHS website, its author is Gifford, L and it was ratified by LCHS Trust Board, under reference number: P_HS_06 (Version 2).

4.3.4. CPFT Food Safety Policy Approval and Revision Period

The latest CPFT Food Safety Policy was ratified on 9th October 2015 and was due for review in October 2017. The accountable Director is the Director of Service Department and its author is Head of Facilities.

4.3.5. UHS Food Safety Policy Approval and Revision Period

UHS introduced some minor changes to its previous Food Hygiene Policy and authorised its latest version on 26th July 2013. It was revised in August 2016 with the new revision planned for 2018. The authorization committee was the Infection Prevention Committee, and the ratification committee was the Policy Ratification and Monitoring Group. The Policy author was the Clinical Lead EMT.

4.4. Quality Assurance Assessment and Professional Bodies Consulted

Quality assurance refers to the maintenance of a desired level of quality in a service or product. In terms of food safety, this means careful attention to every stage of food production. The following list outlines what quality assurances are in place at five UK hospitals.

4.4.1. Nottingham University Hospitals NHS Trust (NUH)

In the introduction to their food safety policy, NUH makes clear minimum requirements for food hygiene (Food Safety Act, 1990; Food Safety and Hygiene (England) Regulation 2013). In the policy statement the Trust aims for the highest levels of food hygiene by ensuring a five rating is achieved as part of the food standards agency's Food Hygiene Rating (page 5), and that food safety applies to all staff employed by catering providers as well as NUH staff. To ensure these quality assurances are met the policy has produced a comprehensive list of definitions (page 5-8) with links to

relevant legislation to ensure there is no doubt about procedures. For example, when discussing Due Diligence there are links to specific sections under the act to ensure clarity of process. They use a Food Safety Management System (FSMS) that incorporates HACCP. The Food Safety Policy has in turn been produced in consultation with the Nutrition Steering Committee to the Clinical Effectiveness Committee (CEC) and the Care Quality Commission. There is a specific role for a Soft FM Performance and Quality Assurance Lead and a Trust Contract Monitoring Team to oversee contractors within catering.

4.4.2. Lincolnshire Community Health Services NHS Trust (LCHS)

In the introduction to their food safety policy, LCHS also emphasises minimum requirements for food hygiene and safety but refers to the Food Hygiene Regulations 2006. They state that the penalties under the act for non-compliance to reinforce the seriousness of food safety (page 5) In their Aims and Objectives section (page 5-6) they state adherence to the principles of HACCP, guidelines set out in the Food Safety Management System and more general observations regarding food safety. The Trust liaises with the Food Safety Group, Health and Safety Committee and the Care Quality Commission. Quality assurance is assumed to be guaranteed through their HAACP system (page 15-20), which ensures all areas of food production and delivery achieve acceptable standards.

4.4.3. University Hospital Southampton NHS Foundation Trust (UHS)

In their introduction, UHS refers to compliance with basic legislation but states that the Trust 'aims to, where possible, set standards in line with best practice, as set down in the Industry Guides to Good Practice' (page 4). They have a detailed HACCP plan that is provided in Appendix B (page 24). A Reporting Framework is included so that it is transparent how quality

assurances are ensured (page 12). A trust Food Safety Standards document (Appendix A page 13) details standards that food handlers, supervisors and managers must follow and adhere to.

4.4.4. Northampton General Hospital NHS Trust (NHFT)

NHFT has a very brief introduction, stating only that food hygiene conforms to 'all relevant food safety legislation – The Food Hygiene (England) Regulations 2013' (page 5). There is no explanation of how and who the Trust consults with, other than stating 'robust processes and systems' are adhered to (page 6). Quality assurance for the Trust is primarily guaranteed through two systems HACCP and SFBB (Safer Food Better Business promoted by the Food Standards Agency in the UK). HACCP processes are outlined in Appendix 2 (page 23) but there is no information or appendix on SFBB. There is a reference to new legislation (EU Food Information for Consumers Regulation 1169/2011) with regards to Allergens (page 13).

4.4.5. Cumbria Partnership NHS Foundation Trust Size (CPFT)

The Trust references its obligation to comply with the Food Safety Act 1990. It also has a Trust Waste Policy and Food Safety Manual. To ensure compliance with the Trust's policy, they have a monitoring procedure (page 14) which covers food safety records, training, food preparation and risk assessments. The policy includes 'references' and 'related trust policy/ procedures' sections (page 150) but these are a list rather than explicit guidelines. There is reference to HACCP (page 18) but it does not have the same prominence given in the previous hospitals reviewed.

4.5. Target audience

4.5.1. Nottingham University Hospitals NHS Trust (NUH)

The Food Safety Policy of NUH Trust lists the following as its target audience: "Catering providers, managers and staff; divisional leads and service managers; matrons; all NUH food handlers, volunteers, tenants, sub-contractors; and third party contractors" (NUH; 2017, p.2). NUH recognizes its responsibility to minimize and if possible, eliminate risks affecting food and its users; therefore, food safety regulations at the highest level apply to all staff, both the ones employed by NUH and by catering providers.

4.5.2. Northampton General Hospital NHS Trust (NHFT)

NHFT does not explicitly state its target audience but in the 'purpose' section this is evident as the Policy 'is guidance in the hygienic production and delivery of food items to patients, customers and staff' (page 5). A 'duties' section lists specific departments and roles so that readers know how the document applies to them. These are: Hotel service managers; ward managers; infection prevent and control; catering team leaders; cooks and catering assistants; clinical staff; estates department.

4.5.3. Lincolnshire Community Health Services NHS Trust (LCHS)

LCHS states in its 'policy statement' section that the policy applies to 'Skegness Hospital, Johnson Community Hospital, John Coupland Hospital, Louth Hospital, and those staff that work with patients as part of on-going or supporting care in the community' (page 5). It elaborates on these principles further in the Aims and Objectives' section where it states the policy affects all LCHS NHS Trust food premises 'both managed by the Trust and third parties inclusive of suppliers registered with the Local Authority' (page 5) and so the target audience is all staff members.

4.5.4. Cumbria Partnership NHS Foundation Trust Size (CPFT)

CPFT states in its 'scope' section that their policy 'applies to all staff, whether they are directly employed by Cumbria Partnership Foundation Trust staff, are under contract, or are employed via Service Level Agreements (SLAs)' (page 2). All staff are required to adhere to the Trust's Policy and its subsequent procedures, codes of practice and guidelines.

4.5.5. University Hospital Southampton NHS Foundation Trust (UHS)

UHS policy opens with an executive statement that contextualises the Trust's 'moral and legal duty to protect all patients, visitors and staff from food-related illness' (page 3). It also states that this applies to both external contractors and in-house food production. These sentiments are comprehensively reiterated throughout the document, such as in the 'scope' section that states legislation applies across all UHS sites, staff (permanent and temporary), staff who are employed by contractors and food retailers, visitors and patients (page 4).

4.6. Aims and Roles with Responsibilities

4.6.1. NUH Trust's Aims and Roles with Responsibilities

The aim of the NUH Food Safety Policy is to prevent the development of food hazards, keep them under critical control, and to ensure that everyone on its sites are safe from chemical and physical contamination, infections caused by bacteria, or risk of allergic reactions to food.

4.6.1.1. The Trust

The Trust's responsibilities are to ensure a level five rating in management of food safety according to Food Standards Agency's 'Food Hygiene Ratings'. Also, that there are zero exceptions in hygiene practice. Structure

and confidence in management will be developed and the approach to the Food Safety Policy at NUH will be consistently fair and economic. It has been stressed that all food provider staff and all NUH staff must equally comply with the policy. NUH Trust has acknowledged its moral and legal responsibilities for the maintenance of the highest levels of food safety and hygiene on the premises and across the providers in accordance with all legislation relevant to food safety. Finally, prevention of hazards related to all the stages of the food storage, processing, service and disposal is also under the supervision of the Trust. The Policy outlines all the rules and procedures to ensure the highest standards of food hygiene and safety.

4.6.1.2.The Trust Board

The policy details roles and responsibilities of the committees. The Trust Board is in charge of ensuring that all the policy activities are in place. They must have a clear picture about the policy compliance and the quality of patient data. It is also the duty of the Trust Board to approve the policy and it has the ultimate responsibility for the food safety activities within NUH. However, it delegates this responsibility to the Chief Executive. In the annual report from the Nutrition Steering Committee to the Clinical Effectiveness Committee (CEC) it will be confirmed that the Trust has complied with the most recent Food Safety Legislation. Also, an annual declaration to the Care Quality Commission must be issued.

4.6.1.3. Chief Executive

As the Trust Board's representative, the Chief Executive must ensure that stages of the production and food-related practices, including provision transportation from one place to another, should follow the highest standards of food hygiene. Also, the food protection strategy within the Trust should be applied successfully and efficiently. The Chief Executive delegates application and management of the Food Safety Policy to the

Director of Estates and Facilities Management, Facilities Management Team, and Directorate Management Team, who then control food services under their supervision.

4.6.1.4. Director of Estates and Facilities Management

The main responsibilities of the Director of Estates and Facilities Management are:

To ensure that NUH food provision services, engaged food provision contractors and external caterers as well as volunteers who work in this area, adhere to the Food Safety Policy. However, although the third party caterers comply with the same policy, they are supervised by their service manager.

To ensure that any problems raised within all food provision services in the Trust, be it external or internal, are reported to the related NUH committees in charge of risk management and control.

To be in charge of the planning of programmes of work connected with food safety risk management, which is part of the yearly business planning procedure. These plans are to be reviewed and approved by the Investment Governance Committee and Performance Management Team. These programmes comprise of the management of the food related sections of the Trust's Capital Programme and its future funding.

Operational roles of the Director of Estates and Facilities Management include: Development, implementation, maintenance and supervision of the HACCP related processes, through the Head of Facilities Management, senior management and line managers of catering services. Ensuring that staff members fully participate in food safety training; this will be achieved through senior management and line managers. Guarantee that the food safety investment agreed is accurately included in the Trust's yearly

business plan. Other daily activities can be allocated to the Head of Facilities (Catering and Linen Laundry Service) who is accountable for the entrusted duties of the Director of Estates and Facilities Management.

4.6.1.5 The Head of Facilities Management

Some of the key responsibilities of the Head of Facilities Management in the Catering and Linen/Laundry Services include: ensuring the application and adherence by top management within the department to such policies, through the setting up of food hygiene supervision and administration of control systems that are in line with HACCP principles. This also entails that food safety and hygiene have to be in keeping with the pertinent legislative needs and are reviewed at least once, in less than a six-month period (Preece, 2014). Another task of the Head of Facilities Management in the Catering and Linen/Laundry Services, is to carry out a follow-up on the hazards, controls, and critical limits, as well as remedial activities and duties, while confirming that all of these are incorporated in the NUH food safety management system (FSMS) and ensuring every NUH catering operation has their own copy.

Similarly, it is important to report compliance with food safety and hygiene on an annual basis to the Nutrition Steering Committee (NSC) in accordance to the required assurance frameworks. Another responsibility of the Facilities Manager lies in ensuring that the Nutrition Steering Committee members are kept informed of all unresolved activities or issues related to food safety, and any issues raised by local authority reports from Environmental Health Officers (EHOs) are addressed. Similar principles of monitoring and best practice are applied to authorised outside caterers list and third party deliverers of catering services, communicating food hazard risks to the Risk Register and ensuring that the Central Production Kitchen (CPK) is functioning to the highest level of food safety. They are also responsible for ensuring relevant training is undertaken, such as Food

Hygiene Training Foundation Level 1 to 4 with refresher courses when needed and following HACCP principles.

4.6.1.6. The Head of Estates (Operational Maintenance)

The Head of Estates, is responsible for maintenance of the buildings and equipment, which should also be in keeping with all other related regulations and guidelines.

4.6.1.7 The Head of Capital Projects and the Assistant Head of Regulatory and Property Services

The job of the Head of Capital Projects oversees the carrying out of all activities and tasks that affect food safety on newly built and current Trust constructions. Such work has to meet a satisfactory technical standard and abide by all prevalent statutory and compulsory food safety legislation, such as the Control of Contractors Policy. The Assistant Head of Regulatory and Property Services (Property and Land) has a duty to ensure, that when offering contracts, a clause is introduced to confirm that lessors abide by the Trust's Food Safety Policy.

4.6.1.8. The Directorate Teams

The Directorate teams play an important role in assuming responsibility and taking charge of food hygiene in their respective regions, while ensuring that all phases of production, processing and service of food under their management, meet the standards set out in the food safety policies. In addition, these teams propagate the policy details and assign local service managers and staff to carry out the relevant tasks, while also ensuring that food hygiene and safety issues are part of any management team consultations and meetings. Moreover, it is important that food handlers be

made aware of their particular duties when it comes to food hygiene, as well as ensuring that, whenever possible, hygiene and food associated risks are recorded on a regular basis. Finally, the Directorate Teams have to ensure that all food handlers have finalised compulsory food safety training, along with any refresher training within a three year period.

4.6.1.9. Ward Sisters/Charge Nurses

Matrons and Ward Managers have an obligation to provide the highest levels of environmental and personal hygiene, as and when required, in the ward or department, in order to avoid potential food poisoning and any other related contamination. They are also required to ensure that staff and volunteers have the sufficient competence to work safely and abide by the safety guidelines, by means of food safety training and nutrition specialists. Another key role of the Ward Managers is to ensure that Ward Sisters and Charge Nurses can effectively manage food hygiene within the ward areas and ward kitchens. This includes the application of the Food Safety Policy, as well as checking whether Nutritional Link Professionals are assuming their food safety obligations, promoting best practice, and have a Foundation Level 2 qualification in Food Safety that is refreshed on a yearly basis. They also ensure the adequate storage of all foodstuffs, as well as following a rotational stock control procedure, while checking that food consumed by patients, or brought in by their family members and friends, is monitored in keeping with this policy.

To avoid potential health risks including cross-contamination, drugs, biological samples, or blood for transfusion, have to be stored elsewhere, and not in the fridges or freezers provided for patients' food. Other responsibilities of the Ward Managers include: ensuring that all ward staff have access to a copy and have read the document related to 'Food Safety at Ward level' and surveying patients periodically on issues pertinent to

food quality and safety. It is important to note that matrons must regularly monitor such procedures.

4.6.1.10. The Head of Catering

The Head of Catering ensures that food providers and handlers are offered the appropriate guidance on all issues related to food safety and hygiene, by implementing and overseeing the suitable management systems in order to safeguard the safety of all foodstuffs. Another key responsibility lies in creating Codes of Practice and key performance indicators that can be checked, reviewed and reported and reinforced through training. These then form the basis of standard operating procedures. The Head of Catering ensures these principles are filtered down to all suppliers and monitored, such as through assessments, control standards, and evaluation forms, and that all food premises are on the Local Authority Environmental Health Department's register and that the local EHO is conducting regular audits on all food outlets. This applies to all related food preparation, distribution, delivery, handling and service.

4.6.1.11. The Central Production Kitchen Manager

There are a number of tasks that should be undertaken by the Central Production Kitchen Manager and Assistant, including ensuring that the Trust's Food Safety Policy and Codes of Practice are carried out within all the catering premises, such as the Central Production Kitchen (CPK). This should be done as per schedule to guarantee compliance and determine any training areas that need to be addressed. The manager of this department should also ensure that all official external caterers must be subject to an audit of their premises and food safety and hygiene policies once a year, whether through EHO inspection reports, visits to the premises by a catering management team member, or the NUH supplies department. In addition to reporting to the Head of Catering on issues related to food

safety and hygiene, the Production Kitchen Manager should ensure that all aspects of food safety are dealt with and resolved within the CPK.

4.6.1.12. The Retail Catering Services Manager

Some of the responsibilities of the Retail Catering Services Manager and Assistant include ensuring that the Trust's Food Safety Policy and Codes of Practice are carried out within all the catering sites. As for other managers, the Retail Catering Services Manager should ensure that the catering premises are reviewed as per schedule to enforce compliance and detect any relevant training needs to be covered and that all official external caterers are subjected to an annual review of their sites and food safety and hygiene policies whether through EHO inspection reports, site visits by one of the catering management team members or the NUH supplies department. Finally, the manager of this department should report to the Head of Catering on food safety issues.

4.6.1.13. The Patients Food Services Manager

The Patients Food Services Manager and Assistant, need to ensure that the Trust's Food Safety Policy and Codes of Practice are in place within all patient food service premises, ward kitchens and other facilities. The catering premises should also be reviewed on a regular basis to observe compliance and determine any relevant training opportunities and needs to be addressed. In addition, the Head of Catering should be kept informed on food safety issues.

4.6.1.14. The Food Safety & Compliance Officer

The role of the Food Safety & Compliance Officer entails reporting to the Head of Facilities Management, as well as Catering and Linen/Laundry

Services and the Head of Catering on food safety issues. They will ensure accreditation standards are followed, such as those provided by STS - a leading food safety and health & safety consultancy and training organisation. He/she also must coordinate with the catering management team, the EHO inspection and compliance, and STS on food safety matters, in addition to reporting to the food, nutrition and menu work stream with regards to food safety issues, as well as acting as the gate keeper for the food safety management system and offering updates in keeping with any legislative developments. This officer must also ensure all checks on food safety are consistent with the guidance set, including accomplishment of action plans and decisions, in addition to the delivery of the six monthly NUH multidisciplinary catering review. While checking for legislation updates through news, media, official reports and the food standards agency, the supervisor must record, examine and provide help in terms of solving food safety issues in collaboration with the catering team members.

4.6.1.15. Catering/Chef Supervisors

One of the key roles of Catering Supervisors is to ensure that all issues related to food safety are accomplished within their work area. Also important is to check on a regular basis that all standard operating procedures are complied with. In addition to reporting food safety issues, these supervisors have other obligation of ensuring best practice of staff under their immediate control, maintaining the highest levels of hygiene and cleanliness, completing documents found in the FSMS, completing HACCP monitoring documentation, and adhering to the Standard Operating Procedures.

4.6.1.16. Volunteer Services Manager

The main task of the Volunteer Services Manager is to ensure that all volunteer food handlers adhere to the Policy at the ward level.

4.6.1.17. PPI (Patient & Public Involvement)

As for the Patient Public Steering Group (PPG), members need to be updated with regards to the policy and other related documents, and informed by means of shared data with the head of Public Patient Involvement. The PPI group holds a monthly meeting with other members of the Catering Management Team who will attend it on a periodic basis and attend the PPG on a monthly basis.

4.6.1.18. Nutrition Steering Committee

The key role of the Nutrition Steering Committee involves ensuring the presence of written policies and procedures in support of the provision and delivery of food and nutritional services to hospital patients, while being actively engaged in the promotion of their Trust-wide application. Any information and action plans must be relayed to the Clinical Effectiveness Committee.

4.6.1.19. Environmental Health Officer/Practitioner

The major task of the EHO is to pay scheduled visits as requested from the official food hygiene authorities. As hospital patient food production and feeding are high risk, this visit may not be less than on a yearly basis. Regarding the retail, suppliers and third-party catering providers, they may be visited as per the official food hygiene rating guidance that has been established. Upon request, the audit reports can be made available to the NUH. If there are any breaches, these can be dealt with through the Trust by the Nutrition Steering Committee (NUH, 2014). All the listed responsible bodies and individuals also regularly communicate the information to other relevant bodies, such as Members of the Catering Management Team, Clinical Effectiveness Committee and other listed bodies and individuals with various roles and responsibilities.

4.6.2. NHFT Aims and Roles with Responsibilities

The Trust complies with guidance laid out in the Northampton Healthcare Foundation Trust (NHFT) and has the overall aim of protecting the patients, customers and staff from anything that can potentially cause harm. Compared to NUH's Policy, the NHFT Policy has dedicated only one page to the roles and responsibilities. The document is concise and focuses more on the processes themselves, presenting them clearly and transparently. The Policy details the roles and responsibilities of the committees and the Chief Executive**.**

4.6.2.1. Chief Executive of NHFT

The utmost responsibility for food standards within NHFT is the duty of The Chief Executive, who is in charge of ensuring the policy implementation and monitoring, as well as achievement of the highest food production standards and the related systems and processes.

4.6.2.2. Director of Finance

The Director of Finance has responsibility to ensure the provision of the relevant resources needed for food services.

4.6.2.3. Director of Infection Prevention and Control (DIPC)

The Director of Infection Prevention and Control (DIPC) must ensure that the issue of hospital food is one of the topmost agendas of the Trust, and that the required resources are available in order to achieve high food quality and other relevant standards. They must identify and present the input information for Estates and Facilities (E&F) projects and procedures

applied through the policy as well determine the best solutions. DIPC also liaises with the Estates and Facilities (E&F) team to reduce any risk of cross infection by ensuring effective response both internally and externally by consultants and contractors commissioned and monitored by the organization.

4.6.2.4. Hotel Services Manager

The Hotel Services Managers are the key leaders of the whole Trust's food provision, and in that role they engage the Modern Matrons when making the final choices related to in-patient food provision.

4.6.2.5. Ward and Homes Staff

Daily management of hygiene and standard control in ward/home kitchens and beverage bays are the responsibilities of the Ward Manager, Home Manager or Sister. They are also in charge of ensuring that mandatory food hygiene training sessions are attended by the relevant employees.

4.6.2.6. Occupational Health Department

The Occupational Health Department monitors if the staff have the following health issues: diarrhea or vomiting, throat related illness, rash on the skin lesions. Secondary food handlers are responsible for self-reporting in case they have any of the above infections and/or illnesses, as soon as possible, both during the working day and outside working hours. The line manager needs to be contacted out of hours, and Occupational Health at the start of the subsequent working day. In the case of infections, staff must not return to work before they are free from symptoms for at least two days. The Occupational Health Department and Infection Control must

be informed by the line manager if more than one employee is on sick leave at the same time, due to stomach infections.

4.6.3. LCHS Aims with Roles and Responsibilities

The aim of the Lincolnshire Community Health Services (LCHS) Food Safety Policy is to guarantee the highest possible protection of people's lives through minimizing the hazard of food poisoning and contamination. The policy follows the regulations prescribed in Food Hygiene (England) Regulations 2006 Reg (EC)852\2004 on Hygiene of Food Staffs.
In the Scope section it has been stated that the policy must also be implemented in the Trust's ward kitchens, staff providing food services in patient's homes and staff kitchens monitored by Trust staff or external sector. Furthermore, nursing teams must adhere to the policy when controlling and managing issues related to patients who bring food for their own use, which can also be purchased or prepared by their visitors.
The following sections outline the key responsibilities of staff with regards to implementing the LCHS Food Safety Policy.

4.6.3.1.Trust Board Responsibilities

The Trust Board must ensure the delivery of various food safety tasks and demonstrate in a yearly report that Food Safety Legislation is fully met. It also has a duty to entrust the Chief Executive with the different food safety roles and responsibilities. The Food Safety Group, the Health and Safety Committee and the Care Quality Commission are all involved in these activities drawing on the criteria from the 2008 Health and Social Care Act.

4.6.3.2. Chief Executive Responsibilities

The Chief Executive acts on behalf of the Trust Board ensuring all current food safety legislation is adhered to and food hygiene requirements are met throughout all phases of production, processing, preparation, advice and

guidance in the community to patients and food service. They must run an efficient food safety management process within the Trust to minimise the risk of food poisoning. The duties are then passed on by the Chief Executive, to the Chairman of the Health & Safety Committee, Head of Clinical Services, Food Safety Lead, and other staff members included in the food chain within the Trust.

4.6.3.3. Responsibilities of the Chairman of the Health & Safety Committee

The Chairman of the Health and Safety Committee's main duty is to ensure that all staff constantly provide support needed and care for the community. This may include monitoring patients during the food preparation and cooking stage in their own residences, as well as providing counselling and advice on healthy eating habits. Another major duty of the Chairman of the Health & Safety Committee is to ensure that food safety issues within LCHS Trust food internal and external services are discussed and assigned to the top management, clinical services & the Food Safety Lead. His/her role also includes recommending work programmes related to the risk management of food safety that are taken into account in the yearly business planning action. Part of this is the supervision of the food related elements of adequate financial resources, to make certain the guidelines are adhered to.

4.6.3.4. Responsibilities of the Head of Clinical Services

The Head of Clinical Services will guarantee that department senior managers execute and commit to the policy by creating food hygiene supervision and management control mechanisms based on general HACCP principles. Another key task is to clearly set out any food hazards, controls, critical limits, monitoring and remedial steps, as well as any other duties in the LCHS Trust Food, Quality, Service and Safety Manual policy. Adherence

to food safety and hygiene is reported on a quarterly basis to the Health & Safety Committee with unresolved issues passed on the Health and Safety Committee, EHO and the Food Safety Lead. Furthermore, the Head of Clinical Services has a duty to ensure the registration of all catering/retail business tasks with the local council. They instigate relevant training and refresher courses for all staff, in line with HACCP principles, that can be measured and monitored, thereby creating due diligence for the LCHS Trust. Finally, they need to ensure the availability of at least two Food Safety Champions in every Community Hospital and two community Food Safety Champions as part of every regional business unit.

4.6.3.5. Responsibilities of Senior Managers

Responsibilities assigned to Senior Managers include: ensuring the most effective criteria of environmental and personal hygiene to minimise food poisoning and any likely food contamination within the relevant wards or departments. The Senior Managers must specify food hygiene training requirements, including basic food hygiene training, as well as making certain that salaried and volunteering staff members have the competence to safely engage in several tasks and the willingness to adhere to the food safety regulations. They also ensure efficient administration of food hygiene within the ward areas, the ward, staff and therapy kitchens as well as in the patients' own place of residence. Managers must commit to the Food Safety Policy and ensure implementation of the Food Quality, Service and Safety Manual.

Senior Management also supervises the storage of all food products through staff delegation and the monitoring of rotational stock control practice. They ensure that food bought by patients and their relatives are in line with the Food Safety Policy and Food Quality, Service and Safety Manual. They enforce the ban on the storage of any drugs or samples of blood to be transfused, in the fridges or freezers used for patient or staff food. They also ensure that staff have access to a copy of the food safety

regulations that must be complied with. The Senior Managers take full liability for staff for any incompliance with the food safety policies and regulations.

4.6.3.6. Food Safety Lead Responsibilities

The Food Safety Lead should hold at least a level four qualifications in Food Safety and HACCP. They are a contact point for all food and drink related issues within LCHS, including all matters related to quality, service and the safety of foodstuffs. The Food Safety Lead presides over the Food Safety Groups and supervises the Food Safety Champions across LCHS. Moreover, they report back to the Health & Safety Committee regarding any problems or issues arising from the reporting system, and observe that the right suppliers and contracted catering provider of food and drink are employed within LCHS. Finally, the Food Safety Lead must put to action any approved decisions from EHO/CQC in respect to food and drink within LCHS, and show evidence of a due diligence defence for LCHS.

4.6.3.7. Food Safety Champion Responsibilities

The Food Safety Champions should have at least a level three Food Safety certificate or L3 HACCP. They are the first point of contact for staff reporting food or drink safety related concerns and logging the report onto a relevant database. In addition, they sign off patient temperature control sheets, and at ward level, the patient fridge temperature control sheets. Moreover, they need to make sure the staff are aware of the remedial measures to their respective tasks, and as advised in HACCP. Their other tasks include reporting back to the food safety group/Food Safety Lead, monitoring staff obligations and answerability with regards to food or drink; supervising and checking the controls imposed via HACCP; attendance monitoring of frequent Food Safety Group meetings.

4.6.3.8. Food Safety Group (FSG) Responsibilities

The FSG are answerable to the Health and Safety Committee. Their duties involve ensuring that the available written policies and procedures are promoted, disseminated and implemented at a Trust level. They are also in charge of quality food supply, high quality service and safety precautions for patients and members of staff. Last but not least, the causes of potential hazards should be addressed at FSG meetings.

4.6.3.9. Food Handlers' responsibilities

Food handlers have a number of duties to adhere to, including: strict adherence to the Food Safety Management System and Food Quality, Service and Safety Manual. They must abide by all Food Safety Policy key requirements and guidelines. Food Handlers must inform their immediate managers of any threat to the health of patients or staff members including their own illness. They must attend relevant food safety training and understand their personal responsibility for their own actions with respect to food safety.

4.6.3.10. Responsibilities of the NHS Property Services (NHSPS): Catering contractor

Some of the key duties of the NHSPS include scheduled yearly check-ups of approved catering suppliers with the outcomes reported to the LCHS NHS Trust. They are responsible for liaising with LCHS Trust regarding food value, service and safety. They must inform the Trust of EHO audits in community hospitals. The NHSPS must ensure the adherence of prepared, stored, handled, cooked or regenerated food to the Food Hygiene Regulations and (EC) 852/2004 Food Stuffs. They must provide food related training provision for NHSPS staff relevant to their job level and role description. The NHSPS must report to LCHS Trust any potential food-related hazards and act in line with their food practices, such as food

disposal and withdrawal. NHSPS is responsible for its own due diligence development with regards to the legal prerequisites. Designing and updating its own business continuity strategy in line with contingency planning (e.g. lack of food provision from the community hospital kitchen). The NHSPS must abide to the written food safety policy and food measures consistent with the Food Safety Act 1990, taking into account HACCP principles.

4.6.4. CPFT Aims and Roles with Responsibilities

In its Scope and Statement of Intent, the policy focuses on its compliance with the Food Safety Act 1990 and all legal documents it refers to. Its aim is to ensure that the Trust's patients and clients experience the best food provision possible. It is interesting to note that in the Cumbria Partnership Foundation Trust (CPFT) Food and Safety Policy, the focus in the area of responsibilities is on individual roles. However, further within the text it is also specified that these individuals are responsible to other bodies as explained below.

4.6.4.1. Head of Facilities

The Head of Facilities is legally, and ultimately accountable for, the practical application of the policy, management of its monitoring and control, as well as policy revision and improvement. Another responsibility is to provide resources for the successful implementation of the policy within the hospital units. The other responsibilities involve ensuring external audit by registered organisations that will check the quality of the relevant food safety standards; food hygiene training for all relevant employees; ensuring that Environmental Health Practitioner (EHP)'s suggestions are approved by the Trust Board of Directors and followed up; regular review of food safety risks.

4.6.4.2. Housekeeping Supervisor/ Catering Supervisor/ Head Chef

The responsibilities for these roles are as follows: overall food safety on a daily basis; safe and hygienic food preparation and regeneration, which is a very delicate process of retaining food quality when returning prepacked products to the natural state (e.g. vacuum-packed products, ready-made, dried and frozen food). In addition, they are responsible for continuous and effective contamination prevention together with employees' adherence to personal hygiene rules, especially, hand hygiene, protective clothing and self-reporting in case of an illness. They are also responsible for ensuring clean conditions of overall work places and pest reporting to the Facilities Manager. They have responsibility for ensuring that the Trust's food safety procedures are adhered to, that structures are put in place, and regular and reliable records systems are maintained effectively. Finally, this role requires individuals to inform and supervise staff, and provide suitable training for them.

4.6.4.3. Housekeeper

The role of the Housekeeper is to maintain implementation of hygiene regulations and standards, especially the ones about hand hygiene, protective wear, and workers' reporting of personal infection or disease. Another area of responsibility is maintaining clean work spaces at all times and reporting vermin to the Facilities Department. In addition, adherence to health and safety rules for food preparation, as detailed in the Food Safety Regenerated Manual, is an additional responsibility. As for the training, the role of the housekeeper is to keep up-to-date training records of individual staff.

4.6.4.4. Catering Assistant

The Catering Assistant is expected to respect personal hygiene standards at all times, in particular good hand hygiene, wearing of protective clothing, and infection and disease self-reporting. They must report to the Facilities Department any incidence of vermin contamination, and at all times adhere to the regulations detailed in the Food Safety Conventional Manual, a document produced by the Trust, in relation to food related activities, such as production and serving. Finally, catering assistants must be regularly upskilled in relation to their food safety knowledge through the appropriate training.

4.6.5. SUH Aims and Roles with Responsibilities

The roles and responsibilities for food safety in University Hospital Southampton Foundation Trust (SUH) are described below

4.6.5.1. Chief Executive

The Chief Executive is ultimately responsible for the implementation of the Food Hygiene Policy.

4.6.5.2. Chief Operating Officer

The Chief Operating Officer is a role with executive responsibility within the Trust and he/she is responsible for food safety services.

4.6.5.3. Director of Nursing and Organizational Development

The Director of Nursing and Organizational Development is expected to implement the policy as well as oversee procedures for the control prevention of infection.

4.6.5.4. Contracted caterers and food retailers

Contracted caterers and food retailers have many responsibilities. They must ensure that the organisation has a well implemented system in place for food safety. In addition they must ensure that safety training is provided for employees and ensure that safety systems are carried out on behalf of the Trust. They must maintain accurate documentation for HACCP and ensure it is properly organised. Furthermore, they must ensure that all documentation regarding food safety systems are available for auditing and inspection. Other responsibilities include ensuring that pest control recommendations are carried out and informing the Trust promptly of any visits from local EHP's and to provide recommended staff with copies and reports. They must inform the Trust of any recurring or serious allegations or complaints of food poisoning. Finally, they must inform the Trust if the contractor is not able to meet legal requirements and/or control critical control points.

4.6.5.5. The Environment Team

The Environment Team also has many responsibilities. These include carrying out food safety audits in a minimum of three wards per week and to providing their recommendations and findings to the contracted caterer. They must consult with the Infection Prevention Team (IPT) to liaise with food retailers and contract caterers in order to ensure actions required by EHP's are carried out. In addition, they must consult with IPT (and external food consultants, if required) and organise timely reviews of the Food Hygiene Policy. Another responsibility of the Environment Team is to liaise with IPT and Care Group Manager regarding the catering contract and food hygiene. They consult with the IPT in handling food complaints or any allegations of food poisoning that may arise from food or drinks provided by the Trust. Finally, they report to the non-clinical support Care Group Manager regarding recurring or serious food safety issues or anything else that cannot be resolved.

4.6.5.6. The Infection Prevention Team (IPT)

The responsibilities of IPT include liaising with the EMT and Non-Clinical Care Group Manager regarding catering contract concerns and issues of food hygiene. They provide advice to the Trust on matters such as food safety and catering contracts as required by the Health and Social Care Act (2008). In addition, they consult with EMT for liaising with food retailers and contract caterers to ensure the actions required by EHI audits. The IPT consult with the EMT regarding the handling of food poisoning allegations and/or food poisoning which may have come about from food or drink provided by the Trust. They liaise with contracted caterers/food retailers in consultation with EMT in ensuring that food safety complaints and allegations of food poisoning are appropriately handled by the food retailer and contracted caterer. They report to the Care Group Manager, any recurring food safety issues and other serious complaints regarding food poisoning and any other matter which cannot be resolved.

4.6.5.7. Care Group Manager for Non-Clinical Support

The Care Group Manager for Non-Clinical Support is responsible for the management of food retail contracts. He/she provides regular reporting to the IPC regarding matters of food safety. They are responsible for liaising with EMT and IPT regarding issues of food hygiene and any concerns which relate to the catering contract.

4.6.5.8. Estates Department

The Estates Department is responsible for overseeing the service provided by pest control and ensuring that the pest control contractor visits are of the correct frequency and that actions are carried out on their recommendations.

4.6.5.9. Ward and Department Managers

The Ward and Department Managers are responsible for appropriate training and/or instruction of staff working in their department and ensuring that they are correctly supervised to guarantee that there is correct adherence to the principles. They are responsible for the implementation of the Food Hygiene Policy and the Trust's Food Safety Standards. Lastly, they are responsible, if required, to escalate through the defined escalation framework any concerns that relate to food hygiene and catering.

4.6.5.10. Consultant Medical Staff

The Consultant Medical Staff are responsible for ensuring that the junior staff read and understand the Trust's Food Hygiene Policy and its Food Safety Standards and adhere to its principles at all times.

4.6.5.11. Divisional and Care Group Management Teams

The Divisional and Care Group Management Teams are responsible for monitoring and implementing the Food Hygiene Policy and to ensure that staff comply with the policy.

4.6.5.12. Divisional Director of Operations, Division C (DDC)

The DDC is responsible for ensuring that the IPT are consulted at every stage of the contract as required by the Health and Social Care Act (2008). The DDC is also responsible for placing the food retail and Trust catering contracts.

4.6.5.13. All staff (including permanent and temporary staff)

All staff are responsible for following the Trust's Food Hygiene policy. This includes the reporting of any breaches of the Food Hygiene Policy or the Food Safety Standards to their line manager or the relevant person in charge. They are all responsible for adhering to food safety standards and

making sure that they have received the correct and appropriate food handling training.

4.7. Processes

4.7.1. The Processes Explained in the NUH Policy

The NUH Policy is part of the NUH's health and safety policies and procedures under Estate and Infrastructure, under the following code: HSE1024. The NUH Policy states that the Food Safety Management System (FSMS), which uses HACCP as the legal system, must be read in addition to the policy, as the policy document only highlights some of the main standards and practices. HACCP involves the following steps: keeping records of temperature and monitoring of standards, food waste safe management, secure pest control and ensuring safe cleaning.

Chapter 1 The FSMS is applied to maintain and improve hygiene, structure and confidence in management. The main method used in NUH food production is the cook freeze, whereby all frozen food is reheated at the ward level using Burlodge Ovens. Best practice and FSMS standards must be recognised and respected as the norm at all NUH catering sites. In addition to the reference to FSMS standards, the policy emphasises that temperature control is crucial in protecting food from hazardous substances and contamination. Therefore, the policy provides detailed explanations of temperature control. Furthermore, it lists and explains the main steps of the food safety management system as follows

Table 4-1 demonstrates the steps within the food safety management system

F	Planning a food service	K	Sandwich production
B	Purchase	L	Cooking
C	Delivery	M	Cooling
D	Chilled storage	N	Vacuum packing
E	Frozen storage	O	Portion / packing
F	Dry storage	P	Blast freezing
G	Defrosting	Q	Holding freezer
H	Decanting	R	Picking
I	Preparation	S	Dispatch / transport
J	Repacking		

Table 4: NUH Food Safety Policy Version 2 (May 2014; and revised in May 2016).

Table 4 demonstrates the steps within the food safety management system, starting with planning a food service and purchasing and delivery of the purchased items. The next stage is storing the food, which can be kept as chilled, frozen or dry food. The policy explains how this food is kept at the appropriate temperature and at an appropriate location. Similarly, it details the defrosting, blast freezing, cooling and decanting processes. It also describes different types of packing, such as repacking, vacuum packing and portion packing.

Furthermore, the policy contains guidelines on food preparation together with sandwich production and cooking. Finally, picking, dispatching and transportation are detailed at the end of the processes. In addition, the

policy provides some details related to the following aspects of food safety, namely cleaning, maintenance, pest control, personal hygiene, monitoring / recording / reporting.

4.7.2. Processes in the NHFT Policy

There are many processes covered in the policy which address specific areas and provide guidelines on best practice. There is no need to explain the processes for each as this information is in the policy (pages 7-20) but these are the areas covered below.

- Hand Hygiene
- Protective Clothing
- Management of Food Production
- Premises
- Kitchens
- Cleaning Schedule (Main Kitchens)
- Pest Control
- Food Purchasing and Supply
- Food Deliveries
- Food Storage
- Temperature Control
- Allergens
- Visitors and Staff Bringing Food into the Hospital
- Take-Away Meals
- Food Handling, Preparation and Cooking
- Cooking, Cooling and Re-heating
- Freezing and Defrosting Food
- Patient Catering
- Patients/Outings
- Food Transportation Equipment and Trolleys
- Equipment
- Ice Making Machines
- Food Waste

- Washing Up

The main process used by NFHT is HACCP. This is presented as a flow diagram consisting of 15 stages to be considered when dealing with food procedures. This is a simple and easy to follow guideline that can be applied to all areas of food management systems.

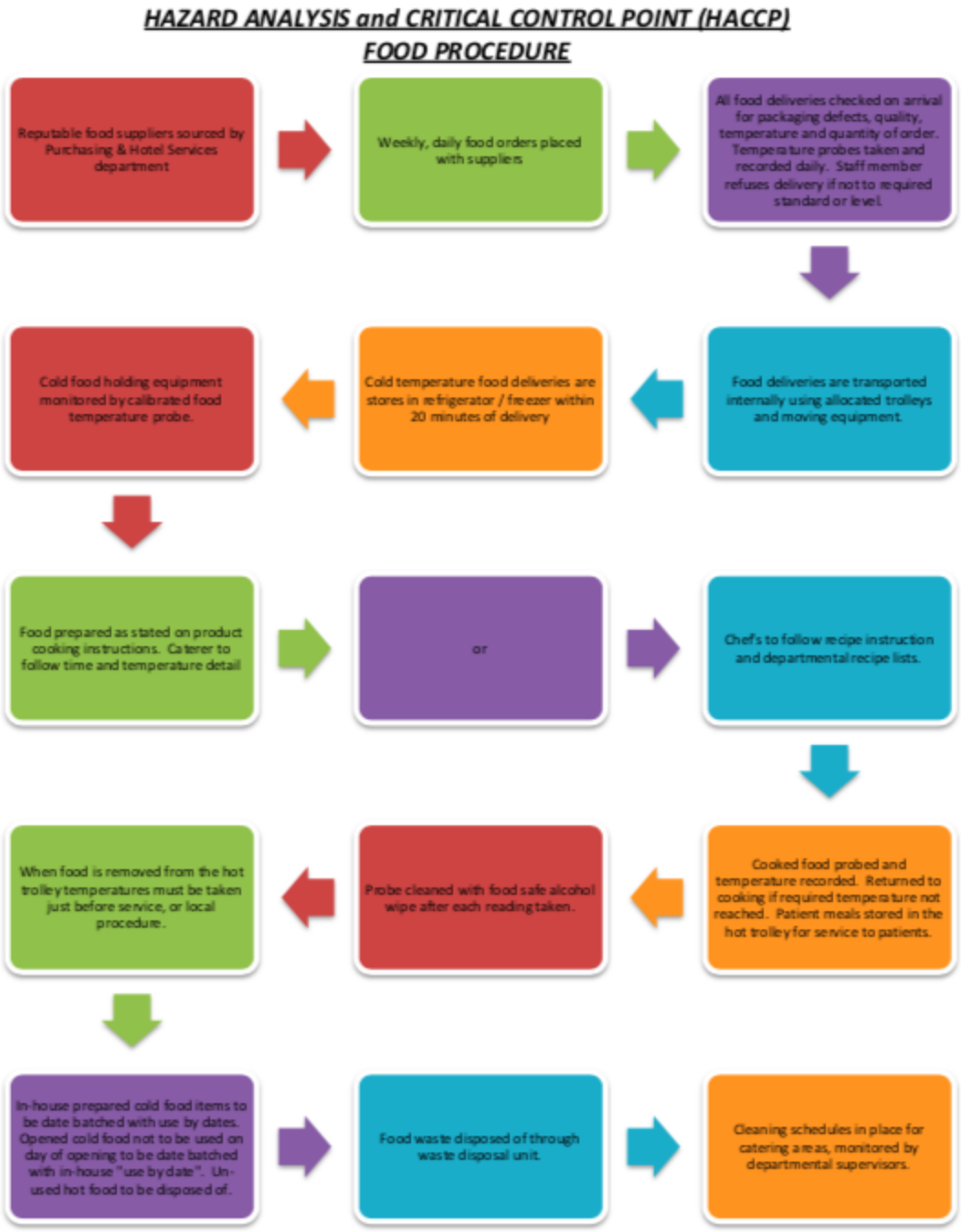


Figure 4-1 Hazard Analysis and Critical Control Point (HACCP) Food Proceure

4.7.3. Processes in the LCHS Policy

In the LCHS Food Safety Policy there is no separate section for processes. Instead, these are mentioned in two other sections. First, there is a very short section called "Scope", which states "that the Food Safety Policy

applies to the following: planning, serving, storing, disposal of waste, support and care for patients, recommendations for food intake and other related guidance; food transportation to patients' homes or other communal accommodation; purchasing food for patients living in the communal accommodation; training provision".

These are detailed under the section on processes in the NHFT Policy (excluding training), whereas the NUH's Policy requires the use of the Food Safety Management System (FSMS) alongside their food safety policy, in which they only highlight the main process points. The LCHS Policy has a separate section on food safety policy for the HACCP food safety management system, where it states that its key features are cleaning and training. Therefore, the LCHS Policy continues with the important processes selected from this system, listing and explaining them in more detail. This means that the processes have been included in the section on compliance with HACCP (Pages 15-20)

The following processes are listed:

A - Food provision planning

B - Buying and delivering food

C - Storing chilled food

D - Storing frozen food

E - Storing dry food

F- Preparing food

G - Cooking process

H - Cooling process

I - Food reheating process

J - Keeping food hot and hot food service

K - Food vending machines

L - Food transportation

M - Palliative care (addressing pain only)

N - Food advice and guidance to patients in the community/at home

O - Ward kitchens

P - Supplementary drink preparation

Q - Food made or purchased by patients or their visitors.

4.7.4. CPFT Procedures (Policy Content)

The NHS usually contracts national providers to ensure that the quality standards are met with ease. The recommended preferred suppliers should be used across the NHS as the first choice. This makes the insurance procedures more convenient in cases of an incident related to food-borne disease. The NHS Supplies Department must authorise the engagement of any alternative suppliers, which means that all suppliers must be approved before any purchase. The policy forbids the purchase of fresh seafood, discount-price food and food made with alcoholic ingredients. The Trust food delivery guidelines must be adhered to. The Trust also provides food safety guidelines on food storage, which also must be respected. Food provision in CPFT requires that the food safety manual be consulted constantly so as to prevent any food-related issues from occurring. They do not include a HACCP or Food Safety Management System within the policy but there are guidelines on processes for specific areas of food production (pages 8 – 12). These are available in the document but are listed below:

- Purchasing
- Food supply
- Delivery
- Storage
- Preparation
- Temperature control
- Food stuffs brought into hospital
- Equipment
- Use of microwaves
- Wash up
- Menus

- Food waste
- Personnel
- Medical screening
- Personal hygiene standards
- First aid
- Protective equipment
- Hand washing
- Environmental Health

4.7.5. Processes in UHS

The Southampton Food Hygiene Policy has named the processes as "Food Operations", whereby it has included various appendices to its food safety policy. For instance, food safety standards are presented in Appendix (A) so as not to repeat them in the policy. Similarly, for the purpose of clarity and brevity, the guidelines on the preparation and storage of infant powdered foods are included in Appendix (D). In Appendix (C), the policy lists key rules for personal hygiene related to hand washing, nails, coughing and sneezing, wiping hands, as well as the responses to cuts and burns coverage. In addition, the same appendix explains food handling, ward kitchen responsibilities and access, storage, food service, and food brought in by patients or visitors.

Furthermore, in the UHS Policy, Appendix (F) details food hygiene policy exceptions related to cancer care. This appendix is very detailed compared to other hospitals' policies. Finally, Appendix B has a very well-structured operation stage following the HACCP system (Step $\rightarrow$ Hazard $\rightarrow$ Control Measure $\rightarrow$ CCP (Critical Control Point) $\rightarrow$ Critical Limits $\rightarrow$ Monitoring Procedure/ Documentation $\rightarrow$ Corrective Action). For example, the service of ambient-temperature foods, as one of the steps, has microbiological, physical and chemical poisoning hazards, and the relevant control measures include placing such food away from potentially infected items or

cross-contaminants. No CCP or critical limits are included in the step. The monitoring procedure consists of visual checks and, as a corrective action, all contaminated food items must be thrown away. Overall, the UHS Food Hygiene Policy is very well-organised, concise and links different steps and related operations following HACCP in a clear table, followed by appendices which further detail individual elements of the comprehensive table overview.

Table 4-2 HACCP Plan for University Hospitals Southampton NHS Foundation Trust:

Step	Hazard	Control measure	CCP	Critical limits	Monitoring procedure/ documentation	Corrective action
Refrigerated Storage	Bacterial multiplication. Microbiological, physical or chemical contamination.	Target temperature for all fridges 5°C or below. Foods to be dated, within date and stock rotated. No raw food to be stored at ward level. Food to be kept covered.	Yes	8°C for high risk refrigerated foods. No out of date food.	Check temperature of refrigerators daily. Daily date checks. Visual checks. Complete refrigerator monitoring form daily	Follow fridge/freezer breakdown procedure. Any out of date, food not dated or contaminated foods to be disposed of.

Step	Hazard	Control measure	CCP	Critical limits	Monitoring procedure/ documentation	Corrective action
Frozen Storage	Bacterial multiplication. Microbiological or physical contamination.	Target temperature for all freezers -18°C or below. Foods to be stock rotated, dated and within date. Food to be kept covered.	Yes	-13°C for high risk frozen foods.	Check temperature of freezers. Date checks. Visual checks to check food is covered, stock rotated. Complete freezer monitoring form daily.	Follow fridge/freezer breakdown procedure. Any out of date or contaminated foods to be disposed of.
Dry storage	Microbiological, physical, chemical contamination.	Manufacturer's guidance to be followed for all dry foods. Opened foods to be stored in plastic lidded containers. Food to be dated, within best before date, stock rotated.	No		Check dates weekly. Visual checks.	Any contaminated or out of date foods to be disposed of.
Low risk food preparation	Microbiological, physical, chemical contamination.	Food & hand contact surfaces to be disinfected. Foods to be kept away from sources of contamination during preparation. High standards of personal hygiene, including strict controls after contact with patients.	No		Visual checks.	Any contaminated foods to be disposed of.
Service of ambient foods	Microbiological, physical, chemical contamination.	Food to be placed in areas away from potential contaminants during service.	No		Visual checks.	Any contaminated foods to be disposed of.

Step	Hazard	Control measure	CCP	Critical limits	Monitoring procedure/ documentation	Corrective action
Hot Service	Bacterial multiplication. Microbiological, physical, chemical contamination.	Food served as soon as possible after heating in microwaves. Food to be located away from potential contaminants. Clean & disinfected crockery, cutlery & utensils to be provided. Foods to be covered where possible. Leftover foods to be disposed of. Good standard of personal hygiene.	Yes	Hot food to be served within 15 minutes of microwaving.	Visual/time checks.	Any foods contaminated to be disposed of. Dispose of hot foods left for more than 15 minutes of time of microwaving.
Cold Service	Bacterial multiplication. Microbiological, physical, chemical contamination.	High risk food to be kept in refrigerator whilst awaiting service. Food to be located away from potential contaminants. Clean & disinfected crockery, cutlery & utensils to be provided. Foods to be kept covered.	Yes	High risk chilled food only to be held out of refrigeration for service once only, and for less than 1 hour.	Visual/time checks	Dispose of leftover cold foods at end of service, or place in refrigerator at 8ºC or less and serve straight from refrigerator. Any foods contaminated to be disposed of.

4.8. Monitoring Compliance with Policy and Reporting Mechanism

4.8.1. NHFT

The method for monitoring compliance with the NHFT Policy is the same as explained in HACCP (the relevant section is attached to the Policy). Monitoring ensures food provision from trusted suppliers following the FSA guidelines. Staff are responsible for monitoring as are managers, supervisors, health care assistants (HCA) and food handlers. The compliance is observed and recorded daily, weekly and monthly and reported to the Hospital Services Management that is also, together with supervisors, responsible for the follow-up actions.

4.8.2. LCHS

In the LCHS Trust, the Food Safety Group monitors any food safety issues, which must be reported by all the member of staff as soon as they are noticed. They meet at least 4 times a year and it is the role of the Chairman of the Health and Safety meeting to record important findings. Every June an annual report is written on the Food Quality Management, including

service and safety. It is distributed to the Health and Safety Committee, after which any information about hazards is reported to the Heads of Clinical Services who would share the same with the Business Units they work in. National standards of best practice in clinical effectiveness must be met by the Trust. These are decided by Department of Health (DoH), National Institute for Health and Clinical Excellence (NICE), NHS Litigation Authority (NHSLA), Care Quality Commission (CQC), and the Clinical Negligence Scheme for Trusts (Maternity).

Table 4-3 Monitoring and Compliance in LCHS

Aspect being monitored	**Monitoring method**	**Individual responsible**	**Frequency**	**Report to**	**Compliance**
Ensure records up to date	FSA	FC-C	Annual	FMG	HF
Training kept up to date	EHP	EHP	Bi Annual	FMG	HF
Food preparation carried out safely and accordance to Food Safety Act 1990	FSA	FC-C	Annual	FMG	HF
Risk assessment/ COSHH data kept up to date and complete	FSA	FC-C	Annual	FMG	HF

Abbreviations: FSA, Food safety Audit; FC-C, Facilities Coordinator-Compliance; EHP, Environmental Health Practitioner; FMG, Facilities Management Group; HF, Head of Facilities

In the LCHS Policy, the section on reporting mechanisms is separate from food safety processes, which are part of HACCP. This is perhaps because this mechanism is specific to the Trust, whereas the food safety processes are part of the international food safety management system, which is the same for all the parties involved. This section states that any staff member is in charge of monitoring food safety and if they notice anything untoward, they must report it to a food safety champion in their area, who will then pass the concern on to the main ward manager or the most senior member of staff. The issue will where possible be resolved within the ward and the champion will report it at the first opportunity to the food safety group meeting. In cases when the incident cannot be resolved locally, it must be recorded on the hospital intranet, under a section named Infrastructure and resources, (subcategory - Environmental matters), Incident reporting form, connected with food safety.

4.8.3. CPFT

CPFT has a monitoring process that involves six stages. These are: Aspect of compliance or effectiveness being monitored; Monitoring method; Individual responsible for the monitoring; Frequency of the monitoring activity; Group / committee which will receive the findings / monitoring report; Group / committee / individual responsible for ensuring that the actions are completed. As we can see from table 5 below (Cumbria…Policy, 2017:14), specific staff and departments are designated with fulfilling roles during each process stage. This includes both internal and external organisations. The ultimate responsibility is with the Head of Facilities who ensures and actions are completed and legislation, procedures and standards are updated accordingly.

Table 4-4 Monitoring Compliance with this Policy

7. MONITORING COMPLIANCE WITH THIS POLICY

The table below outlines the Trusts' monitoring arrangements for this policy/ document. The Trust reserves the right to commission additional work or change the monitoring arrangements to meet organisational needs.

Aspect of compliance or effectiveness being monitored	Monitoring method	Individual responsible for the monitoring	Frequency of the monitoring activity	Group / committee which will receive the findings / monitoring report	Group / committee / individual responsible for ensuring that the actions are completed
Ensure the Food Safety records set out in the Food Safety Manual are up to date.	Food Safety Audit	Facilities Coordinator - Compliance	Ongoing	Facilities Management Group	Head of Facilities
Training of staff is kept up to date	External auditor from EHP Reports/Visits	EHP	Ongoing	Facilities Management Group	Head of Facilities
Ensure that food preparation is carried out safely and in accordance to the Food Safety Act 1990.	Food Safety Audit. Observational site visits	Facilities Coordinator - Compliance	Annual Scheduled	Facilities Management Group	Head of Facilities
Ensure that risk assessments have been completed and that all COSHH data information is kept up to date and complete.	Food Safety audit	Facilities Coordinator - Compliance	Annual	Facilities Management Group	Head of Facilities

4.8.4. UHS

In the UHS Policy, there is a short section on Monitoring Compliance. The policy is open to review at any point by staff or managers, but it must be reviewed after the first year and afterwards every third year. To ensure the policy is implemented and verifications are in place, the food safety manual has various processes in place. The Environmental Health Practioner ensures mandatory inspections of catering and food outlets takes place,

provides copies of reports to the contractors, Governance and trust boards, and the Environmental Team and the Infection prevention Team. There are also internal audits to monitor performance and standards at ward level, and special feeds units. The Trust employs a food safety consultancy, STS, to undertake external audits. Findings are passed onto the Clinical Lead Nurse. Explicit guidelines are provided in HACCP in the appendix.

4.8.5. NUH

NUH includes a Policy/Procedure Monitoring Matrix (pages 27-29) which has seven processes or stages to ensure legislation and policies are being followed. These are: Minimum requirement to be monitored; Responsible individual/group/committee; Process for monitoring e.g. audit; Frequency of monitoring; Responsible individual/group/committee for review of results; Responsible individual/group/committee for development of action plan; Responsible individual/group/committee for monitoring of action plan. Ultimate responsibility is with the TCMT (Trust Contract Monitoring Team). The procedure matrix is below.

Table 4-5

9.0	**Policy / Procedure Monitoring Matrix**

Minimum requirement to be monitored	Responsible individual/ group/ committee	Process for monitoring e.g. audit	Frequency of monitoring	Responsible individual/ group/ committee for review of results	Responsible individual/ group/ committee for development of action plan	Responsible individual/ group/ committee for monitoring of action plan
Daily recording of HACCP & FSMS	Food Handlers. Catering providers & their independent company audit body. TCMT	Monitoring of HACCP & FSMS Spot checks & Audit to correspond with the details set in the Catering contracts.	Daily / Monthly	Catering providers Management TCMT	Catering providers Management TCMT	Catering Management. TCMT
Food safety Issues.	Catering providers TCMT Nutritional Steering Committee	FSMS DATIX Reports	Daily / Monthly	Catering providers TCMT Other outlets must be issued and follow e.g. costa, century café etc.	Catering providers TCMT Other outlets must be issued and follow e.g. costa, century café etc.	Catering providers TCMT Other outlets must be issued and follow e.g. costa, century café etc.
Foreign Bodies	Catering Providers	DATIX	Daily	Catering providers TCMT	Catering providers TCMT	Catering providers TCMT
Management of food safety	Catering providers. Nutrition Steering Committee (NSC) Clinical Effectiveness Committee (CEC)	Annual report	Annual	Catering providers. Nutrition Steering Committee (NSC) Clinical Effectiveness Committee (CEC)	Catering providers. Nutrition Steering Committee (NSC) Clinical Effectiveness Committee (CEC)	Catering providers. Nutrition Steering Committee (NSC) Clinical Effectiveness Committee (CEC)

	Organisation Risk Committee (ORC)					
Food Safety Rating	local Environmental Health Officer STS	Audit	Yearly or as scheduled.	TCMT	TCMT	TCMT
National standards of best practice in relation to clinical effectiveness.	Department of Health (DoH), Care Quality Commission (CQC), NHS Litigation Authority (NHSLA), National Institute for Health and Clinical Excellence (NICE) and the Clinical Negligence Scheme for Trusts (Maternity).	Audit	As required	Clinical Effectiveness Committee (CEC)	Clinical Effectiveness Committee (CEC)	Clinical Effectiveness Committee (CEC)

4.9. Training, Implementation and Resources

The Food Safety Act 1990 and the Food Hygiene Regulations 2013 legally oblige the owner(s) of any food related company that the food production staffs employed by the company are well-managed, and that they receive food hygiene and safety training relevant to their duties in the company.

4.9.1. NUH Trust's Training

The NUH Policy details implementation and resources (funding) for the training. It does not require any specific training for the Food Safety Policy itself, but catering teams, support teams and directorates must train food handlers in the areas related to their work and responsibilities, which are included in SOPS within the FSMS. Also, where necessary, staff must take Foundation Food Safety courses Level 1 and 2. In practice this means that the training consists of the following components: Induction, Level 1-2, Refresher year 1, and Refresher year 3. The following professions require

Induction, Level 1-2 and Refresher year 1: Catering staff, Catering Supervisor, Nutrition Nurse. On the other hand, Nursing, Support Teams and volunteers need Induction, Level 1 and Refresher year 3. Further up the managerial scale, Catering Supervisors, Catering Assistant Managers and Catering Managers need Induction, Level 3 and 4, as well as Refresher year 1 and 3. It is obvious that the more qualified and responsible professionals require more training, but without sufficient training, the consequences can be detrimental at any level of duty.

4.9.2. Training NHFT

Very little is written about training in the NHFT Policy document and training levels are not specified. They only differentiate between mandatory Food Hygiene Training, for food production staff and Specific Training, in Food Hygiene Awareness, for clinical staff and food deliverers. Compared to NUH, the details of the training provision are few and there is no mention of the training steps.

4.9.3. Training LCHS

The LCHS Policy states that HACCP main components refer to training and hygiene. Therefore, a clear picture of the training needs has been detailed in a table explaining the courses and even, target audience, delivery, refresher period, as well as reporting, recording and attendance. Training in Lincolnshire Trust must be provided to all the relevant staff and supervised in accordance with the Trust Mandatory Training Policy.

The Food Safety Lead_is in charge of approving the training which is then agreed through the Food Safety Group. Food Safety Training provided is delivered at 3 levels (L2, L3 and L4) according to the needs of specific staff members and their respective roles. Level 2 training applies to staff involved in preparation, handling, serving, storage, disposal, patient assistance, food transportation, food purchasing. Level 3 applies to Supervisors, Managers, Food Safety Champions and Team Leads responsible for employees doing L2 training. Level 4 is aimed at Food Safety Lead and Head of Estates/Facilities. In addition to these standard forms of

training, at L2 and L3, Food Safety Training can be organised for other stakeholders, such as volunteers, and staff who have not completely taken or fulfilled L2 and L3 responsibilities. It is important to note that training at each level is repeated in the form of refresher courses, which means there is one refresher training every 3 years. At Level 4, Food Safety Lead and Head of Estates and Facilities need to provide evidence of Continued Personal Development (CPD) in this area, organised by external recognised bodies.

4.9.4. CPHF Trust Training

The CPHF Policy details legal requirements, supervision and training requirements related to food safety and hygiene training. All employees dealing with food must be trained and closely observed. This is particularly important for workers who have little work experience, have not been officially trained, or workers dealing with high risk foods. Training related to Food Hygiene has been divided into several levels. These are: Awareness Training; Basic, Intermediate and advanced training. In addition, there is Food Safety Training. Food Hygiene Awareness Training is delivered to staff who have never worked in the catering business. Therefore, it is crucial for such food handlers to be presented with written records of the instructions, and if possible verbal explanations of detailed standards and requirements related to the following aspects: Maintaining individual hygiene and cleanliness; Maintaining clean work spaces, machines and tools; Preparing reasonable quantities of food and at the correct time for consumption, to avoid waste and contamination; Distinctly separating fresh ingredients from cooked food; Ensuring that reheated food is very hot; Safety regulations for food cooking and reheating are observed at any time; Ensuring that timely information about any incidents is passed on their managers or supervisors. The Level 2 Award in Food Safety in Catering, aims to train each member of staff in the essentials of food hygiene, regardless of the area they work in, ranging from catering, therapeutic kitchen, through to the staff canteen and to the wards. The period of time

within which all workers must be trained in the above fields, ranges from 28 days, in case of fully employed staff, to 56 days for part-time workers. Other staff members, such as porters and maintenance workers, who may for some reasons visit the above areas, also must be trained within 90 days after the start of their job and receive the same type and level of training. The Intermediate Food Hygiene Training at L3 Award in Food Safety in Catering, must be delivered within 90 days of job start date to all the chefs who are in charge of preparing high contamination risk food. Finally, advanced food hygiene training is delivered to cook supervisors, who are also in charge of delivery and production of food on premises, and they must receive this training, not later than 180 days after the start of their jobs. Training provision can be either in-house or external. All Food Safety Training must be recorded. It is also a requirement for all supervisory employees to receive training in monitoring and recording individual hygiene levels of the workers within their supervision and ensuring that they maintain standards.

4.9.5. UHS Training

In UHS it is a legal requirement that all food handlers are supervised and instructed and/or trained commensurate with their work activities. It is essential that all ward-based food handlers undergo induction training relevant to their post. At induction, staff should be supplied with written guidelines on food hygiene, a signed copy of which should be recorded on their personal file (Appendix C). In general, nursing staff and housekeepers will be involved only in the preparation of low risk food items, and therefore no additional specific training will be required for this group. Staff who are involved in the preparation of high-risk foods, or whose main role function is catering will be required to complete additional food hygiene training, equivalent to Level 2 standard.

4.10. Conclusion

The survey of the five England's NHS Trusts, provided the valuable information about the hospitals' Food Safety and Hygiene Policies. Each Trust's policy was examined in detail and the main information highlighted. It can be seen from the explanations above that there appears an underlying attempt by the policy makers to make the different Trusts' Policies increasingly similar, after several reviews, usually after 2-4 years. The similarities are likely the consequence of common prescribed responses to evolving regulations. Consequently, although there was no official standardization, a clear framework could be discerned and structured in this research in terms of the policy content. Where there were variations in terms of headings and sub-headings, it was still possible through the similarities in the subject matter to prepare the individual policies for the comparison within the same framework as exemplified in the discussion. It also must be noted that the review dates for different policies vary and that the most recent versions are more advanced compared to the previous ones, both within a single hospital and among the trusts. In the following chapter we will discuss the policies of the five hospitals and conclude with recommendations in terms of how these practices can be applied to the development of a common policy for Saudi hospitals.

Chapter 5 : Functional Discussion of the Food Safety Policies of Five NHS Hospital Trusts in the UK

5.1. Comparison of the hospital sizes

This section will identify the hospital sizes by comparing number of staff and patients admitted per year, the number of the main hospitals and centers per trust, as well as the number of wards and beds. Table 1 illustrates the relative sizes of the Trusts based on information from the Trust's Food Safety and Hygiene Policies and other hospital documents referenced in the text.

Table 1 Summary information comparing the Five trusts

Table 5-1 Summary information comparing the Five trusts

NHS TRUST	No of Staff	No. of patients/ year	No of main hospitals/ centers	No of wards	No of beds
Nottingham University Hospital (NUH)	14500	826,656	3	87	1700
Northampton General Hospital (NHFT)	4545	880,000	4	33	765
Lincolnshire Community Health Services (LCHS)	7800	775,000	4.	71	602
Cumbria Partnership	4000	100,000	4 NA/Not applicable -	NA	700

NHS Foundation Trust (CPFT)					
University Hospital Southampton (UHS)	10,500	785,000	3	NA	1372

The five hospitals whose policies were analyzed and compared are of varying sizes as outlined above in Table 1. The largest hospital is Nottingham University Hospital (NUH) with approximately 14,500 staff, followed by The University Hospital Southampton NHS Foundation, with around 10500 employees. The remaining hospitals are of medium size with 7800, 4545, and 4000 members of staff. The policies of each Trust vary in emphasis on procedures and regulations, and how much information they provide to users of the policy. Nevertheless, they all have the same aim, which is to protect patients and staff from food-related diseases, through adherence to food safety and hygiene procedures.

According to Table 1 the largest number of the patients and visitors is in NHFT (880,000), followed by NUH (826,656). The second set according to size is UHS with 785,000, and ULCHS with 775,000 patients. The smallest number of patients per year is in CPFT, 100,000.

If we calculate the number of patients per staff member we find the following ratios: NFHT is highest with 194 patients per member of staff, followed by ULCHS (99), UHS (75), NUH (57) and CPFT (25). NFHT and NUH are the two largest hospitals in terms of patients but in terms of the staff to patient ratio they are extremely different. NUH has invested in high staff levels with 57 patients per member of staff whereas HFHT is 194 patients per member of staff. However, we should be cautious of jumping to any conclusions as this data does not specify the exact roles of each member of staff. But it might be an area of study for future researchers to

investigate as the figures suggest, at least statistically, that HFHT is under more pressure than NUH based on staff/patient ratios.

Another interesting point is that all the Trusts have approximately the same number of hospitals and centers, 3-4, whereas the number of wards varies, 33-87. The number of beds in these five hospitals falls into two categories: below 1000 (602 in LCHS, 700 in CPFT, and 765 in NHFT) and above 1000 (1372 in UHS, and 1700 in NUH). It would be expected that in NHFT, which has the largest number of patients, there would be a patients' advisory group that would be involved in consultations related to food safety and hygiene, and to some extent in decision making. The trust first started addressing this in 2017 in their Communication and Engagement Strategy (Clinical & Group, 2018), with an outline of how they will communicate with the patients and created a specific job of Patient Leader who will feedback patient concerns to the relevant committees of the Trust. This is a very good initiative, but it could be more specific, with provision to focus the next stage of development on food safety and hygiene. It would be useful for them to consult the NUH PPG policy as detailed below.

As for the second largest hospital, NUH with approximately 826,656 patients, they have a Patient Partnership Group (PPG) that is consulted regarding Food Safety and Hygiene Policy. PPG are involved in reviewing and updating the Policy, as well as the Patient menus; the policy is available via the intranet and following patient feedback, amendments are made to both documents. In addition, each year patients and visitors are offered satisfaction surveys to provide valuable feedback related to their perception of the safety of the food and preparation when in the care of the Trust.

Furthermore, there is The Patient Public Steering group (PPG), which is also informed in the same process. They share the same documents and information in communication with the Head of Patient Public Involvement (PPI). It is interesting to note that Catering Managers are present at the PPG meetings each month and periodically at the PPI group meetings organised monthly. This enables them to get direct feedback on service improvements which they can then implement within their teams.

NUH have also developed a new Policy called "We are here for You". This was developed in consultation with more than 1000 staff and patients. From this they developed 12 behavioural standards to ensure best customer service. It has been recommended that these standards should be embedded and revised into other NHS hospital KSFs (Simplified Knowledge and Skills Framework) (Nottingham University Hospitals NHS Trust, 2015). Similarly, UHS has patient consultations through their Patient Experience Strategy which provides them "with a detailed blueprint of how we are putting "Patients First"". This strategy was built on a previous consultation that helped the Trust develop their core values. The strategy states that "We aim to make these values 'what we do' and 'who we are' - in essence they are to become our "DNA;" the building blocks of our organisation. They help us to inspire, develop and support every staff member to live the values for every patient, every colleague, every day." (University Hospital Southampton NHS Foundation Trust, 2012).

UHS states that involving patients makes good sense business-wise as the patients are used to rating their experiences on the internet for different services and products, which may have either positive or negative impact on respect and popularity of an organisation. In addition, the Department of Health published the 'Liberating the NHS: No Decision about me, without me' (2012). This had the objective of ensuring "no decision about me, without me" is the norm. It included proposals to give everyone more say over their care and treatment with more opportunity to make informed choices, as a means of securing better care and better outcomes." ("Patient Experience Strategy," 2012; pp4).

On the other hand, LCHS have few records of patient consultations. In the Engagement and Involvement Analysis in the Policy, the two questions requiring description of the ways in which the stakeholders were engaged in testing the policy or programme proposals, or in gathering evidence available, were answered with an insufficient "yes". Also, in the list of the

consulted stakeholders there is no individual or group of patients Following a serious incident in 2017, The Care Quality Commission Report found that the safety is inadequate (Care Quality Commission, 2017).

In the smallest of the five hospitals, CPFT, there is no mention of patient groups consultations or facilitated general feedback. Feedback exists in the form of complaints, such as the taste of food, its smell or the way it looks. They have a Food Complaint Procedure to prevent repetition of the similar mistakes in the future. This is a reactive response which should be more proactive in consulting patients before the incidents related to food safety and hygiene occur.

Overall, it is obvious that even in the NHS Trust hospitals in different cities, there is no standardisation regarding patient consultations in terms of Food Safety and Hygiene Policies, although they are all requested to follow the same HACCP Principles. Even in the smallest hospital CPFT, the detailed complaint procedure is seen as a way to prevent future mistakes, whereas it is actually reactive and not proactive as patients' satisfaction surveys should be conducted on a regular basis irrespective of the previous results. It is also evident that larger hospitals have more involvement with patients in terms of consultations and that NUH is the leader in this respect. It is strange, however, that the largest hospital NHFT has no public records of patient surveys or the involvement of Patient Groups in the design or update of Food Safety and Hygiene Policy.

5.2. Aims

In this section, aims, roles, and responsibilities with regards to food safety and hygiene in the five discussed NHS hospitals' Food Safety and Hygiene Policies will be compared and contrasted.

The policies are in line with Food Hygiene (England) Regulations 2013 Reg (EC)852\2004 on Hygiene of Food Stuffs. All five hospital policies state their aims in line with legal regulations and governance, although the level of detail varies. The common aims are as follows:

- Prevention and control of food hazards development (NUH, NHFT LCHS)
- Ensuring everyone's safety from pathogen infection and contamination such as physical and chemical (NUH, NHFT)
- Prevention of food allergies (NUH, NHFT)
- Carry out its catering operations with all due diligence (CPFT).
- Set standards in line with best practice, as set down in the Industry Guides to Good Practice (UHS)
- With the ultimate aim to protect the Trusts patients, staff and visitors from food-related illness (UHS)

5.3. Results Part Three

According to the Equality Act 2010 and the NHS Act 2006 (Duty to Involve) and The Equality Act 2010 (in NHS, UK, 2013) it is illegal for professionals and public authorities involved in food (goods), premises and services to people, to discriminate against a person with a protected characteristic or making a victim of anyone during service provision, such as food/goods and various facilities. The person is protected both when requesting a service and during the course of being provided with a service. Furthermore, The National Health Service Act 2006, and its amended version in the Health and Social Care Act 2012 (in NHS, UK, 2013), obliges the NHS Commissioning Board and clinical commissioning groups to seriously consider the need to minimize inequality related to patients' access to different stages of health care provision, and its outputs and accounts on overall NHS services. Therefore, it is a legal duty for hospitals and trusts to introduce several consultations with relevant bodies and individuals before introducing the Food Safety Policy. Table 1 shows a compilation of the consultations that were conducted in the five UK Trusts and hospitals.

Table 5-2 Professional Bodies consulted before the introduction of the policies

*	NUH	NHFT	LCHs	UHS
Directorate of Estates and Facilities Management	✓			
Control Team Lincolnshire Community Hospitals Education			✓	
Trust Health and Safety Committee Local Authority Environmental Health Officer	✓		**x**	
Training Team Assisted Discharge and Stroke Services Independent Living Teams Health			✓	
Healthcare Assistants				
Community Occupational Therapists	✓			
Trainers, Assisted Discharge Services				
Health and Safety Advisor		✓		
Food Safety Lead/Group2			✓	
Infection Prevention and Control**	✓	✓		✓
Environmental Health Officer	✓			
Nutritional Steering Committee	✓			
Patient Partnership Group	✓			

Risk Management		✓		
Matrons Forum		✓		
Organization Risk Committee, Dietetics & SMT	✓			
Safety Committee			✓	

Adapted from: NUH, 2017; NHFT,2017; LCHs, 2014; CPFT,2017; UHS, 2015

* CPFT is not mentioned in the above table as there is no mention of consultation in their published policy.

**Infection Prevention and Control and Control Team (only mentioned as responsible although not explicitly as engaged in consultations).

Table 2 demonstrates that the NUH Trust has consulted eight professional bodies before the introduction of the Food Hygiene Policy. This is more than any other Trust. NUH and NHFT covered all the professional roles in their consultations but with slight differences in approach. NHFT tended to consult people performing specific roles, such as the manager, advisor, lead nurse and officer. The NUH Trust tended to consult committees and groups, recognising that these groups had collective responsibility for food safety and hygiene. In NHFT, it has been stated explicitly that the Care Quality Code is not applicable, whereas in NUH Trust, the Nutritional Steering Committee is responsible for controlling all food safety issues which must be reported directly to them. In addition, the Trust must ensure that there are written policies and procedures to support the provision and delivery of food and nutrition to hospital patients and actively promote the Trust-wide implementation of these. Furthermore, The Management of Food Safety Reports must be distributed to the Nutrition Steering Committee (NSC) annually.

The Nutrition Steering Committee is also responsible for the provision of staff training and supervision using the Trust Mandatory Training Policy and the FSMS. It shares the information and actions with the Clinical Effectiveness Committee. Furthermore, The Patient Partnership Group (PPG) is informed of the policy; it collects feedback from patients, for instance on patient menus and, based on the feedback, suggests amendments. The Catering Management Team attends monthly meetings of PPG. There is consultation and communication with stakeholders, such as public and patient groups.

In NHFT Policy there is no special role given to patients, apart from the note that for the policy purposes there were consultations and communications with stakeholders, public and patient groups. However, there is no other mention of whether the patient group is active in determining quality assurance and enhancement. In NHFT there is no mention of the Director's Group, whose responsibility in NUH Trust's Policy has been detailed on page 10. Each Directorate team is responsible for food hygiene in their areas. The Director of Estates and Facilities Management ensures development, maintenance and monitoring of all HACCP procedures and principles, that staff training is provided, and that agreed investment in food safety is properly accounted for in the Trust's annual business plan. We can conclude the NUH Trust's policy is more detailed and more transparent, and that the responsibilities lie in committees and groups more than in individual people. Consequently, these responsibilities are both shared and individual.

The LCHS Food Safety Policy, refers to the Equality Act 2010 and the NHS Act 2006 (Duty to Involve). It states that staff representatives from all business entities involved in different ways in food processes, were engaged in gathering or testing the evidence available. Firstly, ward managers and safety advisors were consulted for the policies of NUH and NHFT. In LCHS, more professionals were engaged in developing the policy, such as healthcare assistants, community occupational therapists, trainers and Assisted Discharge Services. In this respect LCHS is more similar to

NUH than NHFT. On the other hand, where the other two Trusts have specific professionals in charge of prevention of infection control, the closest role in LCHS is; Food Safety Lead/Group who were responsible for carrying out the assessment. The Infection Team in LCHS is responsible for the Food Safety Policy, other teams sharing responsibility but not necessarily consulted are: Education and Training Team, Stroke Services, Independent Living Teams and Health and Safety Committee. It is mentioned that the LCHS NHS Trust food safety management system has been designed internally with consultation from the EHO.

However, neither the Nutritional Steering Committee for Patients, nor the Partnership Group, were included in this section of the policy. This is despite the policy clearly stating that the Food Safety Group should agree that the policy's decisions consider the service users' safety. Taking into account the later documents (not mentioned in this policy), The Equality Act 2010 (in NHS, UK, 2013) on discrimination, amendment to The National Health Service Act 2006, from the Health and Social Care Act 2012 (in NHS, UK, 2013), ideally LCHS should have involved patients more, as NUH Trust did, through the Patient Partnership Group. Similarly, NHFT would have benefitted from doing similar and making the patients' involvement more transparent. SUH consulted three bodies before introducing their latest Food Hygiene Policy: the Infection Prevention Committee Catering Group and Dietetics. It seems that this hospital is focussing on prevention, which is one of its strengths.

Table 5-3 Assessments undertaken for Quality Assurance

Assessment	NUH	NHFT	LCHS	CPFT	UHS
Equality Impact Assessment	✓				
Environmental Impact Assessment NA	✓				
"We Are Here for You" Assessment	✓				
CQC (Care Quality Commission) assessment is not applicable		✓			
Human Rights assessment tool (The Human Rights Act, Section 6, 2000) CQC (Care Quality Commission), Core Standards C15 A and B; consideration for all 16 core CQC standards (Policy, p. 22)			✓		
EHP inspection –Environmental Impact Assessment				✓	
Equality impact assessment by STS, (Supply, Training and Service) and food safety consultants to ensure fairness and consistency for all those covered by it regardless of their differences					✓

[1]Care Quality Commission is not applicable

[2]Human rights assessment tool

[3] Undertaken by STS (Supply, Training and Service)

[4] EHP

From Table 3 (above) it is evident that NUH has undertaken several assessments for quality assurance before the introduction of the policy: Equality and Environmental Impact assessment, as well as "We are Here for You" assessments. On the other hand, NHFT have been explicit that the Care Quality Commission assessment is not applicable. This suggests that NUH Trust has invested more effort to assess the impact of the policy, whereas the other Trusts considered it as not applicable. Regarding LCHS, their assessment tool is based on The Human Rights Act, Section 6 (2000), which is very broad and refers to the European Convention on Human Rights (1951). In addition, LCHC Policy shows compliance with CQC (Care Quality Commission), Core Standards C15 A and B; and it shows consideration for all 16 core CQC standards in relation to food safety, (Policy, p. 22).

Table 5-4 Legal Documents Consulted before the Policy Design

Document	**NUH**	**NHFT**	**LCHS**	**CPFT**	**UHS**
Food Safety Act 1990	✓	x	✓	x	✓
Food Safety and Hygiene (England) Regulations 2013 (the same as NUH Trust Policy)	✓	✓	Just states relevant regulations must be	Only mention is "Food safety and hygiene regulations however, must be adhered to on	x

			follow ed	leaving and re-entering the kitchen after a lunch break, visit to the toilet or to any patient area." Page 7.	
The guidelines are in accordance with the current food legislation: HACCP (Hazard Analysis of Critical Control Points), for the central kitchen, and SFBB (Safer Food, Better Business), Food Standards Agency, for kitchens in community care centres; Safer Food - Better Business		✓			
Industry guide to good hygiene practice: Catering Guide 1995					✓
Food Standards Agency 2009					✓

Food Safety Regulations stating the basic hygiene requirements for all food operations: Regulation (EC) No. 852/2004 on the hygiene of foodstuffs Care Quality Commission (CQC) Core Standard C15:A Core Standard C15:B All Core CQC standards with reference to food safety			✓		✓
The Food Hygiene (England) (No2) Regulations 2006.		✓	✓	✓	✓
Chilled and frozen guidelines on cook chill and cook freeze catering systems, 1989	✓				
Control of Substance Hazardous to Health Policy, First Aid at Work Policy,		✓	✓		

Risk Management Policy, Food Hygiene: A Guide for Business, Food Standards Agency, 2006					
Control of Substance Hazard to Health Regulations 2003				✓	
Industry guide to good hygiene practice: Catering Guide 1995 Food Standards Agency 2009			✓	✓	✓ + HM Government 2007
Waste Management Policy			✓	✓	
Guidelines for making up special feeds for infants and children WHO guidelines for the safe preparation, storage and handling of powdered infant formula					✓
Mandatory Training Policy			✓		

Care Quality Commission Guidance (March, 2010)				✓	
Uniform Policy			✓		
Mersey Care Food Hygiene Policy				✓	
Hand Hygiene Policy			✓		
Related Trust Policy/Procedure				✓	
Health and Social Care Act 2008				✓	
Health and Social Care Act 2006/2008			✓		
Food Safety Conventional Manual Food Safety				✓	
Infection Prevention and Control Policy			✓		
Colour Coding of Cleaning Materials and Equipment Policy Infection Prevention and Control Cleaning Manual				✓	

As can be seen from Table 4, all the trusts (NUH Trust; NHFT; LCHS, CPFT and UHS) have consulted some of the relevant documents and regulations

prior to the policy design. On the one hand, NUH lists all the documents, whereas NHFT only details Food Safety and Hygiene (England) Regulations 2013. Similarly the NUH Policy states that "the guidelines are in accordance with the current food legislation, without reference to any individual acts and regulations". This shows that NUH provides more references and is in this respect more transparent to the public and all interested parties. The table above shows clearly that LCHS policy has been very transparent regarding the legal documents which were consulted and taken into consideration before the policy design.

From the UHS's policy, it is clear that out of the five selected hospitals, only this policy refers to the legally bound documents on infants' food preparation and safety. Possibly, they considered some previous evidence and included this area in the policy. The policy also refers to the 'European Food Safety Authority's Scientific Panel on Biological Hazards' document on the microbial hazards in infant powder milk and food. As well as the Department of Health and the Food Standards Agency's document on the provision and storing of infant formula milk in a non-hospital care environment.

Table 5-5 TARGET AUDIENCE

NHS TRUST POLICY	AUDIENCE	PERSON IN CHARGE
NUH	Catering Managers and Catering Staff Clinical Leads; Service Managers Matrons; All Trust Food Handlers; Trust Volunteers; Tenants and Contractors.	The Chief Executive (CE) holds ultimate responsibility for Implementation of the Policy. Section on Roles and responsibilities details other activity responsibilities.

NHFT	All users of hospital wards kitchens and community home kitchens	The CE has the ultimate responsibility; other responsibilities detailed in roles and responsibilities.
LCHS	All staff members have been recognized as the target audience	The Trust Board is accountable for the activities and the CE on behalf of the Board is responsible for the compliance; other responsibilities are detailed in Responsibilities.
CPFT	All the staff employed: permanent employees, contracted staff or Service Level Agreement / SLA staff	The Head of Facilities is ultimately responsible for the implementation, control, monitoring and review of the Policy; other responsibilities are detailed in Responsibilities. All the staff are responsible for delivery of high quality food, having patients in mind, at all times
UHS	All the Trust staff, Supervisors and Managers, permanent employees, contracted caterers and food retailers, as well as the students on placement; it does not refer to the food brought in by staff members for their own use.	The CE is ultimately responsible for implementation of the Policy; Other responsibilities are detailed in roles and responsibilities; monitoring at different CCP, such as the point of delivery (Ward Managers, Ward Hostesses,

		other authorised ward personnel, ward house keeper etc.)

The five hospital policies' target audiences detailed in Table 5 are focussed on the staff, both permanent and contracted. UHS also specifies that it applies to students on placements while they are on hospital premises. In each Trust there is a leader who is ultimately responsible for the implementation of the Policies, for instance, CE in UHS, NHFT, NUH or the Head of Facilities in CPFT, and the Trust Board represented by CE in LCHS. There are other roles with detailed responsibilities in each hospital. Their duties and responsibilities have been discussed in the sections Roles and Responsibilities. It is interesting to mention that some hospitals have included students on placements, and that CPFT highlighted the importance of the compliance with the Policy by stating that all the staff are responsible and should always be mindful of patients' needs. It is also worth noting that there are big differences in how much information is conveyed to the target audience across the hospitals. This is evident in the information provided on 'definitions' as well as reference to legislation and supporting documents. There is clearly a presumption that the audience will be aware of legislation and therefore it is not always necessary to expand on certain issues. The implications of this are discussed in the following 'Process' section.

5.5. Roles and Responsibilities

The following roles are categorised according to first, second or third level responsibilities, with first being the most important. The purpose of structuring the discussion in this way is so that a hierarchy of responsibilities can be identified.

5.5.1. First level: Trust Board and chief executive.

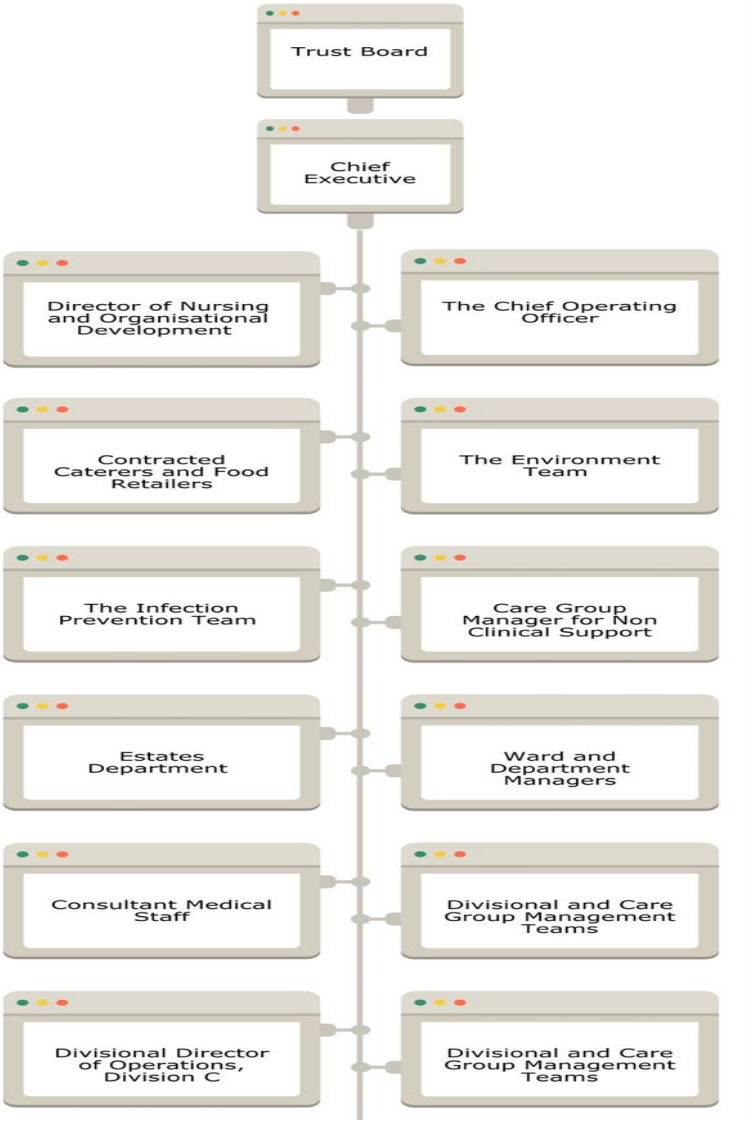
The main accountability lies in the hands of the Trust Board and that is to ensure the quality and all the arrangements are in compliance with the policies. The Trust Board produces an annual report justifying how Food Safety Legislation is completely adhered to. The roles and responsibilities are generally very detailed to ensure clarity and transparency for daily application and in case of emergency and related legal issues.

Chief Executive is the Trust Board representative acting on its behalf to ensure that food safety regulations and food hygiene requirements are adhered to. They must manage effectively food safety procedures in all the food related processes, such as preparation and production, as well as serving the patients and providing them with advice and guidance. All this is to reduce the risk of food contamination in the most efficient way.
What follows is the explanation of the Chief Executive delegation of duty, which is organised similarly in the five hospitals.

5.5.2. Second level: CEO Duty Delegation to Senior staff and Committees – Operational responsibilities

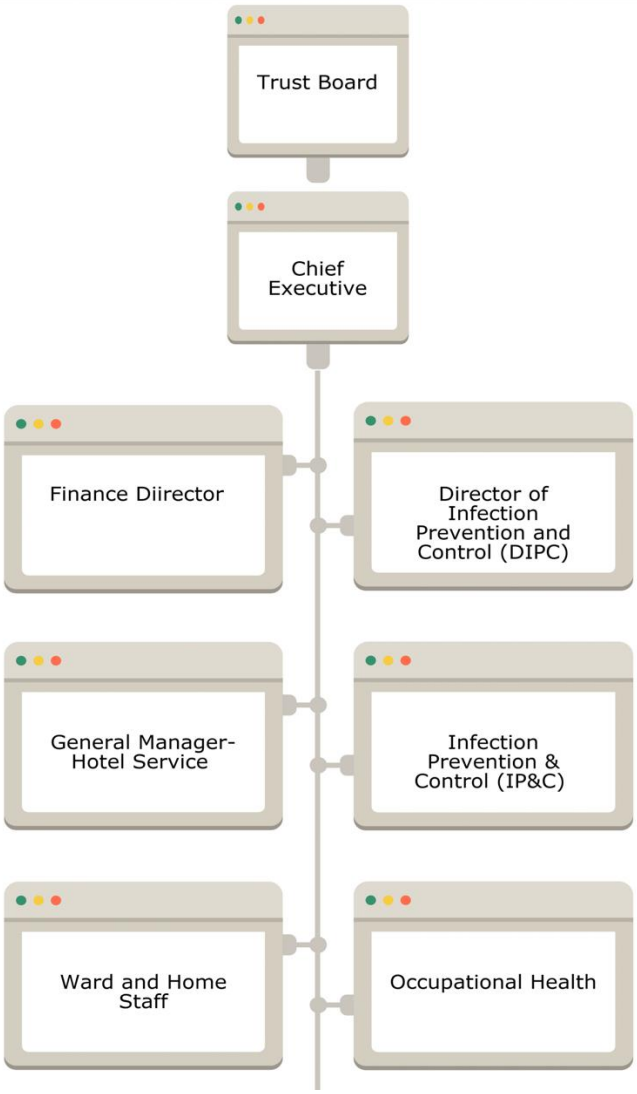
These are the second level of responsibilities, which can be called the executive responsibilities.

Table 5-6 Southampton (UHS)



Firstly, in Southampton for the SUH Food Safety and Hygiene Policy, the Chief Operating Officer has operational responsibility over food safety services, just below the CE. Next, Director of Nursing and Organizational Development oversees infection control and prevention, which is also monitored by the Infection Prevention Team (IPT).

Table 5-7 Northampton (NHFT)

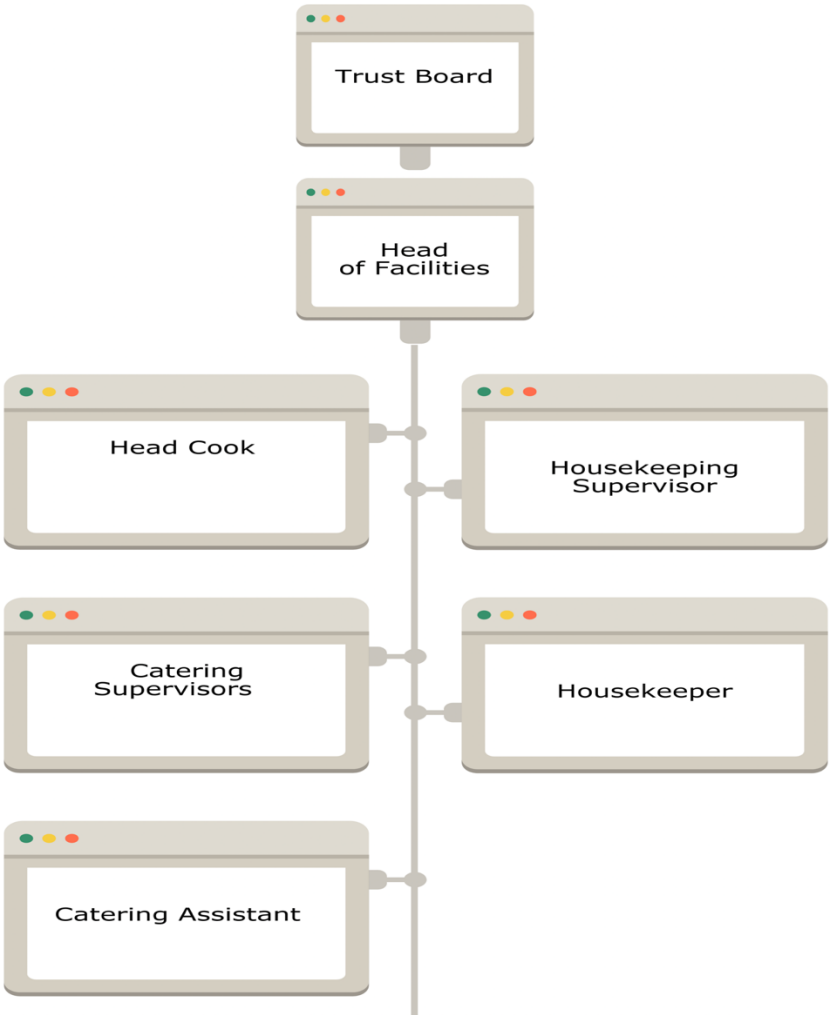


Similarly, in Northampton NHT, there is the role of **Director of Infection Prevention and Control (DIPC**), who has the corporate responsibility for selecting adequate resources provision in terms of high food quality and standardised processes. Additionally, the Director of Finance occupies a senior role, being responsible for ensuring finance for resources are available for relevant departments so that food hygiene services can be delivered. Occupational Health Departments are the first point of call if staffs involved with food suffer from diarrhoea or vomiting, throat infections, skin rashes or boils and other skin lesions. Managers are expected to monitor such sickness and inform occupational health if more

than one member of staff is off duty at one time with a gastrointestinal illness. Other middle responsibility level roles in Southampton Trust are the Care Group Manager for Non-Clinical Support, The Estates Department, Consultant Medical Staff, the Divisional and Care Group Management Teams and Divisional Director of Operations, Division C (DDC).

Food safety legislation states that all food premises are registered with their local Environmental Health Department, however in the various policies the emphasis on the importance of this varies. Southampton is the only hospital which appears to have a specific Environment Team whose purpose is to ensure this legislation is followed. This isn't to say that other hospitals don't follow the same principles, they just have not named teams in the same way. Northampton states that that EHOs are consulted as part of stakeholder engagement. Lincolnshire explains that the local EHO has open access to the trust and therefore can inspect ward kitchens at any point.

Table 5-8 Cumbria (CPFT)



Cumbria is broader in their description of the role of environmental health, stating that wherever food production is carried out, the premises must inform and register with the local Environmental Health Department before any food is provided for others. They also provide a useful definition of the role of Environmental Health Practitioners, stating they are there to provide advice and assistance as well as ensure compliance with food safety law. Nottingham also provides a clear definition of the role of an EHO as well as details of an environmental impact assessment, the purpose of which is to identify the environmental impact of their policies as well as to help identify ways of improving their policy based on events recorded in the assessment.

Table 5-9 Lincolnshire (LCHS)

Only the Lincolnshire Trust has the specific Health and Safety Committee whose Head is responsible to the Chief Executive. Other hospitals do not have a similar senior group with this explicit name that is officially responsible for food safety and hygiene in hospitals. But they are addressing the issues of health safety through different roles. In Cumbria CPFT, roles are organised somewhat differently. Trust Board of Directors is the most important body, but the Head of Facilities is accountable for the food safety and hygiene. At Southampton, the role of CEO and Chief Operating Officer oversees this duty. Under their supervision in terms of

safety and hygiene, are individual roles of Head Cook, Catering Supervisor and Housing Supervisor, Housekeeper and Catering Assistants, which means there are fewer senior and middle management staff in between the front line and the most responsible person. Policy amendment and revision are also carried out by the Head of Facilities, as well as ensuring audit by external registered agencies for food standards, hygiene and food safety, and similar.

Lincolnshire is the only hospital that has a Head of Clinical Services, but this role is also officially responsible for food safety and hygiene. Having all these services managed by one role - Head of Clinical Services, creates greater awareness of the everyday operations within a hospital as well as ensuring different departments and staff are aware of their responsibilities and are arguably better joined up. Clinical services act to collect a series of metrics that enable a department to compare services with the aim of ensuring better information for staff, citizens and stakeholders.

Table 5-10 Nottingham (NUH)

In the Nottingham Trust, Director of Estates and Facilities Management oversees all catering services, catering contract providers, external catering staff and voluntary workers, in terms of compliance to the Policy. Senior

managers and line managers related to catering services must report to this role in terms of compliance to HACCP principles at the relevant levels including training needs and delivery. Importantly, the Director should ensure investment in food safety is included in the Trust annual business plan. The other middle level roles are Divisional Team Director, Director of Estates and Facilities Management and Head of Trust Contract Monitoring Team.

The Contract Monitoring Team oversees various forms of compliance related to food hygiene and safety and the Trust's policies and procedures. These findings are reported annually, along with outstanding actions, to the Nutrition Steering Committee. They ensure contractual obligations are fulfilled within catering and inform the EHO about any legal matters and best practice. They also record food safety risks on the NUH Risk Register and make these risks known to the risk management committee.

5.5.3. Internal Guidance Provider and First Line Management Roles

The responsibility of the internal guidance provider is to liaise with the relevant bodies and ensure the appropriate actions are put in place internally and externally by the contractors. In the Southampton Trust, the Infection Prevention Team (IPT) liaise with contractors and food retailers regarding the EHO's audits, and provide advice on food safety issues, handle any complaints and are accountable to the Care Group Manager for Non-Clinical Support for serious food poisoning issues.

It is interesting to highlight that the Environment Team exists only in Southampton Trust, despite NHS trusts being required to register and work closely with externally employed Environmental Health Practitioners (EHP) and be accountable to the local authority Environmental Health Department. Perhaps that is the reason why the Southampton Policy does

not mention EHPs. The Environment Team is responsible for carrying out and documenting food safety audits on a weekly basis liaising with the contracted caterer including the relevant documentation, ensuring that the required actions are taken. Also, they are involved together with the Infection Prevention Team in the policy review, and handling of food complaints

In the Northampton Hospital there exists a less senior role of Infection Prevention & Control Lead, who is accountable to the Director of Infection Prevention and Control (DIPC**).** Also, Infection Prevention and Control (IP&C) department works closely with Estates and Facilities to ensure projects and schemes are implemented correctly and appropriate solutions are identified, both internally and externally, when a problem occurs.

Another Northampton Trust role, similar to Southampton Chief Operating Officer, is Hotel Services Manager who is responsible for the main hospital food processes. This role should not be mixed up with the lower level role of Home Manager in care homes. In Cumbria Trust, there is no intermediary role between Head of Facilities and Head Cook, Catering Supervisor, Housing Supervisor and Housekeeper who are directly responsible to this most senior role and under whom are Catering Assistants.

In Lincolnshire, a middle management role is the Food Safety Lead. They are tasked with identifying possible concerns which they then report back to the Food Safety Group that have the power to action relevant responses. The Lead represents The Food Safety Group and develops and writes policies and procedures to help with the delivery of Food Quality, service and safety to patients, in line with HACCP. An example of this is the reporting form (p.20). They in turn are accountable to the Health and Safety Committee, just below CEO. The other advisory roles below the Health and Safety Committee roles are as follows:

The Clinical Services Head is responsible for ensuring various policies and procedures are followed and to comply with relevant regulations and standards. They are responsible for setting up food hygiene monitoring and management controls in line with HACCP principles. In terms of compliance they ensure the Health and Safety Committee is informed on any outstanding actions raised in EHO reports or from general food safety operations.

They oversee all necessary training as well as refresher courses so that staff are kept up to date with the latest legislation. From this they are able to hold any staff accountable for abuses of the food safety management system. All the above tasks are defined and agreed upon by the Chief Executive.

The Care Quality Commission (CQC) has 16 core standards that guide food safety. For example, standard C15 ensures that patients are given a choice about the food they consume and that this food is prepared safely and provides a balanced diet. (p.22) i
Senior Managers implement and comply with the Trust's policy by creating food hygiene and management control systems that comply with the principles of HACCP. This is to ensure relevant legislative requirements are met and complied with. Their duties are delegated by the Head of Clinical Services.

At University of Nottingham Hospital the main priority of the Soft FM Performance and Quality Assurance Lead is ensuring that the primary contractor is complying with their contractual obligations in line food safety legislation. The Estates is overseen by The Head of Estates/ Contracted Services (Operational Maintenance) who ensures that buildings and equipment are maintained to a good working order in line with relevant legislation. They are also responsible in ensuring there is adequate funding to deliver this service and to highlight where and when additional money is

required to fulfil this duty. The EFM Capital Projects Manager ensures that any work that needs to be carried out on Trust buildings is delivered to a suitable technical standard and that the work conforms to any mandatory food safety legislation. The Head of Regulatory and Property, also known as Property and Land, relates to letting contracts and ensures that the Trust's Food Safety Policy is implemented.

The Divisional Teams include a director and Divisional nurse. The team is responsible for the production, processing and service of food within their area. This typically involves ensuring food hygiene concerns are raised at team meetings, food handlers are aware of specific responsibilities, all risks are reported to the risk register, food handlers have mandatory food safety training every three years, and that policy details are disseminated to local service managers and staff.

he Trust Lead for Food Safety reports to the Soft FM Performance and Quality Assurance Lead, liaises with catering providers, EHOs, and STS's on matters of food safety. They oversee relevant monitoring, check for legislative updates, and record, investigate and assist on food safety matters. The Soft FM Performance and Quality Assurance Lead performs daily tasks devolved down from the Director of Estates and Facilities Management and is responsible for food safety within catering service. The Trust Contract Monitoring Team ensures that the primary contractor is performing as per catering contract under the current food safety legislation and to the terms set in the internal catering contract.

5.5.4. Third level: Food Safety and Hygiene Standards Implementation Roles

Food safety and hygiene standards implementation roles are the third tier roles. These are typically management roles dealing with aspects of food

service within hospitals. They are accountable to the senior staff and committees, that are in return responsible to CE and Trust Board. First, in the Cumbria Trust, there is a special flat responsibility pattern, without any senior committees between the implementation roles and the most accountable role of Head of Facilities.

This flat management and responsibility system in terms of food safety and hygiene accountability has its advantages, some of which are real-time reporting, improved coordination and speed of communication between employees, elevated employees' levels of accountability, easier decision-making processes and decreased bureaucracy. Some disadvantages of a flat structure are incomplete knowledge of the person who the employees should report to; absence of a specialist for a particular area or issue; flat structure is not suitable for large organisations unless they are divided into smaller departments and units (Meehan, 2018).

An interesting role to analyse at this layer is the one of Housekeeper who is directly in charge of hygiene standards implementation (e.g. protective clothing, and individual self-reporting about infection or disease). They have additional responsibilities such as maintenance of clean work spaces and vermin report for the facilities, implementation of food preparation health and safety regulations and individual workers' training records.

Furthermore, in the same trust, Cumbria, the roles of Head Cook, Catering Supervisor and Housing Supervisor are also at the same level of implementation of hygiene and food safety standards. Their duties have been explained in the Findings Chapter. They are directly accountable to Head of Facilities. In Northampton Trust, the related roles are Ward Manager, Home Manager or Ward Sister. They are responsible for direct implementation of the hygiene standards in wards and kitchens. Their additional role is to monitor obligatory training for other ward staff.

Furthermore, the role of Infection and Prevention Control Lead Nurse ensures compliance with Food Hygiene Guidelines, which has a direct effect on all users of hospital ward kitchens and community home kitchens. In Southampton SUH, contracted caterers and food retailers have the role to ensure food safety processes are implemented and procedures are well-structured, safety training for employees must also be carried out for the Trust.
Contractual obligations also include correct and comprehensive HACCP documentation with organisation of the underpinning actions, and that the documents are readily available for inspections and audits. Other responsibilities include ensuring that pest control recommendations are carried out and informing the Trust promptly of any visits from local EHP's, and to provide recommended staff with copies and reports. Finally, they must inform the Trust of any complaints of food contamination or inability to comply with the regulations.

In Lincolnshire, it is Catering Food Contractor Manager/Supervisor who is directly responsible for food safety and hygiene in hospitals, as they are the ones who prepare and serve the food. Above them are the hospital senior managers, who belong to the middle level of accountability, below the CE. In Nottingham, at the front line of supervision are Matron/Ward Sisters, Nurses/Nursing Staff, but also the Head of Catering/Manager (Catering providers), and the Retail Catering/Head/Manager. The Retail Catering Manager ensures that the Trust's Food Safety Policy and Codes of Practice are implemented in all catering areas and premises are reviewed according to the schedule. This role also reports any food safety problems to the Head of Catering. Other roles are listed in the Findings section on NUH.

We could also classify Environmental Health Officers (EHO) as a third level within a hospital as they ultimately have the power to close services if they do not achieve suitable health standards. The EHOs role is to visit the NHS

hospitals at least once a year in terms of auditing the food hygiene rating. Their other role involves visits to the retailers, suppliers and other catering partner companies. The final reports are available at request unless in case of a breach, which will be addressed by the nutrition steering committee (NUH, Food Safety Policy, 2017)

5.5.5. Other supporting roles

In addition to the first, second and third roles mentioned previously, there are also many supporting roles mentioned in the policies. These vary from hospital to hospital as some may have very different needs and delivery objectives to each other, and so require additional support. In the Nottingham University Hospital Trust, there are other roles responsible for food safety and hygiene. They are Volunteer Services Manager, Patient and Public Involvement (PPI) Group and Nutrition Steering Committee whose role is to support the food provision and ensure the appropriate nutrition to patients. They inform the Clinical Effectiveness Committee about the actions taken and any important information.

Northampton is the only hospital to make reference to Modern Matrons in their policy. A modern Matron is now considered a vital role in clinical governance. Very simply, the Matron ensures that the quality of the care provided is of the highest standard. An example of this is the Matron being consulted by the General Manager for decisions involving in-patient food services. Public and Patient Groups act as stakeholders who are consulted on various issues to ensure the best delivery of service. At Northampton, they may be consulted by the Modern Matrons, Infection Prevention and Control Lead Nurse, Risk Management, Health and Safety Advisor or the EHO. They also refer to a Health & Safety Advisor, this role is about advising on all matters regarding health and safety and how best to implement policies and procedures with regards to food safety legislation. Southampton mentions in its roles and responsibilities section that there is

additional support from Consultant medical staff. Their role is to ensure junior staff have read and understand the hospital's policy and are aware of the Trust's food safety standards. Technically this could be considered a management role as they are overseeing standards and monitoring but as this task is also specifically dealt with by line managers it could be seen as an additional supporting role. Likewise, a Food Safety Group is used at Lincolnshire to provide support with the provision and delivery of Food Quality, service and safety to patients.

They could be considered as a form of supporting service as they provide feedback at meetings regarding food and drink issues. They also help approve HACCP. Therefore, they work closely with senior management and so have a vital role that could also be thought of as a management role given the impact their input has on policy validation. Cumbria's policy does not make any supporting roles explicit in their policy.

To conclude, all of the five hospitals have a management structure in place to ensure that food hygiene and safety policies and procedures are regulated, implemented and monitored. Names of roles or departments may differ slightly, such as a Head of Facilities instead of Clinical services, but essentially, they are all performing the same function, which is to ensure food safety.

5.6. Process

Table 5-11 Process

	CUM	NUH	NHTF	SUH	LINCS
Purchasing	x	x	x	x	x
contracted suppliers	x	x	x	x	x
local suppliers	x	x	x	x	x
Food supply	x	x	x	x	x
Delivery	x	x	x	x	x
Storage	x	x	x	x	x
Preparation	x	x	x	x	x
Temperature	x	x	x	x	x
Cooking, Cooling and re-heating	x	x	x	x	x
Freezing and defrosting food		x	x	x	x
Separate raw and cooked foods (cross contamination)	x	x	x	x	x
Food Stuff brought into hospital	x	x	x	x	x
Parents/carers provision of food		x	x	x	
Patient outings			x	x	
Enteral Feeding				x	
Milk kitchen				x	

Water cooler	x	x		x	
Ice making machines		x	x	x	
Food Trolley Transportation	x	x	x	x	x
Take Away Meals		x	x	x	
Equipment	x	x	x	x	x
Microwaves	x		x	x	x
Wash up	x		x	x	x
Menus	x	x		x	x
Food waste	x	x	x	x	x
Waste Cooking oil	X		x		
Personnel	x			X	x
Medical Screening	x	x			
Personal Hygiene standards	x	x		x	x
First aid	x	x			
Personal protective Equipment	x	x	x	x	x
Hand washing	x	x	x	x	x
Staff health		x		x	x
Environmental Health	x	x		x	x
Routine Inspections	x	x		x	x
Investigation of complaints	x	x		x	x
Hazards warnings	x	x			
Food Hazards	x	x		x	x
Emergency Control order	x				
Food safety	x	x		**x**	
Food hygiene rating		x			x

Food poisoning Bacteria		x			
Allergens		x	x		
Cleaning	x	x	x	x	x
Maintenance (building/fixtures)	x	x	x	x	x
Pest control	x	x	x	x	
Monitoring, recording, reporting	x	x		x	x
Teenage Cancer trust units		x		x	
Access to ward kitchens	x	x	x	x	x

As you would expect in a document created by the five individual Trusts, there are great differences in how each hospital approaches information regarding processes. Table 6 above offers a simple overview of what processes are covered, although this varies in complexity. Nottingham provides a comprehensive overview of processes by listing key definitions, such as 'ambient temperature' and 'Contract caterers,' in order to remove any ambiguity about who and what is discussed in the whole document. The core issues regarding food safety are formed around their internal Food Safety Management System, which lists 18 processes that are categorised alphabetically (A-S). By structuring processes under broad categories, such as 'Planning a Food Service (A) and Purchase (B) it is very easy to find relevant information.

The system also means that categories can be expanded on and updated where necessary. They also include a comprehensive list of relevant legislation, guidance and associated NUH documents, the information from

which are filtered down to staff and teams through relevant departments. They also include an appendix of four documents to ensure staff are aware of processes for specific tasks and areas of work.

Southampton also includes a list of definitions though these are not as complex or specific as Nottingham. Instead they prioritise two categories of food (low risk and high risk). Southampton includes six additional documents in their appendices which clarify procedures. These documents range from common sense guides, such as 'The 10 Golden Rules for Personal Hygiene' (Appendix C, page 27) to the more comprehensive HACCP plan which acts in a similar way to Nottingham's Food Safety Management System. The stages in this process include: Step; Hazard; Control Measure; CCP; Critical Limits; Monitoring Procedure/documentation; and Corrective actions.

Lincolnshire provides a clear list of definitions of key areas (page 11-12) They also have a comprehensive Food Safety Management System/HACCP that addresses 17 key areas (A-P, pages 15-19) to ensure clarity around processes. There is also the inclusion of a 'Reporting mechanism' that applies to all staff members to ensure everybody follows the same processes with regards to detecting and resolving issues (pages 21-22). There is also the inclusion of a section on relevant documentation that applies to food safety, listing 14 pieces of legislation that staff should be aware of.

Northampton has a definitions section but these only define abbreviations and don't go into detail about specific areas (page 5). Section 6 outlines 'Process – Responsibility' (pages 6-7). This provides basic information on who is responsible for certain areas. This does not contain sufficient information to follow the processes, but it would be fair to presume that the purpose of this section is to signpost readers to relevant people and that staff are aware of what these roles involve. Other sections of the

document go into basic detail about procedures, but this is not as well-structured or as easy to find information as the previous hospitals reviewed. The document only includes references to three related Trust policies (page 21), which is very brief in comparison to other hospitals. They do provide a user-friendly flow diagram outlining 15 HACCP stages for food procedure. In order for this document to be effective, staff must be fully aware of procedures which presumably will come from training and team meetings. But the lack of detail and clarity is worrying in comparison to the other hospitals.

Cumbria is the only hospital not to have a section detailing 'definitions' although bullet points are provided for key roles (page 3-4). The document provides lots of information on cleaning procedures (pages 5 - 6) and also includes reference to eight nationwide pieces of legislation and eight related Trust policies (page 16).

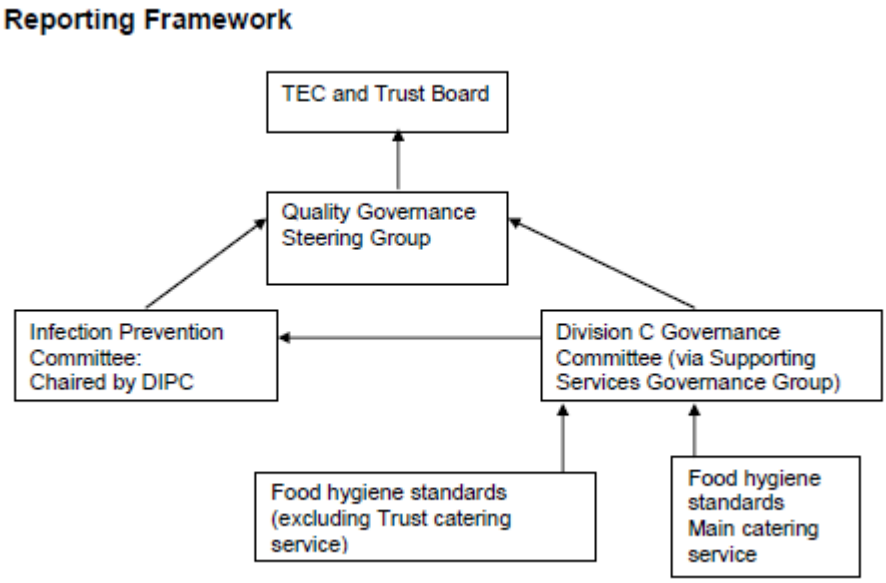
To conclude, there are very different approaches to the information of the policy documents. The best structure appears to be framing the document around HACCP or FSMS as then processes for specific areas can be found very quickly. Cumbria is the only hospital that does not do this, which means it is harder to immediately detect the operational processes. It is also worth noting that different hospitals have different priorities regarding what processes are important. Southampton is the only hospital that contains specific information on a milk kitchen where as Nottingham goes into detail about teenage cancer patients and specific forms of illness, allergens and bacteria. This may simply be because these are areas that the respective hospitals specialise in, although they would perhaps all benefit from a more standardised approach with regards to essential processes that any hospital would encounter.

5.7. Monitoring

Nottingham includes a Policy/Procedure Monitoring Matrix (page 27 - 29) that clearly identifies responsibilities in an easy to follow guide using the following categories: Minimum requirement to be monitored; Responsible individual/group/committee; Process for monitoring; Frequency of monitoring; Responsible individual/group/committee for review of results; responsible individual for development of action plan; and responsible individual for monitoring of action plan. As can be seen from these processes, individuals, committees and groups are able to double check on the progress of each area, thereby removing individual accountability and ensuring a more interdependent approach.

Southampton has a specific section dedicated to 'Processes for Monitoring Compliance' (page 11-12) which includes a breakdown of monitoring for specific areas of the hospital, thereby clearly outlining who is responsible for what. They also have a very useful flow diagram about their internal Reporting Framework (page 12 – see diagram below) so that their monitoring processes are transparent, and all workers understand what happens when an issue is raised.

Table 5-12 Reporting Framework



Northampton have a section on monitoring compliance (page 21). The information provided is very basic. For example, advice includes: "Monitoring frequency – Daily/Weekly/Monthly" (Page 21) but does not specify exactly what has to be monitored daily, weekly or monthly. Lincoln has a section on policy monitoring that includes eight clauses that explain which groups or individuals are responsible for ensuring food safety. All food safety issues are reported and monitored by the Food Safety Group on a quarterly basis. Central to monitoring is the Food Safety Management System (F) which outlines all hazards, controls, critical limits, monitoring and corrective actions.

Cumbria has a monitoring and compliance section (page 7) which breaks processes down into five stages: Aspect of compliance or effectiveness being monitored; Monitoring method; Individual responsible for the monitoring; Frequency of the monitoring activity Group / committee which will receive the findings / monitoring report; and Group / committee / individual responsible for ensuring that the actions are completed. This is very useful as each section directs staff to a specific member of staff or group to ensure everybody is clear about processes.

5.8. Training in the five surveyed England's state hospitals

Of the five- NHS hospital Food Safety and Hygiene Policies compared, it appears that NUH Policy is the most comprehensive. On the other hand, the fewest details on training are provided in NHFT Food safety and Hygiene Policy - only four lines about mandatory food safety training and specific food awareness training. However, there is a little more on food safety in Health and Safety Policy (2015). It seems as if it has been covered elsewhere, but it is not mentioned in the related Trust Policies. The hospital staff would benefit from developing a special Training Policy or adding more details to the existing Food and Safety Policy.

Table 5-13 compares all five policies sections on training and its implementation:

Training-related details	**NUH**	**NHFT**	**LCHS**	**CPFT**	**UHS**
Implementation and resources (funding)	✓	Very brief	Very brief **With reference to the Mandatory Training Policy stating sufficient funding is required to ensure the staff	Very brief *** Additional Trust Mandatory Training Policy exists	✓ ****

			can receive adequate training.		
Training for Food Safety Policy	Not required	Not required	Not required	Not required	Not required
Catering staff: Induction, Level1-2 Refresher-year 1, Refresher-year 3	✓	✓	✓	✓	✓
Nursing, Support Teams and volunteers need Induction, Level 1 and Refresher year 3	✓	✓ Food Hygiene Awareness, for clinical staff and food deliverers	✓	✓	NO Nursing staff and housekeepers will be involved only in the preparation of low risk food items, and therefore

					no additional specific training will be required for this group
Catering Supervisors, Managers and Assistant Managers: Induction, Level 3 and 4, as well as Refresher year 1 and 3	✓	✓	✓	✓	✓
Recording, Reporting and Attendance	✓	NOT SPECIFIED	✓	✓	✓
In-house training; Externally delivered training	✓	Induction – in-house; External training-unspecified	✓	✓	Induction – in-house External training-unspecified

Regarding the LCHS Policy, it refers to the Mandatory Training Policy (2016) ratified by Trust Board, which provides details of training including for the catering staff and managers. UHS Food Safety Policy in Appendix C provides written information as training for non-catering staff using the ward kitchens and pantries, at the end of which the individual staff member has to sign to confirm they have received training in that form. In CPFT Policy (2017) it has been stated that any food handler must complete Food Allergy Training, COSHH Training, Personal Hygiene Training and any other relevant training which will be kept on their personal training plan which will be recorded as part of the continuing professional development plan, CPD certificate.

6.10 Conclusion

To conclude, the five NHS food safety policies explored in this chapter vary in organizational structure and how information is conveyed. However, despite the differences, it is clear that thorough processes are in place and staff are aware of who to contact and when regarding any issues. The following chapter will outline recommendations for Saudi hospitals based on the findings outlined in this chapter.

Chapter 6 : Survey Findings

6.1. Introduction

In this chapter the findings obtained from the questionnaires distributed to the three groups of respondents have been interpreted and analysed. The purpose of the questionnaire was to examine the application of PRPs and food safety procedures in seven Saudi state hospitals in Riyadh, so as to determine the current level of their staff food hygiene awareness, their hygiene practices and supervisory procedures. Finally, the aim was to establish the extent to which government hospitals in Riyadh respect the standards set within the contract approved by the Ministry of Health in Saudi Arabia (2015).

To begin with, the questionnaire was prepared and piloted (Appendix 1) among a selected sample of hospital staff in seven state hospitals in Riyadh. The hospitals are recorded with the following names: AAA, ALIMH, ALYMH, KFMC, KSMC, KSH, PMBA

The sample involved three distinct groups of staff; catering workers, MOH Hospital nutrition Supervisor and contracted catering supervisors, but only two types of questionnaires were produced, Questionnaire A (Q-A) and Questionnaire B (Q-B).

Questionnaire A(Q-A) was used with:

Contracted catering workers expected to have some level of awareness of food safety (148 respondents)

Questionnaire B (Q-B) was used with:

Hospital Catering Supervisors under direct supervision by the MOH (80 respondents).

Catering Supervisors employed by the contracted catering companies (14 respondents).

MOH Hospital catering managers/supervisors are employed as general supervisors in charge of food safety and nutrition in Saudi state hospitals. They are MOH hospital-based staff working for the Nutrition Department in hospitals. Their base professions are either nutritionists, HACCP administrators or head supervisors.

As for the contracted catering supervisors, they are responsible for providing information regarding efficient food safety management during food deliveries and on the hospital premises. Finally, cooks and waiters as catering workers belong to the contracted staff who prepare and serve food in state hospitals. In other words, MOH supervisors are food dieticians and technicians, whereas catering manager and chefs belong to the contracted catering companies.

The Institute of Food Safety Technology is a Europe-based independent qualifying body for food professionals, and in the UK, it is the only body addressing all elements of food science and technology. This organisation operates as a registered charity whose members cover all food chain segments. The organisation accredits degrees, specialist programmes, and short courses to ensure future employees have the necessary knowledge for their work within the health sector. They also offer team professional

development programmes and working closely with SALSA contribute to improvement in small food businesses.

The recognition scheme is firstly designed for large training providers and food businesses that have their own in-house short training, as well as further education colleges and universities providing external training courses Hygiene Level 2 and Level 3 courses can be organised by experts within hospitals worldwide, including the UK and KSA, for instance, and then accredited by IFST.

6.2. Results from the responses

Overall, 242 respondents participated in the whole survey, which was first approved by the General Administration of Nutrition in the Saudi Ministry of Health. All the target groups work in the Nutrition Departments of seven different state hospitals in the city of Riyadh as managers, supervisors (MOH supervisors or caterers' supervisor) and caterers. The respondents were first briefed about the aims and objectives of the questionnaire, after which they voluntarily signed the consent forms and anonymously completed the questionnaires. This means that they had a complete understanding of the purpose of the survey and were given the opportunity to opt out of the research at any point. Three hundred and twenty-nine (329) questionnaires were distributed and 242 were completed. The response rate consists of: a) the hospital catering manager/supervisors was

33%, b) supervisors employed by the contracted catering companies was 6%, and c) the contracted catering workers was 61%.

6.3. Catering workers

All 148 catering workers in the seven selected state hospitals in Riyadh are primarily employed through contracted catering companies. Contracted hospital workers across all the hospitals perform a variety of roles and have various responsibilities. These roles include: cleaners, meat cutters, waiters, fruit preparers, infant milk preparers, chief cook, diet cook, mechanical technicians, food safety monitors and supervisors.

6.3.1. Demographics - Age, gender and nationality

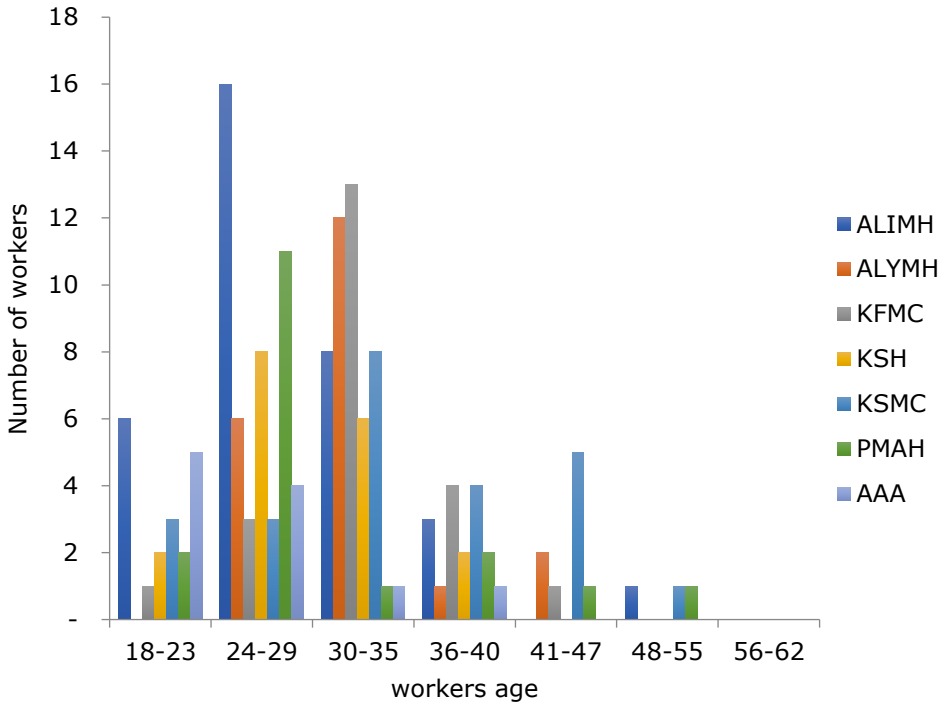


Figure 6-1 what is your age?

In respect of the age group of the hospital workers, the data shows that there are distinct age disparities. Age ranges 24-29 (51 workers) and 30-

35 (49 workers) were highly represented in all hospitals, constituting just over 50% of employees in each hospital and over 75% in selected hospitals such as ALIMH, ALYMH, KFMC, PMAH and KSH. These data confirm lower employment frequencies among those in the age ranges 36-40 (17 workers), 41-47 (nine workers) and 48-55 (three workers). The youngest workers, aged 18-23 (19 workers), had greater representation than mature workers. The data also shows that the ALIMH Hospital employs the highest number of workers aged 24-29, approximately twice as many as those aged 18-23, representing sixteen and six workers respectively. ALIMH had only one respondent in the age group 48-55 and none in the age group 41-47. The demographics for KSMC Hospital are different: 30-35 (eight workers), 41-47 (five workers), 36-40 (four) and 24-29 and 18-23 (three workers) and finally 48-55 (one worker). The other hospitals are between the two extremes. The distribution of age categories among study sites are statistically significant using the Chi Square test (P= 0.001).

Overall, it can be concluded that catering workers are mainly younger than middle-aged employees. The benefit of a younger workforce in catering is that hospitals can provide career enhancing training, which provides motivation for the employee to remain in the job. Maintaining experienced and qualified staff removes the need for extensive entry point training.

6.3.2. Contracted Workers' Gender

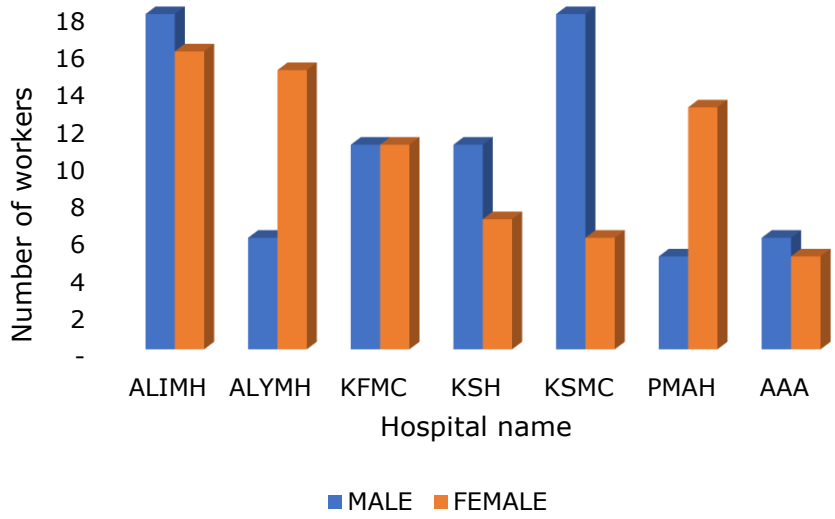


Figure 6-2 what is your gender?

The following **Error! Reference source not found.** is a breakdown of the total number of male and female employed at the seven hospitals used in my case study. The purpose of presenting these statistics is to contextualise how many people took part in the questionnaires.

Table 6-1 Gender distribution in the survey groups

What is your gender?		Female	Male	Total
ALIMH	Freq	16	18	34
	Percent (%)	47.06	52.94	100
ALYMH	Freq	15	6	21
	Percent (%)	71.43	28.57	100
KFMC	Freq	11	11	22
	Percent (%)	50	50	100
KSH	Freq	7	11	18
	Percent (%)	38.89	61.11	100
KSMC	Freq	6	18	24
	Percent (%)	25	75	100
PMAH	Freq	13	5	18
	Percent (%)	72.22	27.78	100
AAA	Freq	5	6	11

	Percent (%)	45.45	54.55	100
Total	Freq	73	75	148
	Percent (%)	49.32	50.68	100

According to the data in Figure 6:2 and Table 1 **Error! Reference source not found.**, both males and females were represented almost equally in the survey group. However, there are differences between the representation of male and female participants in the seven hospitals. The difference of gender across these hospitals is statistically significant using Chi Square test (P= 0.025)

These findings were a surprise given that traditionally more men have been employed in the health sector within Arabic society. For instance, in ALYMH and PMAH hospitals there were more female than male workers. In ALYMH the female to male ratio was 2.5 (15/6). In PMAH the ratio was 2.6 (13/5). Another interesting finding was that in the ALIMH Hospital, which employs the highest percentage (31.4%) of younger workers (24-29), gender was more equally represented with a female to male ratio of 0.88 (16/18). The only hospital to equally employ both genders was KFMC (11 each gender). Other hospitals employed more males than females, for whom 46 male employees were within the 24-29 and 30-35 age groups, and form 61.3% of the whole male population. The difference in gender within age categories was not statistically significant using Chi Square statistical test (P= 0.196).

6.3.3. Contracted Workers' Nationality

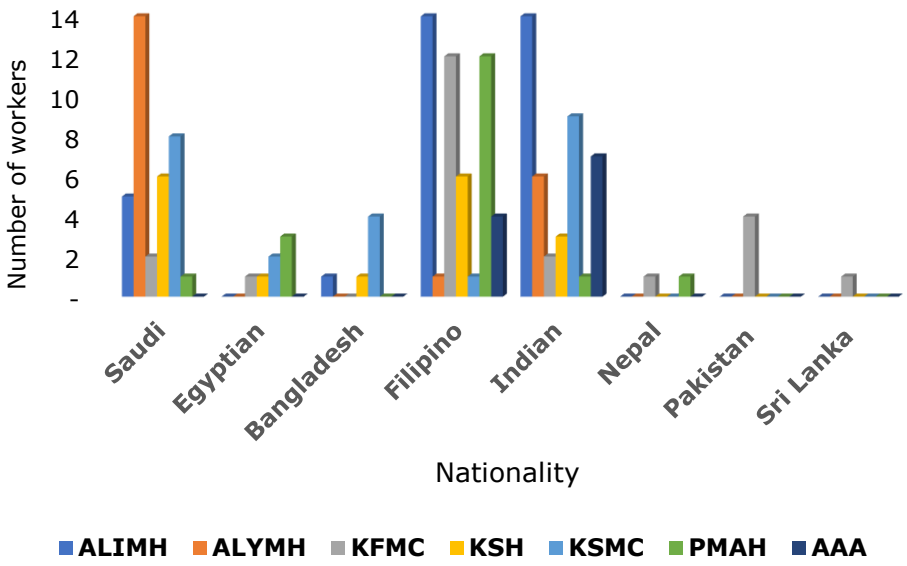


Figure 6-3 What is your nationality?

According to the data in Figure 6:3, around 36 participants (24.3%) of contracted workers are from Saudi Arabia. The majority (75.7%) are foreign workers, which represent the largest percentage of the workers at Saudi Hospitals. These contracted workers originate from seven countries, where Filipino and Indian nationals represent the highest proportion 92 (82%) of employees. ALIMH has the highest number of the overseas workers. Overall 42 Indians and 50 Filipinos are employed across seven hospitals. The least represented nationalities are Sri Lanka with one person working at KFMC. One Nepalese worker is employed at KFMC and PMAH. The highest proportion of Saudi participants work at ALYMH (66.7%). The variations in workers origins was statistically significant across the seven hospitals (P= 0.001)

6.3.4. Workplace

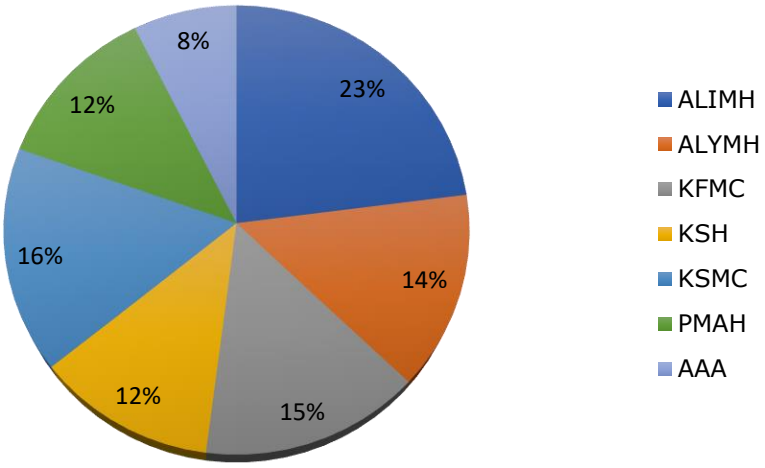


Figure 6-4 What type of hospital do you work in?

In Figure 6:4 it can be observed that out of the seven hospitals surveyed, the largest has 23% of the catering staff respondents at work. Approximately 69% of workers are employed in medium-size hospitals. These five hospitals account for 12-16% of the respondents who were employed as contracted catering workers. Finally, there was one small hospital, with 8% of the surveyed catering workers.

6.3.5. Monthly salary range

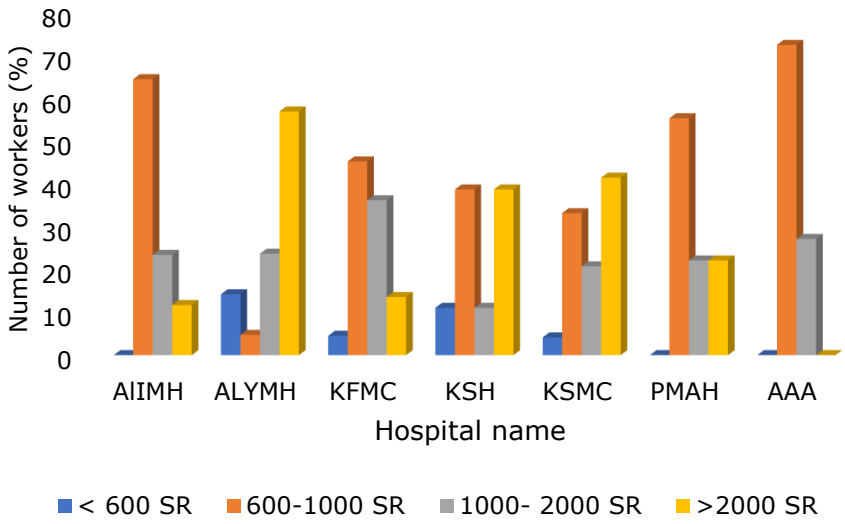


Figure 6-5 What is your monthly salary range?

Figure 6:5 reports the results of the survey question asking the contracted workers about their monthly salaries. The reason why this question was included was to determine the level of job complexity and the related qualifications. This was to test the assumption that the higher paid workers would have more knowledge of hygiene practice and management. The majority of the workers were paid between 600-1000 SR[1]. AAA paid staff this level of salary more than any other hospital (73%) and ALIMH (65%). The second most common range of income was more than 2000 SR. It was the highest income level within the study sample and was paid to 40 workers (27%). This amount was paid to around 57.1% of workers at ALYMH and to about 40% of workers at KSH and KSMC. All hospitals except AAA paid some staff this level. Moreover, 86% of those who receive more

[1] 1 SR= 0.20 Sterling Pound (GBP)

than 2000 SR (40 workers) are Saudi nationals whom more than two third of them are females. The next most common income range was 1000-2000 SR. This was the most common wage at KFMC (36%). These discrepancies were statistically significant (P= 0.001) and show that there are some workers who earn more than the others, for example, those who earn more than 2000 SR, and with this level of remuneration are expected to be identifiable to the public and staff and undertake more complex tasks. In these roles, they are expected to wear uniforms at all times for health and safety purposes. It can be concluded from Figure 6:5 that 'low income' who earn less than 1000 SR describes nearly 42% of the catering workforce in the study sample. They were are either Indian or Filipino nationals.

6.3.6. Employment length

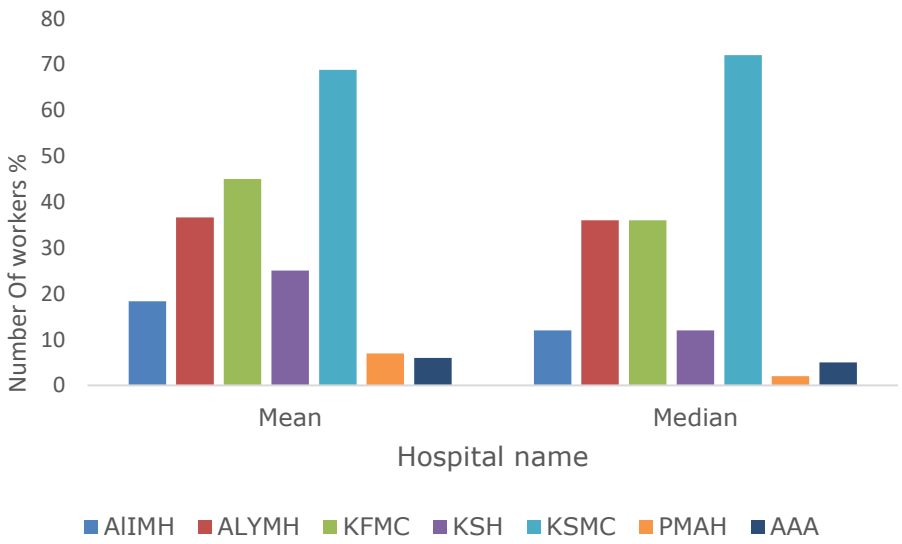


Figure 6-6 Employment length?

According to the employment length, all catering workers had a mean of 31.6 months of service and median of 24 months. This is a sign of high

workforce turnover, possibly due to new catering companies being engaged. The minimum length of service was one month which was for six workers whom half of them were working at AAA, and the maximum length of service is 192 months (16 years) and was only for one participant who was working at KSMC hospital.

As can be observed in Figure 6.6, statistics of mean and median were presented for each hospital. After checking for normality for this parameter, the data revealed that it was not normally distributed, and thus, non-parametric tests were used to measure the level of association with the study hospitals and median was used to describe the data.

The highest median of employment length was 72 months and was for workers in KSMC hospital for whom at least 50% of them have 72 months (six years) of experience or more. The second highest median of employment length were 36 months (three years) for two hospital KFMC and ALYMH for whom more than 50% of their workers had at least 36 months experience or more. Whereas the lowest median of employment length in this study was two months for workers in PMAH hospital where ten participants out of 18 have been employed for just two months. The second lowest median was five months for employees at AAA hospital where there are 11 workers; six had less than six months of experience and the most skilled worker had 12 months of employment (one year).

The Kruskal-Wallis test was used to measure the association between hospitals and the employment length. The model showed that there is a statistically significant association between both variables (P=0.001).

6.3.7. Contracted workers' education and qualification level

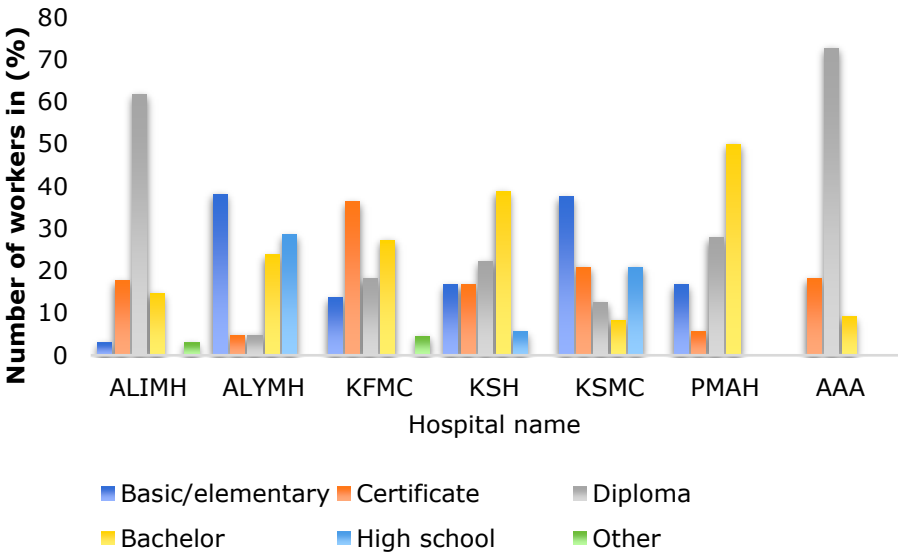


Figure 6-7 What is your education level and what qualifications do you hold?

The definition of a suitably qualified contracted worker is somebody who holds a relevant certificate in a food related qualification that enables them to do their job professionally and complies with the expected standards and regulations of that specific role. For most staff, such as fruit preparers and meat cutters, a standard certificate in food hygiene is enough to ensure they perform their job successfully. Some roles, such as that of a supervisor, require a broader knowledge and understanding of food hygiene as they have to ensure procedures are followed. Therefore, it is desirable that they have a higher qualification, such as a degree in food science, in order to perform their role to expected standards. Experience is also an important element in determining how qualified an individual is. Somebody who has worked across several departments within a hospital and has gained experience of various issues raised by food hygiene could be

deemed suitably qualified. However, this is also problematic as the individual may have a lot of experience but the relevance of this experience and whether the working environment is adhering to best practice. They may have picked up 'bad habits' and continue to perform them across jobs because nobody has picked up on this and corrected them. Therefore, in order to be a suitably qualified person the individual must have the necessary training and certificate in food hygiene to enables them to perform the specific tasks for their specific role. It is worth noting that in a recent study of Riyadh hospitals, Al-Mohaithef (2014) found that in addition to having suitable qualifications, foodservice staff were also expected to have sufficient experience in food hygiene. Catering staff were required to obtain a health licence before being employed and this licence was subject to a review every six months. The catering contract that staff must sign before commencing employment also ensures that qualifications are checked and accepted by the nutrition administration in the hospital before starting work. Based on this, it is clear that a suitably qualified person is one who has had qualifications validated, has a health license, and, for the purposes of this thesis, has a relevant qualification for the proposed role.

Comparing the individual hospitals in Figure 6:7, it is clear that the most suitably qualified workers are employed in ALIMH Hospital (62% Diplomas in Food Hygiene) and one with Master's Degree in Dietetics. Next best is PMAH with 50% of their workers qualified with Bachelor's Degree and 27% of workers with Diplomas. ALYMH, as well as KFMC and KSH, have quite similar profiles of staff qualification types. Next is AAA Hospital with one

Bachelor, two Certificates and eight Diplomas. Those who are qualified to high school level were 12 participants, of whom 11 were Saudi females. Two of those Saudi nationals receive less than 600 SR and the other nine receive more than 2000 SR. All these differences were statistically significant where P=0.001 using Chi Square test. The overall association between qualifications and either salary range, gender and study hospitals were statistically significant where P=0.001.

This clearly dispels any assumption that catering workers are unqualified. Clearly, they are intelligent and educated. The fact that these workers possess formal qualifications justifies the need for future training that enhances and builds on their existing knowledge and experience. Overall, the survey indicates that ALIMH employs workers with qualifications most suited for purpose. The least suitable hospital is KSH that employs the younger males with the least suitable qualifications and cohort of overseas workers.

However, a combined analysis using Chi Square test of nationality Figure 6:3 and qualification Figure 6:7 shows that there is no statistically significant correlation as to whether employees with appropriate qualifications or otherwise are Saudi or foreign citizens (P value = 0.543). It should also be noted that the Saudi MOH appears to value the knowledge brought by competent international employees. However, it is evident that labour shortages exist, for example in AAA Hospital there are two foreign nationals with the least appropriate qualifications, suggesting that the

contracted company struggles to employ Saudi citizens or recruit the most appropriate international employees.

6.3.8. Individual Hygiene Training

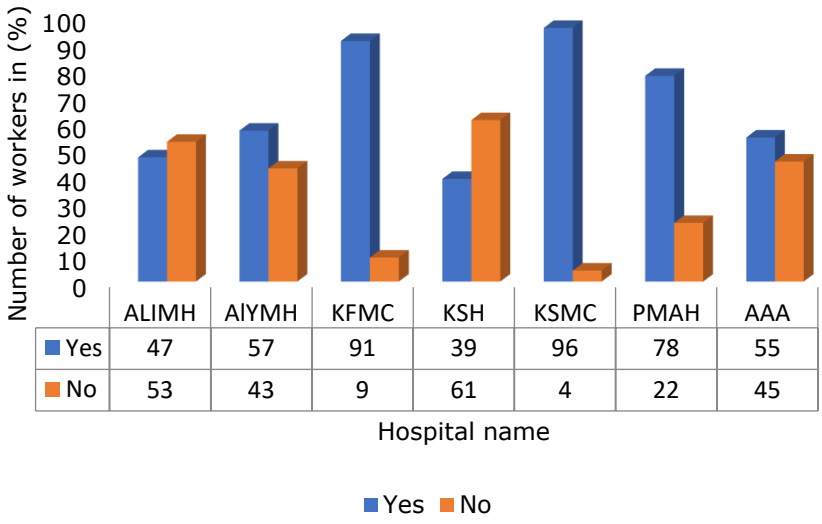


Figure 6-8 Have you had any hygiene training?

In Figure 6-8 one of the survey questions asked the contracted workers to disclose if they had had any hygiene training. At the KSMC (96%), KFMC (91%) and the PMAH (78%) hospitals, more than three quarters of the workers answered positively. On the other hand, at the KSH and ALIMH hospitals only 39% and 47% respectively had received any specific hygiene training. Although the correlation between gender and hygiene training was not statistically significant, females were more likely to have more hygiene training than males within this sample.

The differences of having any hygiene training within the hospitals were statistically significant (P = 0.001). Whereas there was not any significant correlation between hygiene training and any demographic characteristic

such as gender, nationality, salary or qualification (P value > 0.05). The only parameter that had a statistically significant correlation was the employment length where P value was 0.04 using an independent t-test. The results showed that workers who had hygiene training had a mean length of employment of almost three years (35.8 months) and a median of 24 months. On the other hand, workers who did not attend any hygiene training had a mean length of employment of less than two years (23.8 months) and a median of 12 months. Therefore, KSMC and KFMC had the highest attendance rate because the means for the length of employment were 69 months and 45 months respectively in these hospitals. Despite the fact that PMAH had a mean length of employment of 7 months, more than three quarter of workers responded as they had received hygiene training, and this may be rationalised due to the qualification level of their workers as 50% of them had Bachelor's Degree and 27% had Diplomas.

This data show that there is clearly a strong need for training amongst the contracted food preparation workers in the hospitals of Riyadh who had newly recruited workers for less than 12 months. Reasons for this include the high turn-over of staff in the contracting companies, and the fact that hospitals need to invest in the training for contracted employees and maintain up-to-date training records.

6.3.9. General Food Safety and Hygiene Training

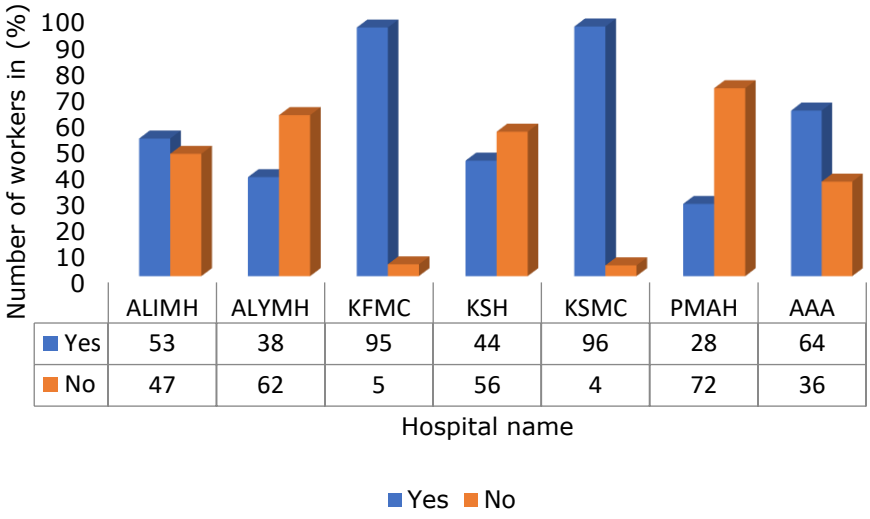


Figure 6-9 Have your managers required you to attend any employee food hygiene training course?

According to Figure 6-9, when contracted workers were asked if their managers required them to undertake any other food hygiene training, the workers answered positively in four hospitals ALIMH (53%), KFMC (95%), KSMC (96%) and AAA (64%). Worrying answers come from a large proportion of workers from the ALYMH (62%), KSH (56%) and PMAH (72%) hospitals, where they have never been asked to attend a food hygiene course by their managers. These results were statistically significant with the above results. To clarify, 82% of workers in this study who had hygiene training were asked by their managers to do so, whereas 80% of workers who had not had any hygiene training were not asked or instructed by their managers to attend any hygiene training. These hospitals, therefore, need to be targeted and managers and patient boards need to be made aware

of the services they are getting, and the value of ensuring staff are trained to a sufficient level.

Male workers were more likely to be asked to attend hygiene training than females, this variation was not statistically significant (P= 0.069). This may explain the response in the previous section where males were more likely not to have any hygiene training, and thus, they were asked to attend the training while females had already been trained in hygiene practice and were more likely not to be asked to attend the available training. There was no statistically significant difference between the matter of being asked to attend a training and demographics such as gender, salary, qualification or nationality. Nevertheless, and similar to the previous variable, workers who had a mean length of employment longer than 38.6 months were statistically more likely to be asked to attend hygiene training than workers who had a mean length of employment less than 21 months (P = 0.002).

6.3.10. Detrimental consequences of contaminated food consumption

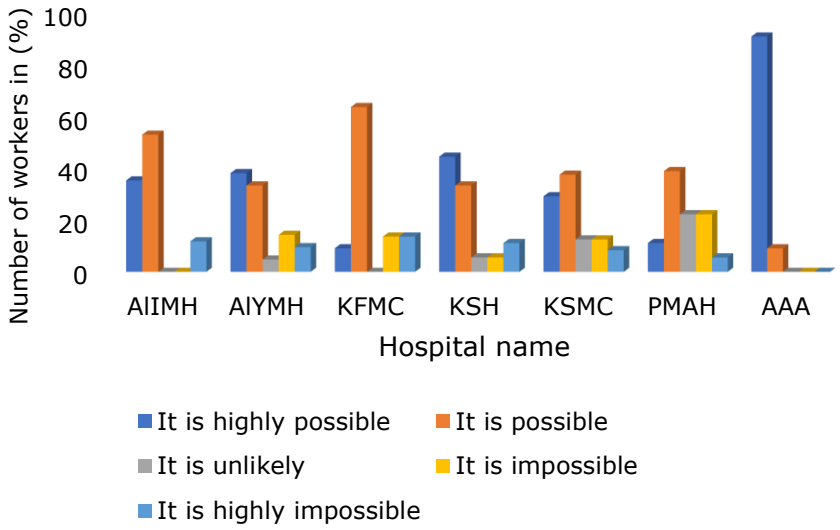


Figure 6-10 Can consumption of food that was not hygienically prepared lead to death of a hospital patient?

When asked about the possibility of death after consumption of food that has not been prepared hygienically, the workers in Figures 6:10 mainly answered that it was possible. However, in some hospitals, such as ALYMH (38%), KSH (44%), and AAA (91%), there were more answers stating that it is highly possible. Other responses (unlikely, impossible, and highly impossible) were generally less represented. Workers who answered highly possible or possible were considered as the appropriate answers and inappropriate if they chose other options as presented in the following graph:

6.3.11. Detrimental consequences of contaminated food consumption

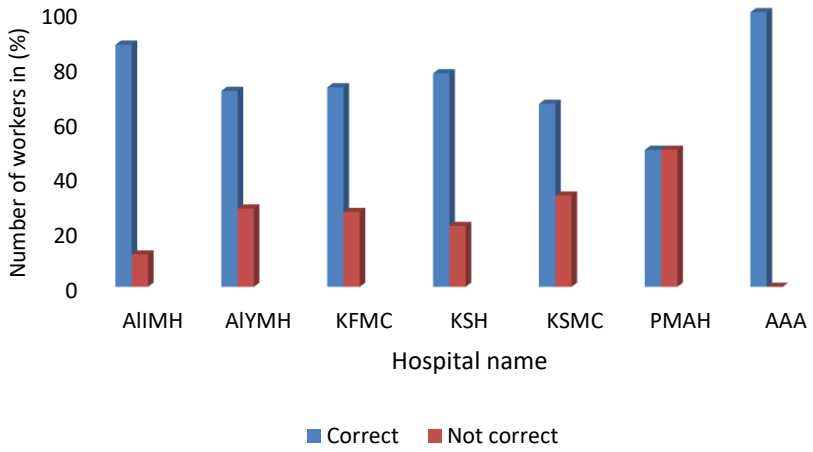


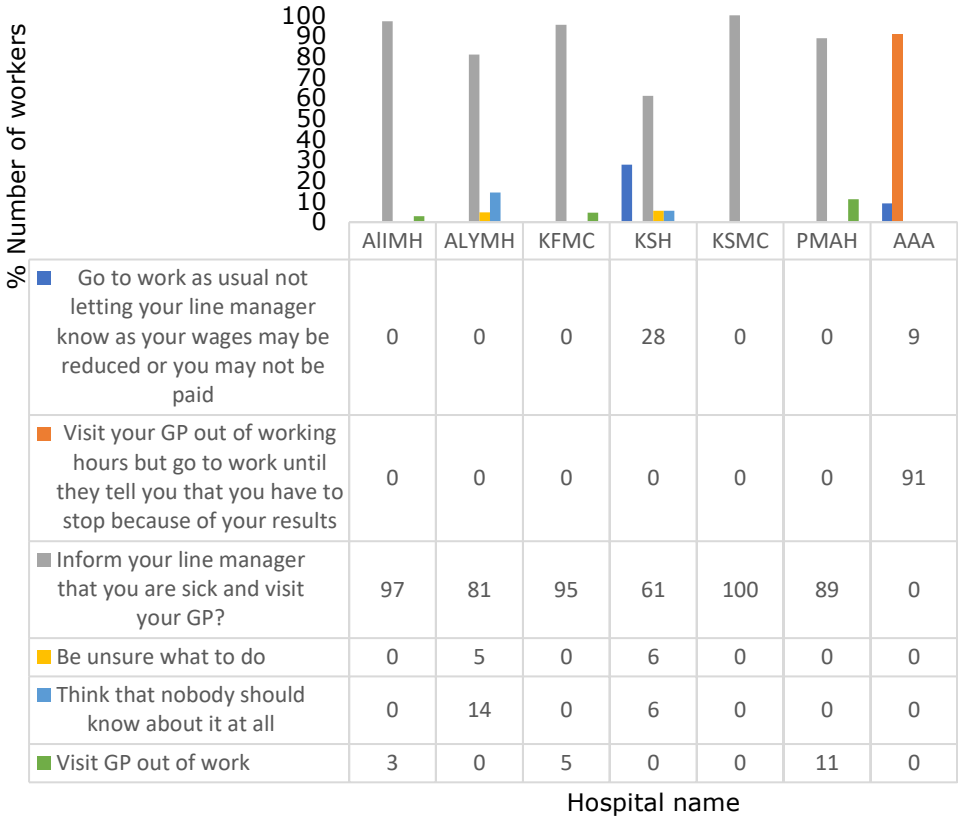
Figure 6-11 Can consumption of food that was not hygienic to death of a hospital patient.

The graph shows that more than 60% of workers at all study hospitals answered correctly and were at least double the number of workers who answered wrongly at each hospital. The only exception was at PMAH where half of the workers answered correctly. The variation between hospitals was statistically significant with those answering the question correctly P=0.03 and was not statistically significant for any other demographic. This may relate to the fact that PMAH workers were newly recruited and had a mean length of employment of seven months. Of these 72% were not asked to attend any training by their manager. Despite 50% having Bachelor Degrees and 27% with Diplomas, qualifications that suggest a high level of educated workers, the percentage of whom answered appropriately was surprisingly low. This reveals that continuous hygiene training after

qualification during employment is vital to keep these workers up to date and as a means of refreshing their previous knowledge.

This result suggest that the perception of the risks posed by food hygiene failures differ, and specifically these differ in the hospitals that do not request training of their staff. Informed understanding of the risks posed will improve the application of food hygiene and clearly highlights the need for proactive training courses with efforts to disseminate best practice and unify the contents across hospitals.

6.3.12. Determinant consequences of feeling sick:



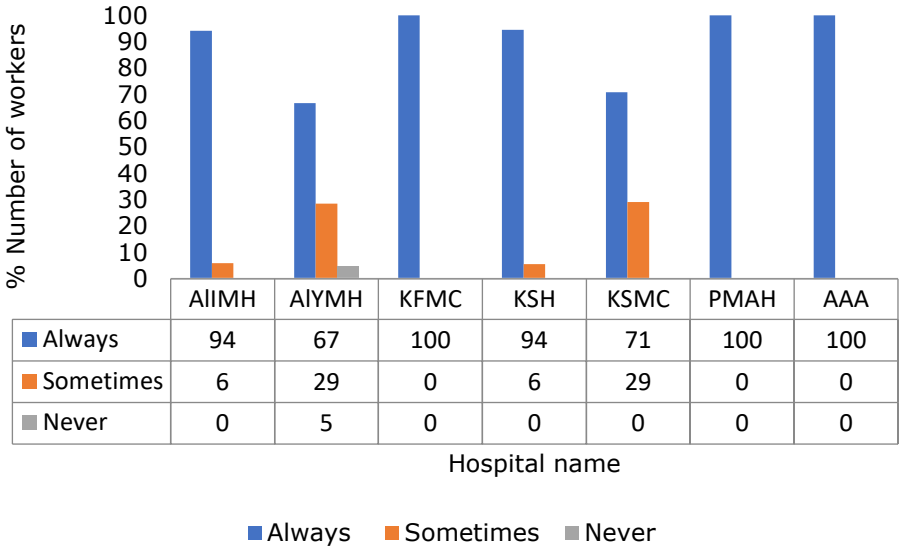
	AIIMH	ALYMH	KFMC	KSH	KSMC	PMAH	AAA
Go to work as usual not letting your line manager know as your wages may be reduced or you may not be paid	0	0	0	28	0	0	9
Visit your GP out of working hours but go to work until they tell you that you have to stop because of your results	0	0	0	0	0	0	91
Inform your line manager that you are sick and visit your GP?	97	81	95	61	100	89	0
Be unsure what to do	0	5	0	6	0	0	0
Think that nobody should know about it at all	0	14	0	6	0	0	0
Visit GP out of work	3	0	5	0	0	11	0

Figure 6-12 If you suffer from a stomach disease, such as diarrhoea, vomiting or even fever, what should you do?

As detailed in Figure 6:11, the majority of workers in six of the seven hospitals understood the need for basic reporting procedures when they are sick or vomiting to ensure that this illness is not spread to other people. They were aware that they need to visit their GP to confirm the illness, and then inform their manager about the reason for their absence. Of these, only KSMC gave a 100% response that they should inform their line manager. However, a high proportion of staff at AAA (91%) answered that they would visit the GP out of hours and 9% answered that they will go to work as usual and not inform superiors so as to avoid being unpaid for that day. This suggests that they felt doing so in work hours was problematic and illustrates that they are not fully aware of the importance of personal hygiene and the consequent effect this may have on patients. They also felt that being absent from work was only possible once the results of the illness were confirmed. This is a risk to health as it means they would continue to work while potentially being ill and posing a risk to the patients. Ensuring that staff are aware of their responsibilities to patients and that it is ok to miss work on such occasions is something that needs to be addressed through proper training of both line managers, who enforce the rules and safeguard patients, and the staff affected by the illness. Two hospitals, ALYMH (14%) and KSH (6%), had a low percentage of workers who stated they were unsure what to do. Even though this percentage is small it is something that needs to be addressed to ensure standardised procedures are in place. KSH also had the highest proportion of workers

(28%) who said they would still go to work and not inform their line manager through fear of not being paid. This suggests that management need to make it clear that it is acceptable to miss work due to hygiene issues that could affect patients. The correlation of differences between hospitals in terms of sickness procedure was statistically significant (P=0.001) while it was not statistically significant with any of the demographics. Moreover, workers who had hygiene training were more likely to answer this question correctly than workers who did not attend any hygiene training (P=0.05). This means that they understood the correct procedure for dealing with stomach illness during the training programme.

6.3.13. Personal Hygiene and Food Safety



	AlIMH	AlYMH	KFMC	KSH	KSMC	PMAH	AAA
Always	94	67	100	94	71	100	100
Sometimes	6	29	0	6	29	0	0
Never	0	5	0	0	0	0	0

Figure 6-13 Do you clean and wash your hands if you are planning to touch unwrapped food?

Regarding personal hygiene and food safety in Figure 6:13, the contracted workers were asked about the measures they take to maintain personal hygiene to protect food from contamination. The great majority of them in all seven hospitals answered that they always wash their hands if they are planning to touch unwrapped food. Of these, the staff at three hospitals gave 100% the appropriate response KFMC, PMAH and AAA. Generally, the contracted workers are aware of the standards for good personal hygiene practice. However, it is worth noting that four hospitals ALIMH (6%), KSH (6%) and KSMC (29%) ALYMH (33.3%) had staff respond 'sometimes'. There should be no ambiguity about such procedures and again this needs clarification of procedure from higher management. The correlation between answering this question correctly by choosing the option "always" and other options across hospitals was statistically significant (P=0.001). While the correlation with age demographic was not statistically significant. Nevertheless, there was statistically significant correlation with other demographics including gender, salary, qualification and nationality. Of those who answered incorrectly with other options than "always", 30% finished their education with a high school degree, 94% receive more than 2000 SR salary, 88% were Saudis and the others were Egyptians, of which 82% were females.

6.3.14. Clean and wash your hands after dealing with unwrapped food

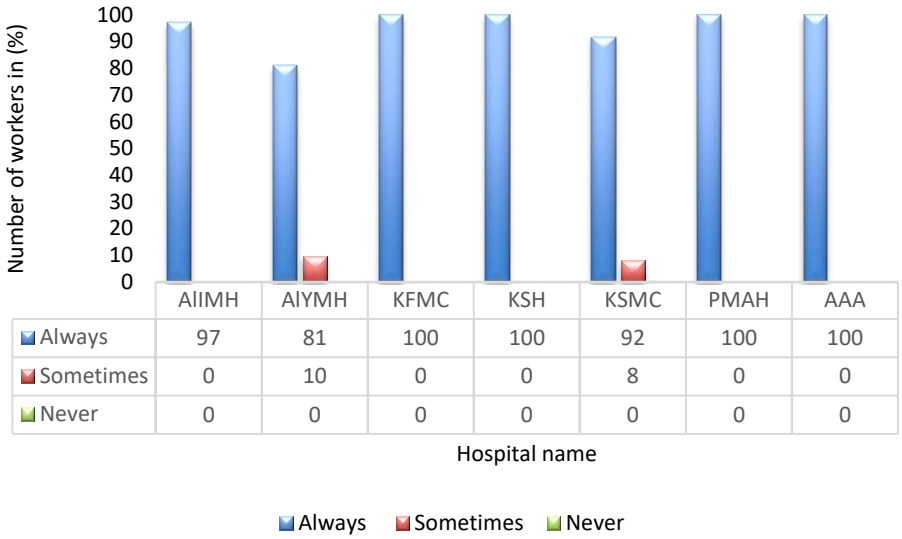


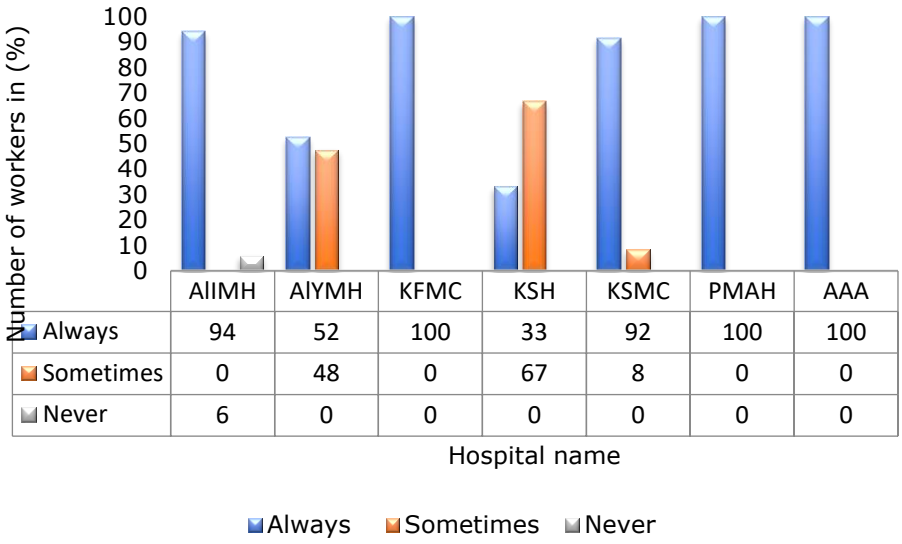
Figure 6-14 Do you clean and wash your hands after dealing with unwrapped food?

In the data collected in Figure 6:14, contracted workers were asked about their actual behaviour while dealing with unwrapped food. The majority of the workers across the hospitals answered that they always wash their hands after dealing with uncovered food. In AAA, PMAH, KSH, ALIMH and KFMC 100% of the respondents returned appropriate answers for this procedure. ALYMH (81%) and KSMC (92%) also demonstrated a high proportion of correct answers. This level of awareness and hopefully practice is commendable, but it is worth stating that two hospitals reported 'sometimes' as answers. These were ALYMH (10%) and KSMC (8%). These proportions were alarming as these workers present a risk to patients' health and safety, which clearly means that they require reinforced food safety training. The difference in responses on this point between workers

in all hospitals was statistically significant (P=0.03) and was not statistically significant with demographics such as the gender and age categories. Of those who answered correctly, 96% had hygiene training and 98% were asked by their managers to attend hygiene training, and this correlation was statistically significant where P= 0.003 and P= 0.01 respectively.

Other demographics such as gender, salary, qualifications and nationality were correlated with choosing an option for this question where P value was less than 0.05. Of those who did not answer correctly, 42.9% hold high school qualifications, 65.4% were required by their manager to attend a hygiene course, 53.9% did not attend a training course on hygiene, 85.7% received more than 2000 SR as monthly income, 85.7% were female Saudi nationals and 57% were working in ALYMH.

6.3.15. Use of cap or head covering when dealing with unwrapped food



	AlIMH	AlYMH	KFMC	KSH	KSMC	PMAH	AAA
Always	94	52	100	33	92	100	100
Sometimes	0	48	0	67	8	0	0
Never	6	0	0	0	0	0	0

Figure 6-15 when you deal with unwrapped food, do you use a cap or wear head covering?

In terms of covering their head when working with unwrapped food, Figure 6-15 shows that workers in three hospitals complied with this regulation 100% (KFMC, PMAH and AAA). In two hospitals the figure is in the nineties with ALIMH (94%) and KSMC (92%). Head covering happens sometimes at three hospitals, ALYMH (48%), KSH (67%) and KSMC (8%). In the ALIMH Hospital 6% of workers never wear any head cover when working with unwrapped food, a situation that needs to be addressed urgently. A Chi-Square statistical test revealed that the correlation was statistically significant between the practise of covering the head or use of a cap when dealing with unwrapped food across hospitals (P= 0.001). The correlation with other demographics such as qualifications, age groups and gender were not statistically significant. However, it was statistically significant

with some demographics; of those who answered any options other than "always", 65.4% were female Saudi nationals, 46.2% serving in the KSH hospital, earning more than 2000 SR, 65.4% had not being asked to attend hygiene training by their manager and 53.9% had not had any training in hygiene

6.3.16. Covering mouth and nose with a mask when dealing with unwrapped food

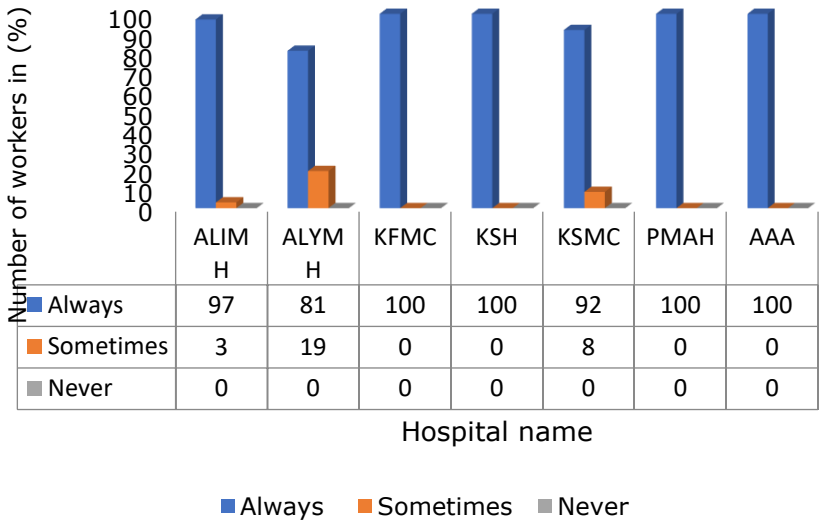


Figure 6-16 Do you cover your mouth and nose with a mask when you deal with unwrapped foods?

In Figure 6-16, above, the majority of the contracted workers responded that they comply with the regulation regarding covering their mouth and nose with a mask. Four hospitals produced the responses of 100%, i.e. all of the time. These are: AAA, PMAH, KSH and KFMC. However, three hospitals only complied with the regulations sometimes: ALIMH (3%), ALYMH (19%) and KSMC (8%). This suggests that the overall situation related to the use of protective facial masks is good, but it can still be

improved. This needs to be highlighted in the training regimes and reinforced through monitoring. Similar to the previous section, the Chi-Square statistical test was employed to find if there is any correlation between the parameters. It revealed that the correlation was statistically significant between the practise of covering mouth and nose with a mask when they deal with unwrapped foods across hospitals (P= 0.03). The correlation with other demographics such as qualifications, salary, gender and nationality were statistically significant. To illustrate the association, of those who answered any options other than "always", 85.7% were female Saudi nationals who earn more than 2000 SR, 57.2% serving in ALYMH hospital and 42.9% finished high school only. Although the correlation with hygiene training was not statistically significant, 71.5% did not attend any hygiene training.

6.3.17. Is behavior more hygienic when in the presence of a manager or supervisor?

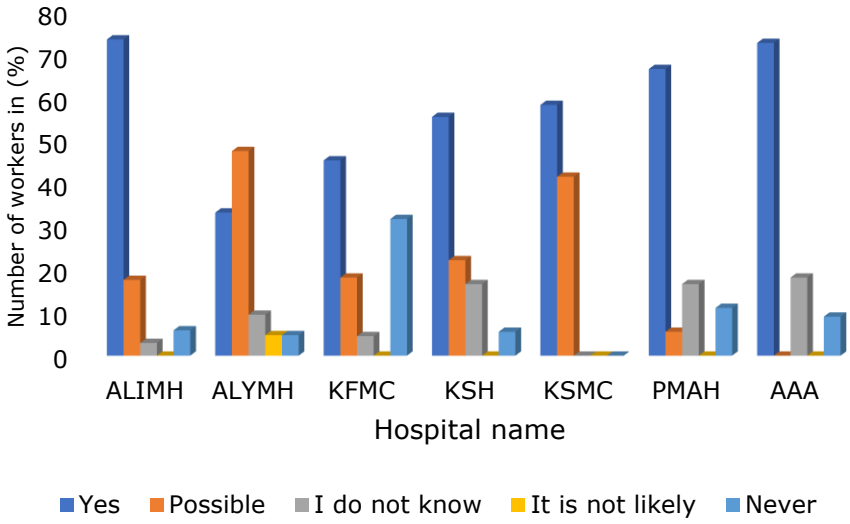


Figure 6-17 I am more likely to comply with hygiene regulations when my line manager or supervisor is around

The results in Figure 6-17 are related to the individual hygiene practices in the presence of the line manager or supervisor and show that a high percentage of the respondents consider that they improve their hygiene habits under the close supervision of their supervisors. Six of the seven hospitals had yes or possible as their most frequent answer. Only KSMC hospital scored 100% with ALYMH 81% and ALIMH 91.1%. The only hospital not to have 'yes' or "possible "as their highest response was KFMC (63.6%). The correlation between the presence of supervisor and their behaviour related to food hygiene was statistically significant (P= 0.03). Moreover, the correlation was statistically significant with the variables of qualification, gender and nationality. Of those who responded that the

presence of a supervisor "is not likely", "never" and "I do not know" to change their behaviour in relation to food hygiene were 82% female, 52% were Filipinos and 86% were educated to a university degree level in food science either with Bachelor, certificate or Diplomas.

This is strong evidence that there is a need for the Supervisors' presence among the workers and their close relationship in terms of monitoring and reporting, which depends on teamwork, communication, knowledge of individual duties to be performed and of reporting mechanisms. The ideal situation to result from effective training would be staff who do not need to be monitored and perform their responsibilities without the need for a supervisor. This would suggest that they understand why their behaviour has to change.

6.3.18. Awareness of temperature requirements for food preparation

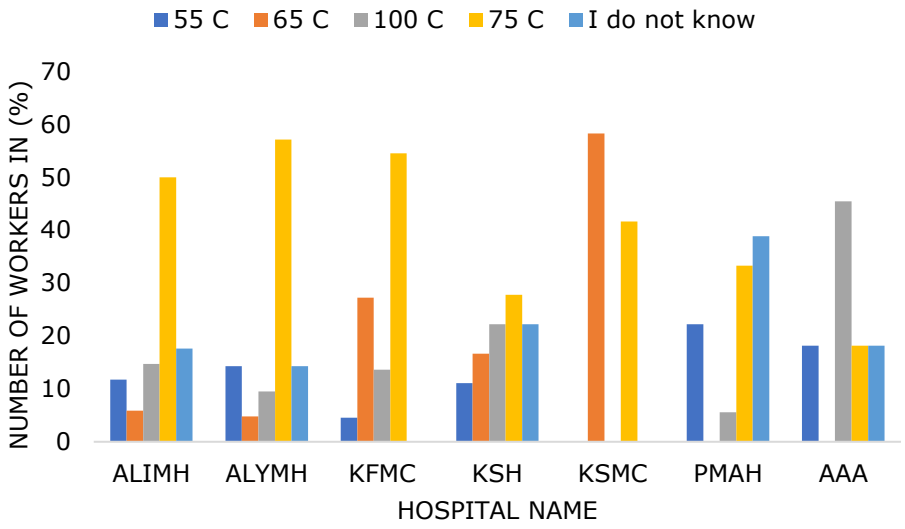


Figure 6-18 When chicken is cooked, the minimum internal temperature should be?

When workers were asked about the minimum temperature requirements for cooked chicken the range of responses was unexpectedly broad as recorded in Figure 6-18. The majority across three of the seven hospitals provided correct answers: ALIMH (50%), ALYMH (57%), and KFMC (55%). However, alternative answers varied between 55^{o}C, to 65^{o}C and 100^{o}C. What is more, ALIMH (18%), ALYMH (14%), KSH (22%), and PMAH (39%) hospital food workers disclosed that they did not know the answer. The differences in responses between study hospitals was statistically significant where P =0.001. Those who answered this question wrongly were statistically significant. They were more likely to be female (57.1%) than male. Moreover, more than three quarters of those who answered with "I do not know the correct answer" were more likely to not have attended

any training programmes or not been asked to attend one by their managers. This could be dangerous if the workers set the oven temperatures and do not know how to correctly cook chicken. It revealed their lack of knowledge highlights the fact that there is a great need for training for the operation of safe cooking, and in some cases the workers may be aware of the shortcoming.

6.3.19. Normal temperature in refrigerator

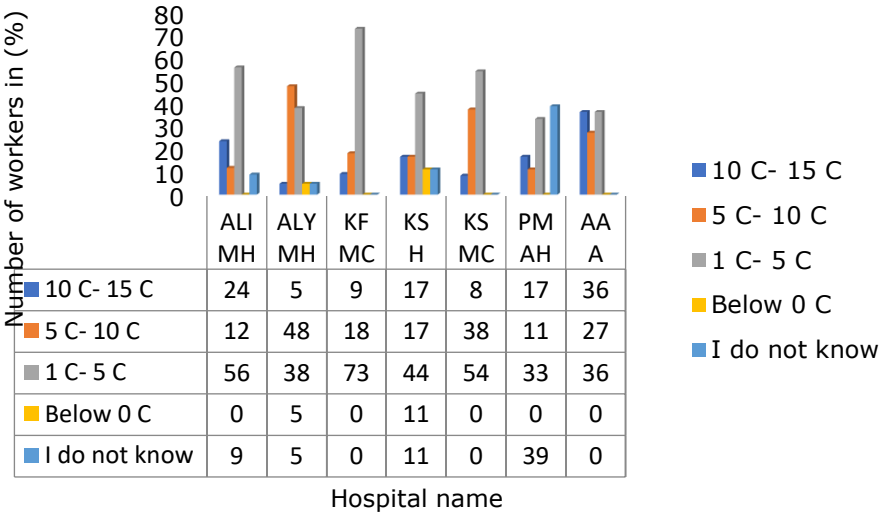


Figure 6-19 The normal temperature in a refrigerator:

Figure 6-19 records the answers to the question about what the normal temperature should be inside a refrigerator. Although this information should be standard knowledge, the workers' responses were divided. The majority of workers in four hospitals thought that it should be between 1 and 5 ^{o}C, which is the correct answer. These were: ALIMH (56%), KFMC (73%), KSH (44%) and KSMC (54%). For ALYMH (48%) the most common response was five and ten ^{o}C, and in PMAH (39%) the most common answer

was ‘I do not know’. Only ALYMH (5%) and KSH (5%) answered that it should be below 0^{o}C. The findings in Figure 4-20 demonstrate that there is no consistency in the knowledge regarding the correct operation of the refrigerator. Differences in answering this question across hospitals was not statistically significantly correlated (P value = 0.152). While it was statistically significant with demographics such as nationality, gender, salary and qualifications. Of those who chose any option except 1 to 5 ^{o}C, 62.1% were females, 33.8% finished their education with a Diploma Degree, around 36% were Filipinos who earned 600-1000 SR and 35.1% were Saudi nationals who earned more than 2000 SR monthly.

Knowledge of the application of correct refrigeration temperatures is necessary for all food workers, as it is a fundamental requirement for food hygiene. Therefore, training is required to explain the importance of maintaining certain temperatures for refrigeration. Although it must be admitted that not all the workers who provided wrong answers are in charge of refrigerators, this still presents a risk for food safety because there is a bigger chance for bacteria development at higher temperature (time, temperature, food and moisture are the main factors that contribute to the increased bacteria growth). This risk must therefore be addressed in future training on food safety.

6.3.20. Temperature for keeping ready to eat meals in the Bain-marie

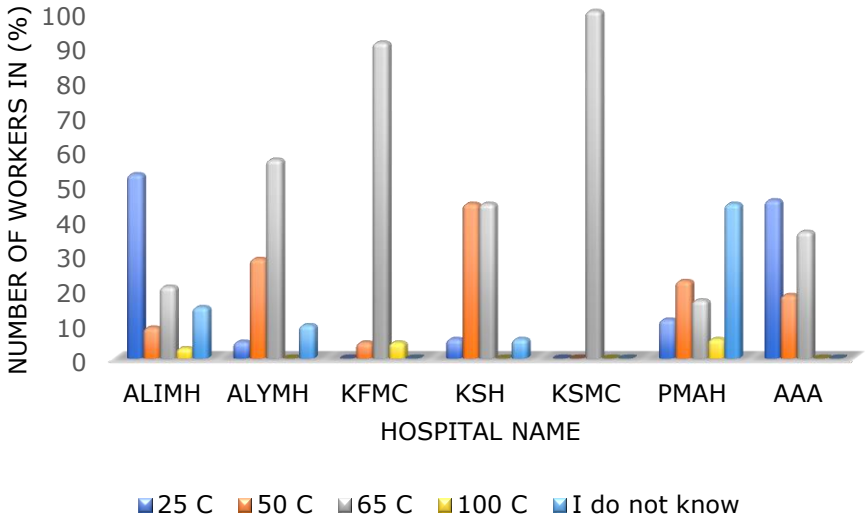


Figure 6-20 Ready to eat meals should be kept hot in the Bain-marie at:

The responses to another important temperature-related question are outlined in Figure 6-20 with regards to the Bain-marie temperature as a place where food should be kept ready for consumption. Three hospitals answered correctly (65^{o}C) more than any other answer. These were ALYMH (57%), KFMC (91%), and KSMC (100%). However, for the ALIMH and PMAH, 20.6% and 16.7% of the workers respectively chose the correct answer. In the other hospitals less than half of the workers (44.4%) answered correctly was KSH. The correlation between choices in answering this question was statistically significant across hospitals (P=0.001). Moreover, the correlation was statistically significant with several demographics such as qualification, salary, nationality and age (P values < 0.05). Of those who did not answer correctly, surprisingly, 43% were

holding Diplomas and 25% a Bachelor's Degree. What is more, 58.6% earn around 600-1000 SR where 38.6% of this group are working in ALIMH. In terms of nationality, 50% were Filipinos and 70% aged from 24-35 years. In terms of hygiene training, the results showed that there was no statistically significant correlation between answering this question and attending hygiene training. Whereas workers who attended hygiene training and did not answer correctly were 33% of the study sample. A subset of 27% of the study sample were asked by their managers to attend hygiene training but did not answer this question properly.

6.3.21. Cigarette smoking in the hospital kitchen

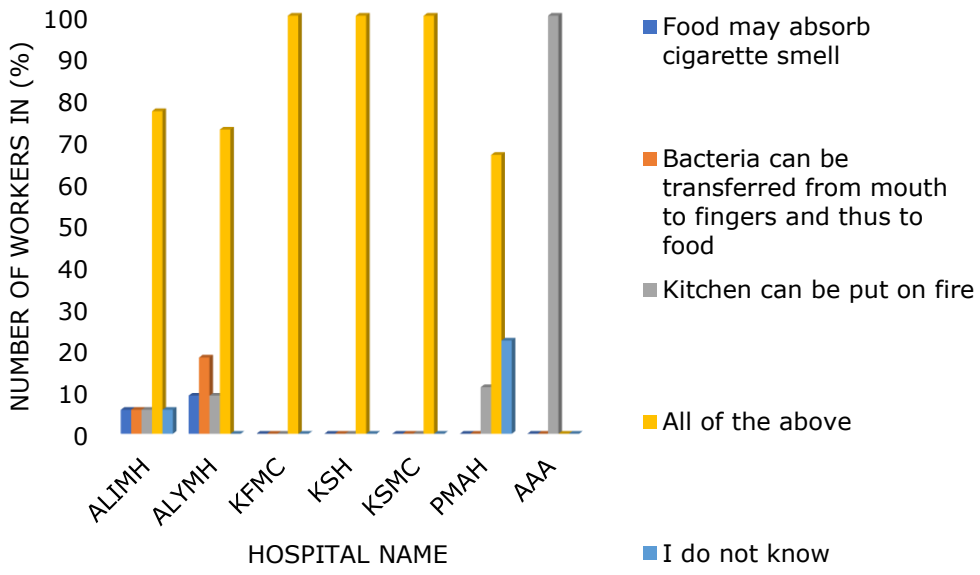


Figure 6-21 it is unacceptable to smoke cigarettes in kitchen as:

The data in Figure 6-21 explores the workers understanding of the rules and policy against smoking on hospital premises. The correct answer is 'all of the above'. Three hospitals gave 100% correct answers at KFMC, KSH and KSMC. AAA gave 100% answer that not smoking was important to prevent fires in the kitchen. Likewise, staff at ALYMH (18%) and ALIMH (6%) stated this could cause bacteria to be transferred from the mouth to fingers and then the food, which although correct belies the ranges of reasons for maintaining the regulation. Therefore, when dealing with this data we need to acknowledge that staff are aware of the dangers of smoking in terms of food hygiene and perhaps felt one reason for not smoking was enough. Of more concern was PMAH with 22% of respondents answering that they 'did not know'. Their knowledge on the drawbacks of

smoking in hospitals varied across hospitals and this variation was statistically significant with P value = 0.001 using the Chi-Square statistical test. The correlation between their knowledge of smoking risks and other demographics were not statistically significant (P value > 0.05). A significant correlation was evident with respect their attendance of hygiene training. Of those who answered correctly, 71% had hygiene training and 67% were asked by their managers to attend hygiene training, P value =0.02 and P value=0.001 respectively.

Proper training that outlines all of the reasons why smoking is unacceptable is important to ensure that it is completely restricted. Again, this data reveals discrepancies in the procedures adopted across hospitals and the need for standardisation.

6.4. Contracted Catering Supervisor Set B (Q-A questionnaire type)

This section will focus on the catering company supervisors. The same questionnaire was used previously with the MOH supervisors has also been used for the contracted catering managers. The aim is to analyse the quality of food safety procedures in state hospitals in Riyadh and to examine the application of PRPs.

The questionnaire was distributed to the catering company supervisors in the same seven hospitals, as previously mentioned and discussed. The sample comprised of 14 members of staff, who are in charge of food safety in the nutrition departments of these hospitals. They are employed as HACCP administrators, nutritionists or head supervisors. The information

they had to provide was related to food safety supervision, including both delivery and supporting hospital facilities.

Overall, 14 participants were surveyed anonymously, after the General Administration of Nutrition in the Ministry of Health in Saudi Arabia had approved the study "Nutrition Contract for Hospitals Catering" (2015). They were familiar with the purpose of the research and they all signed the consent forms. The response rate for this group of participants was 100%.

6.4.1. Age Representation/Distribution

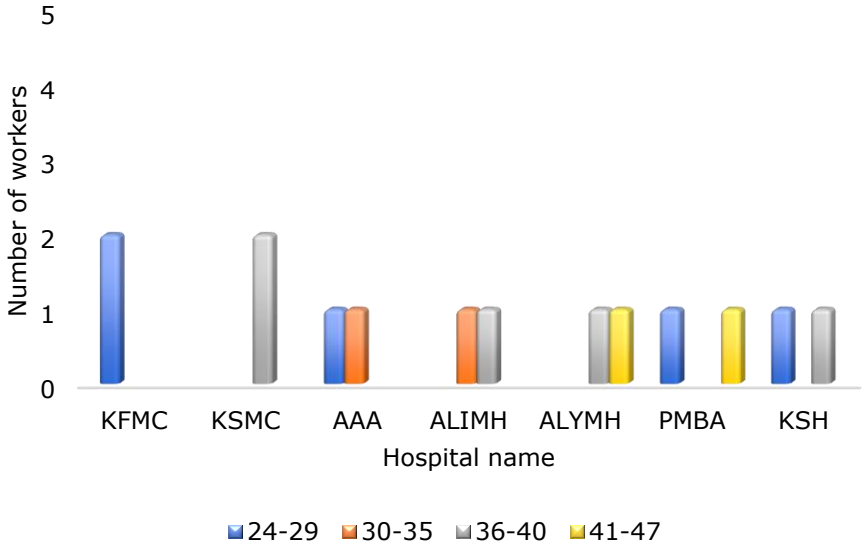


Figure 6-22 What is your age?

Regarding the age group of the contracted supervisors, as Figure 6-22 shows, all age groups were represented. However, in two hospitals only one age group was employed, namely the 24-29 age group in KFMC and the 36-40 age group in KSMC, with two employees in each hospital. The other hospitals each contracted two supervisors, each being from a

different age group. Also, in two hospitals the age groups were very close to each other while in one hospital, the youngest age group worked together with a representative of the eldest age group.

It is of interest that in both small and large hospitals there were only two contracted supervisors, and that in the largest hospitals the ages of the staff were similar.

Overall, the number of the youngest contracted supervisors was five (24-29 years). It was the same as for the age group 36-40. There are two supervisors in the age group 30-35, and two are in the group 41-47.

6.4.2. Gender representation

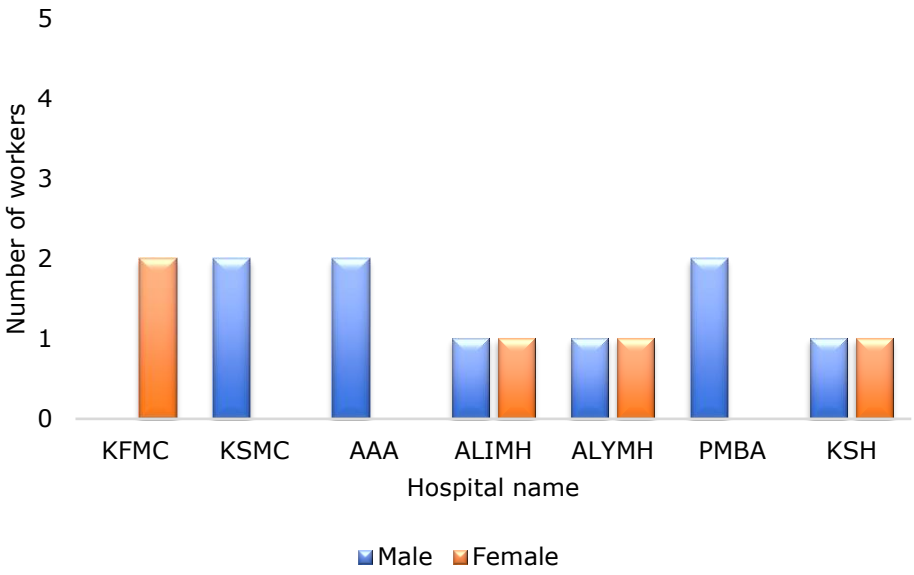


Figure 6-23 What is your gender?

For the supervisory group, Figure 6-23 shows that there were overall nine males and five females, out of a total of 14 respondents in this group.

Regarding the individual hospitals, the largest two hospitals had different representation regarding the gender of the contracted supervisors: KFMC with two females, KSMC with two males, and AAA and PMBA also with a bias towards male contracted workers, whereas in three other hospitals the two genders are equally represented (one male and one female). When compared to the age of these supervisors, it is noteworthy that the KFMC hospital employed younger females, whereas KSMC employed males in the 36-40 age group. The AAA hospital employs young males aged between 24-35. On the other hand, PMBA employed male supervisors albeit over the broadest age range. The distribution of age and gender categories across study sites was not statistically significant using Chi-Square due to P=0.36 and P=0.28 respectively.

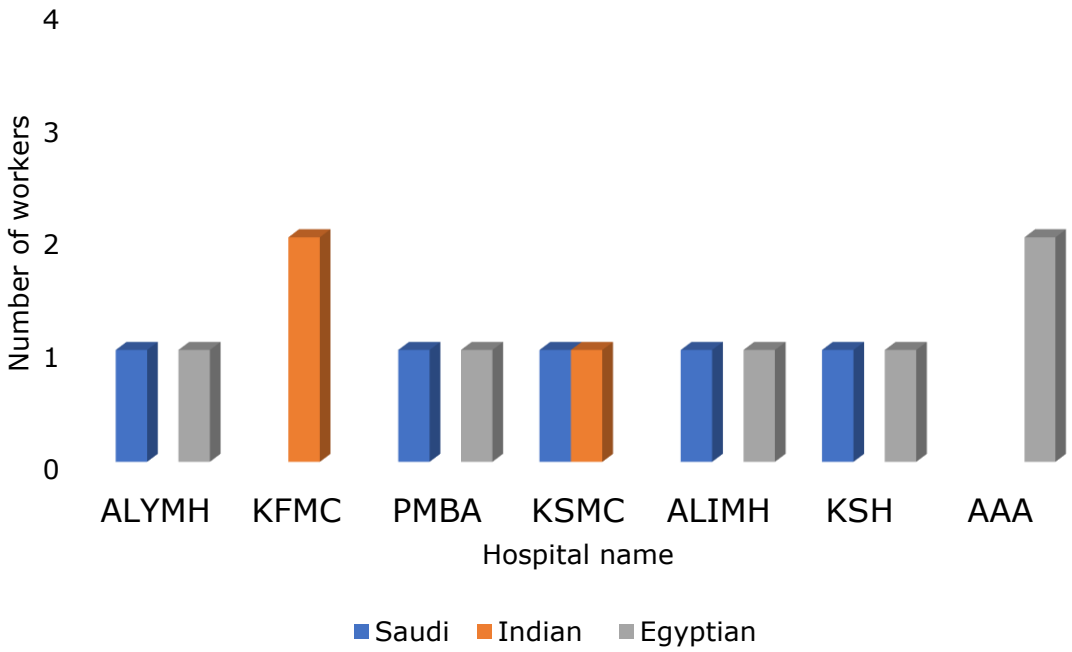


Figure 6-24 What is your nationality?

The data presented in Figure 6-24 serves to record the nationality of the catering managers in the seven hospitals. As can be seen, Saudi nationals are in the minority. The highest proportion of Egyptian employees is at the AAA hospital, whereas the highest proportion of Indian employees is at the KFMC hospital. The remaining five hospitals all tend to employ an equal number of people from KSA, Egypt and India. Although it is not vitally important to know the nationality of catering managers, these data are useful in helping to understand the diversity of staff within hospitals. People employed from different countries may have different conceptions of what their role entails based on their own cultural background. This information may also assist in the development of future training. This diverse trend of employing different nationalities was not statistically significant across the study hospitals where P=0.301.

6.4.3. Education and Qualification

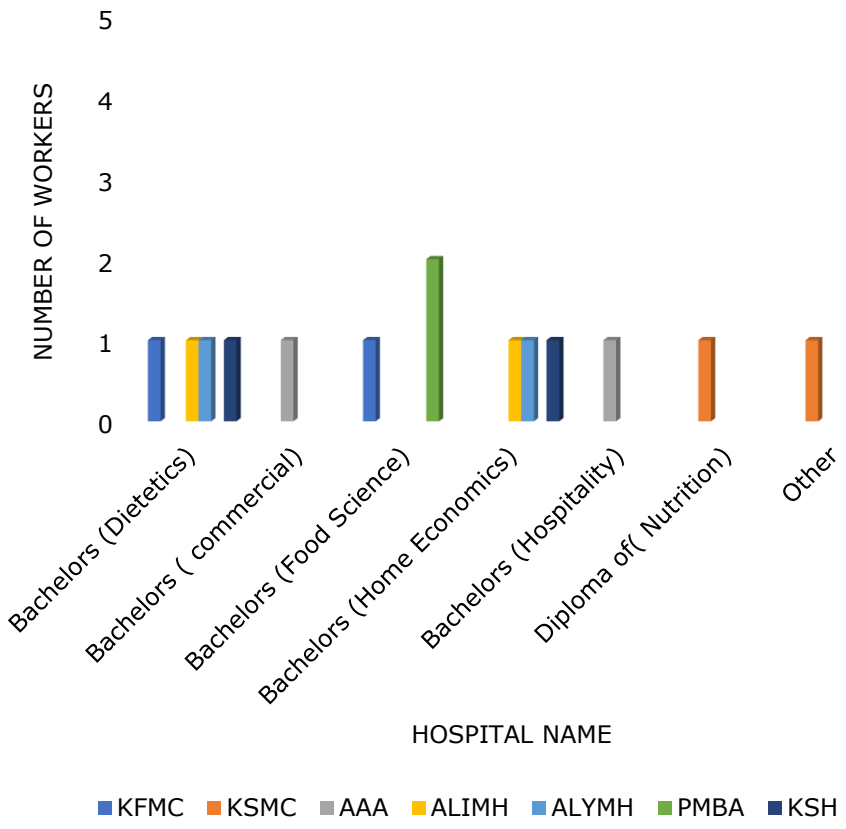


Figure 6-25 What qualification do you hold?

Regarding the individual hospitals portrayed in Figure 6-25, it is clear that the most suitably qualified contracted supervisors are employed at the PMBA hospital, with two Bachelor's degrees in Food Science. The next best hospital is KFMC with one Bachelor of Dietetics and one Bachelor of Food Science. ALIMH, KSH and ALYMH have similar types of contracted employees: one Bachelor of Dietetics and one Bachelor of Home Economics. Finally, the KSMC hospital employs one contracted supervisor with a Diploma in Nutrition and another one with a qualification categorised as 'other'.

The least suitable employees' qualifications are in the AAA hospital: one Bachelor of Commerce and one Bachelor of Hospitality; in addition, they are both Egyptian males from the two youngest age groups. Overall, this shows that the PMBA hospital employs the youngest and the oldest male contracted supervisors with the most suitable qualifications, whereby one is Saudi and the other is Egyptian. This is followed by KFMC, which employs the youngest females who are Indian and who have two suitable qualifications: Bachelor in Food Science and Bachelor in Dietetics. The least suitable is the AAA hospital. They employ the youngest males with the least suitable qualifications and who are both foreign citizens (two Egyptians). Overall, there are five Saudi contracted supervisors, three possessing Bachelors of Dietetics, one Bachelor of Food Science and one supervisor with a Diploma in Nutrition.

The Indian contracted supervisor with the most suitable qualification has been employed in one of the largest hospitals, KFMC, and an Egyptian with the same qualification has been employed in the PMBA hospital, suggesting that the Saudi Ministry of Health respects and values the knowledge offered by highly qualified international employees. The fact that in the AAA hospital there are two foreign nationals with the least suitable qualifications (Commerce and Hospitality) suggests that the contracted company struggles to employ Saudi citizens.

6.4.4. HACCP related knowledge

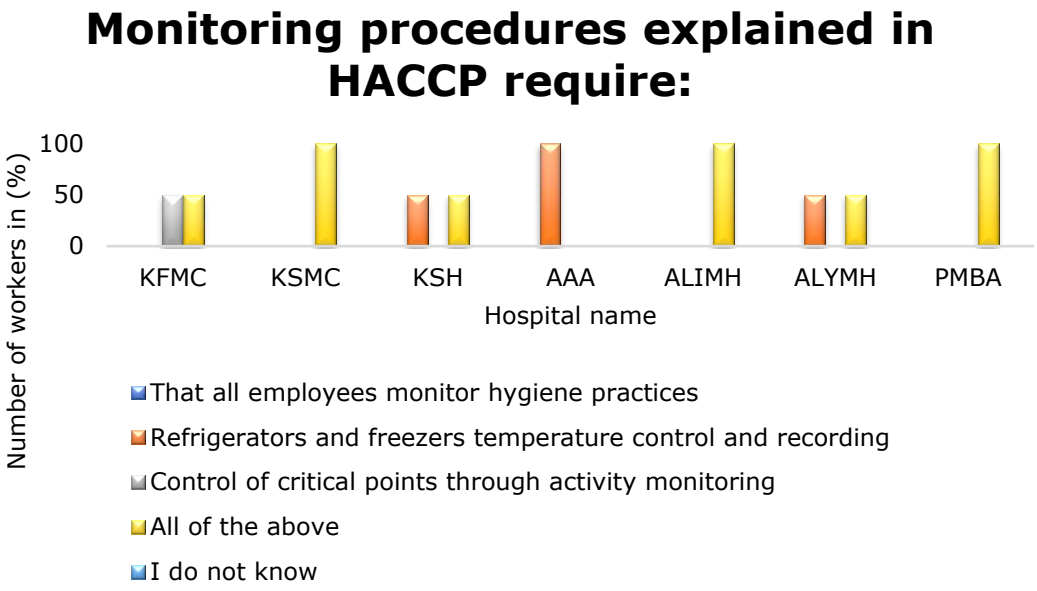


Figure 6-26 Monitoring procedures of the HACCP principles

All the respondents (14 employees) defined HACCP correctly and understood its importance. Given the employees supervisory roles, this is not a surprising finding. Regarding the monitoring procedures in Figure 6-26 when considering HACCP principles, nine contracted catering managers provided the correct answer 'All of the above'. The hospitals who had a 100% correct response to this question were KSMC, ALIMH and PMBA.

50% of contracted managers of three different hospitals (KSH, ALYMH, KFMC) gave incorrect answers. All managers at AAA believed that monitoring is specific to refrigerators, whereas one of the contracted managers at (KFMC) thought that monitoring only involved critical control points. The responses were chosen by different contracted managers from different hospitals and this variation was not statistically significant using

Chi-Square P=0.28. With further investigations, none of the demographics of the contracted managers had any statistically significant correlation.

6.4.5. HACCP plan verification

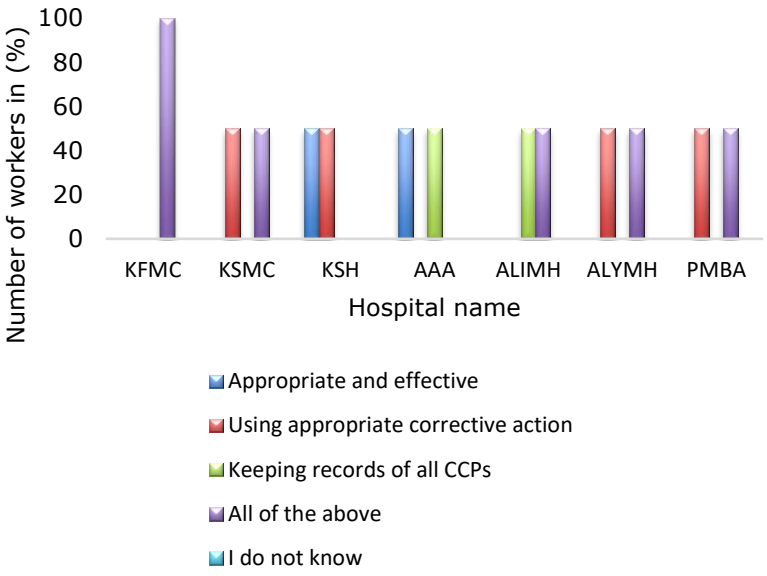


Figure 6-27 Verification aims to ensure that the HACCP plan is?

Each hospital has two contracted managers, one of whom is an assistant. As demonstrated above in figure 6-27, six contracted managers at five hospitals defined the aim of the verification process correctly and chose "All of the above". While the other eight responses were incorrect. None of the contracted managers in both KSH and AAA answered this question correctly At KSMC, ALIMH, ALYMH and PMBA, 50% of managers gave a correct answer. The differences between the responses across study hospitals were not statistically significant due to P value more than 0.4 in Chi-Square test. Although the correlation between nationalities and choosing the incorrect answer for this question was not statistically significant (P=0.07), 80% of

Saudi and 67% of Egyptian contracted managers chose the incorrect answer.

6.4.6. Attitudes towards hazard analysis:

To recognize the attitudes toward hazards analysis and critical control points training at the study hospitals, the researcher asked the contracted managers to respond to four elements in terms of how much they agree or disagree. Those elements are explained in detail below:

6.4.7. HACCP is fully implemented in this hospital

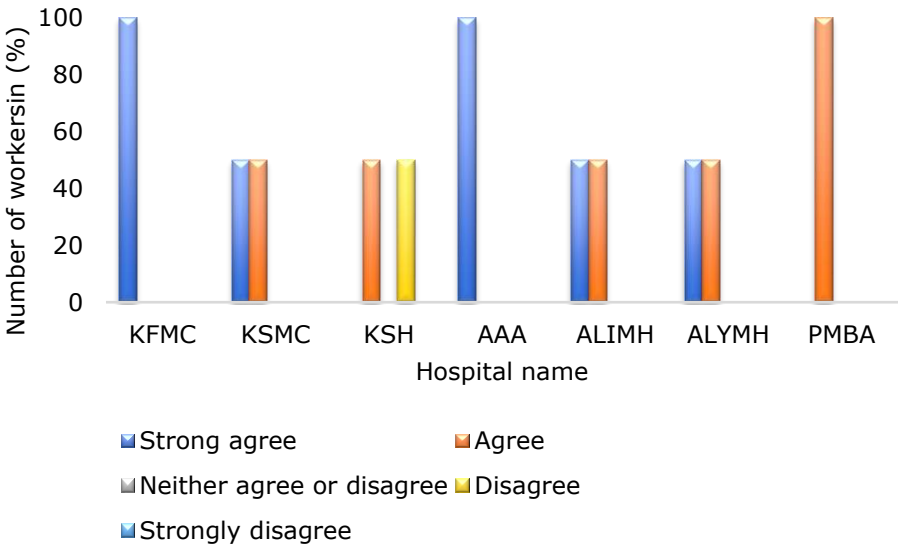


Figure 6-28 HACCP is fully implemented in this hospital:

Regarding the statement in Figure 6-28 where food safety issues are concerned, the answers were varied. In terms of the full implementation of HACCP in individual hospitals, 100% of the contracted supervisors in the KFMC and AAA hospitals strongly agree that this is necessary; 100% staff from PMBA agree with the statement and the contracted supervisors. In the three remaining hospitals, the attitudes are divided: KSMC – 50%

strongly agree and 50% agree; ALIMH and ALYMH – 50% each equally strongly agree and agree. While the only hospital to disagree (50%) with the statement was KSH. Although there were no statistically significant variations across study hospitals (P=0.34) between the responses, the disagreement came from a Saudi female supervisor at KSH.

6.4.8. There has been no training on HACCP

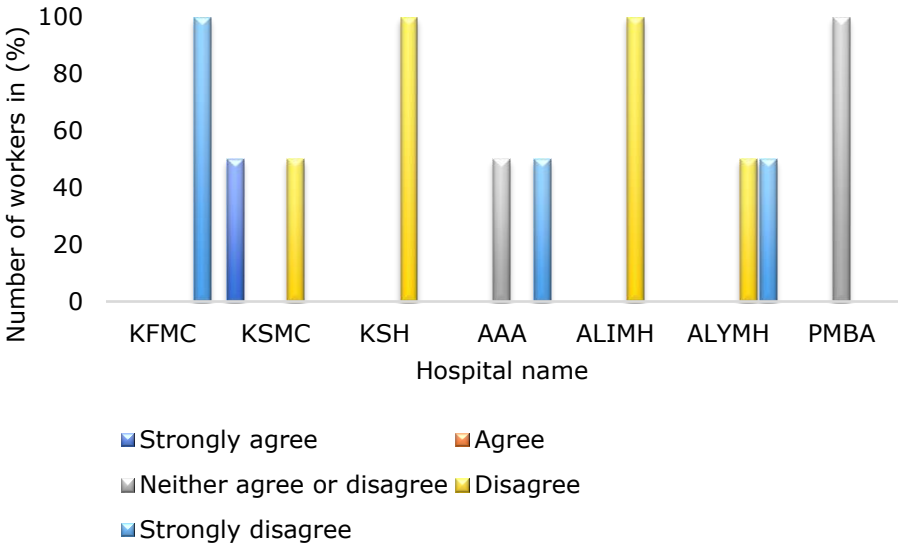


Figure 6-29 There has been no training on HACCP

Figure 6-29 explores whether catering managers have received HACCP training. Of the seven hospitals surveyed, only KSMC both agreed (50%) and strongly agreed (50%) that there had been no training. The following hospitals strongly disagreed that there was no training offered on HACCP: KFMC (100%), AAA (50%) and ALYMH (50%). The three hospitals who disagreed were KSH (100%), ALIMH (100%) and ALYMH (50%). In two hospitals (AAA – 50% and PMBA – 100%), the answers were undecided: neither agree nor disagree. The differences in responses across hospitals

toward the training on HACCP were statistically significant and P was 0.043. Moreover, none of the demographics had a statistically significant correlation with the responses except for the aspect of professional qualification. The correlation was statistically significant because P was less than 0.02. in detail, those who chose 'disagree' or 'strongly disagree' were qualified with Bachelor degree, while those who chose 'agree' or 'strongly agree' were qualified with other types of degree such as Master level.

6.4.9. Compulsory Training for all Food Handlers

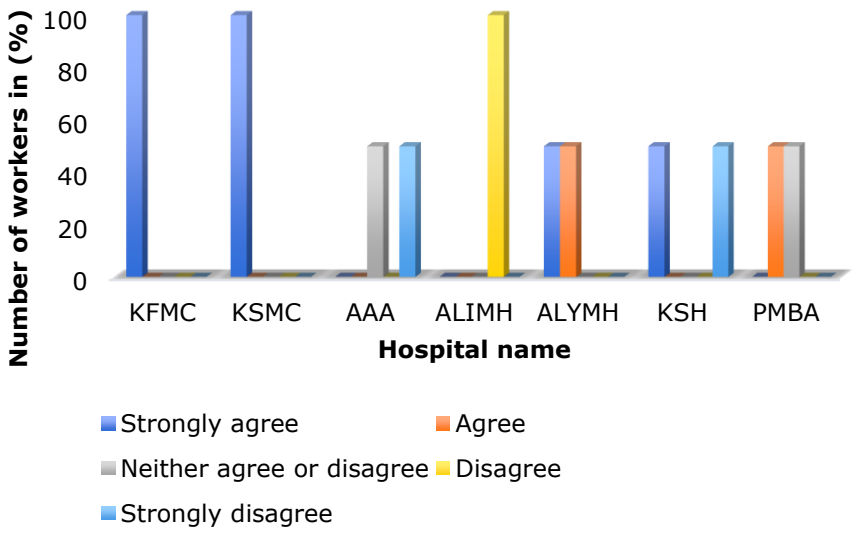


Figure 6-30 Compulsory Training for all Food Handlers

Figure 6-30 outlines opinions on compulsory food safety training for all food handlers. For KFMC, KSMC all the respondents (100%) strongly agreed with the statement. In KSH, and ALIMH 50% strongly agreed with the idea of compulsory training for all while the other half agreed. These findings clearly show that half of the contracted supervisor are positively

encouraging the idea of making food safety training compulsory for all food handlers. Lastly, all other demographics were statistically non-significant correlated with the agreement of making food safety training compulsory.

6.4.10. Unresolved Food Safety Issues

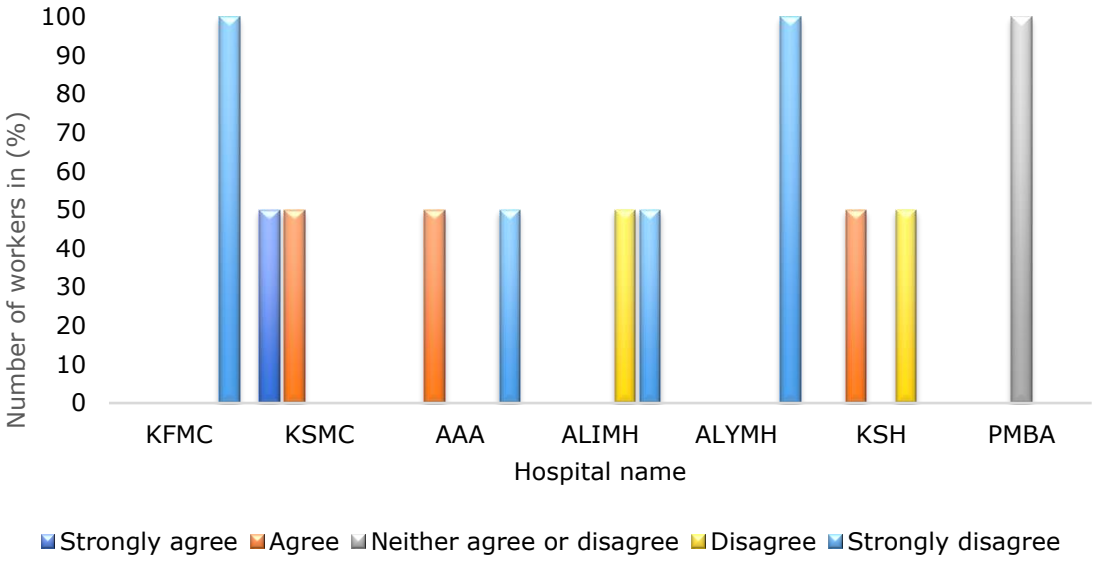


Figure 6-31 When we raise concerns about food safety issues, they are ignored

The responses to the statement regarding action or inaction after raising concerns about food safety were varied as shown in Figure 6-31. In KFMC and ALYMH, all the respondents (100%) strongly disagreed that safety issues were ignored when they raised them. At AAA and ALIMH 50% strongly disagreed. On the other hand, for KSMC the situation was opposite – both respondents strongly agreed or agreed with the statement. In KSH and ALIMH, 50% respondents disagree with the statement. There was also a large number of undecided responses, such as in PMBA (100%).

6.4.11. Contribution to Hospital Menu Planning

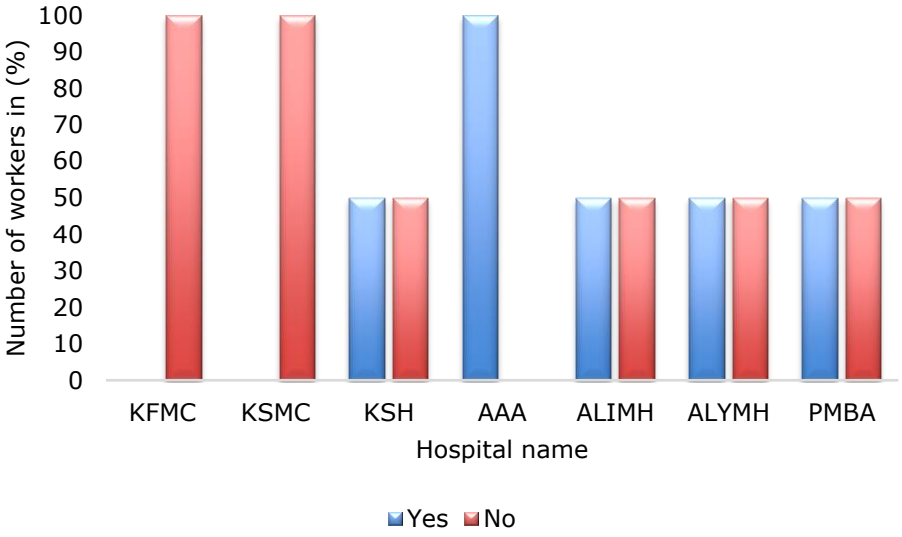


Figure 6-32 Do you contribute to the hospital menu planning?

The overall hospital results in Figure 6-32 show that only in AAA hospital, 100% of supervisors were involved with hospital menu planning. In KSMC and KFMC, the responses were 100% against involvement. While in other hospitals such as KSH, ALIMH, ALYMH and PMBA the responses were divided equally by yes and no. Although those who tend to contribute to the food menu planning were Saudis by 67%, demographic characteristics were statistically non-significant correlated with the responses using Chi-Square test. Overall, it can be concluded that there is no consistent pattern in terms of the involvement of the contracted supervisors in food menu planning.

6.4.12. Hospital Food Safety Assurance (Monitoring and Checks)

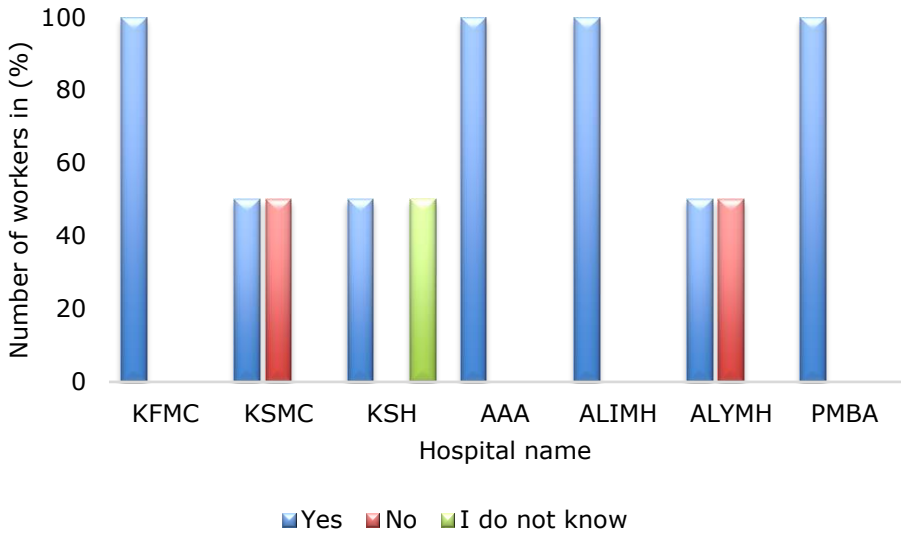


Figure 6-33 Does your hospital have any organised monitoring / checks to ensure the safety of the food served to patients

This results in Figures 6-33 shows that the hospitals mainly ensure food safety of the food offered to patients through organised monitoring. However, in three cases, the supervisors have not been included in this activity as they either do not know about it or they answered negatively. Nevertheless, this situation is better than the MOH supervisors, where the majority of the contracted catering supervisors' answers were positive; 50 % in KSH said they do not know about it, and 50% said that the hospitals does not have any organised monitoring. On the other hand, 50% in both KSMC and ALYMH responded by yes and the other half responded by no. This demonstrates a strong need for training in this area and the involvement of higher management in implementation, since it presents a high risk to food and patient safety. Other demographics were statistically non-significant correlated with the response of whether hospitals have any

organised monitoring / checks to ensure the safety of the food served to patients.

6.4.13. Corrective Food Safety Actions in Hospital Kitchens

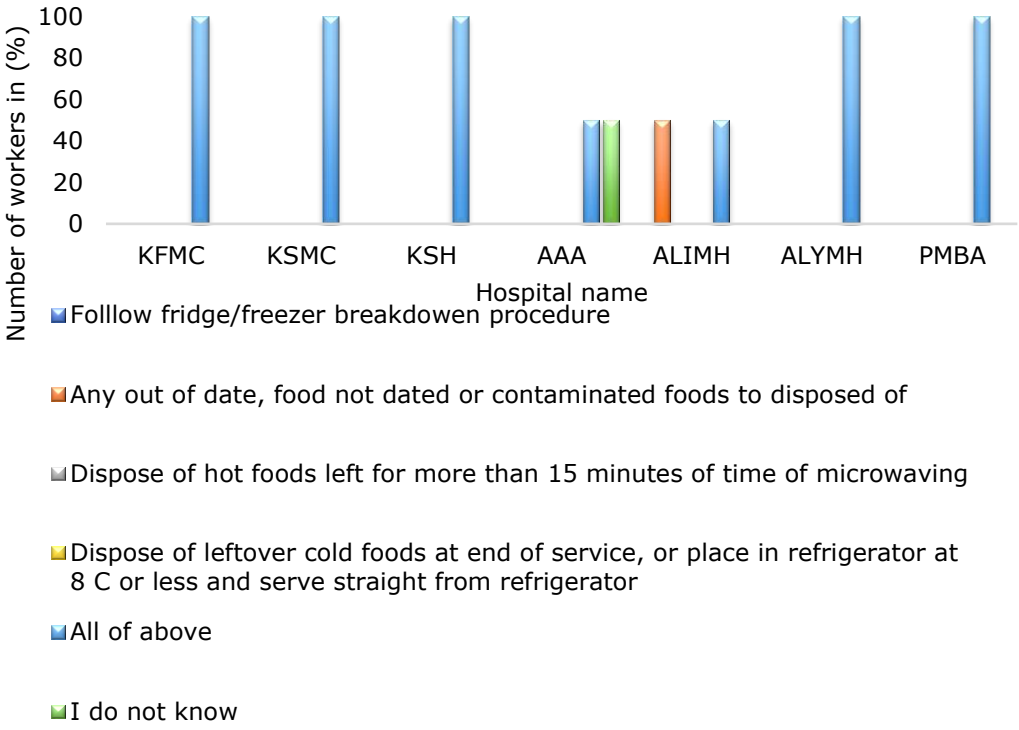


Figure 6-34 Are you aware of any corrective actions for ensuring food safety in your kitchens

Regarding the corrective measures taken in their hospital kitchens in Figure 6-34, the supervisors' responses were divided. It is surprising that 50% in AAA hospital were not completely sure about the measures being taken in their hospital kitchens; this means that they lack the competence and confidence necessary for their core responsibilities. The survey records 50% of supervisors responded out of date food, which suggests that this may be the only measure taken in their kitchens in ALIMH. The explanations of the findings clearly indicate that there is an urgent need for food safety

training for kitchen supervisors. Approximately more than 85% of the supervising staff were aware of all the food safety corrective measures in their hospital kitchens. Although demographics were statistically non-significant with the matter of being aware of any corrective actions for ensuring food safety in your kitchens, those who answered wrongly in both AAA and ALIMH were Egyptian and aged 30-35 years old.

6.4.14. Frequency of the Corrective Food Safety Actions in Hospital Kitchens

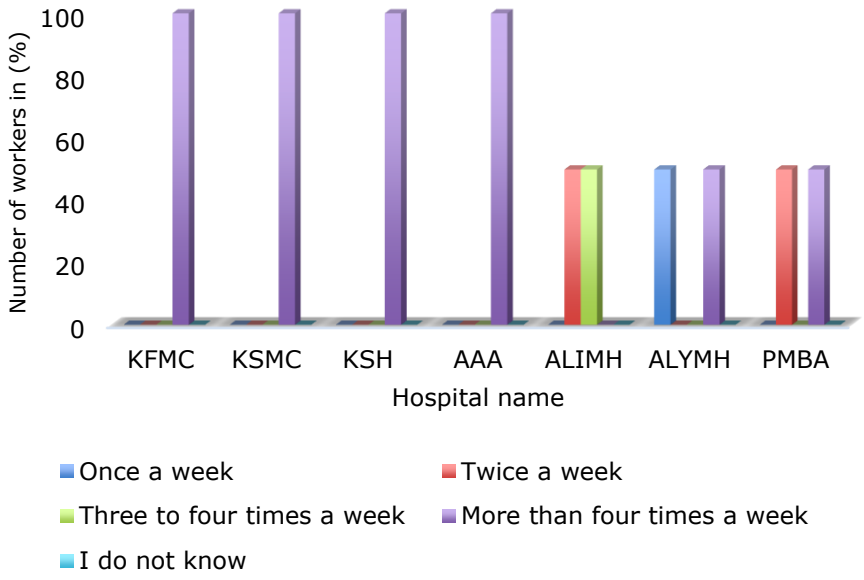


Figure 6-35 How often have the above corrective actions been applied?

Regarding the frequency of the corrective measures, the findings in Figure 6-35 provide limited information because even the supervisors who previously were not sure of their corrective measures provided the answers about the frequency of the measures. This has to be taken into account

when writing the final conclusions and recommendations. For example, 50% of PMBA and ALYMH were not completely sure of what measures were being undertaken in their hospital kitchens, which could include a) daily or b) Friday and Saturday excluded practice. In addition, none of the contracted managers answered correctly in ALIMH hospital. Although there was statistically non-significant correlation between the responses and other demographics, those who answered incorrectly were two Saudis and two Egyptians. This suggests the need for standardization and a benchmarking for the required knowledge, understanding and practice across all the state hospitals in Riyadh.

6.4.15. Participation in Food Pathogen Control

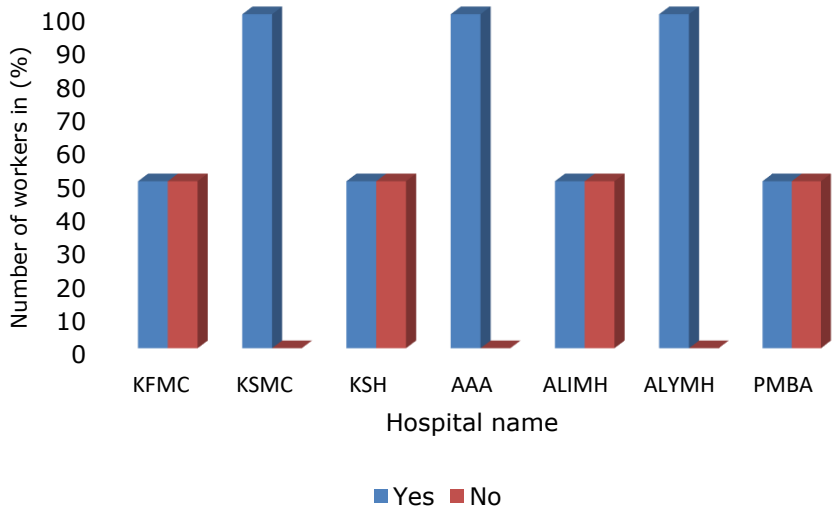


Figure 6-36 Have you ever tested for any food-borne pathogen?

Results from Figure 6-36 surprisingly show that four supervisors have never initiated or implemented any tests for food pathogens in four hospitals

(KFMC, ALIMH, KSH and PMBA). However, it would be interesting to find out if this is in respect of a decision being made from higher management, such as by a head supervisor. However, these responses were statistically non-significant with any of the demographics.

6.4.16. Course of Action in Case of Positive Test Samples

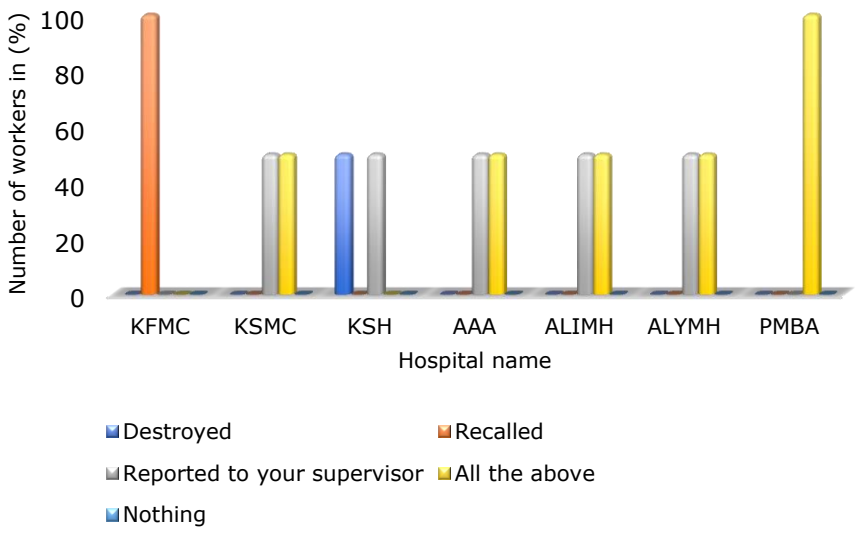


Figure 6-37 What happens if the food-borne pathogen test samples are positive?

When asked about the course of action following positive test samples, as shown in Figure 6-37, most of the contracted catering managers responded correctly – 'reported to the supervisor'. The largest proportion of all the respondents stated that they did all of the suggested activities: destroyed the samples, recalled the samples, as well as reported the outcome to their supervisors. Almost 50% of the respondents performed an incomplete action. They either 'recalled' (100%) in KFMC or 'destroyed' (50%) in KSH.

Using Chi-Square statistical test, results revealed there were not any statistically significant correlation with any of the demographics.

6.4.17. Increased Growth of Bacteria (Knowledge)

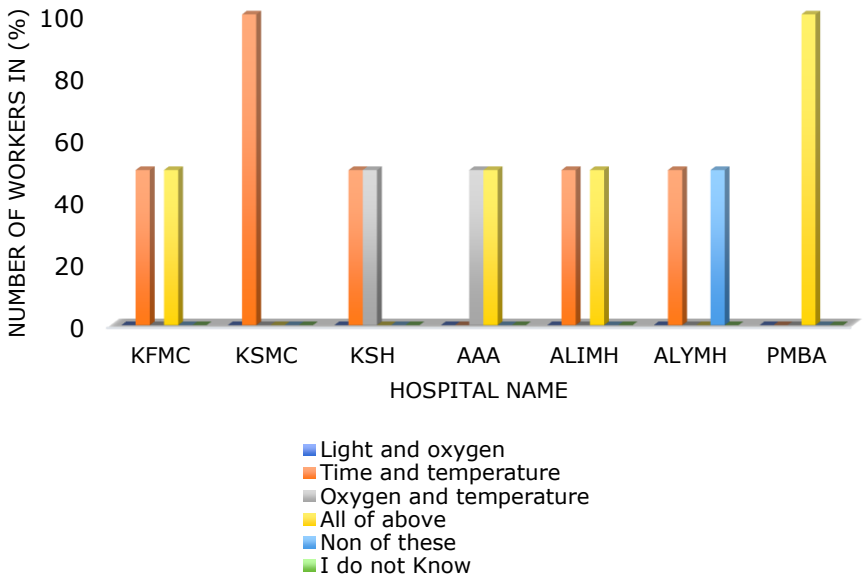


Figure 6-38 What conditions generally increase the growth of bacteria?

When asked about the favourable factors that stimulate the growth of bacteria, as shown in Figure 6-38, the majority of the respondents circled the best answer, although the percentage of such participants was just above half, with 100% in PMBA. In Figure 13 show that this suggests that there is a need for training on the main types of pathogens and the conditions which encourage them to thrive. Using the Chi-Square statistical test, results revealed that all the responses were chosen randomly and there was no statistically non-significant correlation with any of the demographics.

6.4.18. Causes of Food Poisoning from Chicken

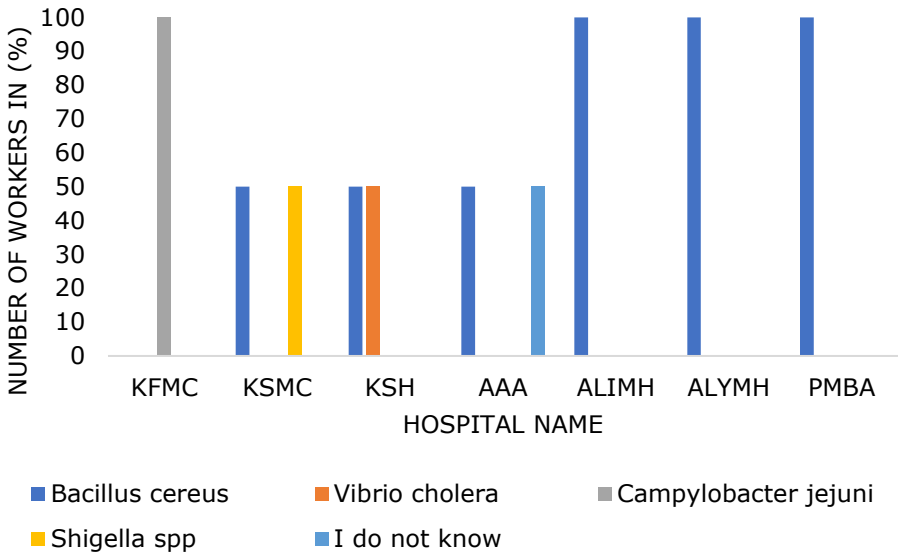


Figure 6-39 Food poisoning from chicken meals are mainly caused by the following bacteria:

The results in Figure 6-39 shows the responses to the question related to the causes of food poisoning from chicken meals. These show that only in one hospital, KFMC (100%), were the answers all completely correct, whereas in all other hospitals, all the answers were incorrect. The supervisors mainly thought that *Bacillus cereus* was the correct answer in different hospitals. They also believed that *Vibrio cholera* or *Shigella* spp are the main causes of chicken associated food poisoning, whereas one respondent admitted to not knowing the correct answer. It is urgent that training be organised in this area of food safety in all hospitals, even in the one with the correct answers. Using the Chi-square statistical test, there were statistically non-significant correlations between the answers on this question and any other demographics of the participants.

6.4.19. Recognition of Food Contamination

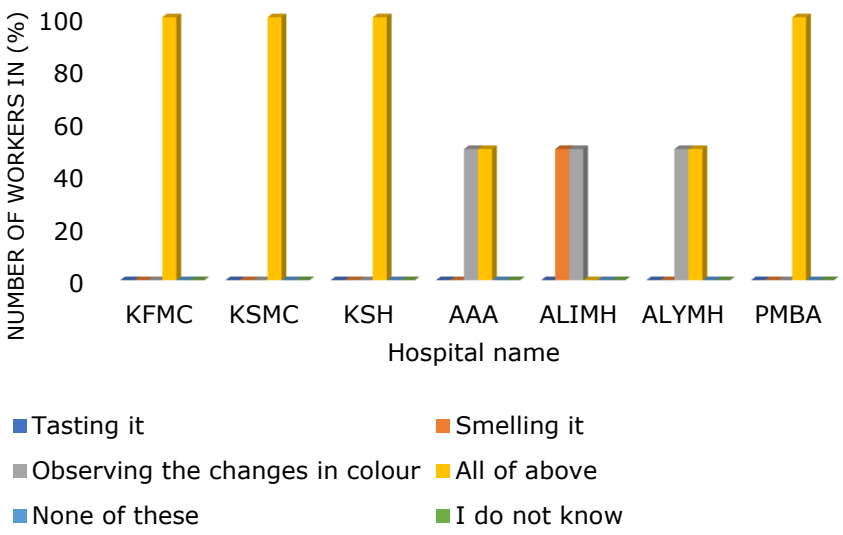


Figure 6-40 Food contamination can be recognised by:

When asked how that food contamination can be recognised, as shown in Figure 6-40 the majority of contracted supervisors answered 'all of above'. However, in two hospitals (AAA and ALYMH) half of the responses answered (Observing the changes in colour). Instead, the supervisors thought that smelling and changes in colour were the only ways to recognise contaminated food, while the correct answer is 'None of these'. The finding indicates that there is a significant risk of food contamination not being recognised before the food reaches patients. Therefore, there is a great need for this fundamental knowledge to be included to the catering manager's training. Having this need, the researcher conducted several statistical analyses to examine if any of the demographics had any statistically significant correlation with the incorrect answers above, and the results were not statistically significant.

6.4.20. Concerns about Patient Food Safety (Action in Case of Inconclusive Evidence)

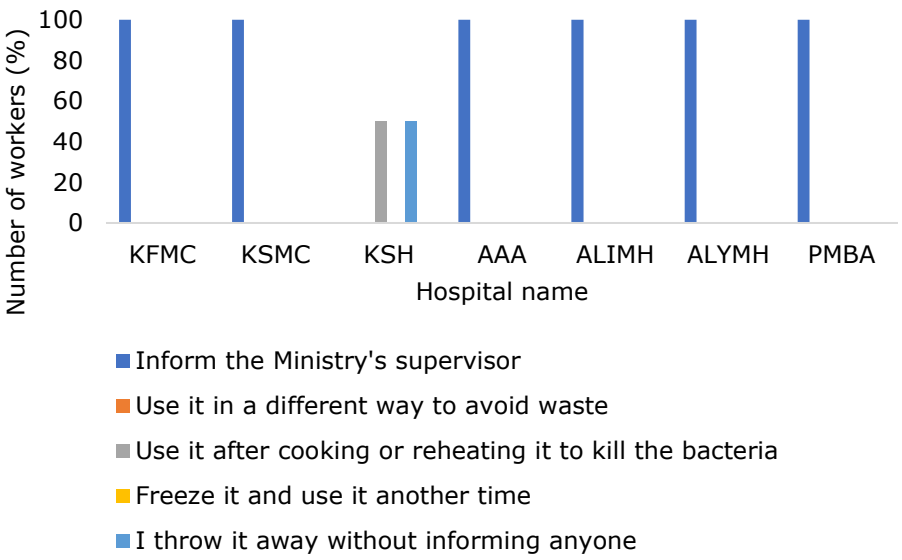


Figure 6-41 When you are not sure if food is safe to be served to patients, do you?

Catering managers were also questioned in relation to their concerns and responses regarding patient food safety in cases when there was insufficient evidence to openly condemn the food (Figure 6-41). Six of the seven hospitals answered correctly – inform the Ministry's supervisor. Nevertheless, KSH gave two incorrect answers, believing the appropriate action was either 'use it after cooking or reheat it to kill the bacteria' or 'throw it away without informing anyone'. This represents a huge risk for patients' safety and a lack of awareness of the importance of monitoring and recording activities so that irregular patterns in food safety can be identified. Therefore, they require urgent training regarding process and monitoring procedures. Similar to the previous question, the researcher conducted several statistical analyses to examine if any of the

demographics had any statistically significant correlation with the participants' responses, but none of them were correlated.

6.4.21. Negative Impact of Smoking in Hospital Kitchens

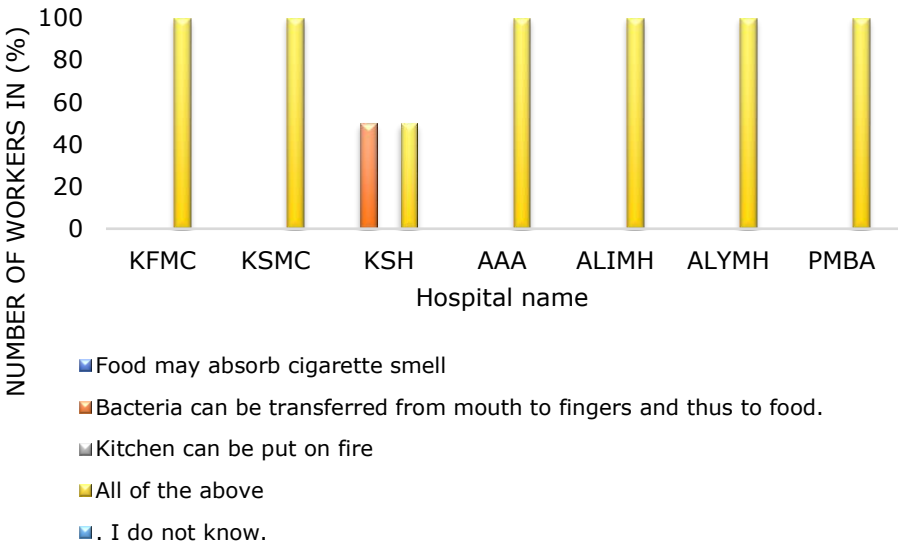


Figure 6-42 It is unacceptable to smoke cigarettes in kitchen as:

When asked about the impact of smoking in hospital kitchens (Figure 6-42), all the catering supervisors agreed that it was not acceptable. There was only one respondent in KSH hospital who thought that the main reason was to avoid bacteria transfer from mouth to fingers and food.

This shows that all the catering managers understand that smoking is not allowed in kitchen hospitals, although one did not know all the reasons for this. Likewise, statistical analyses revealed that none of the demographics had any statistically significant correlation with the participants' responses.

6.5. MOH Supervisor Set C (Q-A questionnaire)

Eighty respondents participated in the survey, the results of which are presented with interpretations below. To begin with, it should be noted that in the following presentation of findings both numbers and percentages have been used because in some cases the numbers were very low, e.g. 0-14 and it is believed that the use of percentages could be misleading. This means that in case of smaller numbers, both numbers and percentages have been used to overcome this limitation.

6.5.1. Age representation across gender distribution

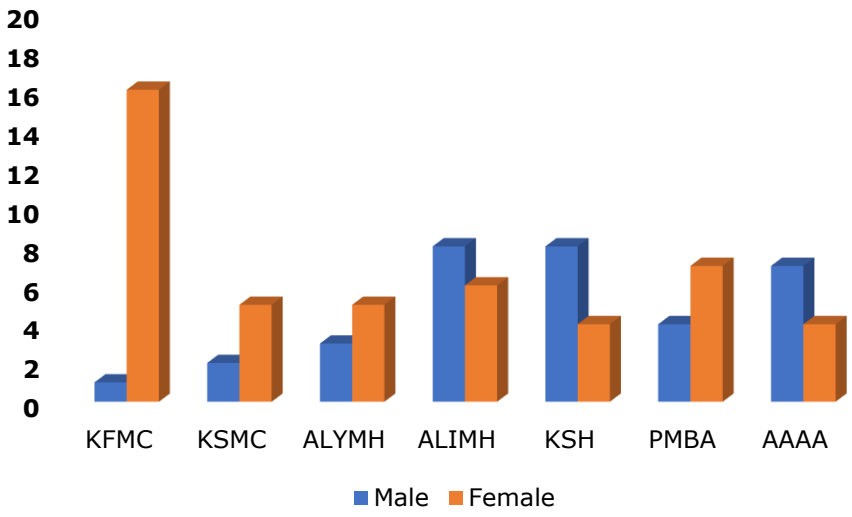


Figure 6-43 Supervisors gender distribution

In this group of 80 supervisors, 33 out of eighty there were male (41%) and 47 female participants (57%). All of them are Saudis. It is interesting to note that the majority of female participants were in the role of managers, which is somewhat unexpected taking into consideration that Arabic society favours men in leading positions (Omair, 2008). New related

university programmes in Saudi Arabia also have more females, which contribute to the higher proportion of this gender employed by MOH, considering that more mature employees are less likely to change jobs. Although there was no statistically significant correlation between the age categories and gender for MOH supervisors in this study (P=0.08), 40 females were aged into two categories: 38% were (24-29) and 47% were (30-35) age categories. In terms of males, 21% were (24-29) and 36% were (30-35) age categories. In contrast, the correlation between the distribution of gender across study hospitals was statically significant correlated due to P was less than 0.012. The correlation was clear because some hospitals had more females' supervisors than males and vice versa. For example, in KFMC, 16 participants (94%) were females with one male only, while KSH (67%), AAA (64%) and ALIMH (57%) had more male supervisors than female.

6.5.2. Gender Representation

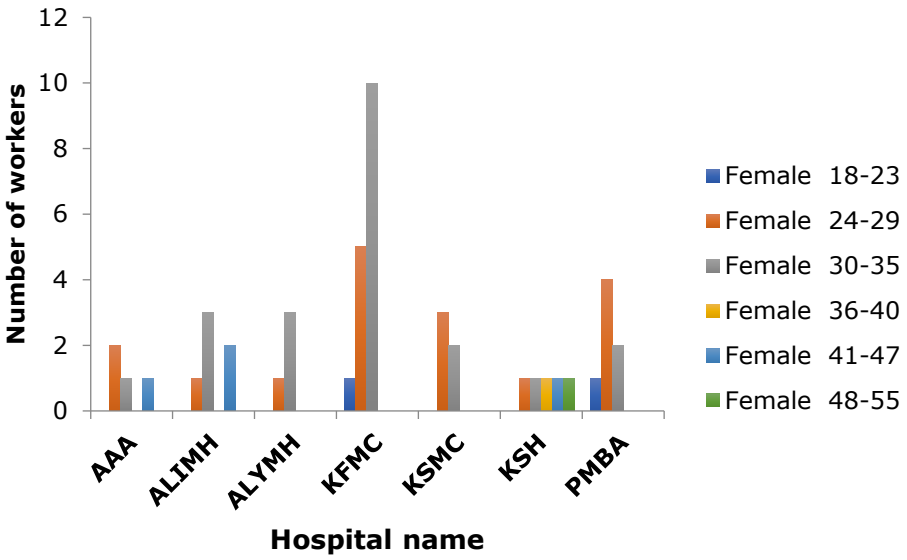


Figure 6-44 Females Supervisors age distribution

The data represented in Figure 6-44 shows that KFMC hospital had the highest number of younger mid-age range female managers (aged 30-35) with ten supervisors. The same female age group were less represented with three supervisors at each AlIMH and ALYMH hospitals. In the AAA hospital the situation was equal numbers between the younger mid-age range females (30-35) and the older group aged 41-47, with one supervisor in each age group. However, in KSMC and PMBA the situation was reversed, with the younger female group of 24-29 having more supervisory positions than the 30-35 age group. Female supervisors aged 24-29 were also represented in AAA and ALIMH hospitals. For the ALIMH hospital the 30-35 age group was better represented, with three female supervisors. KFMC and PMBA had the largest overall numbers of female supervisors. KFMC employed the most female supervisors (ten) in the age group 30-35,

whereas PMBA employed the most female supervisors (four) in the age group 24-29. It seems that some hospitals are investing in developing the careers of their own staff who will progress and learn about the role from an early age. It is interesting to note that female supervisors aged 41-47 were only represented in three hospitals: AAA, ALIMH and KSH. In conclusion, younger female supervisors were more represented than older female supervisors. However, this correlation of the distribution of females across age categories was not statistically significant across hospitals due to P value more than 0.25.

6.5.3. Age Distribution for Males

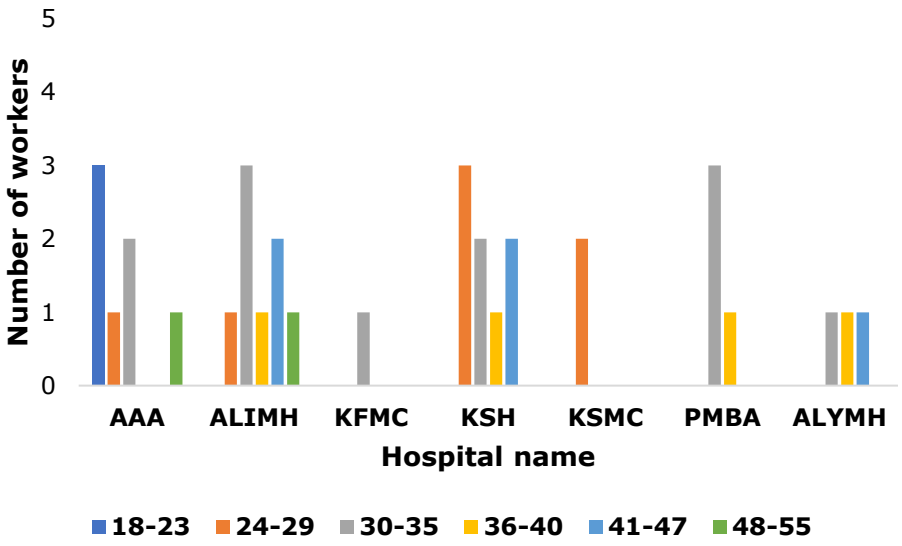


Figure 6-45 Age distribution of male staff for different hospitals:

The data presented in Figure 6-45 shows that overall, there were 33 male MOH supervisors employed in the seven surveyed hospitals in Riyadh. As

for the male supervisors' age distribution, it is clear from Figure 2 that the situation was similar to the female representation in the same hospitals. For instance, in the largest KFMC hospital there was only one male representative from the age group 30-35 group, compared to the 10 female supervisors in this age range. Overall, the 30-35 age group was the most represented in ALIMH and PMBA hospitals with three supervisors each, followed by AAA and KSH, which accounted for two supervisors each. In ALYMH hospitals there was only one male supervisor in the age group 30-35. It seems that there is a trend in the two biggest hospitals is to employ female supervisors. The Heads of the Departments in these two hospitals were females, which may have a positive impact in terms of the effectiveness of managing the staff of the same gender, in terms of mutual empathy. This evidence is in accordance with the recent legislation in KSA to include more females at higher level positions as well as in general roles within employment. The findings indicate that the government is following the new legislation.

The highest proportion of MOH male supervisors in the age group 24-29 were represented in KSH hospital. Male supervisors in the 48-55 age group were found in only two hospitals, AAA and ALIMH. Only one hospital, AAA employed three male supervisors in the 18-24 age group. This is most likely because they are young and so people with better experience tend to be employed in management positions. In one hospital (ALYMH), three age groups (30-35, 36-40 and 41-47) were equally represented, with one person in each age group. It seems that the bigger hospitals were more

likely to employ younger people. The biggest hospital can make a direct contract with young employees, and females seem to be more interested in these food-related positions than men. The other six hospitals belong to MOH but there is no direct contract with employees. Since these are relatively new types of jobs, it is expected that older females were already in some kind of employment and were relatively established in their companies, so they do not apply for new jobs requiring knowledge of the most recent legislation related to HACCP and food control.

Finally, ALIMH was the most diverse in terms of employing male supervisors from a broad range of age groups, accounting for: one male supervisor in the age groups 24-29, 36-40, and 48-55. Two male supervisors in the age group 41-47 and the highest employment of male supervisors was three in the 30-35 age group. Overall, the surveyed hospitals invested in younger people between the ages of 18 to 35. This is most likely because younger people have the benefit of learning as they progress through their job as well as learning directly from the more experienced older supervisors. However, the correlation between recruiting male supervisors across hospital within age categories was not statistically significant where P=0.37 using Chi-Square statistical test.

6.5.4. Education and Qualification of supervisors

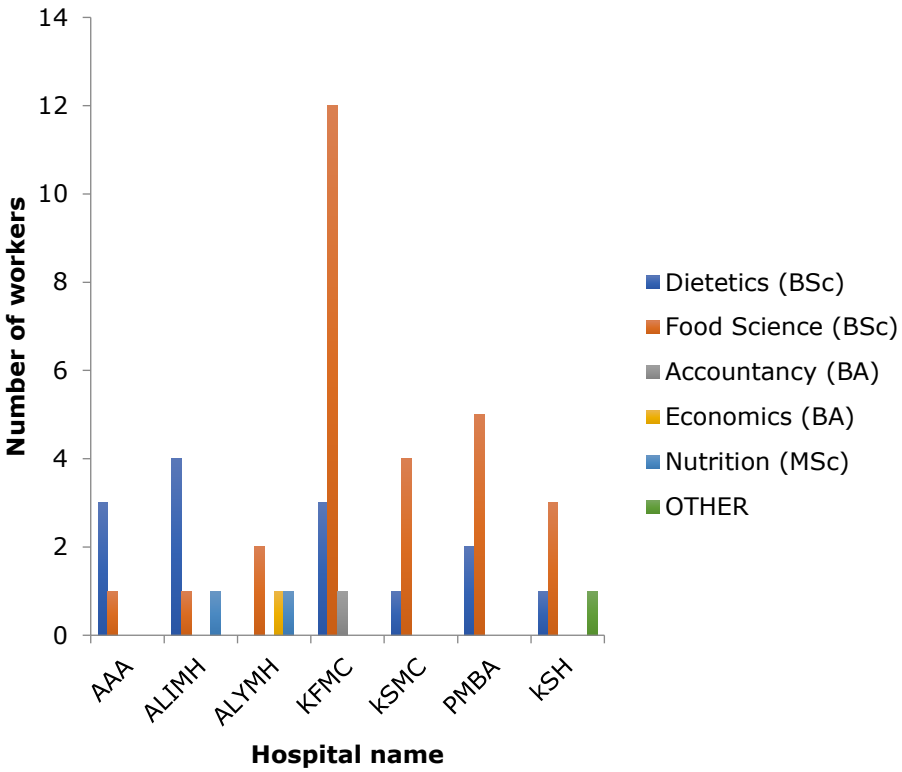


Figure 6-46 Qualifications of female staff for different hospitals

The data presented in Figure 6-46 shows that in terms of qualification, the situation related to the division by gender in each hospital is as follows: the most striking detail was that in the largest hospital (KFMC), there was the largest number of females (12) with a degree in Food Science (BSc). The same qualification was the most represented in three more hospitals: PMBA (five), KSMC (four) and ALYMH (two). In each hospital there is at least one female supervisor with a degree in Food Science (BSc.)

According to the data in Figure 6:45 Bachelor of dietetics was the second most represented qualification among the female supervisors and accounted for every hospital except ALYMH. It was the leading qualification

in two hospitals: ALIMH (four), and AAA (three). In these two hospitals, there is only one more supervisor with a degree in Food Science (BSc) and in case of ALIMH hospital, there was one female supervisor with an MSc in Nutrition. Finally, in ALYMH hospital there was one supervisor with a degree in Economics (BA), while KFMC hospital was the only one to employ a supervisor with a degree in Accountancy (BA).

The total number of females in the role of MOH supervisors was 47. Out of this number, the largest proportion has a qualification in Food Sciences (28), and the largest number of them was in KFMC (12). The other hospitals had between one and five female supervisors with the same qualification. This variation in employing female supervisors was statistically significant and correlated with the fact that some hospitals focused more on employing female supervisors with food science qualifications than others due to P value was 0.049 using Chi-Square statistical test. It was noticeable that some hospitals have only four female supervisors with suitable qualifications (e.g. AAA: one Food Science and one Dietetics; ALYMH: one Food Science, one Economics and one Nutrition).

6.5.5. Qualifications for males

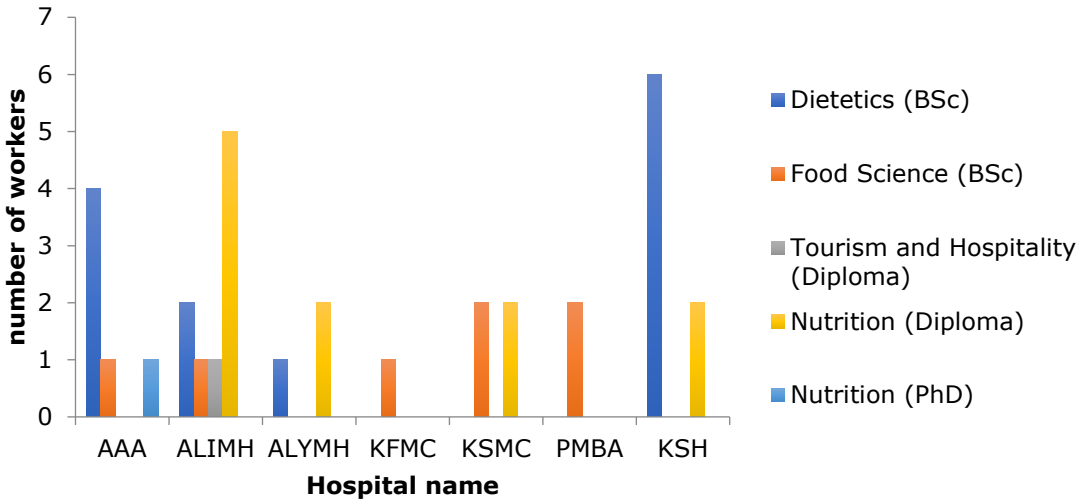


Figure 6-47 Qualification of male staff for different hospitals

The qualifications for male supervisory staff in the different hospitals are shown in Figure 6-47. There were five types of qualification represented: Dietetics (BSc) -13, Food Science (BSc) – 7, Diploma in Nutrition – 11, and Doctoral degree (PhD) in Nutrition - 1. The data shows that the most appropriate qualification, Food Science, was not the most common qualification amongst male supervisors. This accounted for only one in AAA, ALIMH and KFMC and two supervisors at the KSMC and PMBA hospitals. The least common qualification was a diploma in Tourism and Hospitality, which was held by a supervisor at ALIMH. In contrast to female supervisors' qualifications, the correlation of employing qualified male supervisors was statistically non-significant across study hospitals as a result of conducting Chi-Square statistical test where P value was 0.16.

6.5.6. HACCP related knowledge

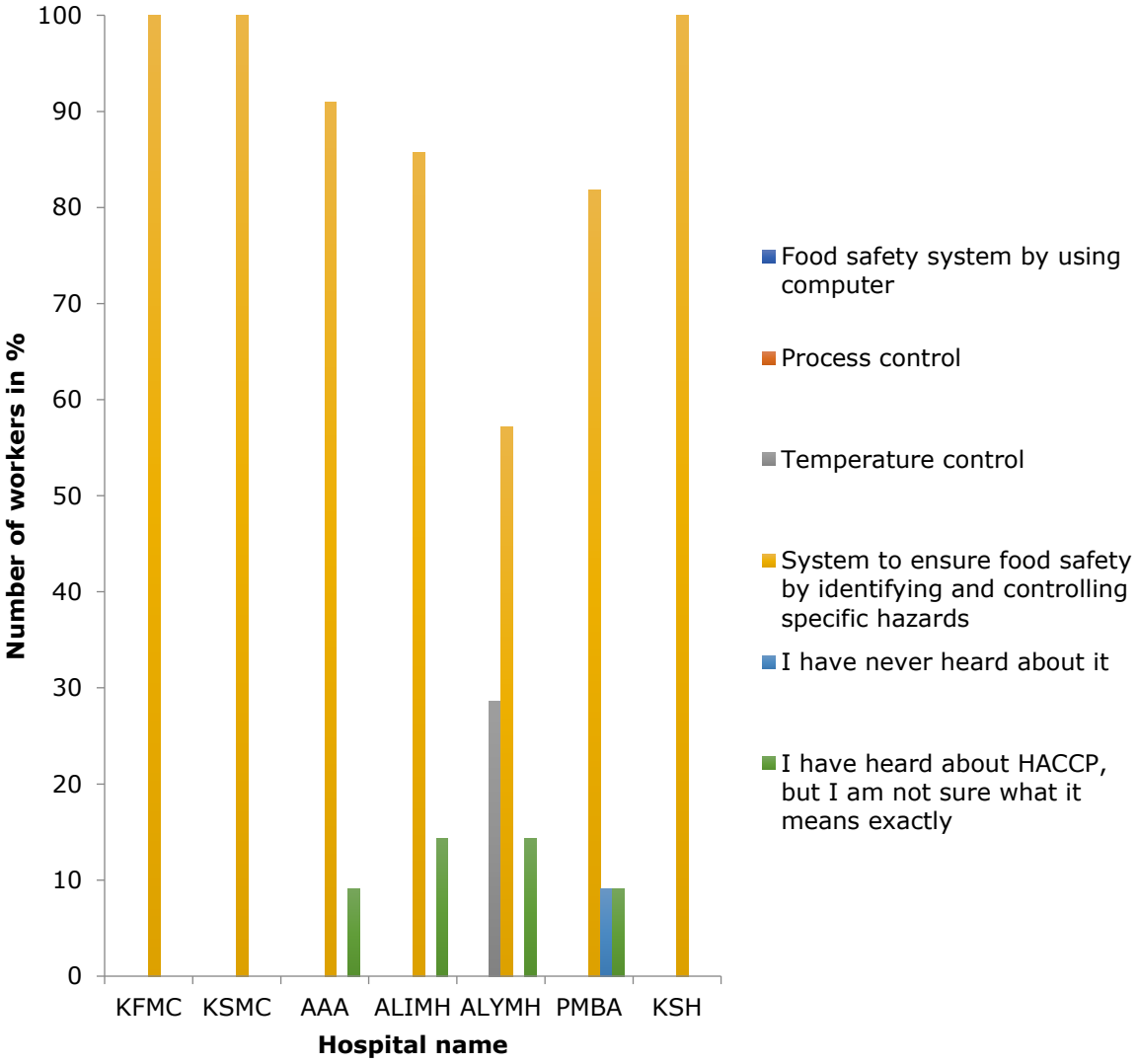


Figure 6-48 knowledge about HACCP:

The HACCP related knowledge of the supervisors from each hospital was assessed by means of a questionnaire. The responses are detailed in Figure 6-48 the highest scores of 100% correct answers were provided by supervisors from KFMC, KSH and KSMC hospitals. In only four hospitals, supervisors answered that they had heard about HACCP, but were not certain about its meaning. These were AAA and PMBA at 9%. In ALIMH and

ALYMH hospitals the percentage was slightly higher at 14%. The fact that four hospitals had not heard about HACCP is worrying and is a training area that needs rectifying. What is more, one of these hospitals, PMBA, had around one third (29%) of their supervisors who thought that HCCAP is about temperature control. PMBA (82%) and ALYMH (57%) hospitals had the lowest percentage of correct answers for HACCP knowledge. The correlation between being employed in some hospitals such as PMBA and ALYMH and responding to the question correctly was statistically significant where P value was 0.046 using Chi-Square test.

In fact, some demographic characteristics showed a statistically significant correlation with answering this question correctly such as within the age category and qualification. To explain, 45% of supervisors who were aged (40-47) did not choose the correct answer and the same case was for diploma holders where 57% of them chose the wrong choice. Other demographics showed statistically non-significant correlation with the question about HCCAP knowledge.

6.5.7. Monitoring Procedures in the HACCP Principle

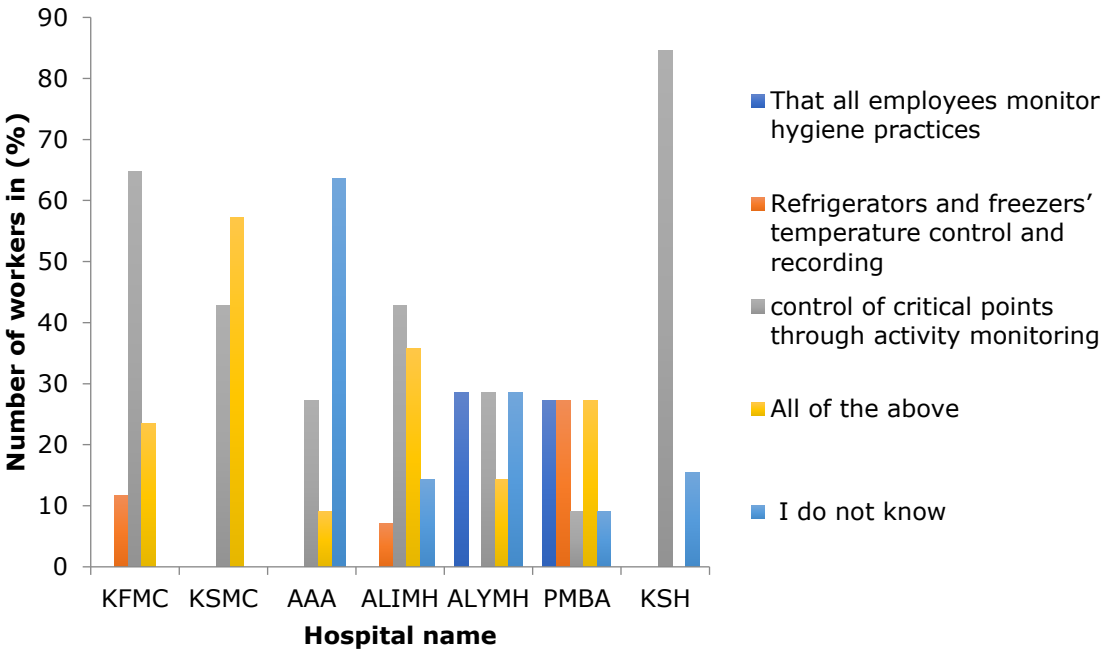


Figure 6-49 Monitoring procedures for HACCP principle 4 require

In relation to the question about monitoring procedures for HACCP Principle 4, it is interesting to note in Figure 6-49 that at KSH, 85% of supervisors thought that control of critical points through activity monitoring was sufficient. Possibly, it was not clear to them what critical points meant. More worryingly, there were five hospitals who responded that they did not know the answer. These were: KSH (15%) PMBA (9%) ALYMH (29%) ALIMH (14%) and AAA (64%). This is very alarming as it suggests this problem is down to a lack of standardised training as was evident at several hospitals. KFMC (12%), ALIMH (7%) and PMBA (27%) believed that it only referred to the temperature control of freezers and refrigerators, whereas ALYMH (29%) and PMBA (27%) believe that all employees need to control hygiene practices. The great variety of the answers detailed in figure 4-49

are a clear indicator that more specific training is required in the area of HACCP monitoring procedures in Riyadh's state hospitals. All other supervisors who chose "All the above" choice responded correctly, and their statistics were standing at (27%) for PMBA, (14%) for ALYMH, (36%) for ALIMH, (9%) for AAA, (57%) for KSMC and (24%) for KFMC. It is clear that over half of the supervisors in KSMC (57%) answered correctly. KSMC was also the only hospital with a higher proportion of correct answers whereas more than two thirds of supervisors in other hospitals chose incorrect answers. In conclusion, all these responses were statistically significant correlated with the distribution across hospitals, while several demographics were statistically non-significant with the responses of this question, except the qualification parameter. Of those who were holding diplomas, 55% answered incorrectly and this correlation was statistically significant where P value was 0.012.

6.5.8. HACCP Plan Verification

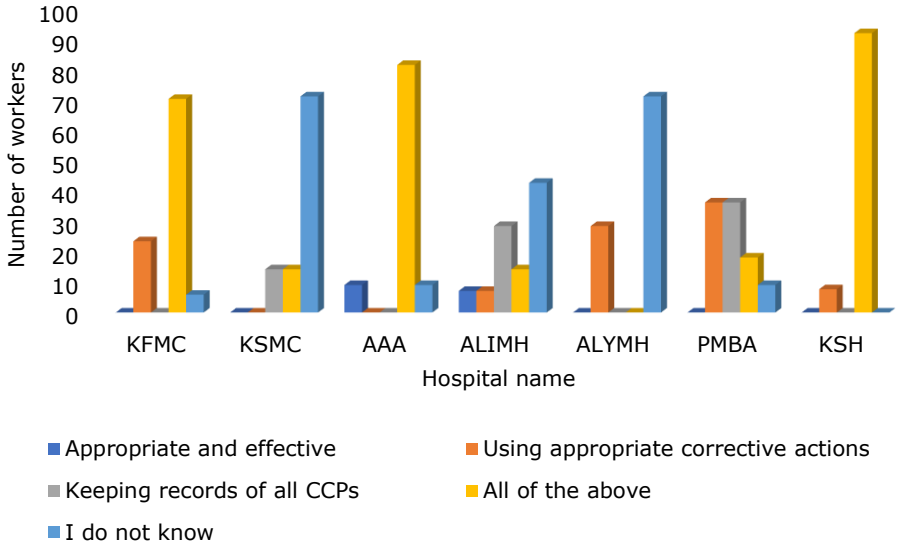


Figure 6-50 Verification aims to ensure that the HACCP plan is:

As far as verification aims are concerned, the correct comprehensive answer is ‘’All of the above’’. According to the data represented in Figure 6-50 most of the supervisors from three hospitals chose the correct answer with the percentages as follows: KFMC 71%, AAA 82% and KSH 92%. In contrast, ALYMH hospital performed the worst with nobody providing a single correct answer and 71% chose to express that they do not know the answer. This indicates that there is a need for training in this area. In addition, many KFMC, ALYMH and PMBA respondents believed that verification meant using appropriate corrective actions, which demonstrated a lack of clarity, comprehensive knowledge, and relevant training; an issue, which needs to be addressed. The variation between responses across study hospitals was statistically significant where P value was less than 0.001. In terms of other demographics, none of them was

statistically significantly correlated with the distribution of those supervisors' responses on this question.

6.5.9. Attitudes towards Hazard Analysis

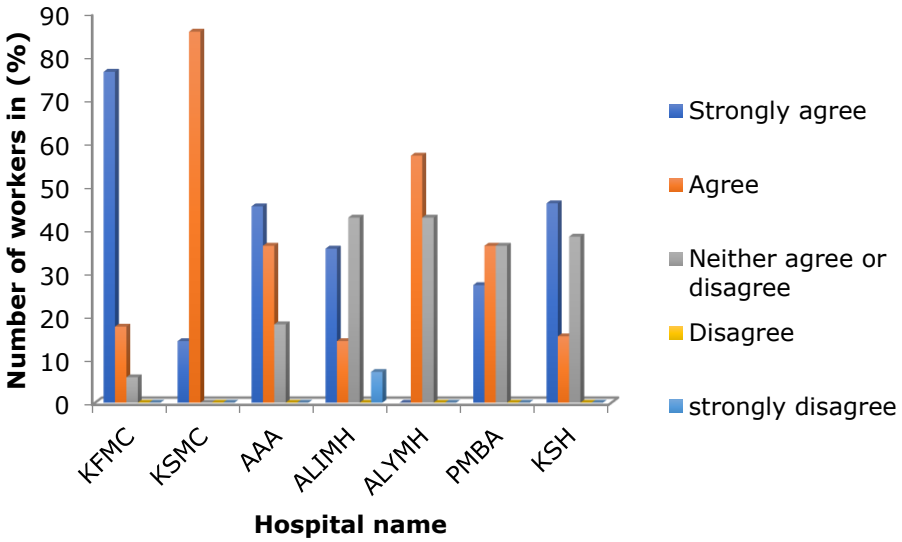


Figure 6-51 HACCP is fully implemented at this hospital:

When respondents were asked whether they considered that the hospital had fully implemented HACCP, the answers were divided. According to the data presented in Figure 6-51 KFMC had the highest proportion of respondents strongly agreeing with the statement (76%), while 18% just agreed and only 6% neither agreed nor disagreed. Hospitals AAA (45%) and KSH (46%) produced similar results in terms of strongly agreeing, which was followed by ALIMH (36%). On the other hand, in KSMC six respondents agreed (86%) and one (14%) strongly agreed. Only in the ALIMH hospital was strong disagreement with the statement by one member of staff recorded. The correlation between choosing to agree or to

disagree on this statement was statistically significant across study hospitals due to a P value of 0.015 within supervisors. Interestingly, the only demographic that was statistically significant was the qualification variable where P value was 0.023. In detail, all supervisors who held master's degree chose to strongly disagree or neither agree or disagree as a response to this statement. None chose to agree whatsoever.

6.5.10. Lack of Training on HACCP

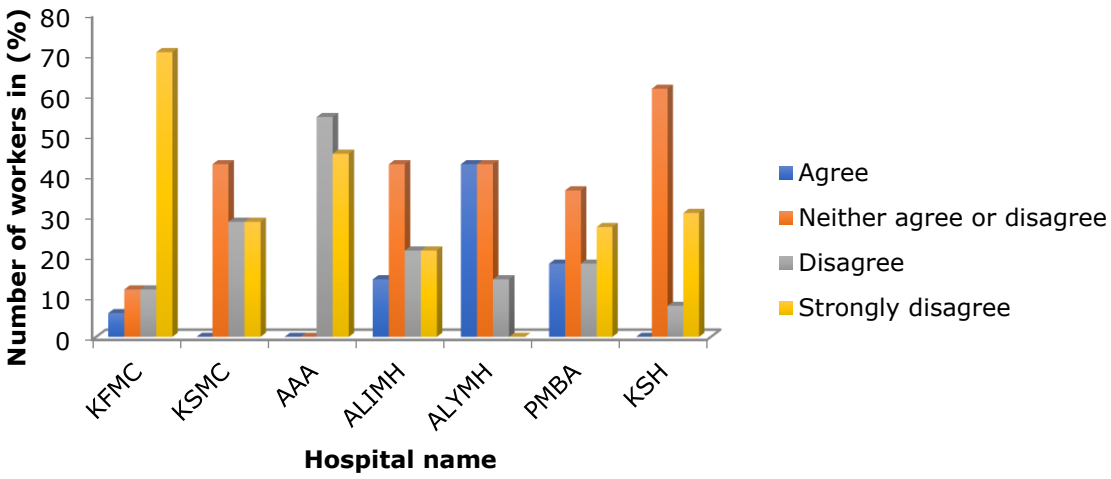


Figure 6-52 There has been no training on HACCP?

Regarding the responses to the assertion that there has been no training on HACCP in the hospital, the answers collected showed marked variations in Figure 6-52. The highest proportion who agreed with this statement was ALYMH hospital (43%) with the lowest level of agreement coming from KFMC (6%). ALIMH (14%) and PMBA (18%) hospitals also included respondents who agreed. KSMC, AAA and KSH did not agree that there had been no training on HACCP. Interestingly, KSMC, ALIMH and ALYMH all had

43% of respondents who neither agreed nor disagreed. PMBA was also quite close to this range with 36%. The fact that four hospitals were all unprepared to commit to an agreement or disagreement suggests that there is ambiguity about what type of training has taken place and so this needs to be made clearer if all hospitals are to use the same procedures.

In conclusion, none of the demographics had a statistically significant correlation with the responses on this statement, while the only parameter that had a statistically significant correlation was the variation of the responses across hospitals due to P value being 0.005.

6.5.11. Compulsory Training for All Food Handlers

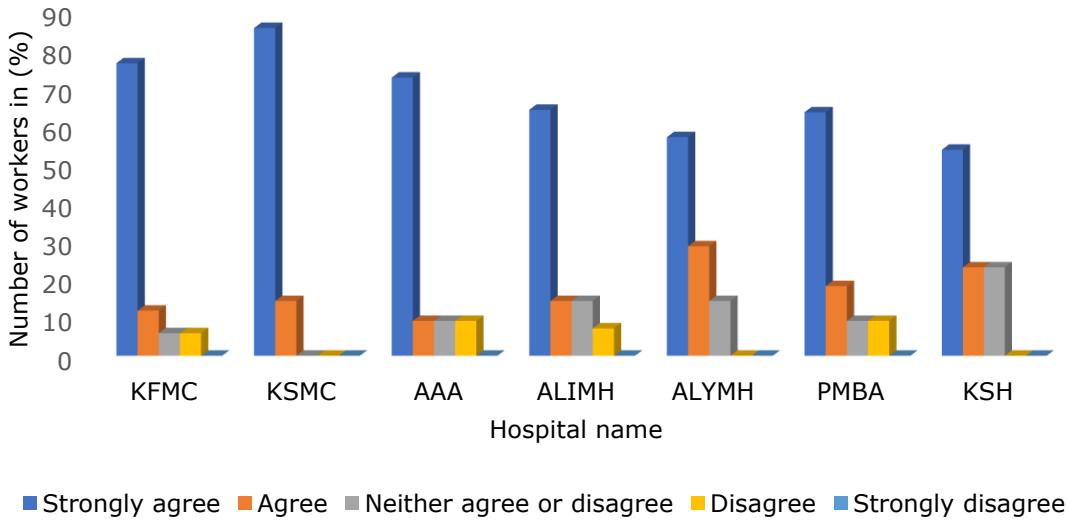


Figure 6-53 Food safety training should be compulsory for all food handlers:

According to the data represented in Figure 6-53 when asked about compulsory training for all food handlers, in all the surveyed hospitals many of the respondents strongly agreed that it should be implemented. KSMC was the highest with 86%, followed by KFMC (76%), AAA (73%) ALIMH

and PMBA both with 64% followed by ALYMH (57%) and finally KSH (54%). However, it was interesting that staff from four of the seven hospitals surveyed disagreed with this statement. These were KFMC (6%), AAA (9%), ALIMH (7%) and PMBA (9%) It may be worth investigating in detail why training was not thought necessary. If, for example, it relates to cultural attitudes, what can be done to change these perspectives and recognise the importance of following necessary hygiene standards. In terms of Chi-Square statistical tests, neither of the demographics nor the variation of responses across study hospitals were statistically significant due to P value being more 0.05 for all parameters.

6.5.12. Unresolved Food Safety Issues

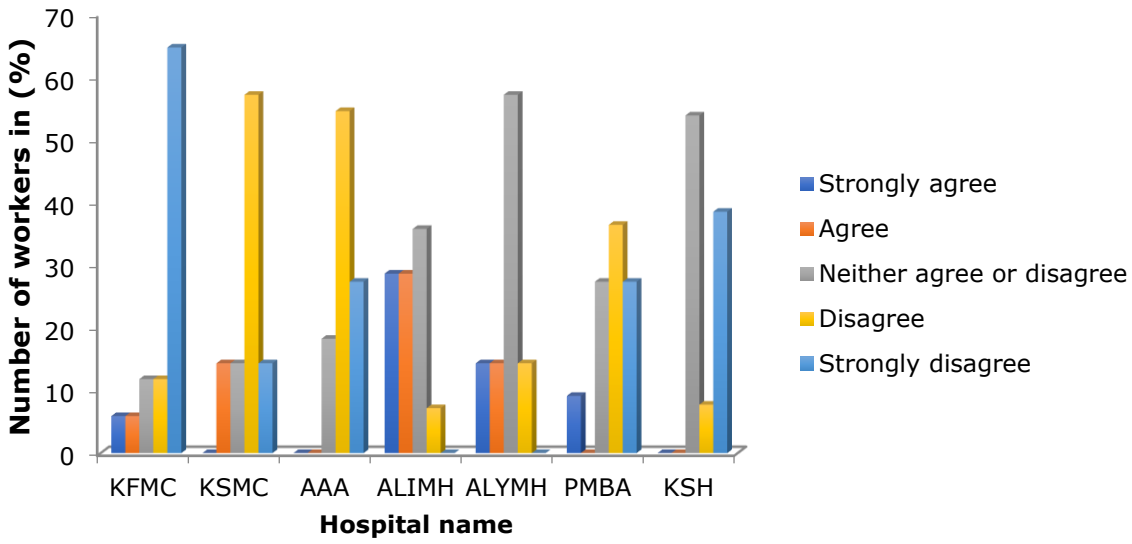


Figure 6-54 When we raise issue about food safety, they are ignored?

The perception of attention given to issues of food safety raised in the surveyed hospitals were investigated as outlined in the data in Figure 6-54. There was a mixture of responses, but notably five hospitals strongly disagreed that they felt they were ignored when they raised issues of food safety. These were KFMC (65%), KSC (38%), AAA (27%), PMBA (27%), KSMC (14%). Only ALYM and ALIMH did not strongly disagree with this statement. Unsurprisingly, they had the highest percentage in agreement with the statement, with ALYM (14%) and ALIMH (29%). This suggests that five of the hospitals have a good support network in place and are able to raise questions knowing that they will be resolved. However, all seven hospitals also answered that they neither agreed nor disagreed with the statement. This all indicates that there is some inconsistency in addressing the issues of food safety raised in the surveyed hospitals. This inconsistency was statistically significant when the researcher tested it through Chi-Square statistical test and P value was 0.001. None of the participants demographics had statistically significant correlation with the supervisor's responses. It is therefore necessary to consider a systematic way of monitoring food safety reporting, action plans and follow-up activities.

6.5.13. Contribution to Hospital Planning

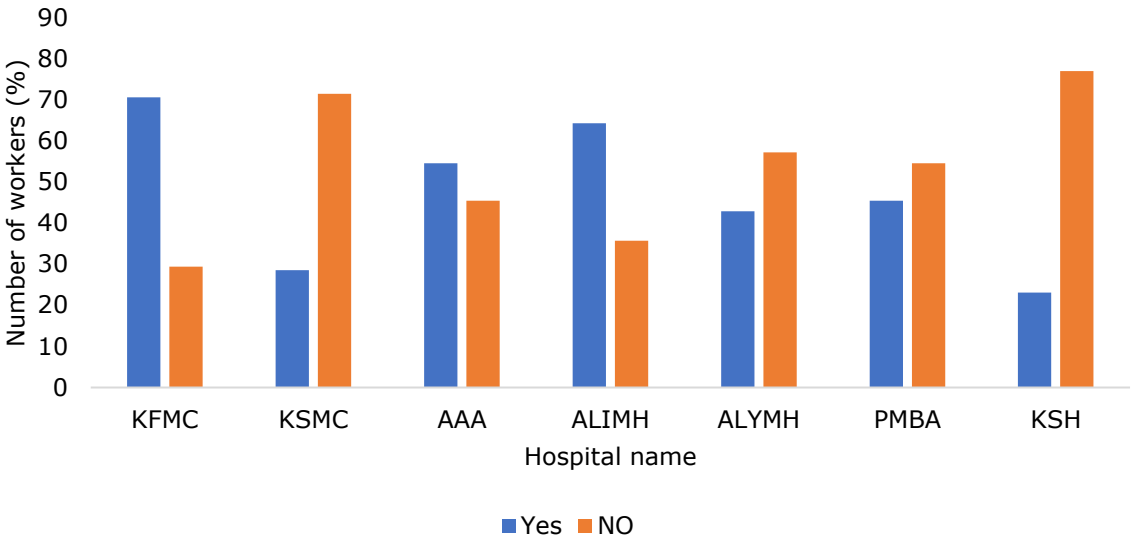


Figure 6-55 Do you contribute to hospital planning?

The data represented in Figure 6-55 explored contributions made towards hospital planning. In the KFMC hospital, 71% of MOH supervisors answered positively, in KSH, 77% MOH supervisors answered negatively. Negative responses were also prevalent in PMBA (55%), ALYMH (57%) and KSMC (71%), whereas MOH supervisors believe they contribute to hospital planning in AAA (55%) and ALIMH (64%) hospitals. There is a need for consistency in this respect, in particular knowing that quality of planning is enhanced when working in teams consisting of different professionals. This variation of responses within MOH supervisors was statistically non-significant across the studied hospitals. Likewise, demographics were all statistically non-significantly correlated with the responses on contributing to the hospital menu.

6.5.14. Hospital Food Safety Assurance (Monitoring and Checks)

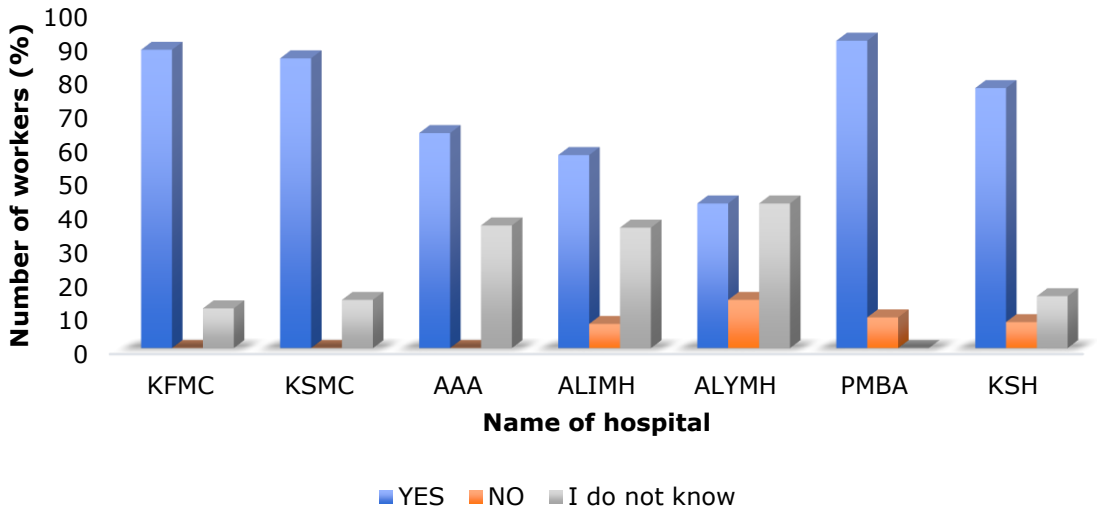


Figure 6-56 Dose your hospital has organised monitoring /checks to ensure the safety of the food served to patients?

When asked to comment on the hospital organisation of monitoring and checks to ensure safety of the food served to patients, most answers collected in Figure 6-56 were positive with the highest percentages at PMBA (91%), KFMC (88%) and KSMC (86%). However, despite these optimistic findings, in each hospital there were some other answers given that disclosed a lack of knowledge. The highest was ALYMH (14%) followed by PMBA (9%), KSH (8%) and ALIMH (7%). Six of the seven hospitals replied that they neither agreed nor disagreed, with only PMBH answering either in agreement or disagreement. The fact that some MOH supervisors were not aware of their hospitals' checking activities to ensure the safety of the food offered is of concern and may increase the overall risk of a food safety failure. The KSA MOH needs to invest in enhanced training on food safety in hospitals, and to ensure effective communication. After conducting Chi-

Square statistical test that included all demographics and supervisors' responses on whether their hospitals have an organised monitoring or check system to ensure food safety, none of the correlations were statistically significant as P values were more than 0.05.

6.5.15. Corrective Food Safety Actions in Hospital Kitchens

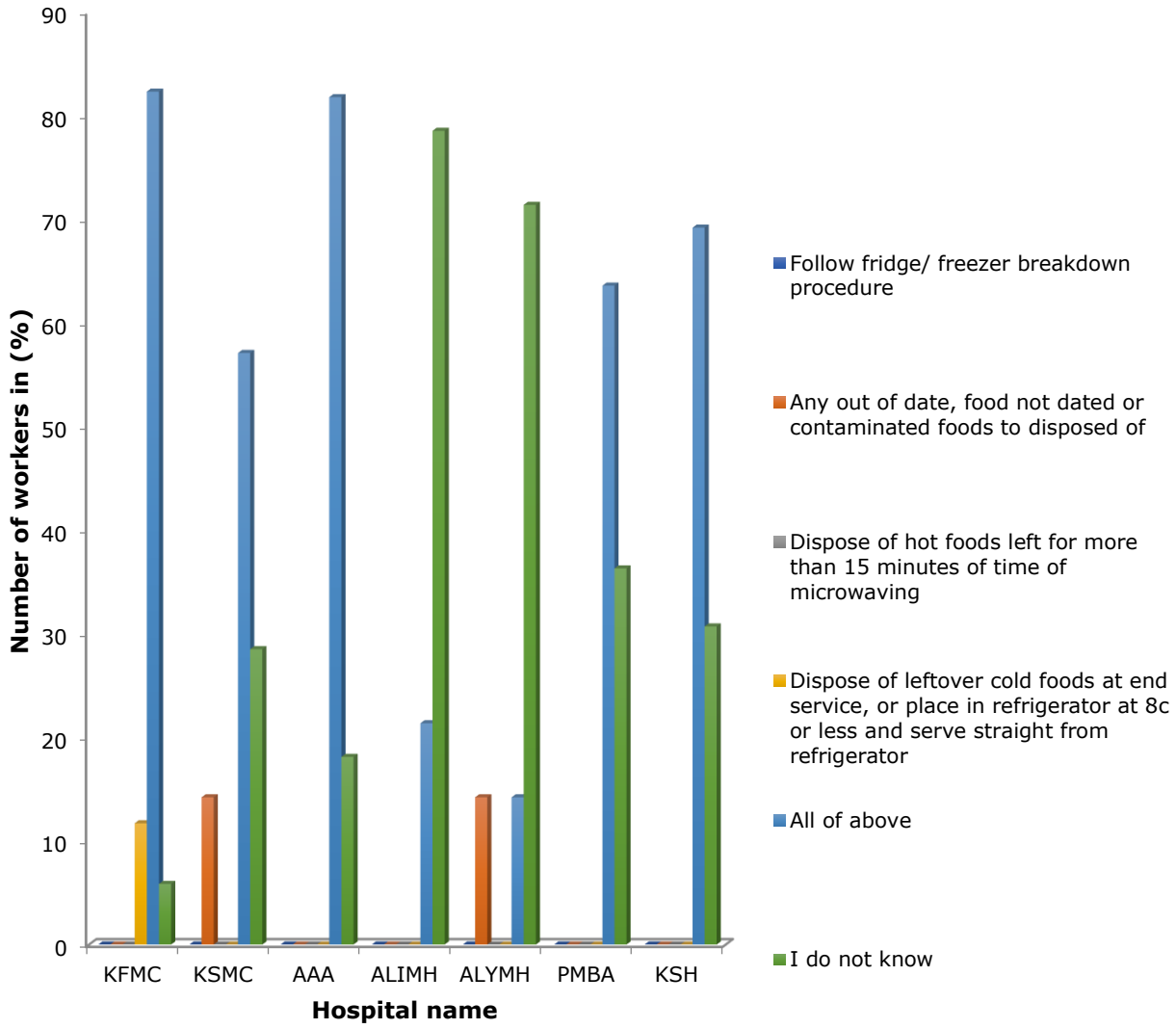


Figure 6-57 Are you aware of any corrective actions for ensuring food safety in your kitchens?

The data presented in Figure 6-57 are related to the awareness of the corrective measures for food safety in hospital kitchens. The responses were divided. In five out of seven hospitals, the majority of the answers were correct ("all of above"). These were, KFMC and AAA (both 82%), KSH (69%), PMBA (64%), KSMC (57%). However, each of the seven hospitals all responded that they did not know the correct procedures. The figures were: ALIMH (79%), ALYMH (71%), PMBA (36%), KSH (31%), KSMC (29%), AAA (18%), KFMC (6%). This variation and discrepancy in choices from some hospitals indicates that the issue of the corrective actions related to food safety in hospital kitchens needs to be included in the new enhanced food safety training. To confirm that this is an important issue to consider in some hospitals, statistical analysis revealed that supervisors' responses were statistically significant with the distribution across the study hospitals due to P value was less than 0.001.

6.5.16. Frequency of the Corrective Food Safety Actions in Hospital Kitchens

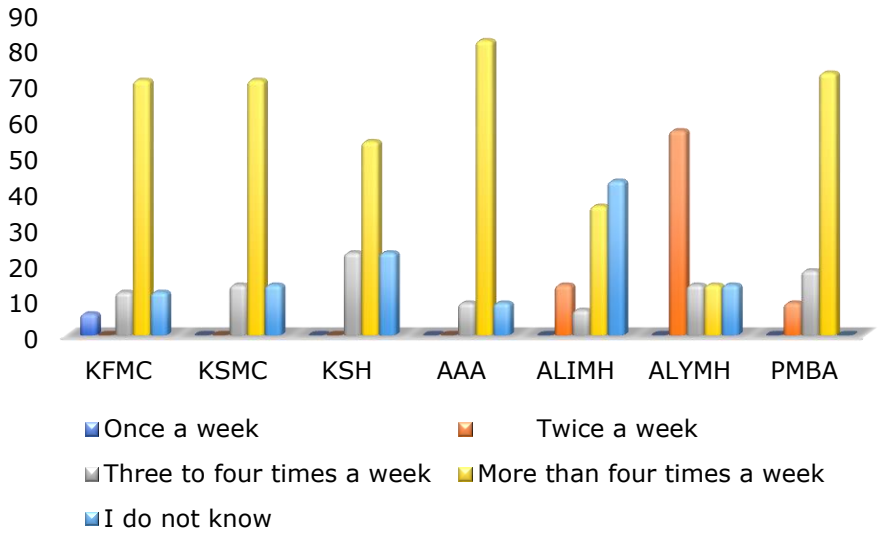


Figure 6-58 How often are the corrective food safety actions applied in your hospital kitchens?

As for the frequency of the corrective measures applied in hospital kitchens, the data presented in Figure 6-58 shows that all seven hospitals applied corrective measures more than four times a week, where in five out of the seven hospitals this was the most common response: KFMC (71%), KSMC (71%), KSH (54%), AAA (82%) and PMBA (73%). The fact that a hospital uses corrective measures four times a week could indicate that they either have more issues that require attention, or that they are doing it more than necessary which could be related to training issues. This could be an area for future research to examine the criteria by which corrective actions are deemed necessary. What is more important is that six hospitals replied that they did not know, with only the PMBA respondents being aware of how many times this procedure took place a week. Not knowing how often

corrective procedures take place indicates a lack of standardisation and a lack of knowledge related to health and safety issues in hospital kitchens; it also suggests a need for the training in this area. Similarly to the previous question on the corrective food safety actions in hospital kitchens, none of the demographics were statistically significantly correlated with the responses on the frequency of the corrective actions where P value was more than 0.05.

6.5.17. Participation in Food Pathogen Control

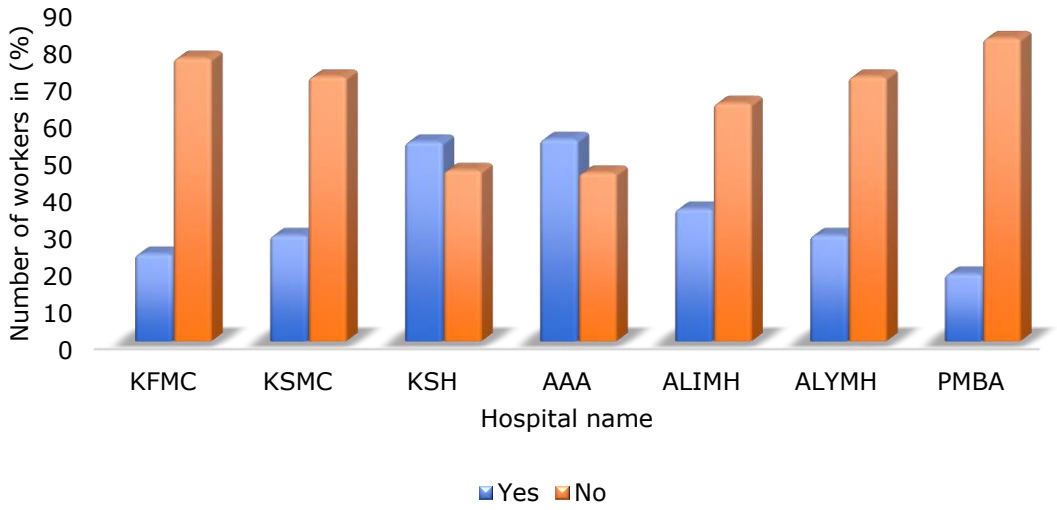


Figure 6-59 Have you ever tested for any food-borne pathogen?

The data presented in Figure 6-59 are the responses to the question whether the respondents have requested or participated in testing for food-borne pathogens. Answers of both yes and no, demonstrate inconsistency in the approaches adopted. Five hospitals gave more negative answers than positive to this question. These were: KFMC (76%), KSMC (71%), ALIMH

(64%), ALYMH (71%) and PMBA was the highest with (82%). These findings show that there is lack of consistency even within the hospitals. The results show the need for more consistency which can be achieved through both clearer regulations and training. The Chi-Square statistical test revealed that all demographics were statistically non-significantly correlated with the supervisor's responses except in regards to gender. Of females, 74% answered with "no" while it was the opposite for male supervisors whom 69% answered with "yes" and P value was less than 0.001. It appears that gender is an issue regarding testing food for pathogens or not.

6.5.18. Course of Actions in Case of Positive Test Samples

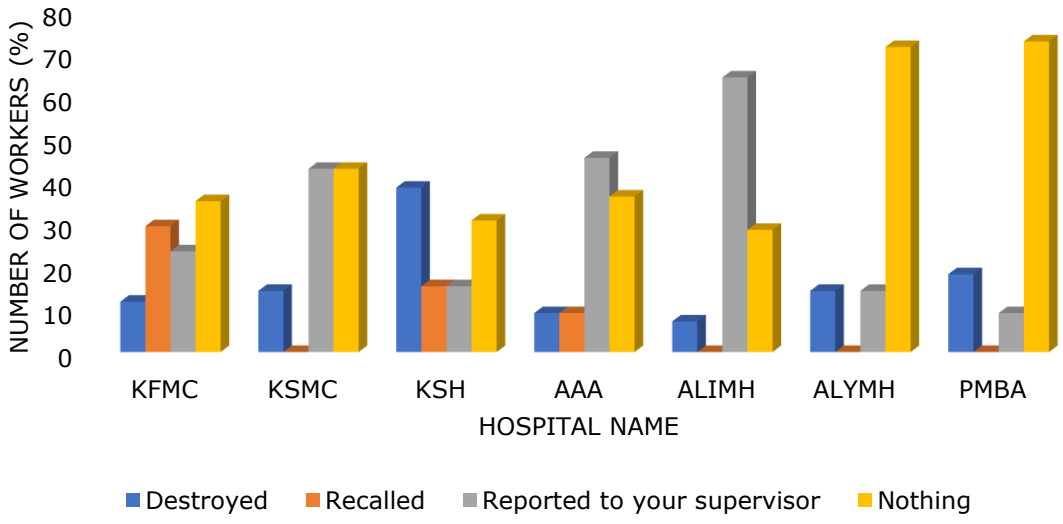


Figure 6-60 What happened if the tested samples were positive?

The data presented in Figure 6-60 shows that MOH supervisors provided varied answers when asked about the procedures after identification of samples that tested positive for pathogens. ALYMH (71%) and PMBA (73%) did nothing when pathogens tests came back positive, whereas only two hospitals reported this directly to their supervisor first. These were ALIMH (64%) and AAA (45%). But all hospitals responded that they destroyed the samples, although this figure was relatively low with the highest at KSH (38%) and the lowest being ALIMH (7%). This distribution of responses over study hospitals was statistically significantly correlated with supervisors' answers as P value was 0.025. This situation requires not only enhanced training, but also other regulatory measures taken by hospitals, possibly in the form of a pre-structured decision tree, as this presents the highest risk to food safety identified in the seven hospitals in Riyadh.

6.5.19. Increased Growth of Bacteria

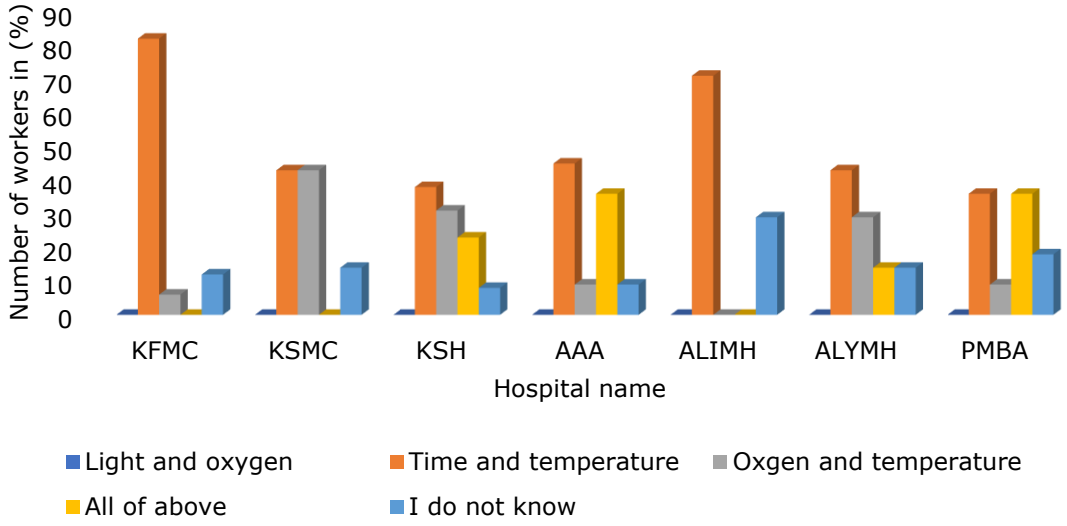


Figure 6-61 What conditions generally increase the growth of bacteria?

The data represented in Figure 6-61 relates to knowledge regarding conditions that encourage increased bacterial growth in foods. The correct answer is 'time and temperature'. Although all seven hospitals had some correct responses to this question, they were not consistently high. KFMC (82%) and ALIMH (71%) were the highest with PMBA much lower at 36%. Temperatures that permit bacterial growth in food production stages can lead to food poisoning (Derens-Bertheau et al., 2015), so clearly staff training needs to improve on this area. Responses on this question were statistically significant with several parameters and they were the distribution of supervisors across study hospitals, age categories, gender and qualifications. As explained above, across hospitals the variation of responses was statistically significant due to P value was 0.049. In terms of other demographics such as qualifications, of those who held master's

degrees, 67% answered incorrectly and more than 55% of Diploma holders did not answer correctly either. While for gender, 58% of females did not choose the correct answer and this result was statistically significant where P value was 0.02. And lastly for age categories, 50% of those who were aged from 36-47 years did not answer the question correctly as well as younger employers aged from 18-23 years. This was statistically significant as P value was 0.039.

6.5.20. Causes of Chicken Poisoning

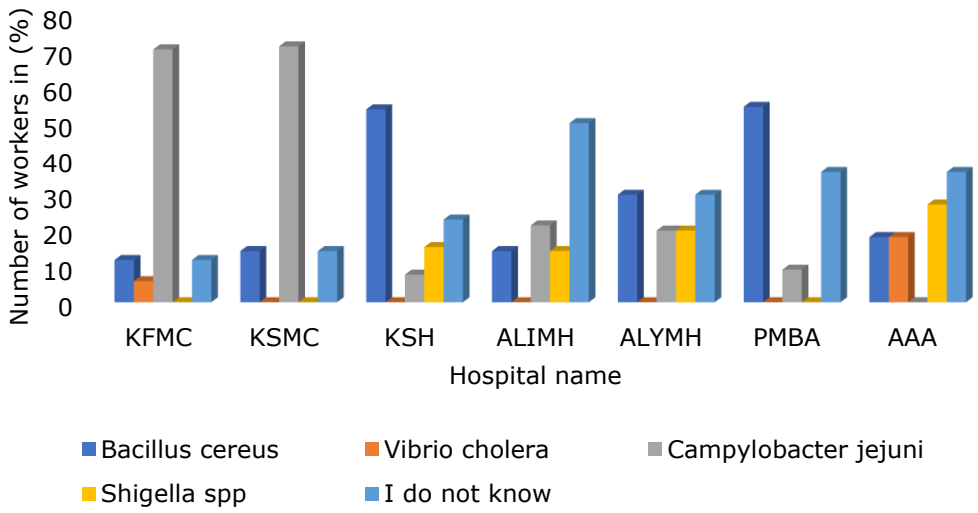


Figure 6-62 Food poisoning from chicken meals are mainly caused by the following bacteria:

When respondents were asked about the types of the bacteria that cause food poisoning associated with the consumption of chicken, the answers varied dramatically. According to the data presented in Figure 6-62 the highest percentage for respondents from the PMBA (55%) and KSH (54%) hospitals considered the major hazard to be *Bacillus cereus*, although all seven hospitals featured respondent answers that they did not know. KFMC

and KSMC both had 71% of the respondent answers as *Campylobacter jejuni*, whereas AAA (18%) and KFMC (6%) were the only ones to respond with *Vibrio cholera*. This distribution of responses was statistically significant across study hospitals where P value was 0.001. Of those who answered correctly, 75% were female supervisors and this was a statistically significant correlation due to P value being less than 0.01. The responses indicated that there is a need for an enhanced training in handling chicken meat safely and possibly other poultry and meat that may be contaminated by food poisoning bacteria.

6.5.21. Recognition of Food Contamination

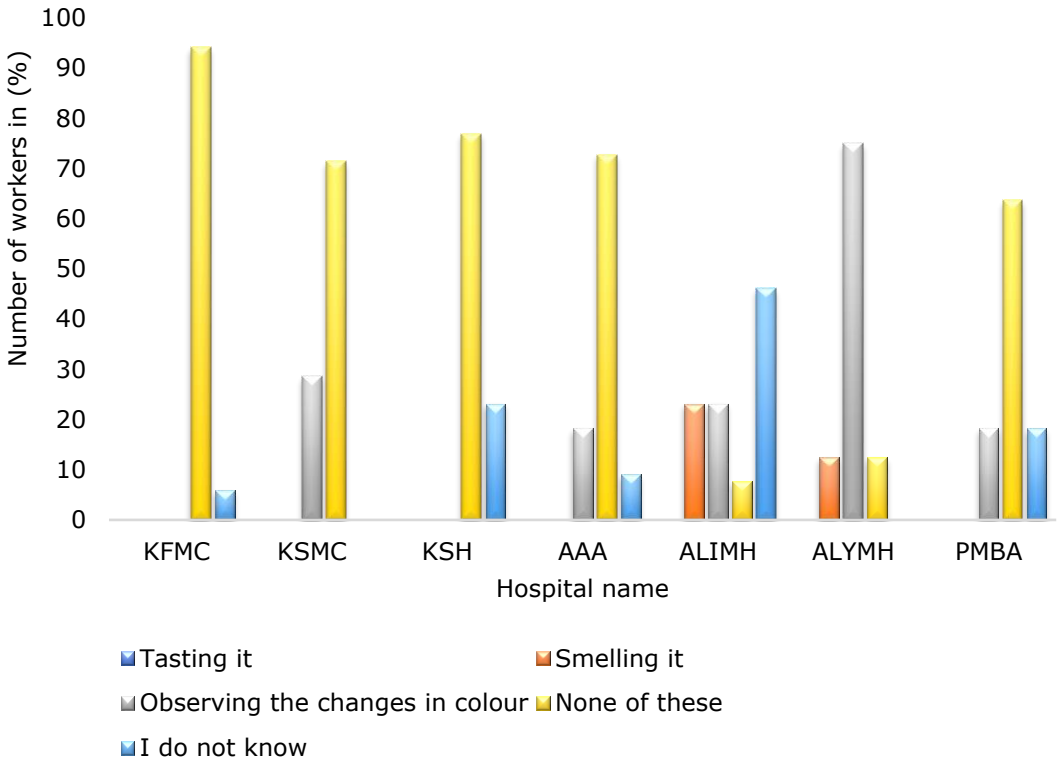


Figure 6-63 Food contamination can be recognised by:

The collected data in Figure 6-63 has shown that in the majority of hospitals, MOH supervisors understand how food contamination can be

recognised and identified. Still, it is alarming that there are some supervisors who disclosed openly that they do not know the answer. For instance, in KFMC hospital 94% correctly answered 'none of these' and 6% did not know the answer, whereas in KSH 77% answers were correct and 23% did not know how to recognise food contamination. The answers in ALIMH varied most: 23% supervisors recognise contamination by smelling and 23% by observing changes in colour. Only 8% of answers were correct. More worryingly, 46% did not know. ALYMH hospital had the highest proportion of supervisors who did not know how to identify food contamination with 75%. This variation in responses toward ways of recognising food contamination was statistically significantly correlated across study hospitals where P value was less than 0.001. Whereas other demographics were statistically non-significant with the responses on this issue. These findings indicate that there is a significant risk of food contamination not being recognised before the food reaches the patients. Therefore, there is a great need for this area to be included in the MOH supervisors' training.

6.5.22. Storage of Raw and Cooked Food

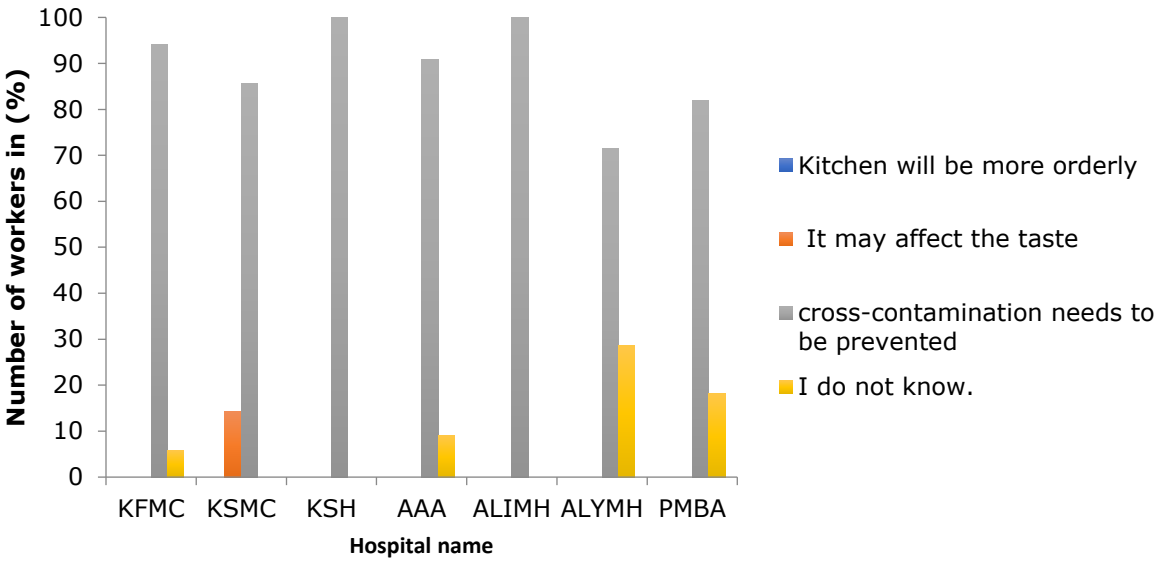


Figure 6-64 Raw food should be kept separately from cooked food during preparation and refrigeration because:

Analysis of data in Figure 6-64 regarding the storage of raw and cooked food, showed that the majority of the answers were correct in all the hospitals. In two of them, KSH and AlIMH, all the answers were correct (100%). However, four hospitals recorded that they did not know the answer. These were KFMC (6%), AAA (9%), ALYMH (29%) and PMBA (18%). Only one hospital, KSMC (14%), recorded that they felt it might affect the taste. This is a serious indicator of a lack of awareness, which should be addressed in training on food contamination and cross-contamination prevention. Neither responses across study hospitals nor any of the demographics were statistically significantly correlated because P values were more than 0.05.

6.5.23. Concerns about Patient Food Safety (Actions in the Case of Inconclusive Evidence)

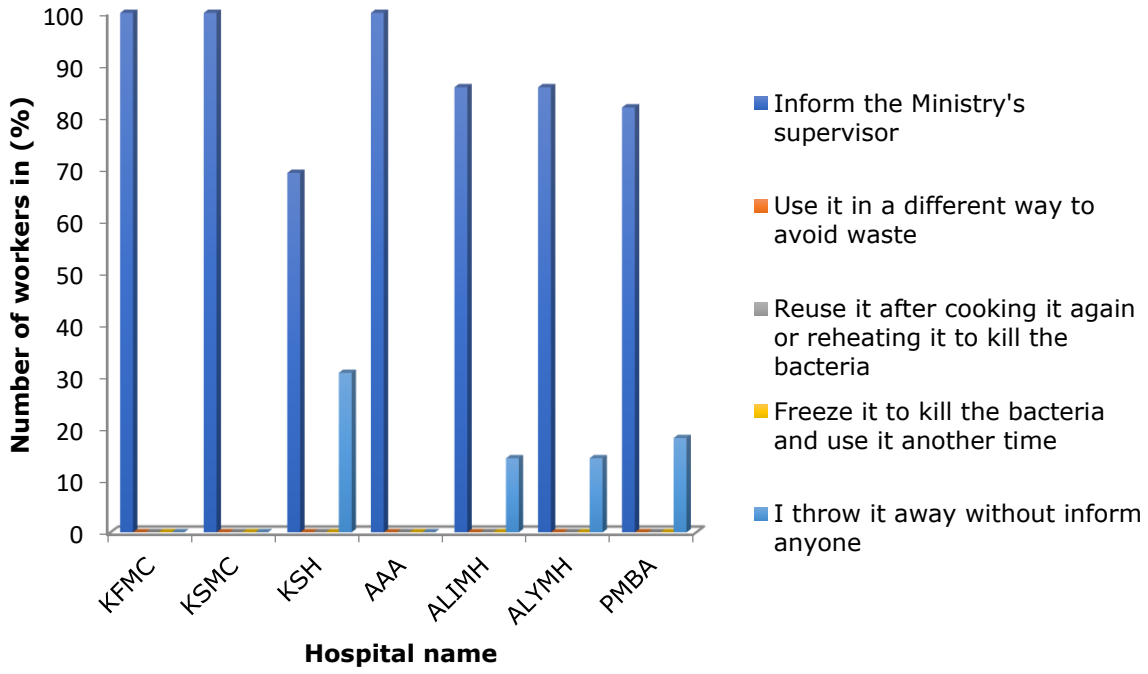


Figure 6-65 When you are not sure if the food is safe to be served to patients, do you?

The data presented in Figure 6-65 relates to whether food should be served to patients when uncertain whether it is safe or not. In such circumstances the great majority of supervisors at the seven hospitals informed the Ministry's supervisor. At KFMC, KSMC and AAA this accounted for 100% of answers. However, four hospitals recorded that they threw it away without informing anyone. These were: KSH (31%), PMBA (18%), and ALIMH and ALYMH (both 14%). The distribution of supervisors' responses across study hospitals was statistically non-significantly correlated but was statistically significant with other demographics such as age categories, gender and qualifications. As for gender, 63% of those who answered correctly were

female supervisors while males equated for 37% of correct responses when P value was 0.009. For age categories, 44% of supervisors aged 41-47 years answered incorrectly and this correlation was statistically significant (P=0.009). Lastly for qualifications, of those who are diplomas holders, more than half of them (55%) answered incorrectly and this result was statistically significant at P value 0.003. This course of action does not take in to account the reasons for the assumed failure or how this failure could be avoided in the future. It is clearly contrary to the philosophy of HACCP of nil defects due to procedural implementation. This situation needs highlighted in future training.

6.5.24. Negative Impact of Smoking in Hospital Kitchens

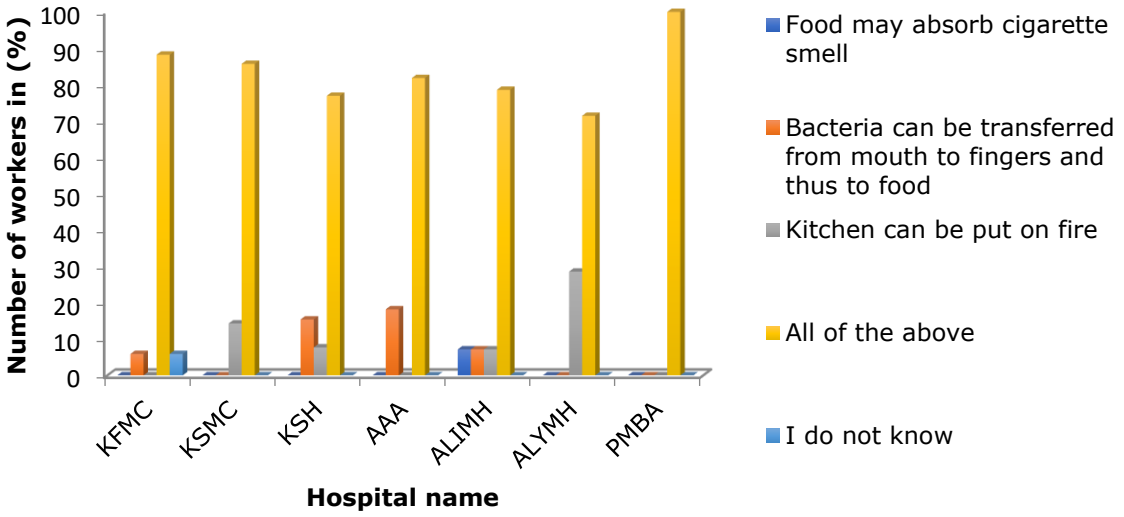


Figure 6-66 It is unacceptable to smoke cigarettes in kitchen as:

According to the data represented in Figure 6-66 the majority of the respondents in each hospital agreed that it was not acceptable to smoke in

kitchens for all the reasons provided (smelly food, bacteria transfer from mouth to food via hands, kitchen fire hazard). But only PMBA had 100% responses of 'all of the above'. Only KFMC (6%) answered I do not know. The distribution of supervisors' responses was statistically non-significantly correlated across study hospitals. However, age categories were statistically significantly correlated because 20% of supervisors who were aged (36-40) and 55% aged (40-47) did not answer the question correctly and P value was 0.03. While other demographics were statistically non-significant. From the responses discussed in this chapter regarding working practices in seven Saudi hospitals we can see there is no standardised approach to food health safety among MOH supervisors, catering supervisors and catering workers. These findings will be discussed in more detail in the following section.

Chapter 7 : Saudi discussion

- **Introduction**

The comparison of five English hospitals revealed that all of the hospitals complied with recognized regulatory guidance, such as the Food Safety Act (1990) and the Food Hygiene Regulations (2013). Such procedures ensured that the food related company proprietors provided the relevant training to staff to ensure their jobs were performed to the necessary governing standards. Although this was discussed in detail in the Methodology chapter - it is worthwhile summarizing the key points as these will inform suggestions for improving training at Saudi hospitals.

1) The NUH policy recognizes that funding for training is vital to ensure food provision is in accordance with relevant standards and that the employees are familiar with the policy requirements by providing them with suitable training and guidance.

2) Any training is overseen and implemented by a specific person and department. In this instance it is by the organisational development department i.e. training can be provided externally or in house, but it must be approved first.

3) NUH Policy requires regular induction and refresher training in order to familiarize staff with the most relevant ideas. This training should follow a specific order e.g. Induction, Level 1-2 Refresher-year 1, Refresher-year 3

4) Training should be varied out according to needs e.g. face-to-face training, tool box talks, online training, etc.

5) Training is vital to the success; therefore time should be allocated for 'study leave'.

Saudi hospitals follow the HACCP system in order to enhance food safety at every stage of food production (purchasing, receiving, transportation, storage, preparation, handling, cooking, and serving). The HACCP system is a scientific and systematic approach that helps identify, assess and control hazards in the food production process. With the HACCP system, food safety control is integrated into the design of the process to help prevent problems. According to (Food Standards Agency, 2017) the seven principles of a HACCP System are:

"The 7 HACCP principles are:

1. Identify any hazards that must be prevented, eliminated, or reduced to acceptable levels.
2. Identify the critical control points (CCPs) at the step or steps at which control is essential to prevent or eliminate a hazard or to reduce it to acceptable levels.
3. Establish critical limits at CCPs which separate acceptability from unacceptability for the prevention, elimination or reduction of identified hazards.
4. Establish and implement effective monitoring procedures at CCPs.
5. Establish corrective actions when monitoring indicates that a CCPs is not under control.
6. Establish procedures, which shall be carried out regularly, to verify that the above measures are working effectively.
7. Establish documents and records commensurate with the nature and size of the food business to demonstrate the effective application of the above measures."

Analysis of the seven principles of the HAACP system with respect to the operation and comparison study of the five English hospitals, are referenced to the results of the surveys undertaken in Saudi Arabia as part

of this thesis. The relationships will be discussed in the following three sections:

1) Contracted catering workers
2) Catering supervisors
3) MOH supervisors.

7.1. Contracted Catering Workers – Discussion

Contracted workers represent one of the three surveyed groups within the research conducted in seven Saudi national hospitals, with the aim to establish the degree of the implementation of PRPs and food safety regulations, as prescribed in HACCP. According to the World Health Organization (World Health Organization, 2006) prerequisite programmes are mandatory foundations for HACCP implementation; they prevent hazards occurrences and comprise activities and contexts necessary before and during the application of the system. PRPs refer to the individual institution "good housekeeping", whereas HACCP addresses risks and hazards that may occur within the specific processes. For instance, a hospital should prepare all the written documentation which supports HACCP implementation, including the written records and results for all prerequisite programs which support their HACCP system (Fsis, n.d.)

The following roles were performed by catering workers: infant milk preparers, fruit preparers, meat cutters, chief cook, diet cook, mechanical technicians, waiters and cleaners. Two other groups of respondents were MOH Hospital Food Service Supervisors and contracted catering supervisors, that shared the same type of questionnaire, Questionnaire B (Q-B), whereas the contracted caterers were given Questionnaire A (Q-A). It was expected that 148 contracted catering workers would show approximately the same level of awareness of food safety in hospital

environments. The workers were made aware of the aim of the anonymous survey to which they consented to. The response rate of the contracted caterers was the highest among the three groups at 61%. It is important to mention that the contracted catering workers belong to different catering companies whose names will not be revealed to maintain anonymity.

In this section, first the content of Questionnaire A will be discussed, which will be followed by identifying training needs that will improve the contracted catering workers' food safety awareness and practices.

Questionnaire A focused on:

1) Demographics
   1.1. Age, sex, and nationality
   1.2. Workplace: hospital size, employment length, salary range
   1.3. Education and qualifications
2) Training
   2.1. Individual hygiene training
   2.2. General food safety and hygiene training
3) Awareness of food hygiene and food safety regulations and standards
   3.1. Detrimental consequences of the consumption of contaminated food
   3.2. Awareness of specific food preparation temperature requirements
   3.3. Fridge and Bain-marie temperature regulations

4) Individual food hygiene practices
   4.1 personal hygiene and respect of the food safety standards that address contact with unwrapped food (hand and facial hygiene including cleaning and washing hands in the preparation stage; use of cap or head covering; covering mouth and nose with a mask)

4.2 improved personal hygiene and other related behaviour in the presence of a manager or supervisor

4.3 cigarette smoking in the hospital kitchen

7.1.1. Demographics discussion: Age, sex and nationality

Age group analysis of the contracted catering workers has shown that most of them are in the range of 24-35 (groups 24-29 and 30-35). However, there are exceptions on both ends of this range, namely within the age groups 18-23 and 35-55, with the youngest employees outnumbering the eldest ones. More compelling evidence is presented by Chartered Institute of Personnel and Development (Rudiger, 2013) who found that young employees tend to have more enthusiasm towards their first job duties, they follow the regulations and policies as they analyse their responsibilities to better understand the employer's standards. Young workers tend to be more optimistic and sincere as they do not have awareness of the previous conflicts at work and they are friendlier as they need to communicate with more mature employees to understand the finer details of their duties (May & Media, 2015). They also found that their expectations at work are usually lower and they can more easily offer help or cover for other workers. Furthermore, they may more easily accept to work extra hours if required, and do not aspire to progress quickly through the ranks, while being more interested in their job role. Therefore, it is easier to manage younger employees. Furthermore, young graduates can bring in some more cost-effective ideas and smarter methods of addressing the job-related issues. Invariably, they may not have the same level of experience in terms of food safety and hygiene, which could result in a higher risk of error as they learn their profession. Still, awareness of such a possibility may influence them to intake more information about their duties so that they minimise the occurrence of errors.

Conversely, more experienced workers with a wealth of knowledge can provide learning opportunities for their teammates, acting as advisers (Rudiger, 2013). On the other hand, younger catering workers will inevitably have more training which may motivate them to stay in the job, consequently reducing turnover. As for the more mature, experienced staff, they are more cost-effective as they require less training and will have attained relevant certification, only requiring refresher training or training with regards to new legislation or procedures. According to (Rudiger, 2013), employing workers of different ages increases skills and knowledge diversity and promotes social benefits. A healthy mix of different ages is good for business dynamics. Employing someone with experience is less costly in terms of training and maturation time. What is more, elder workers usually have good people skills and deeper knowledge of the matter enabling them to think proactively, which altogether has a reassuring effect on the customers, in this case patients. They mainly have a good work ethic and flexibility that brings reliability. According to (Susan Clows, 2017) companies should 'Retain, Retrain and Recruit' a mature workforce, and in this way address ageism as a form of discrimination in the workplace and change perceptions of retirement.

Another interesting study in KSA (Soliman et al., 2013) related to age and foodborne diseases, identified that intestinal parasites were more common with young people (age 20-29; 18.5%) than with older people (age 50+; 11.8%). The same study revealed that Pakistani workers were the most infected (23.2%) and the least infected were Sudanese (18.7%) (Soliman et al., 2013) This means that more experienced and mature workers will be more aware of the risks of low hygiene levels and will have improved their attitudes and behaviour throughout their career. This also implies that there is a need for training international and local catering workers and that there are benefits from employing mature workers who can teach the younger employees through teamwork and an improved level of

communication. Therefore, as much as the training on skills and knowledge is required, so is the training on teamwork, enhanced communication channels and change in attitudes through an "engaging employees" training.

7.1.2. Contracted Workers' Gender

Regarding sex or gender analysis of contracted catering workers,
Figure 6-2 has shown that the surveyed groups of contracted workers comprised representatives of both male and female participants in all seven hospitals. Similarly, (Soliman et al., 2013) confirmed that in their surveyed group in KSA both genders were represented. Generally, there were more female catering workers employed, with the ratio male to female, 2.5:2.6; however, where younger workers were predominant, both genders were almost equally represented. In the Riyadh hospitals' study, there were more females than males contracted catering workers in several hospitals, whereas only in one there was the same number of both gender representatives.

For instance, in ALYMH and PMAH hospitals, females outnumbered males, with the ratio female to male: 15/6 or 2.5, and 13/5 or 2.6, respectively. Similar to (Soliman et al., 2013) findings, ALIMH Hospital with more younger workers in the age range 18-23, a female to male ratio was 16/18 or 0.88 (16/18) and in KFMC both genders have the same number of representatives, 11 each.

According to the data concerning the nationalities of contracted caterers, 15% of those surveyed were Saudi workers and 85% international workers from seven countries: Filipinos and Indian (the majority), Sri Lanka and Nepal (the minority); others are from Egypt, Bangladesh and Pakistan. The nationality factor is directly related to work motivation and its effects on work performance, in this case food safety and hygiene in hospitals.

International workers usually work to support their families and may be more dedicated to the job with respect to the need for the financial reward. On the other hand, they can hardly be satisfied due to the way they use annual leave – only once a year, as their countries are far and the journey is very expensive. In addition, they give almost all surplus monies to their families and return with little money to start their struggle again. To contribute to the poor work-life balance, they are often in unconsumed marriages after they have several children, as they see their spouses only once a year. This poor work-life balance is one of the main causes of the low level of motivation. A substantial imbalance in family relations has also led to very late marriages or non-marriages. With the family pressure, and reduced extended family support mechanisms, the international workers are under continuous tension and anxiety (Committee on Freedom of Association, 2009). Furthermore, other social and environmental trends, back home such as famine, natural disasters, internal and international state conflicts, can negatively impact the situation of international workers that will considerably diminish their enthusiasm for work.

Furthermore, in search for any job just to make a move from their poor countries, many qualified workers take jobs as caterers, in which case they have very little motivation to stay in the same work place, which overall affects their job performance. What may frustrate them even more is that they are paid very little and they are usually the only qualified workers in the team, as the qualified Saudi job seekers will rarely accept such jobs.

7.1.3. Workplace: hospital size, employment length, salary range

Figure 6-4 shows that regardless of the size, all the surveyed hospitals employ and rely on contracted catering workers. Obviously, the larger the hospital, the more workers are employed. The recent experience with the

UK based company Carillion (Wearden, 2018) shows that if the catering company goes bankrupt the services they provide are at a high risk with wide-ranging consequences for the organisations and hospital patients in this case. However, according to (Bartlett, 2017) there are several main benefits to contracted catering: firstly, accountability, as the contracted company is responsible for meeting the clients' needs, allowing them to concentrate on their business; next, the in-house coordinators will have more opportunities to develop if working alongside the contracted catering managers. Also, food safety training provided by the specialist catering company to workers gives the business peace of mind. Next, the contracted company can also provide a full financial report, which can then be audited by the main business. If the business engages a reputable contracted caterer it may increase its reputation, as well as the service users' trust. On the other hand, if the contracted caterer is not working properly, there is an increased risk of not only food poisoning, but of other issues such as negative patients' perception or disrupted transition between service delivered to the ward and hostesses bringing food to the food consumers (The Caterer, 2017). In relation to the hospital size, the more contracted workers involved, the greater the risk of potential issues if the contracted caterer starts falling behind the agreed duties.

Regarding the seven surveyed hospitals, the largest has 23% of the catering staff respondents at work. Approximately 69% of workers are employed in medium-size hospitals. These five hospitals account for 12-16% of the respondents who were employed as contracted catering workers. Finally, there was one small hospital, with 8% of the surveyed catering workers, which means that small-size hospitals can more easily resolve any issues with the contracted caterers. It is worthwhile mentioning that in Riyad there are numerous catering companies that a hospital can contract through a tender, which means that the risk they represent is moderate as a new company can be found and engaged.

7.1.4. Salary range

Evidence was sought to test the assumption that the higher paid workers would have more knowledge of hygiene practice and management. Figure 6-5 demonstrates that most of the caterers' salary is in the range between 600-1000 SR and that they are mainly non-Saudi workers. According to (Dench et al., 2006) employers hire low-skilled international workers due to the shortage in the local workforce. In Saudi Arabia it is legal to give lower salaries to such workers as they usually come from underdeveloped regions and are poor themselves, for which reasons they accept to be paid less than local workers. It is understandable that frustration they may feel afterwards is directly linked with negative attitudes towards their work responsibilities.

In terms of improving the low-paid workers' attitudes, the Joseph Rowntree Foundation (Joseph Rowntree Foundation, 2015) concluded that low-paid workers often find their jobs stressful and with too many changing targets; overall, their working conditions make them unsatisfied, overstrained due to understaffed departments and excluded from any decisions. In addition, they usually have low or zero-hour contracts, which altogether leads to high turnover and dysfunctional relationships with their employers. The study found there was no single replacement for their number one objective at work - better salaries. After that came the better appreciation of their time at work, such as breaks, holidays, overtime, unsociable hours and training.

When workers were asked to consider what they would most like to change about their jobs, they invariably focused on pay. This was usually their base rate of pay, but also fairer recognition of their time spent at work, including breaks, paid sick-leave, overtime and the time in training, as well as support with child-care. Most of the surveyed workers accepted the unsatisfactory conditions in order to have a secure and sustainable source of income to support their families.

In order to find a satisfactory win-win solution, such companies should be presented with a business case demonstrating that more satisfied workforce would translate into an increased profit and more satisfied customers, in this case patients. The key positive effect for hospitals would be better hygiene and food safety.

7.1.5. Employment length

Regarding the length of contracted catering workers' employment, results presented in Figure 6-6 show that in most of the hospitals, the catering workers length of employment is several months to two years. High turnover, according to May & Media, (2015) can be because the company is being run by people who are not experienced in management. When they witness co-workers leave regularly they in turn become demotivated. It creates a difficult situation for everyone working or associated with the company. May & Media (2015), suggest there are several strategies to help motivate workers to remain loyal to a company. These are: good treatment, fair salary, making them feel valued, expressing interest in their outside of work motivations and activities, flexible working, and supporting skills development and other interests. In relation to the high turnover in the surveyed hospitals, it may be due to the engagement of new catering companies in which case all the workers may be withdrawn and new ones employed regardless of their individual performance. For instance, in PMAH 56% of staff average employment length is two months only, and in AAA for 36% of the contracted catering workers it is nine months. This likely includes the following possibilities: that after eight years of employment in the hospital, the interest of the contracted catering workers drops dramatically, or that the catering companies lose the contracts and consequently the workers leave, or that the overseas workers tend to leave the KSA due to visa issues or family commitments. On the other hand, in KSMC the employment range is broader: from 8 years (21%), 10 years (4%), 12 years (4%) and 16 years (4%).

7.1.6. Education and qualifications

The definition of a suitably qualified contracted worker is somebody who holds a relevant certificate in a food related qualification that enables them to do their job professionally and complies with the expected standards and regulations of that specific role. For most staff, such as fruit preparers and meat cutters, a standard certificate in food hygiene is enough to ensure they perform their job successfully. Some roles, such as that of a supervisor, require a broader knowledge and understanding of food hygiene as they ensure procedures are followed. Therefore, it is desirable that they have a higher qualification, such as a degree in food science, to perform their role to expected standards.

Experience is also an important element in determining how qualified an individual is. Somebody who has worked across several departments within a hospital and has gained experience of various issues raised by food hygiene could be deemed suitably qualified. However, this is also problematic as the individual may have a lot of experience but the relevance of this experience and whether the working environment is adhering to best practice may be questioned. They may have picked up 'bad habits' and continue to perform them across jobs because nobody has picked up on this and corrected them. Therefore, to be a suitably qualified person the individual must have the necessary training and certificate in food hygiene to enables them to perform the specific tasks for their specific role. It is worth noting that in a recent study of Riyadh hospitals, (Al-Mohaithef, 2014) found that in addition to having suitable qualifications, foodservice staff were also expected to have sufficient experience in food hygiene. Catering staff were required to obtain a health licence before being employed and this licence was subject to a six-monthly review. The catering contract that staff must provide evidence of the qualifications before commencing employment to ensure that these are checked and accepted by the nutrition administration in the hospital before starting work. Based

on this, a suitably qualified person is one who has had qualifications validated, has a health license, and, for the purposes of this thesis, has a relevant qualification for the proposed role.

Comparing the individual hospitals in Figure 6-7, the most suitably qualified catering workers were employed at AAA with 73% of catering workers holding a Diploma and 9% with a Bachelor qualification. ALIMH hospital had a high proportion of qualified catering workers with 15% Bachelors and 62% Diplomas. Only 3% of the catering workers at this hospital had basic food hygiene qualifications. PMAH employed 50% of catering workers with Bachelor degrees and 28% with Diplomas. This clearly dispels any assumption that catering workers are unqualified. The fact that these workers possess formal qualifications justifies the need for future training that enhances and builds on their existing knowledge and experience. It also reaffirms the vital role played by supervisors in ensuring that these skillsets and knowledge are utilised and that the workers are made aware of roles and responsibilities. Likewise, the MOH need to regularly check the catering workers levels of knowledge of food safety policy by ensuring regular training and checks are implemented by supervisors.

The least suitable hospital is KSH that employs the highest proportion of young males with the least suitable qualifications. They also have a high proportion of foreign citizens among their workers. This would suggest, perhaps, that younger workers have less experience and so require more regular training. Likewise, there is the risk that language difficulties faced by foreign workers could create problems. Therefore, providing simple posters with infographics may be a simple way to convey necessary information. It would also be useful to provide important rules, regulations and procedures in their native tongue to better assist them in their learning. it is also evident that their shortage of Saudi nationals prepared to do catering work. For example, in AAA Hospital there are two foreign nationals with the least appropriate qualifications, suggesting that the contracted

company struggles to employ Saudi citizens or recruit the most appropriate international employees.

7.1.7. Training:

As discussed in the section on Employment Length, there is a strong need for the contracted workers to be trained in the individual hygiene tasks needed for food preparation. The data from Figure 6.8 regarding contracted caterers' hygiene training shows that in KSMC 96%, and KFMC 91% hospitals, catering workers had basic training. However, at the KSH and ALIMH, the numbers were much smaller, with basic training at 39% and 47% respectively. The high turnover of contracting company catering workers contributes to this issue, which suggests that hospitals cannot only rely on the training provided by a contracted catering company. They also need to invest or contractually insist upon the provision of specified training with the recording and monitoring evidence of individual training to ensure it is relevant and up-to-date.

- General Food Safety and Hygiene Training

According to Figure 6-9, in several surveyed hospitals, ALYMH (62%), KSH (56%) and PMAH (72%) a high percentage of the contracted catering workers stated that their managers had never asked them to enrol on a food hygiene course. On the other hand, in the following hospitals, ALIMH (53%), KFMC (95%), KSMC (96%) and AAA (64%), the catering workers answered positively the same question. According to (Rennie, 1994), even when formal courses were organised in contexts outside of food handling work setting, its effectiveness was limited. Although the participating workers had a better understanding of the issues related to food hygiene and safety, their actual behaviour did not improve considerably.

The research demonstrated that when the food safety and hygiene training courses are closely related to the actual work environment,

there is more likelihood that they will be effective as the learning points and outcomes will be reinforced by hygiene and food safety practice in the work setting (Seaman, P., 2010), argued that food mishandling due to lack of food safety and hygiene training account for 97% of all food-related diseases linked to catering outlets. Considering all the above it is of paramount importance that the managers of both catering contractors and the hospitals themselves, take proactive preventative measures against outbreaks of foodborne illnesses through efficient training, monitoring and record keeping (Bakri, 2017).

In context of the nation of Saudi Arabia it is The SFDA established in 2003, under the Council of Ministers resolution as an independent organisation, that is in charge of monitoring and control of food, but also of making the public aware of all the important food and drug related issues (El Sheikha, A.F., 2015).From a national perspective it is suggested that the most effective systems of food disease prevention have involved tracking and tracing methods achieved by telling the product story that has been embedded into the information available to consumers. Traceability systems allows more efficient monitoring and minimises product recall, saves cost, provides safe and healthier products to consumers, in this case hospital patients. Software tools developed for tracking and traceability are nowadays in use as a business to business means of communication. These measures and supporting information should be considered in the procurement policies of hospitals.

7.1.8. Awareness of food hygiene and food safety regulations and standards

- **Detrimental consequences of the consumption of contaminated foo**

According to (Bakri, 2017), in the developing countries approximately 2.2 million people are killed by food contamination and infected drinking water a year. Most foodborne disease is preventable if hygiene measures were improved during food processing and handling. This would help minimise the presence of microorganisms that cause food poisoning and food spoilage. Figure 6-10 in the Findings section clearly demonstrates that the contracted catering workers on the surveyed hospitals are aware that consumption of food that has not been prepared hygienically can lead to death. The results showed that the contracted workers' perception of the food hygiene risks and food safety failure differ, especially in the hospitals that do not require additional contracted staff training. Monitoring contracted workers' practices and proactive training with dissemination of best practice across all hospitals will encourage and support food hygiene and safety standardisation.

Furthermore, Figure 6-11, reveals that the contracted caterers in six of the seven hospitals recognise the need for basic self-reporting in cases of sickness or vomiting to prevent the spread of illness to others, in particular vulnerable patients. Despite their understanding, a high percentage of staff in AAA (91%) believe that their visit to the GP should happen after work hours, which suggests that they still do not fully understand the urgency of maintaining personal hygiene at work and that this should be a priority. Training line managers and workers about their responsibilities to patients must involve clear guidelines on processes for informing and recording of staff illness. Finally, some workers disclosed they do not self-report when they are ill out of fear they will lose their wages. However, this fear is ungrounded and overblown, which the managers should explain to the staff in advance. These findings seem to reinforce previous research of (Alahmadi, 2010) who conducted a survey in 13 general hospitals in Riyadh City, Saudi Arabia, iof 223 health professionals to help identify dimensions of patient safety. He found that the overall Patient Safety Grade was rated as very good by 60% of the respondents, acceptable by 33% and poor by

7%. The surveys revealed that over 50% of respondents felt that managers repeatedly overlooked safety problems. Alahmadi concluded that leadership is critical in patient safety initiatives and that one barrier to creating safer working environments was the fear of a culture of blame:

> "Building safety culture requires eliminating three destructive elements in organisations: blame, fear and silence regarding errors. Error reporting should not be viewed as an end in itself but rather as a means of learning from mistakes and as the first step towards elimination of harm and improvement of patient safety. Efforts to develop and implement effective strategies to promote patient safety culture in Saudi Arabian hospitals are limited by leadership capacity to establish a climate of open communication and organisational learning." (Alahmadi, 2010:5)

7.1.9. Individual food hygiene practices

Regarding personal hygiene and food safety, (Bakri, 2017) highlight it is a matter of concern for food supplying companies, particularly in Saudi Arabia, where foodborne outbreaks and food poisoning (*Bacillus cereus* and *Clostridium perfringens*) is increasingly being reported. An earlier study concluded that food handlers are the main reason of food contamination. In KSA, during the last decade, food handlers touching raw food have been the main source of foodborne diseases (Bakri et al, 2017) Although self-reported food handlers and the ones with obvious symptoms of the illness can be excluded from food-related activities, still, the most dangerous are the pathogen carriers that remain undiscovered. Infections stemming from workers of South Asian are common, where Bangladeshi workers (17.4) were leading, followed by Indian (1.93%), and Pakistani food handlers

(1.25) (Bakri et al, 2017). The most common pathogens found in their intestines were hook worms, Entamoeba histolytica, Entamoebacoli, Giardia lamblia and Enterobius vermicularis. It is interesting that food handlers may have single, double and even triple infections and that they are more likely to be from South East Asian origin. According to the UK Food standards Agency (Food Standards Agency, n.d.)
and Regulation (EC) 852/2004 on the hygiene of foodstuffs in case the catering workers have had contact with enteric fever, E. coli O157 and Norovirus Cases exclusion from work is required (Food Standards Agency, 2018).

7.1.10. Hand and facial hygiene when dealing with unwrapped food, including the planning and preparation stages

According to Figure 6-13, the great majority of contracted caterers in the seven surveyed hospitals responded that they always wash their hands even when planning to work directly with food that is not wrapped. This shows high levels of awareness of personal hand hygiene, although, importantly, in four hospitals some staff (6% - 29%) stated they only do it occasionally. The senior management and first-line managers should emphasise that there should be no excuse from this activity as it is crucial for food poisoning and cross-contamination prevention.

According to (Food Standards Agency, 2012) catering staff must be 'fit for work' at any time, which means they should be illness-free to prevent food contamination. Also, no unathorised person should be allowed access to the place where unwrapped food is kept or handled. Food Standards Agency (2017), also advises managers that they should ensure that catering staff are totally familiar with the meaning of 'fit for work' and its implications, as well as that it is their duty to train the catering workers to report to their line-managers any form of illness before they see the doctor. If the manager identifies that a catering worker is not 'fit for work', they must

destroy the unwrapped food touched by such a worker. Also, they should be sent home or removed from the food-handling area and asked to do something suitable unrelated to direct contact with food. Corrective actions should include an introduction to personal hygiene training for all staff and procedures that ensure increased supervision of catering workers (Food Standards Agency, 2018)

Furthermore, all the catering staff must have training in effective hand washing, so that they wash their hands correctly. A visual guide should be displayed above the wash basin in the kitchen and other areas to act as a constant reminder, such as the graphics provided in the Safe Catering Guide (Food Standards Agency, 2007). As an additional protective measure hand gels and rubs must all comply with the standard BS EN 1500. Confirmation of this will appear on the product label or as informed by the manufacturer. Products without this validation should not be used. However, it must be clarified that these should not be replacement for correct handwashing. Finally, disposable gloves can be used effectively to avoid food contamination. Still, it must be emphasised that hands must be washed correctly both before and after they are used. Importantly, when the tasks are altered, the gloves must be changed as well, such as after touching raw poultry, after handling meat, when finishing cleaning, or before ready-to-eat food (Food Standards Agency, 2012).

7.1.11. Use of cap or head covering when dealing with unwrapped food

According to Figure 6-15, in half of the surveyed hospitals catering workers cover their hair, but in others it only happens sometimes and in less common cases, never. Failure to cover hair, especially when dealing with unwrapped food, can increase the risk of cross-contamination. Table 7.6 below explains what the supervisors can do to avoid this and why it is essential for food contamination prevention.

Table 7-1 Supervisors cross-contamination checklist

What can go wrong here? [Hazards]	**What can I do about it?** [Control/Critical Limits]	**How can I check?** [Monitoring/Verification]	**What if it is not accurate?** [Corrective action]
Contamination from personnel hair and hair accessories	Ensure staff tie their hair back and wear a hair net or cap. Limit the use of hair accessories to the basic pins, cap and beard net. I have done this. √	Check if staff are wearing hair/beard net and cap with the basic hair pins if necessary. I have done this. √	Improved training or re-training is required; More intensive/frequent catering staff supervision and supervision of other personnel entering the areas where food is handled.

Source: (Food Standards Agency, 2007)

According to Trading Standards Institute Advice (2018) at the following bacteria, Staphylococcus Aureus and Staphylococcus, can often live on the human hair and skin, sometimes in large numbers, without people being aware of this. It is well-known that Staphylococcus produces poisonous discharge which when swallowed, leads to temporary vomiting or diarrhoea. If hair is not covered, the bacteria can be transferred onto food

causing cross-contamination, especially by touching hair, scratching the scalp or touching areas of the face. Furthermore, it can continue doubling on the palms as they are usually warm and partly wet, providing ideal conditions for bacteria growth.

In addition, there are other pathogens, such as viruses, which staff may host on their hair due to an indirect contact with people on a bus, in a restaurant, shop, toilets and similar places, without being aware of the situation. If they are made aware during the personal hygiene training, especially using visual sources, such as pictures and video clips with simulations or role plays, it is expected that they will change their behaviour and attitudes toward their personal hygiene.

7.1.12. Covering mouth and nose with a mask when dealing with unwrapped food

According to the information presented in Figure 4-16, the surveyed contracted workers mainly respect the regulations about the use of protective masks on their mouth and nose. Nevertheless, in three hospitals, the workers do it only sometimes (3%, 8% and 19%). This suggests that the overall situation related to the use of protective facial masks is good, but it can still be improved through training and increased monitoring. Droplets passing through people's nose or mouth mucous membranes can contain infectious agents that can spread illnesses (National Services Scotland, 2017). Recent studies have shown that wearing a mask is an effective preventative measure in minimising the spread of viruses and microbes. According to MacIntyre, et al. (2008), if properly applied, masks show high effectiveness in preventing the spread of viral infections. In their study across families with children suffering from flu-related illnesses, the likelihood of getting the same disease was reduced by 80% when the household members were wearing masks. Similarly, Cowling et al (2009), confirmed a similar outcome. In their study with 400 patients suffering from

flu, the researchers recorded reduction of the illness to 70% among the family members who maintained regular hand hygiene and applied surgical masks on their face. In Scotland NHS (2017), a detailed and systematic review of the use of the protective surgical mask in hospitals was conducted in terms of minimising the spread of respiratory viruses. Compared to isolation, intensive hand hygiene and social distancing, the use of surgical masks was reported to be most effective, with the most steady and reliable evidence. The report recommends a fluid resistant (Type IIR) surgical mask (FRSM) for infection prevention, and that the mask must be replaced upon the completion of the task. If the mask is somehow broken, or if it is full of moisture, then specific instructions recommended by the manufacturer must be followed to reduce risk of infection. (Moore et al., 2017) It seems that, although the type of protective surgical mask still may require further investigation, it is certain that its use is effective and should be promoted as mandatory. Nevertheless, due to the simultaneous application of various infection prevention measures alongside the use of the surgical masks, the results are not completely conclusive in terms of the definite degree of effectiveness of their use (MacIntyre & Chughtai, 2015).

7.1.13. Improved personal hygiene and other related behavior in the presence of a manager or supervisor

In relation to the individual hygiene habits under the direct supervision by the line manager or supervisor, the data in Figure 6-17 revealed the majority of the contracted catering workers significantly improve their hygiene practices under close supervision, in some cases 100%. Only in one hospital 5% workers answered it is not likely to happen. This means that monitoring and reporting are essential, and that supervisors need to be well-trained in terms of communication, understanding relationships with workers, knowledge of their individual tasks, as well as reporting procedures. The workers also need to be made aware of why they should

change their habits and that hygiene needs to be consistently maintained at the highest level.

According to the UK Food Standards Agency for Northern Ireland, catering managers and supervisors should use five recording forms to support their regular presence and monitoring of the catering workers performance and hygiene behaviour among other factors as shown in table 7.7 below:

Table 7-2 Supervisor monitoring procedures checklist

Monitoring Record	**Purpose**
Hygiene-related Records	
Hygiene Inspection Checklist	To record your own checks of your premises
Hygiene Training Records	To record training of your staff
Fitness to Work Assessment Form	To record assessment of fitness to work
Other Records	
Food Delivery Record	To record the monitoring of incoming deliveries
Fridge/Cold room/Display Chill Temperature Records	To record the monitoring of the chill, refrigerator, cold display, units (and possibly the function of your freezer/s)
Cooking/Cooling/Reheating Records	To record cooking, cooling and reheating temperatures
Hot Hold/Display Records	To record hot holding temperatures

Hygiene Inspection Checklist	To record your own checks of your premises
Hygiene Training Records	To record training of your staff
Fitness to Work Assessment Form	To record assessment of fitness to work
All-in-one Record	To use as an alternative to SC1-4
Customer Delivery Record	To record monitoring of food deliveries to customers

Table 7.7 is adapted from Safe Catering, issue 5 (GOV.UK, 2013)

According to (Food Standards Agency, 2018), the frequency of checking procedures depends on the size and nature of the business. Also, if any non-compliance has been identified and recorded, the managers must state what procedures in terms of corrective measures they will follow to rectify the situation. Generally, recording will support accuracy of monitoring, increased workers' awareness of the regulations, transparency and effectiveness of hazard control. However, the analysis of the Food Handling Practices and Personal Hygiene forms, has shown that the direct questions related to individual staff hygiene could be made more detailed or even personalised, so that each member of staff has individual records, which would improve their awareness and personal hygiene. These questions include:

- "Are controls being followed to ensure staff wash hands after handing raw food and before touching surfaces, such as the cash register?"
- "Are staff fit to work, wearing clean, suitable protective clothing and following personal hygiene rules particularly hand washing?"
- "Are wash hand basins clean with hot water, soap and hygienic hand drying facilities?"

- "Are wash hand basin used for hand washing only and is effective handwashing by staff regularly observed?"
- "Are staff toilets and changing facilities clean and tidy?"

Finally, other questions in the original document are not related to individual catering workers but, for instance, to the general cleanliness degree of utensils.

7.1.14. Awareness of specific food preparation temperature requirements

Regarding the requirements for the preparation of specific food, the contracted catering workers came up with a diverse range of answers, suggesting there is no standardisation of knowledge or procedures (Figure 6-18) In four out of seven hospitals the answers were mainly correct (50-57%). On the contrary, in four hospitals, 14-39% of contracted caterers openly said they did not know the correct answer. According to safe catering guidelines provided by the Food Standards Agency (2015), catering workers must follow seven HACCP processes to help ensure best practice regarding food hygiene.

If, for instance, the contracted catering workers do not know the temperature they need to set the oven to, or do not know how to correctly cook chicken, the consequences could be detrimental to the consumers including vulnerable patients. Therefore, as Table 7.1 indicates, it is essential to list all the critical control points and to determine all the hazards related to the cooking temperature, starting with:

a) What can possibly go wrong while cooking or, what are the hazards.
b) Setting the critical limits, or what can the worker do about it.

c) Monitoring and verification – how can the worker check what is wrong.
d) How can the errors be corrected – corrective actions.

Table 7-3 Critical point checklist

What can go Here? [Hazards]	What can I do about [Control/critical limits]	How can I check? [Monitoring/verification]	What if it is right? [Corrective actions]
Food is not cooked at prescribed temperature Hazard: spread of bacteria	Use the color-coded thermometer to measure the temperature of ready-to-eat meat and check the prescribed temperature; ensure the temperature is kept for a prescribed length of time	Keep the probe part of your thermometer clean to avoid spreading bacteria or dirt; Take care of the thermo-meter (dry and away from too high temperature); use the colour-coded thermometer for hot food; frequently check the temperature until it reaches the desired level and keep it at it for a Required period of time.	

[Adapted from: Food Standards Agency, 2015. p. 2. Section 5].

Also, the catering workers need to be aware of the points that are unlikely to cause problems or corrective actions. For instance, ovens use a very high temperature and will not require disinfection before cooking chicken. Although the suggested preventive measures will bring better results, it is clear from the workers' responses that there is a urgent need for training in the area of safe cooking, even for those who know the regulations but have a negative attitude towards work. There are simple ways in which these problems could be avoided, such as filling out forms that outline the steps taken in the preparation of food. Forms such as those adapted from the Food Standards Agency (2015) shown in Tables 7.2 - 7.3, should be reproduced and implemented across hospitals, particularly as any mistakes or errors can then be tracked and identified to stop them recurring.

Table 7-4 Food supply checklist

Type of food	Supplied by	Checked use by date	Set temperature and length of cooking	Comments and actions	Completed	Sign

Table 7-5 Food production checklist

FOOD	COOKING				COOLING	
	Time started cooking	Time finished cooking	Core temp	Signed	Time into fridge/ blast chill/freezer	Signed Initials

REHEATING					COMMENTS/ACTION	
Date	Core temperature	Signed				Signed Initials

[Adapted from Food Standards Agency 92015) p.4 section

7.1.15. Refrigerator and Bain-marie temperature regulations

Refrigerator

Information about operational fridge temperatures (1- 5^{o}C) should be common knowledge to the catering workers. Out of the seven hospitals, staff from four of the surveyed hospitals generally answered correctly. However, in the remaining three hospitals the answers were either incorrect, incomplete or the respondents admitted a lack of knowledge. The findings in Figure 6-20 show that there is a need for training in the correct use of a refrigerator which is required for maintaining hygiene and food safety in hospitals, even when the workers are not directly in charge of refrigerators.

The most common way of minimising bacterial growth is by temperature control as bacteria grow more slowly below 7.22 °C, whereas above 60°C thermal destruction occurs. The critical range is from 4.44°C and 60°C when the bacteria slip out of control (Fraser, 2012).

According to (Food Standards Agency, 2018), food that needs to be kept chilled to prevent the growth of bacteria and food decay leading to

poisoning are the types that should have a 'use by' or expiry date; with the labels that say: 'keep refrigerated' or 'once opened keep refrigerated'. It is also crucial to follow the manufacturer's instructions for the correct use of chilled display equipment, and refrigerators. Furthermore, overstocking refrigerators is not allowed as cold air must circulate freely (Ibid.). The regulations state that the coldest temperature of the fridge should be 5°C A temperature more than 5°C can be acceptable for a limited period only in case of equipment failure. Otherwise, the temperature must be checked at least once a day. Finally, food should not be kept in open containers, but instead it should be transferred to cleaned containers with a lid (Ibid.). The Environmental Health Officer should be contacted in case of broken equipment when it is not clear whether the food in it has been spoiled. In Saudi Arabia, the first action in this situation is with the supervisor in hospital. They have to report the incident to the Nutrition Department of the Directorate of Health Affairs. Each region has its own Directorate. Once the Directorate has resolved the problem, they then send a report to General Administration of Nutrition in the MOH.

Regarding freezing, it will not kill the bacteria, but instead will prevent the further growth of bacteria. Freezers should be set at minimum–18°C, and the frozen food should be kept in it immediately after delivery. To prevent poisoning and cross-contamination, raw food should be well-wrapped and kept separate from ready-to-eat meals within the freezer. Also, expiry dates must be checked, and food should be used on a 'first in, first out' basis. Food frozen by the caterers must be date-coded and used by the stated date, which will depend on the type of the freezer and food used. The instructions provided by the manufacturer should be followed (Ibid.).

Regular cleaning and defrosting of freezers is required and recommended. In case of a faulty freezer, the following steps should be taken to prevent unwanted food defrosting and poisoning:

1. Move the still frozen food to another freezer, if available. Otherwise food should be defrosted as usual and used.
2. Move partly defrosted food to a clean place available for complete defrosting and immediate use.
3. Completely defrosted food must be used immediately and cooked till piping hot throughout. Such food should be used immediately or chilled or frozen. If these are impossible, then food must be discarded.
4. Frozen food must never be re-frozen after being defrosted even partially. It should be used straight away or discarded (Ibid.).

Table 7-6 Process checklist for defrosted food

What can go wrong here? [Hazards]	**What can I do about it?** [Control/Critical Limits]	**How can I check?** [Monitoring/Verification]	**What if it is not accurate?** [Corrective action]
Pathogens in prepared food, cold and ready for eating	Store below 8°C. I do this YES or NO	Measure the temperature of the food by: • Measuring fake food temperature, such as water or packed gel I do this YES or NO • Taking temperature of food surface with	If temperatures of food are recorded above 8°C.....

		a disinfected probe. I do this. YES or NO • Taking air temperature with a probe thermometer for the prepared food I do this YES or NO • Respecting the gauge temperature when cooking. This is periodically tested with probe thermometer and recorded. I do this YES or NO • Taking temperature of chilled prepared food.	

		I do this YES or NO Testing if prepared frozen food has started to defrost. I perform Check delivery when coding the dates, and record it. I do this YES or NO	

Table 7.4 was adapted from (Food Standards Agency, 2007) and demonstrates the fridge/freezer related hazards, and how this can be controlled and verified, including the corrective actions.

7.1.16. Bain-marie

Bain-marie is the professional equipment for keeping food ready for consumption. Catering workers should be familiar with its operation so that they can ensure that food is safe from poisoning and cross-contamination. Figure 6-20 shows that in three hospitals the correct answer for cooking with a Bain-marie was prevalent 65^{o}C.However, in the other hospitals many workers answered 25 ^{o}C or 50 ^{o}C , and some disclosed a total lack of knowledge, thereby demonstrating a lack of standardisation of knowledge across hospitals.

Table 7.5 below, taken from (Food Standards Agency, 2007) shows how catering workers can be trained through proactive practice to improve own understanding and catering activities related to hot ready-to-eat food kept in a Bain-marie.

Table 7-7 Bain-marie checklist

What can go wrong here? [Hazards]	**What can I do about it?** [Control/Critical Limits]	**How can I check?** [Monitoring/Verification]	**What if it is not accurate?** [Corrective action]
Food poisoning bacteria grow increasingly in hot ready-to-eat food.	Ensure hot food is delivered above 63^{o}C I have done this. √	Check if temperature is above 63^{o}C and keep records. I have done both. √	Reject the hot ready-to-eat food if temperature measurement shows results below 63^{o}C

Training on minimising bacterial growth by temperature control as well as following simple steps as outlined above will help to reduce risk.
It is expected that after receiving factual (e.g. statistical and visual) explanations the workers will respect the regulations, aware of the potentially detrimental consequences of inadequate behaviour or careless attitude.

7.1.17. Cigarette smoking in the hospital kitchen

Regarding cigarette smoking in hospital kitchen areas, the majority of the contracted catering workers understand why it is prohibited and they comply with this regulation. In addition, there are clear penalties for this behaviour in general in restaurants and other public areas in KSA, which makes the worker comply more easily to this regulation as they are used to it in other areas of public life. However, the information from Figure 6-21 showed that in one hospital approximately 22% of the surveyed contracted workers responded that they did not know the reasons why smoking is unacceptable in terms of infection prevention. As it is expected that detailed understanding will lead to a total compliance with the smoking restrictions, appropriate training explaining why smoking is unacceptable in hospitals is required. Standardisation of approach to such issues is necessary across all the hospitals. The fact that there is still confusion around this issue would make for interesting future research. For example, providing visible reasoning behind the prohibition of smoking in the working area can be effective. This way East Cheshire NHS Trust (2017) promote the anti-smoking message and prohibition by displaying a notice in kitchen areas stating 10 Point Code for Food Handlers. One of the points reminds the workers of the fact that smoking is dangerous as well as prohibited, and in relation to it the workers are warned never to cough or sneeze next to food. The fact that cigarette smoke and ash contain harmful substances and that touching mouth, lips, cigarettes and food can lead to the spread of infection agents has been implied by prohibition of smoking. According to (Food Standards Agency, 2015) suitable training section that raises awareness of the above needs to ensure to the catering workers full understanding and compliance to regulations related to smoking in the hospital kitchen areas and in general.

7.1.17. Conclusion - Catering Workers

The discussion has highlighted that the surveyed hospitals in Riyadh employ the contracted catering workers who belong to various catering companies. It is deemed that this does not represent high, but medium risk, since any failure will not affect all the hospitals, but one or some and there are numbers of similar companies which can replace the unsuitable one. As for the workers, the study concludes that a combination of different ages and genders is a good mix for hospitals for various reasons, among which sharing experience and knowledge diversity, less cost, enhanced motivation and reduced turnover, as well as reassuring effect on patients as service users.

Benefits of employing contracted catering staff include improved responsibility due to an increased focus on the main and only job which is supervised by MOH and Catering supervisors too; also, the hospital staff can focus on their duties, and the contracted company provides their reports on their activities, including the financial ones. Contracted catering workers still need to be motivated using different approaches, among which reasonable salary, valuing their performance and qualifications, showing understanding for their individual lives' motivations flexible holiday and working hours, supporting their development of other skills such as computer skills, communication and team work skills.

Regarding training, appropriate explanations for training and unacceptable behaviour of lack of knowledge is required. Also, standardisation of approach to all the relevant issues is required across the state hospitals, not only the surveyed ones.

7.2. Catering Supervisors Questions

Before discussing the responses from the catering supervisors it is worthwhile detailing the job description and qualifications required to be a catering supervisor. It is expected the supervisor is educated as either a Bachelor of Food or Nutrition or in Hotel Food, Catering or Food Management. The candidate must also have a minimum of two years' work experience in the field of food and nutrition and be proficient in Arabic with a knowledge of English. The job specification lists five areas they are responsible for. These are:

1) Responsible to the hospital administration and nutrition department.
2) Responsible for all employees of the nutritionist in the hospital.
3) Full and direct supervision on all aspects of administrative and technical sites.
4) A representative of the contractor is responsible for the implementation of the contract and its terms and specifications.
5) Organization and distribution of work.

(Ministry of Health Kingdom of Saudi Arabia, 2018).

It is obvious that the role of catering supervisor is essential to the success of a hospital as they must ensure compliance with regulations and that relevant training is identified, implemented, and regularly checked (NHS, 2018). NHS policies recognize that funding for training is vital to ensure food provision is in accordance with relevant standards and that the employees are familiar with the policy requirements by providing them with suitable training and guidance. Any training is overseen and implemented by a specific person and/or department. In this instance it is by the organisational development department. Training can be provided externally or in house, but it must be approved first. The following sections list the types of training that are required to ensure Saudi hospitals reach a suitable standard and conform with HACCP principles. The following

suggestions are based on the results of surveys with 14 catering supervisors.

7.2.1. Regular training (required but not urgent)

According to the Australian Institute of Food Safety, a catering supervisor plays an integral role in a food business as they provide a vital link between the organisation and its customers, suppliers, employees, and local government. Therefore, they advise that the supervisor undergoes specific training in order to be able to perform this role. Supervisors and managers are involved in recruiting, communicating, and motivating staff as well as monitoring their overall performance (Cania, 2014). However, these skills are becoming increasingly more challenging due to the workforce becoming increasingly more diverse in terms of age, race and, as my research has shown, a more culturally diverse workforce. Indeed, it is interesting to note from Figure 4-23 that diversity applies to supervisors as well, with five female supervisors employed by hospitals. This is somewhat unexpected taking into consideration that Arabic society traditionally favours men in leading positions (Al-Asfour et al., 2017). Age is also an important factor. According to figure 4-22, the contracted staffin Riyadh's hospitals are all below the age of 40, and therefore are relatively young. It is encouraging to see that a large percentage of the youngest contracted supervisors have the opportunity to develop further professionally and still be considered as young professionals.

Regular training is required to improve overall knowledge of food hygiene but cannot be considered as immediately urgent in cases where the catering supervisors provided approximately the same number of the correct and inaccurate answers.

Although hospitals are becoming increasingly diverse in their workforce, the Ministry of Health requests of contracted companies that the

supervisors should primarily be suitably qualified Saudi citizens, and only if it is not possible should they then employ foreign citizens in supervisory positions in state hospitals (Nutrition Contract for Hospitals Catering, 2015). Although there are practical reasons for this, it could be seen as demotivating for foreign workers as it suggests they are not being encouraged to progress into better paid and more responsible roles which could have an adverse effect on performance and motivation.

7.2.2. Knowledge of monitoring procedures in HACCP Principle 4

As far as the monitoring procedures of HACCP Principle 4 are concerned, almost half of the catering supervisors provided wrong answers (figure 4-27). The results showed that young and less experienced overseas supervisors, and dieticians with Saudi qualifications, all exhibited incomplete knowledge and will require further training in this area. Furthermore, not all experienced supervisors provided the correct answer, showing that experience without suitable qualifications is not good enough, and cannot be relied on. This means the area of training for the contracted supervisors should be treated as a component of regular training. It is recommended that both native employees and foreign employees, irrespective of experience, would benefit from Food Hygiene Level 2 and 3 training on monitoring procedures (University of Southampton NHS Trust, 2016).

Continual training also demonstrates that staff are valued by supervisors and the institution, as they are investing finance and time to help them improve the performance of their job. Monitoring is a procedure that demonstrates to employers that they are valued as it means that supervisors are able to track their career progress and provide refresher training when needed (Government of Alberta, 2015). But as the research data has shown in figure 4-27, this is not happening at a consistent level across hospitals in Saudi Arabia.

7.2.3. Full Implementation of HACCP

In the research data presented in Figure 4.30, the catering workforce were asked if they had received HACCP training. Out of the seven hospitals, only KFMC agreed 100% that they had had this training. This might be because it is the biggest hospital and so more likely to enforce the catering companies to comply with procedures due to contractual obligations and regulations, whereas smaller hospitals do not have the same infrastructure to enforce this. KFMC have been certified with ISO 22000 which is the highest standard of food safety policy management and therefore understands the importance of training. However, KSMC has also been certified with ISO 22000, yet in the same questionnaire, 50% of staff strongly agreed and 50% disagreed that there had been HACCP training. It is difficult to understand how there could be such a split in opinion among staff when both organisations have the same accreditation from The Institute of Food Science and Technology (IFST, 2018).

Awareness of HACCP implementation standards in hospitals requires attention, perhaps not a necessary remedial activity but should be addressed in the regular training provided to contracted catering supervisors. Another point that justifies this decision is in the KSH hospital where one supervisor agrees that HACCP has not been implemented in the hospital while another disagrees. The difference could be reconciled by differences in the perception of full implementation, but still highlights that the supervisors are not basing their decisions on a common policy or knowledge base. Also, in many cases when supervisors only wrote 'agree' instead of 'strongly agree', it was evident that the same staff were equivocating with respect to the purpose of HACCP. This explains why this should not be addressed under targeted or urgent training. However, all contracted supervisors could benefit from more training on HACCP implementation that will focus more functional demonstrations with

examples in individual hospitals, and these examined through discussions and additional workshops. Training should also clearly demonstrate and exemplify how the most significant points of HACCP are implemented in their individual hospitals so as to clarify processes and alleviate any doubts.

7.2.4. Lack of training evidence

Awareness of training opportunities and participation in training needs to be addressed within regular training frameworks, where everyone needs to be informed about the mandatory training mechanisms and their implementation in individual hospitals, including the referral system, monitoring, budgeting and time allowance. It should also touch upon individual planning for personalised training over agreed timescales to ensure efficient professional development. According to (Desmarchelier, 2016) food safety control supervisors in hospitality services must be certified for completing the relevant units of competency issued by a registered training company for the management of food safety, cleaning and sanitisation. Such a licence will have to be renewed once in five years (See supervisors/training-for-food-handlers, cited 04/05/16). The rationale is explained in the NSW Government Food Safety Strategy 2015-2021, (NSW Food Authority, 2015),and it claims that having a responsible trained supervisor will minimise salmonellosis outbreaks and ensure the SE prevention plan is enacted.

In comparison, the Saudi MOH (Ministry of Health Kingdom of Saudi Arabia, 2018) enforce that the catering company to have a HACCP certificate, but they do not enforce them to provide further training to supervisors. As can be learned from the Australian example, it would be beneficial to the hospital patients if Saudi MOH could introduce similar regulations regarding the supervisor licence. However, the MOH has made a sizeable investment in the catering companies, and the responsibility is not passed on to

individual supervisors, but on to the catering company which must provide regular free training for workers and supervisors.

7.2.5. Compulsory food safety training for all food handlers

In Figure 4-37 it was found that supervisors from three hospitals did not have food tested for foodborne pathogens. This means that standardized testing should be considered throughout state hospital kitchens, and that information about the types of pathogens under test and their impact should become part of the training for food safety supervisors. However, if hospitals comply with HACCP they should not need to test the final product for food pathogens, so this data is open to interpretation but may be used to assess pathogen residency and/or cleaning competency. Likewise Figure 4-40 demonstrates a lack of awareness of procedures regarding food poisoning from chicken. This is unacceptable and requires immediate attention as such issues are fundamentals to food safety.

Regular training should also reinforce why compulsory food safety training for all food handlers is necessary. The rationale behind this is that the supervisors' opinions were varied across the hospitals and within individual hospitals. The MOH has already decided that all contracted food handlers must have food safety training (before or within the first three months of employment, (Ministry of Health Kingdom of Saudi Arabia, 2018). The data suggest supervisors have variable attitudes to the need and types of training. To comply with the MOH ruling there is a need for standardisation in hospitals and that training become part of their organisational culture. Regarding the above value judgements on the suitability of qualifications, and in respect of internationally recognised syllabus of the qualifications, in the future, hospitals in KSA could organise Food hygiene courses at Level 2 and 3 and get them recognised by IFST (IFST, 2018), or they can complement the existing qualifications of some international workers with the suitably designed courses accredited again by (IFST, 2018).

7.2.6. Denial and negligence of food safety issues

Although the denial of food safety issues is a serious matter, the related answers among the hospitals and within the individual hospitals varied. In some the contracted supervisors showed strong disagreement with the statement that, when raised, safety issues were ignored. In others, the supervisors strongly agreed or the views were divided or the answers undecided.

Overall, the responses suggest that this topic should be covered under roles and responsibilities, monitoring mechanisms, teamwork and communication channels. It can be concluded that MOH and the Contracted catering supervisors need to participate in discussions about the Hospital Food Safety Policy and its regular review as they must prioritise patients', workers and all other staff and visitors health and safety, and therefore should be involved in the procedures and processes design and implementation in order to reduce incidences leading to the breakout of contagious pathogens. According to published recommendations regarding the improvement of managers' behaviour towards general health and safety in Saudi Arabian construction companies, certain actions, as discussed below, should be taken as a priority (Alshemimry, A., 2016):

Training and communication are critical components which should influence the attitudes of the contracted supervisors' behaviours towards the negligence of the reported safety issues; it empowers them as the co-employers of the catering workers in this case. Contracted catering supervisors follow the MOH Contract regulations, but it is the MOH Supervisors who are in charge of monitoring the government strategies and the Ministry of Health's regulations, as well as the international laws related to food and safety, HACCP. In this sense, MOH should ensure that the

contracted supervisors that they obtain licences from the authorised training authorities.

Finally, accountability is an important preventive measure, which effectively means that a role for the responsibility of awareness systems should be put in place (Alshemimry, A., 2016). A clear understanding of the function of the rules and regulations for both coordinators and workers is necessary, so as to minimise any failure in behaviour. If the system is accountable, then its users should be able to easily and unmistakably identify the company responsibilities and align their attitudes and behaviour accordingly, and especially in relation to contemporary reported food safety related issues. The survey of the contracted catering supervisors shows there is a lack of satisfactory accountability within the Saudi Arabia hospital catering sector.

Having an up-to-date and accountable hospital food safety policy will encourage and oblige the catering supervisors to motivate and lead the catering workers to behave according to their responsibilities, but also to report the incidents and act upon them, following the clear procedures. For this purpose the roles of the employees within the hierarchy must be clearly defined and transparent. This, on the other hand, requires ensures continuous review of the Food Health and Safety Policy and the performance of everyone to whom its guidelines are mandatory (Food Standards Agency, 2017).

7.2.7. Contribution to hospital menu planning

Only half of the contracted catering supervisors were invited to contribute to the planning of hospital menus. Out of the surveyed hospitals, AAA was the only hospital that had 100% for consulting staff engaged. It is interesting to note that the AAA supervisors' qualifications are Bachelor of Commerce and Bachelor of Hospitality, which are the least related to food planning. Also, both supervisors were young Egyptians. Research has

shown that the results in patients' nutrition and food safety would be improved if more specialists were involved in patients' menu planning (Scottish Government, 2016), and so it is advised that greater consultation should take place. Given that catering supervisors are responsible for overseeing the catering it is important that they are consulted on the food menu planning in order to utilise their knowledge and skills, and to give them more ownership over the role. If an employee feels part of an organisation then it is highly likely that they will take their responsibilities more seriously as they have a vested interest. According to (UK Nursing Labour, 2011) multi-professional teams discussing problems (e.g. catering services, dieticians, the nutrition nurse specialist, ward nurse and doctors), solving the problems, and agreeing on the action points as a result of these analyses have led to improved results in patients' nutrition, including food safety based on hygiene. Considering supervisors work on parallel activities to those in the UK, it can be concluded that food safety and hygiene could be improved if team planning of the hospital menus is practised regularly.

Regarding future training, a screening tool for multidisciplinary teamwork by supervisors, nurses and doctors could be introduced, whereby they will be encouraged to plan hospital menus together. This would include all elements of food safety, with a specific need to address a) patients with weakened immune responses who are unable to fight food-borne illnesses and b) safely prepared healthy food for specific diets that can help patients to recover more successfully (Rotherton et al., 2012) This food-borne disease prevention tool can be included in the team menu planning.

7.2.8. Awareness of the corrective actions for ensuring food safety in the hospital kitchen

Urgent training focussing on corrective measures taken in hospital kitchens is necessary because the contracted catering supervisors had divided views on this topic, whereas they should all be following the same principles. This

is a high-risk situation as the lack of knowledge, skills and confidence may easily lead to pathogen outbreak.

In relation, to the contracted catering supervisors' behaviour and attitudes, it is d whether it is due to their genuine neglect or lack of awareness of the responsibilities. Neglect of serious hazards is one of the common problems encountered with HACCP operation.
The following are the examples of the unacceptable behaviour:

- Inactivity or intentionally postponed corrective actions endanger food safety and may have detrimental effects on the patients;
- Delay of corrective actions as a result of the confusion regarding the responsibilities of the catering staff, catering supervisors and MOH supervisors. It is unclear who is responsible for which part of the corrective action, in which case either training or revision of the instructions are necessary.
- Lack of the correction actions reports which may mislead the managers into the belief that there are no problems.
- Incomplete corrective actions;

Repetitive corrective actions indicate that there is something wrong in the procedures or in the employees' attitudes.

7.2.9. Monitoring and recording the corrective actions.

It was very surprising to find that half of the contracted catering supervisors did not know who monitored corrective actions, and if there were any records kept on the matter despite this being outlined in principle seven of HACCP. A small minority answered that HACCP supervisors and head supervisors are in charge of keeping records of the corrective activities in the kitchen and monitoring the same. Well above one third of the supervisors thought that only one of the above roles was responsible for keeping records and monitoring them. This issue needs to be discussed in

the following areas of training: roles, responsibilities and monitoring mechanisms, teamwork, collaboration, and communication channels. Figure 4-28 also showed that KSH and AAA were the only hospitals that did not answer correctly when asked about the verification of HACCP plans. Based on these responses it is possible that KSH and AAA supervisors are not appropriately monitoring employees under their supervision and are not keeping records of all the critical points, almost certainly due to a lack of knowledge.

7.2.10. Conclusion - Catering Supervisors

Following the discussion, it can be concluded that the catering supervisors in the state hospitals in Riyadh are all from various catering companies. Overall, they are responsible for the hospital contracted catering employees and their supervision on all technical and administrative aspects, including training needs. As a representative of the contractor they are responsible for the contract implementation as well as for organization and distribution of work. They need to accurately manage specific services and make the appropriate adjustments to enhance the services. In order to ensure their good job performance in line with hospital values and ethics, a closer work collaboration should be maintained with MOH supervisors. As for the greater influence on the contracted workers, they need to understand their training needs as well as other interests in order the better to supervise them. It has been advised that the catering supervisors could participate with the MOH supervisors in the deliver y of in-house training as well. Furthermore, Catering Supervisors themselves need training as their qualifications and experiences differ. This can be organised through refresher training in-house delivered by MOH staff or by registered external training agencies.

7.3. MOH Supervisors

Surprisingly, the Ministry of Health in Saudi Arabia does not have a major role in legislation on food safety. Its main purpose is on the notification of food poisoning outbreaks. A notification system was started in 1975 and is now overseen by the Environment Health Administration (EHA). In 1999 a food safety programme was created within the General Department of Preventive Health. The main functions of this program are to regulate food poisoning outbreaks, educate society about food safety issues, training staff to deal with food poisoning, and recommend appropriate sanctions.

The directorate of nutrition at the MOH is responsible for developing catering contracts. The MOH Supervisor is in charge of evaluation of the status of hospitalised patients nutritionally, taking into account the dietary habits of patients, food guidelines for patients, supervision of meals of patients on the distribution line of meals, preparation for special menus, follow-up on the functioning of food services within the workplace, directing staff to prepare and serve meals, and raising awareness and nutrition education in the hospital (Ministry of Health Kingdom of Saudi Arabia, 2018).

MOH supervisors need to comply with the general conditions and specifications for nutrition in hospitals made by the general directorate of nutrition at the Ministry of Health. These regulations inform practices and procedures at state hospitals. It is the Ministry's duty to ensure that catering supervisors are made aware of the latest legislation as well as identifying gaps in training. Their role is vital to the success of a hospital as they are ultimately responsible for a top-down process that ensures all regulations are abided by. Given that MOH supervisors are responsible for awarding contracts to catering teams it raises questions regarding their own training and suitability to be such an important component of the food safety process.

Before analysing my own research, it should be acknowledged that there are inherent problems with the organisational culture of the MOH. Organisational culture is a term used to describe the way in which an organisation's values and beliefs affect and influence anybody working within that organisation. Therefore, in analysing the role of MOH supervisors it is important to also look at other leading players within the food industry to provide context to my own research and to understand how the organisational culture of the food industry in Saudi Arabia needs to change if it is to become a trusted regulator of food safety processes. Any discussion of key players within the food industry, as well as processes and procedures, additionally needs to bear in mind recommendations outlined by ISO22000 (ISO, 2018) that it is the responsibility of the organisation to ensure:

a. Determine the necessary competence of person(s), including external providers, doing work under its control that affects its food safety performance and effectiveness of the FSMS;

b. Ensure that these persons, including the food safety team and those responsible for the operation of the hazard control plan, are competent on the basis of appropriate education, training and/or experience;

c. Ensure that the food safety team has a combination of multi-disciplinary knowledge and experience in developing and implementing the FSMS (including, but not limited to, the organization's products, processes, equipment and food safety hazards within the scope of the FSMS);

d. Where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken;

e. Retain appropriate documented information as evidence of competence.

7.3.1. The role of SFIs

Al Mutairi performed an ethnographic study of Saudi Food Inspectors (SFIs) in Riyadh(Al Mutairi, 2013). SFI's perform a similar role to Environmental Health Officers in the UK, in that they are responsible for inspecting businesses that produce food and ensuring that these businesses conform to accepted standards. During his study he found that some inspectors did not wear official uniforms during visits, and on occasion failed to show their identity cards as they arrived at premises. He also observed a lack of communication among SFI's as occasionally they would arrive for a site visit only to discover another inspector had already been there earlier in the day. On some occasions business owners refused to allow the SFI onto their property, presumably using this as a delaying tactic, yet the SFI in question had no awareness as to the legal implications of being denied access to the premises. Instead of using the letter of the law, they were passive. These instances all help to devalue the role and power of the SFI.

Al Mutairi also noted that enforcement techniques used by SFIs relied purely on financial punishment, regardless of the errors made by the business. He argued that the SFIs should have employed more informal techniques, such as education, advice, or warnings, to coerce businesses to act more professionally and in accordance with the law. Previous research has shown this can be more effective, as well as help reduce the tension between enforcement officers and businesses (Hutter & Amodu, 2008) The inability to implement relevant and varied forms of coercion and punishment suggests a lack of training and experience on behalf of the SFIs who would perhaps benefit from training in case studies and role playing in order to understand appropriate behaviour for specific situations.

Al Mutairi also found that there were inconsistencies within the organisation that further demeaned the effectiveness of SFIs. He found that there was contradictory information given by the agency to SFI's, thereby meaning a lack of consistency in approach. He also heard SFIs complain that the decisions they had made about premises were consistently overwritten by a supervisor or manager, thereby removing any autonomy. This could have a negative effect on their motivation to perform their work well. This could possibly explain why in the 200 visits he witnessed, SFI's overlooked irregularities with temperatures in the fridge, freezer and cooking during 51% of the visits. These errors should have been reported in the Health Inspection Record (HIR) but were not. The SFIs also overlooked more important offences, such as safe food handling, storing of food, and quizzing staff during inspections about ISO22000 or HACCP as food safety systems. Al Mutairi also observed that "Inspectors, however, may not have any idea about the distinction between high risk offences and low risk ones in spite of the majority of inspectors having good training sessions in the food hygiene practices." (2013, page 280). Such inconsistencies may explain why food businesses have little faith in food safety regulations, as was concluded in an empirical study carried out by (Wilson, S. et al., 2015).

Investigating and following up serious issues, such as food poisoning outbreaks from a commercial source, is the responsibility of a government commission that comprises members of the Ministry of Municipality, Ministry of Health, Ministry of Interior, and Saudi Food & Drug Authority (SFDA). Al Mutairi participated with this commission during his research as they inspect food premises when there has been a food poisoning outbreak. There were three outbreaks during his research and he concluded that there was not a systematic strategy in place, such as a planned inspection programme, to deal with the outbreaks. Visits were unstructured in that no checklist was used to ensure all areas had been covered. (Al Mutairi, 2013) also observed that no information was provided to the businesses in

question, and that this was a missed opportunity to help educate and reiterate the importance of following key procedures.

Al Mutairi's study is important because it demonstrates an inconsistency of approach by SFI's who are vital in ensuring food businesses follow food safety protocols. It demonstrates that internally within the organisation there is a lack of communication among management and employees, and finally it demonstrates a lack of knowledge and professionalism by all parties involved. If SFIs are not monitored to ensure that they are trained properly and doing their job correctly, how can it be expected that anyone else within the chain will follow food safety procedures? Appropriate legislation and regulation are vital in helping decrease the hazards of contaminated foods (Food Standards Agency, 2012) but for this to work, regulation, as performed by SFIs, must be taken seriously, properly trained, and supported by an effective enforcement and compliance policy (Al-Busaidi, M.A., 2017).

7.3.2. HACCP principles

Current contracts in MOH hospitals state that all foodservice suppliers adhere to HACCP principles. To ensure that these principles are followed, foodservice suppliers are also required to hire at least one HACCP coordinator in each hospital to ensure the procedures are being followed. They are also expected to provide relevant training to their staff to ensure they are aware of all areas of food safety so that they can follow the HACCP principles successfully. Supervisors of foodservice suppliers are also expected to attend training events to ensure they can deliver and oversee HACCP principles. However, recent research into four MOH hospitals from (Al-Mohaithef, 2014), discovered that none of these processes are taking place. He suggests this could be due to a shortage of qualified people in

HACCP systems, a lack of institutes that provide education courses in food safety and hygiene, and finally a lack of programmes focusing on food safety at Saudi universities and colleges means that graduates from 'general' food sciences and nutrition programs fill the gap as food safety specialists. This is an institutional and structural problem in Saudi Arabia and needs to be addressed by the MOH and SFDA.

(Al-Mohaithef, 2014) has also observed in his study that although implementing HACCP in MOH hospitals is a positive move, it requires an accurate management plan to ensure that all principles are implemented. For example, there is no point implementing HACCP in hospitals when the basics, such as PRPs have not been sorted out first. He suggests, for example, that a number of hospital kitchens in Saudi Arabia are designed in a way that is inappropriate for HACCP. It is the role of the MOH to ensure that PRPs are in place if the HACCP programme is to be effective and that all contract conditions are being met, but this is not happening. Therefore, I would recommend an audit of all hospitals to create uniformity in working environment and equipment as an absolute basic requirement. Once hospitals are operating on similar principles in similar environments, then other systems, such as HACCP, can be fairly implemented and monitored.

The MOH supervisors need to have a more active role in investigating food hygiene in hospitals and ensuring contractual obligations are being met and that appropriate pre-requisites programmes are being run to support staff. All training should be recorded and monitored and stamped by senior management to validate that the training has taken place. This will ensure consistency, high standards that apply to all, and enable catering companies to identify staff who need training. These should be basic conditions that a company has to achieve before being given a nutrition contract. Once staff are trained to a standardized level, then training on HACCP can be applied.

My own research reinforces the warnings raised by (Al-Mohaithef, 2014) with regards to the implementation of HACCP in hospitals, which are discussed below.

7.3.3. Lack of clear knowledge of the meaning and purpose of HACCP

It is necessary for hospital catering staff to interpret HACCP correctly and observe it collectively with respect to all components. In four hospitals supervisors claimed they did not know about HACCP procedures (see Figure 4-49). These were: AAA (64%), ALIMH (14%), ALYMH (29%), KSH (15%). This is a clear sign of a lack of training and awareness of supervisory responsibilities and compliance with official procedures. Such findings have shown that the leaders need to assess the structure of the training mechanisms and identify how they will improve them.

The future training itself needs to contain an element of reflection to encourage the employees to discuss and evaluate the models of training offered. Perhaps having forums to involve the employees to participate in the training design would be useful. It is also important that the meaning of critical points is clearly defined so that supervisors understand that control of critical points through activity monitoring is not enough. This was evident by the fact that supervisors did not all agree on the correct procedures. Training must make clear that monitoring does not refer to temperature control only. For example, in three hospitals, respondents thought the control of fridges/freezers would solve the problem. These were KFMC (12%), ALIMH (7%), PMBA (27%). Alarmingly, one hospital (KSH) had no correct answers for this question and therefore require urgent training on this topic.

7.3.4. HACCP plan verification.

As detailed in Figure 4-50 it is necessary to increase the level of knowledge of HACCP plan verification and raise awareness of the difference between verification and corrective measures. This part of the training has to be intensive in hospitals where there was no single correct answer (ALYMH) or where a low level of understanding is evident.

7.3.5. Full implementation of HACCP in hospitals

Due to the divided views about this question, the training on this topic requires attention to establish and implement best practices. Again, where the percentages of wrong answers were high the training should be focussed, and less so in hospitals where the answers were encouraging. Where the answers were divided within a single hospital, the leaders need to find a suitable way to demonstrate examples of the implementation of HACCP through posters displayed on the walls, and in different ways of internal communication, since it is likely that the awareness of HACCP implementation needs to be raised among the employees. In one hospital a respondent 'strongly disagreed' that full implementation of HACCP had taken place, and many were undecided. In this situation the managers need to be very specific about what changes and processes are being introduced and why so that there is no doubt at all that this relates to HACCP. One possible way to help improve these results is to change how information regarding HACCP is communicated. These outcomes are best achieved when organisations actively engage with staff and communicate effectively with them about food safety and hygiene and how it relates to their individual job. This should be more easily achieved where organisations create and promote a long-term food-safety and hygiene culture vision that is endorsed and supported by senior management, then make incremental, focused changes to address specific business issues. Small incremental changes help to demonstrate that the process is ongoing and constantly

under review, therefore there is always knowledge to be taken from training sessions and previous experience needs constantly updating. Some essential service sectors may be able to draw on activities supporting positive culture in general to build up the organisation's food security and hygiene culture. But failures to understand HACCP processes are ultimately the responsibility of MOH supervisors as they should be constantly reflecting on their own means of disseminating information. Schaadt (2013) has suggested that measuring tools are vital in eliminating miscommunication. He argues that just as staff levels of engagement can be measured through checklists so too managers need a validated measuring instrument that measures their own attitudes and behaviour. This would act as a kind of 'mirror' through which they could better understand the impact they have on those who report to them and how they articulate information.

7.3.6. Corrective food safety actions in hospital kitchens.

Although cultivating culture of food safety and hygiene is a priority, in some hospitals specific training focussing on the corrective food safety actions will be required. This division is more evident among the hospitals rather than within a single hospital. As shown in figure 4-57 the majority of answers in five hospitals were correct, but in two hospitals the respondents openly disclosed lack of knowledge around corrective food safety actions. This means in some hospitals the training should be included in the regular provision, whereas in the ones with poor answers it may need to be enhanced. Despite arising from a common framework training on food safety and hygiene it may be tailored to increase effectiveness.

7.3.7. Frequency of the corrective food safety actions in hospital kitchens.

In the surveys staff were asked how often corrective measures were made with regards to food safety. The responses suggested that this happens

roughly 4+ times a week. However, on reflection this question is slightly misleading as corrective actions are not something that should necessarily happen a certain amount of times a week but rather when a problem arises. Therefore, the question should have asked "When there is a problem, do you apply a corrective measure?" It can be concluded, as the hospitals answered that this happened on average 4+ times a week, that staff are applying the necessary corrective measures when required. The approach to corrective measures is to build in processes that help prevent issues from happening in the first place, then monitor and review those processes regularly. Monitoring or auditing should be treated as opportunities to learn and improve and should involve all staff in regular meetings. This is essentially the difference between corrective action and preventive action; preventive is proactive. It seeks to monitor and prevent issues before they become a problem.

The following sections explore training requirements to specific areas.

7.3.8. Causes of chicken meals causing food-borne disease

Regular training for all the MOH staff should include the topics on the causes of poultry contamination, especially chicken as it continues to be one of the main ingredients in patients' meals. Although it is essential to recognise if the food has been contaminated, it is also important to be aware of the pathogens and conditions causing the contamination so that the supervisors can be proactive and warn the catering staff of any related situations potentially leading to the food contamination. Furthermore, well-trained supervisors can then advise and coach the contracted caterers providing confident explanations and passing their own knowledge to the staff. Finally, information transfer and exchange could also be part of the related teamwork training. It is worth briefly mentioning a recent study commissioned by Public Health England by (Willis et al., 2018) which concluded "Whilst there is an ongoing need to monitor the emergence of

antimicrobial resistance, the risk to consumers can be reduced by following the '4C's when transporting, storing and preparing food". (page 31) The 4Cs are:

- cleaning well
- cooking thoroughly
- chilling correctly
- avoiding cross-contamination

It is a simple checklist but one that needs to be constantly reinforced to ensure food caterers are ensuring food health safety is taken seriously.

7.3.9. Recognition of food contamination

Figure 4-63 demonstrates that in five of the hospitals, MOH supervisors had a relatively good understanding of how to recognise food contamination. However, none of these hospitals had 100% correct answers. In two hospitals, the lack of knowledge was very worrying with only ALIMH (8%) and ALYMH (13%) of correct answers. This is something that needs to be remedied immediately in order to improve their knowledge of how to identify and deal with food contamination. This could be done through regular training programmes whereby they are quizzed on the appropriate course of action for determining food contamination. They need training on how to report these incidences to their supervisor. It would also be useful for the supervisor to regularly remind the staff to contact them with any problems they are unsure about.

7.3.10. Storage of raw and cooked food

Food contamination and cross-contamination prevention is another topic for targeted training. The survey in Figure 4-64 showed that in some hospitals approximately 10% MOH Supervisors lacked awareness and knowledge of both cooked and raw foodstuff. This is unacceptable as it affects the values within the organisational culture and demeans food

safety principles. MOH Supervisors are responsible for administering contracts and therefore need to select contracts to the best qualified and experienced caterers to ensure food safety standards are met. But if MOH supervisors are not aware of basic information regarding food contamination, how can they fairly and accurately employ relevant caterers. There is also the added danger that when contractors know that the MOH supervisors do not have the appropriate knowledge of food safety issues then they are less likely to question their own work. This lack of knowledge and understanding has a demeaning effect and trivialises the entire process.

7.3.11. Concerns about patient food safety (actions in case of inconclusive evidence)

A great risk also represents the fact that some individual MOH Supervisors only throw the food away when not sure if it has been infected with pathogens. This is a potential risk to patients. In addition to training, this also may be addressed at the stage of job interviews, which in some cases have never been organised in the first place. Research from (Howard et al., 2004) into safety enforcement strategies to promote concordance in the hospitality industry concluded that "published models of safety management can work well in kitchen workplaces but they can be made ineffective by failures in management control mechanisms" (ibid: 68). This is a problem in hospitals where financial implications can lead to staff being overworked and making errors; being under considerably less supervision; and experiencing a pressure on production which can affect quality. (ibid: 31).

7.3.12. Increased growth of bacteria /HACCP

Regarding the knowledge and awareness of the causes of the increased bacteria growth, the survey results in figure 4-61 show that regular training is required to ensure complete awareness of bacterial growth and how this

can impact on food hygiene at various stages. There was a lot of variations in answers among the hospitals, with many incorrectly believing that 'light and oxygen' are what help increase the growth of bacteria when the correct answer was 'time and temperature'. Awareness of factors increasing the growth of bacteria is a serious challenge for health organisations around the world, particularly when caused by multidrug-resistant (MDR) pathogens. Catering workers are at risk of contamination through direct patient contact but also after touching surfaces and equipment in the patient zone. Bacteria can remain on dry surfaces for months. Therefore, training needs to reiterate the importance of cleaning hands before and after entering a patient zone to avoid cross-transmission of pathogens and patient colonization or infection (Russotto et al., 2015).

7.3.13. Negative impact of smoking in hospital kitchens

Although there was a high proportion of correct answers with regards to the impact of smoking in hospitals, as detailed in figure 4-66, there was still a small proportion of wrong answers. Therefore, refresher training is required. This should mainly inform facts and attitudes towards smoking. Simple videos that demonstrate the negative impact of smoking on food could be broken down into parts to show the impact at different stages (smelly food, bacteria transfer from mouth to food via hands, kitchen fire hazard). Staff training of these issues could be recorded as outlined in principle 7 of HAACP. It might also be worth trying to change attitudes by providing scientific evidence as to the effects of smoking. (Ertel et al., 1991) found that culture results of the mouth of 15 smokers and 15 non-smokers showed that the smokers have a propensity to develop heavy Gram-negative bacterial colonization.

7.3.14. Participation in food pathogen control

When asked if staff had ever tested for food-borne pathogens in Figure 4-59 there was a real split in answers across the hospitals. At five hospitals

the answer was mainly yes whereas at KSH and AAA a higher proportion answered no. This suggests that there is uncertainty as to when pathogen control tests should be performed and whose responsibility it is. It is not necessary for a food pathogen test if the hospital is complying with a HACCP programme. However, as we have seen previously in this chapter through the research of Al-Mohaithef (2014), HACCP is not as effective in all hospitals due to differing working environments and discrepancies among staff as to critical point training. Therefore, it is worth bearing in mind advice by ISC22000 to "ensure that these persons, including the food safety team and those responsible for the operation of the hazard control plan, are competent on the basis of appropriate education, training and/or experience".

7.3.15. Course of actions in case of positive test samples

As seen in Figure 4-60 almost half of the MOH supervisors did not bother to take any action when the sampled food tested positive for contamination. This constitutes a high-level of risk, which requires immediate attention and enhanced training in this area. It also demonstrates a lack of awareness or seriousness towards critical hazard points. Furthermore, the Public Nutrition Administration should introduce the Food Hygiene and Safety Policy and monitor its implementation in state hospitals. To ensure food safety there could be better dialogue between MOH supervisors and SFIs, both of whom could make regular site visits to hospitals. By involving other partner agencies into these discussions it would have the effect of sharing responsibility which might lead to improved standards. It would also result in regular conversations regarding appropriate action when food has tested positive. Alternatively, or in addition, a recording system should be created whereby such discrepancies are recorded and actioned by a second member of staff. By ensuring two members of staff are in charge of

ensuring such problems are resolved will help improve standards as well as share out responsibilities within an organisation.

7.3.16. Specifically targeted training

The Food Safety Act 1990 states that food safety training is an integral part of the management of the food service business. Training enables procedures to be updated and adapted according to changes in legislation or working practices. Local Managers are responsible for ensuring that all food handlers, including chefs, dietetics, and nursing personnel are trained and kept up to date in food hygiene practices. The training records of directly-employed staff are held by the Trust Learning and Development department. They can be consulted by line managers to identify new training. Clearly similar principles need to be applied to MOH supervisors. It is recommended that there should be targeted training for identified small groups of MOH supervisors whereby their knowledge of specific areas of food production can be tested and support provided where there is a lack of knowledge. Given the importance of their role, it is recommended that this knowledge be tested on a regular basis, such as a six month cycle. It would also be useful for MOH supervisors to be involved in discussion-led training whereby they vocalise their knowledge and understanding of food safety with the hope that this will give them confidence on the subject as well as encourage other supervisors to correct or support their comments where necessary.

7.3.17. Need for the compulsory training for all food handlers

A targeted awareness raising discussion should be arranged on the need for the compulsory training of all food handlers. In each of the seven hospitals there was one (6-9%) MOH supervisor that disagreed with this statement. It would be worthwhile investigating the reasons for this viewpoint. It is argued by IS022000 that it is vital management lead on this by example and are committed to ensuring that any FSMS is taken

seriously and correctly implemented. There should be no questioning by MOH supervisors with regards to training as this is something that needs to be constantly evaluated and adapted. It is not a static process. The IS022000 have an eight point guideline for ensuring commitment and professional leadership in overseeing FSMS which is worth stating in full below and using as a framework within Saudi hospitals.

a. Ensuring that the food safety policy and the objectives of the FSMS are established and are compatible with the strategic direction of the organization;
b. Ensuring the integration of the FSMS requirements into the organization's business processes;
c. Ensuring that the resources needed for the FSMS are available;
d. Communicating the importance of effective food safety management and conforming to the FSMS requirements, applicable statutory and regulatory requirements, and mutually agreed customer requirements related to food safety;
e. Ensuring that the FSMS is evaluated and maintained to achieve its intended result(s) (see 4.1);
f. directing and supporting persons to contribute to the effectiveness of the FSMS;
g. promoting continual improvement;
h. Eupporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

The difference in the attitudes of MOH and Catering supervisors should not be neglected. MOH Supervisors are governmental officers and they must be familiar with the governmental strategies, international laws and regulations related to food safety which they implement, whereas the contracted company is running their private business; although the contractors must obey the regulations, it is the MOH officers and directors ultimate responsibility to see them through.

7.3.18. Unresolved food safety issues

This is another topic for the training in the form of understanding the types of unresolved food safety issues raised and the primary actions that need to be undertaken. In figure 4-54 many supervisors from the surveyed hospitals 'strongly agreed' that food safety training should be compulsory for all food handlers, but supervisors from four hospitals disagreed. These were: KFMH (6%) AAA (9%) ALIMH (7%) and PMBA (9%). This demonstrates there is no consistency of approach. Recommended training, therefore, should be in the form of a forum and discussion about scenarios or cases with the possible solutions, and the follow-up in which the hospital leaders will demonstrate how they plan to resolve them in case of the future incidents. The training needs to include methods to assess continuous improvement in the area of food safety monitoring, reporting, action planning and regular revision of accomplishments and awareness raising. This can be related to cultivating health and safety organisational culture in general, through continuous work on employees' attitudes, case studies and benefits of the full implementation of HACCP.

7.3.19. Hospital food safety assurance (monitoring and checks).

The majority of supervisors in figure 4-56 reported satisfaction with the hospital's mechanisms of monitoring and safety of the food served to patients. Nevertheless, some employees from this cohort require awareness-raising training on the hospital's systematic and sustainable assurance of food safety. At the same time, the leaders need to transparently demonstrate plans for continuous improvement in this area.

7.3.20. Contribution to hospital planning

Contribution to hospital planning is another topic that requires training. In particular, standardisation of practice and methods of raising the planning

quality in multidisciplinary and multicultural professional teams. ISO22000 adopts a process approach when developing and implementing a FSMS so that each interrelated process can be managed effectively and efficiently. Management of the processes is achieved using the Plan-Do-Check-Act cycle (PDCA). This is briefly comprised of four processes:

- **Plan:** establish the objectives of the system and its processes, provide the resources needed to deliver the results, and identify and address risks and opportunities;
- **Do:** implement what was planned;
- **Check:** monitor and (where relevant) measure processes and the resulting products and services, analyse and evaluate information and data from monitoring, measuring and verification activities, and report the results;
- **Act:** take actions to improve performance, as necessary.

(ISO22000, Page 7)

The PDCA cycle operates at two levels. The first level focusses on the overall frame of the FSMS. The second level covers the operational processes. Communication between the two levels is therefore essential if the system if to be effective as outlined in the diagram below. (Page 8)

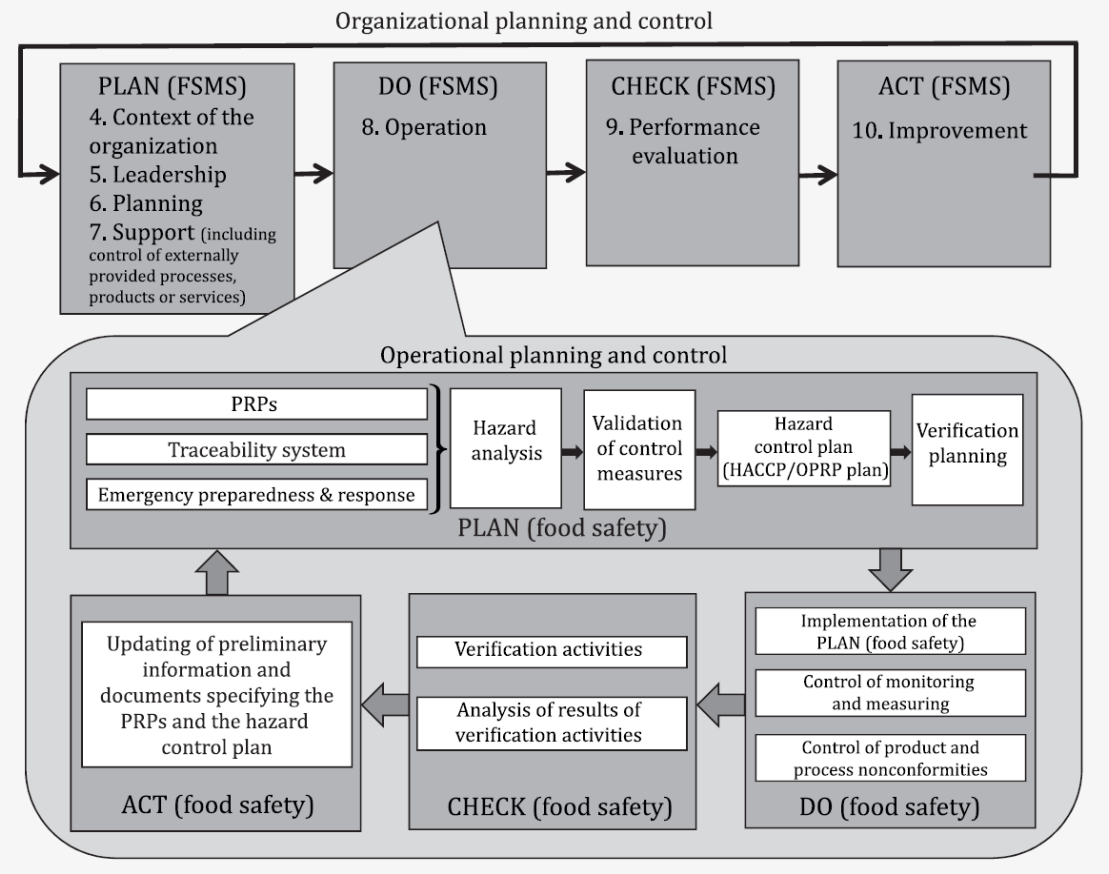


Figure 7-1 Illustration of the Plan-Do-Check-Act cycle at the two levels

By implementing a scientific system such as this, food safety principles can be adjusted and aligned to other policies and procedures within the industry or company. As we have seen with the research of SFIs by Al Mutairi (2013) and the inconsistencies of implementing HACCP in hospitals that have varied working environments by Al-Mohaithef (2014), and this research, there is no standardised approach to food safety and therefore a more joined up approach is required.

However, there does seem to be room for optimism thanks to the SFDA. The SFDA was established by the Council of Ministers Resolution No (1) on 11 March 2003 and approves polices and legislation related to food and

drugs. It is similar in purpose to the American Food and Drug Administration (FDA). It was established to unify enforcement and legislative roles around food and health safety that had been carried out by different government organisations in Saudi. The SFDA has recently created a food law to ensure anyone working within the food industry follows the same procedures. As the SFDA becomes more established and the subsequent Food Law becomes a part of everyday practice, standards will begin to improve. Given the varying levels of engagement by MOH supervisors and the lack of standardisation across the industry – from the top to the bottom – the SFDA will play a vital role in bringing all the components of this industry together and working by the same principles. This will create greater integrity and purpose of roles as well as much needed consistency and standardisation.

7.3.21. Conclusion – MOH Supervisors

In the introduction to this chapter it was stated that the organisational culture within the MOH needs to change in order to have a positive impact on other processes, roles, and procedures within the health industry.

The Saudi Food Inspectors understand the importance of recording and monitoring every incident on a site visit and varying punishments according to the discrepancies of the company.

The MOH Supervisors provide necessary support and guidance to ensure contracted catering company supervisors and workers are able to do their job. In addition, they are even responsible as the MOH representatives to understand the international regulations and the Contract so that they can be responsible for the overall food safety and hygiene in all the state hospitals.

In conclusion, the insight into the KSA MOH Supervisors' knowledge and practices has highlighted various training needs, that have been categorised as urgent and enhanced training, regular (important, but not extremely urgent) and targeted (for individuals or small groups).

The training should be related to skills and practices, knowledge and awareness, attitudes towards hygiene and food safety, as well as team work and communication channels in the work place. To sum up the section on the MOH supervisors, there is a need for further training among this group of staff since overall they exhibit gaps in their understanding of food safety and hygiene related issues.

The supervisors should actually be the champions of food hygiene, act as role models and monitor compliance as their primary job role. Regular training (required but not urgent) is needed where there is a divided understanding among the MOH supervisors, either among the hospitals or among supervisors within the same hospital.

The purpose of this study was to critically analyse food safety and hygiene in seven state hospitals in Riyadh, Kingdom of Saudi Arabia so as to establish the knowledge, behaviour and attitudes of Ministry of Health Hospital supervisors, contracted catering supervisors and contracted catering workers engaged in these hospitals. Surveys were conducted with 242 staff with the aim of answering several research questions:

1. Effectiveness of the staff food hygiene-training programme, and general food services in Saudi public hospitals and the methods to improve them.
2. Attitudes towards food hygiene, knowledge and behaviour of the staff and supervisors of the Saudi hospital kitchens.
3. HACCP implementation in Saudi state hospital catering services in Riyadh.
4. HACCP implementation and the related legislation in five large NHS Trust hospitals in England.
5. The differences between food safety regulations in Saudi state hospitals in Riyadh and the representative UK NHS Trusts, and how can this situation be improved in Saudi Arabia?

To answer the above questions, the research was conducted in Saudi Arabia and England. Selected state hospitals in Riyadh were surveyed across three levels: MOH Supervisors, Contracted Catering Supervisors and Contracted Workers. As for England's hospitals, Food Safety Policies in five English NHS Trust hospitals were analysed and compared in order to identify best practice which would then inform the outline of a new Food Safety and Hygiene Policy for Saudi hospitals. Once developed, this policy was then forwarded to the Saudi community of practice, a group of experts in food safety. After obtaining their feedback, and in accordance to the Saudi field analysis and findings, a new Food Safety and Hygiene Policy for Saudi state (MOH) hospitals was written and proposed in order to enhance the food safety and hygiene practices in the above mentioned hospitals.

Regarding the first research question related to the staff food hygiene-training programme, general food services in Saudi public hospitals and the methods to improve them, the study found different results for the three cohorts of employees: MOH supervisors, contracted catering supervisors and contracted catering workers.

As for the food hygiene-training programme for catering supervisors, it can be concluded that the training is not mandatory. In the Contract (CITATION), the Government requires the hospitals to have at least one Bachelor in Food Safety who will have a training in HACCP or ISO 22000. Most of the contracted catering supervisors do not have the training certificates. Clearly there is a lot of space for improvement in terms of food safety and hygiene training for contracted catering supervisors.

The methods to improve this situation include:

- Face-to-face training on the HACCP implementation in general complemented with the innovative e-learning technologies (e.g. mobile learning applications).
- Monitoring, recording and reporting the information about the training;
- Closer collaboration between the contracted catering supervisors and MOH supervisors;
- Adopting good practice of England's NHS Trust hospitals and continuously measuring organisational culture against food safety and hygiene to facilitate continuous quality improvement.

Standardised measuring criteria will enable a company to compare and manage specific areas of production and adjust approaches accordingly to help improve services. This will be useful for training as it should be related to specific data. Next, in order to ensure greater connectedness among the

supervisors and catering workers, it is recommended that the line managers and supervisor participate in the training sessions as trainers. 'Food Safety Culture Excellence assessment' is a good example that will allow the hospitals more comprehensive control over training. This framework, as a point of reference, will stop the discrepancies identified in this research on Saudi hospital food safety and hygiene.

The benefits of the improved training will be manifold and will be felt across the board. The patients, staff and visitors, including the medical students, will be happier to know their food is safe. The catering workers will have a role model to follow and it is expected that communication channels with better educated and well-trained supervisors will improve. This will largely be due to an increased level of trust and connectedness.

The same is true for MOH supervisors. However, they have more responsibilities for the state hospitals and are officially responsible for food safety and hygiene issues to the Ministry of Health. In addition, they need to be more familiar with the contract and HACCP, international regulations and other hospitals, not just the one they monitor. Their training, therefore, needs to be at the highest level. It is recommended that they participate as trainers in employee training as this will help enhance team bonding. It may also have the additional benefit of improving respect among colleagues as a result of everybody working together. The catering workers will benefit from being provided with theoretical context to the decisions that impact on their daily practice. Such sessions can also be adapted to fit their specific training needs.

It is also essential that the MOH supervisors provide every possible support and guidance to catering supervisors, such as reassuring them that training is an essential component of work and therefore it is acceptable and necessary for catering workers to be paid for attending such sessions. This will ensure long-term compliance with HACCP and Contract compliance

which in turn will benefit the quality of service received by end-users and patients.

The study has shown that the KSA MOH Supervisors' knowledge and practices need to be developed. Their training needs can be divided into the following categories: urgent training, regular but not extremely urgent training, individual or small group targeted training. The following areas for MOH supervisors' training have been identified: a) practices and skills proficiency, b) theory and understanding, c) mind-sets and views on food safety and hygiene, d) working with others and work-related communication. Overall, in terms of training for MOH, it should mainly be standardised across the hospitals, but where necessary individual and small group training addressing attitudes, team work and communication channels at work is also required.

To conclude, the effectiveness of the general food services in Saudi public hospitals can be improved at all three levels of the surveyed cohort. This enhancement will mainly depend on the training which has to be the priority within both MOH and contracted catering companies.

In order to establish the most appropriate training solution in the current Saudi context, food safety and hygiene need to become part of the organisational culture – at all times and everywhere; the managers and supervisors should be directly involved in training as practising trainers, and measuring the culture within the hospitals will enhance food safety and hygiene across the organisation, not only in the kitchen ward.

The study identified several parameters to monitor in terms of organisational culture improvement:

1) Strength of multidirectional communication, in particular in terms of a) training needs monitoring, b) policy revision and consultations with patients, workers and other staff, c)

consultations with the Headquarters of Public Administration of Nutrition of MOH, d) obtaining and implementing the latest international regulations about food safety and hygiene.

2) Innovation in terms of resources, change in attitudes and behaviour, connectedness, processes and services.
3) Agile leadership that seeks regular feedback across the departments or wards and acts upon the identified needs.
4) Wellness, in terms of the physical and mental health of staff, and raising awareness of food safety and hygiene across the organisation.
5) The working environment, such as cleanliness, humidity, and light, can impact staff performance and attitudes to work, as well as food safety and hygiene.

The other parameters that can be used to measure organisational culture are collaboration, company support, performance focus, responsibility, and finally, mission and vision alignment.

The above qualities will identify the organisational personality and will demonstrate to what extent the organisation works for the employees. However, the state hospitals in Saudi Arabia need to work on the priorities first, only to develop the organisational culture further in the second stage of refinement.

The MOH could help improve food safety and hygiene culture by moving from a role-based organisational culture to a task-based culture. In other words, job title or role currently defines the level of authority, power and access to resources in Saudi state hospitals as role-based cultures have a top-down decision-making process. This results in disengagement of unmotivated employees.

On the other hand, moving to a task-based culture will support problem solving, encourage team-based approach to resolving issues, and prioritise talent development. Group instead of individual supervisor accomplishments create a sense of a united organisational culture. Therefore, enabling each person to deliver their responsibilities, and raising awareness of how their individual behaviour affects other stakeholders will bring a major improvement in the organisation, such as Saudi state hospitals. However, it is important to accept that the changes in working cannot happen overnight and long-term vision need to be established for this shift.

In conclusion, the insight into the KSA MOH supervisors' knowledge and practices has highlighted various training needs, that have been categorised as urgent and enhanced training, regular (important, but not extremely urgent) and targeted (for individuals or small groups). The training should be related to skills and practices, knowledge and awareness, attitudes towards hygiene and food safety, as well as team work and communication channels in the work place. There is a need for further training among this group since overall they exhibit gaps in their understanding of food safety and hygiene related issues. The supervisors should actually be the champions of food hygiene, act as role models and monitor compliance as their primary job role. Regular training (required but not urgent) is needed where there is a divided understanding among the MOH supervisors, either among the hospitals or among supervisors within the same hospital.

The second research question was related to Saudi staff's and supervisors' attitudes towards food hygiene, knowledge and behaviour in the state hospital kitchens. Employees' attitudes, behaviours and life-long learning orientation definitely affect food safety and hygiene in hospital kitchens in particular. This research has shown that the appropriate training can improve the situation, and not only the training related to knowledge of the

subject matter, but also effective communication skills, life-long learning, leadership and team work.

It was concluded that the most appropriate method of the delivery will be group sessions for the subject matter, discussions and forums to improve the attitudes and online learning for revision. In addition, some other support could be offered, such as language support and computer skills support. Moreover, the managers and contracted company supervisors should participate in training both as learners in their specific groups, and catering workers' trainers, which will altogether lead to an enhanced mutual understanding, improved rapport and team work. Furthermore, such behaviours and practices will ensure increased mutual respect and clearer communication channels for more effective multidirectional information exchange. Similar to other studies, this one has also shown that attitudes were malformed based on the irregular reactions and behaviour, as well as a lack of training.

Regarding HACCAP implementation in Saudi state hospital services, discussed in research question three, this study has confirmed that HACCP has been introduced by MOH to hospitals as a very large document translated into Arabic, official language of Saudi Arabia. However, due to its size, it is difficult to implement it without breaking it into small-size working documents and policies. In addition, different roles and responsibilities will require different levels of in-depth or basic knowledge, which need to be passed on to the workers through training activities and tested in various ways that suit the employees. Furthermore, the pre-requisite programmes should be more specific, focussing on the clearly described points, proactive activities, monitoring, remedial activities and recording.

As for the comparative analysis of the HACCP implementation and the related legislation in five large NHS Trust hospitals in England, it was

conducted to identify the best practices and implement them in Saudi state hospitals. It can be concluded that these hospitals have moved far from the initial stages, and that at the moment they have their food safety and hygiene policies, based on the same regulations. Nevertheless, some of the hospitals have more specific and user friendly policies. In other words, there is a need for more standardised policies, and some hospitals can learn more from the others, although their characteristics may differ. It is certain that these hospital policies and practices can serve as a model to Saudi hospital food safety and hygiene activities.

Comparative analysis of food safety and hygiene regulations in Saudi Arabia and England state hospitals has established that there is not much difference in the core regulations, such as HACCP. However, UK NHS Trust hospitals have the related policies which may be further broken down (for instance, Training policy), and in order to improve the clarity and transparency, the key Food Safety Policy then makes cross-reference to other more detailed and specific policies and regulations.

In Saudi Arabia the situation is much behind that of England's, and there are only large regulations such as HACCP translated into Arabic, but not broken down to small-size units that the related roles can focus on. Therefore, there is a lack of clarity and transparency when it comes to implementation, in particular in relation to the catering workers, but also catering supervisors. This means that the Saudi MOH can learn a lot from England's NHS hospitals, not only in terms of the subject knowledge, but training and implementation methodology. The best practice of England's surveyed hospitals were summarised and in agreement with the established needs of Saudi state hospitals, the proposed Food Safety and Hygiene Policy for Saudi state hospitals was sent to and discussed by the Saudi community of practice comprising of the experts in food safety field.

On the other hand, this research has been beneficial to England's NHS Trust hospitals in terms of identifying the need for a greater standardisation of the NHS Food Safety and Hygiene policies

Chapter 8 : Food Safety and Hygiene Management Model Policy for Saudi State Hospitals

8.1. Introduction to the Policy

According to the Food and Agriculture Organisation (FAO) of the United Nations and Regulation (EC) No. 852/2004 of the European Parliament and of the Council on the Hygiene of Foodstuffs (2004) (FAO, 2018a), businesses involving operations with foodstuffs must follow the regulation to all phases of producing, processing, transportation and food delivery, which includes imported food (without any exemption) to food hygiene related requirements. Businesses involving operations with foodstuffs, in this case MOH state hospitals, have primary responsibility for food safety and hygiene. Therefore, the hospital must ensure a completely safe food chain, including raw food supply, and on - and off - site food preparation. Good hygiene practice should be reinforced by the general implementation of HACCP (FDA, 2014) and risk assessment. The minimum quality of any imported foods and their hygiene must be at least equivalent to the hygiene standards of the food produced in the country of origin (e.g. Brazil, France, USA, and Spain). In such cases the Saudi Consular Department legalizes the Certificate of Origin and the actual country must be specified (not just EC countries). On the reverse, the following statement should appear:

"We hereby declare that the mentioned merchandise/foodstuff is being exported to Saudi Arabia on our own account. The goods are of pure national origin of ... [name of country or countries]. We certify that the goods are manufactured by ... [manufacturer]." (KSA, 2017).

The following form is the model policy which will be used by different Saudi state hospitals where gaps are left for each hospital to complete specific details, such as name, location, capacity and similar. This means that although the policy is overarching with similar applications across state hospitals, the documents will also be made specific by the inclusion of

individual hospital details, which will allow some changes specific to the hospital, based on their size, number of patients, current conditions and similar. In this way the issues they face will be addressed more efficiently.

The original final draft of the Policy was sent for refinement to four members of a 'community of practice' in Saudi Arabia. Three members replied. Communities of practice, according to (Wenger & Trayner, 2015) ,consist of three core components: 1) domain - an identifiable, shared interest to which they are committed as part of their competence, although not necessarily expertise; 2) practice - members must be serious practitioners prepared to share their experiences and knowledge 3) community – members must meet regularly in order to share and learn from each other and develop their profession. The community of practice members in Saudi Arabia advised me to expand on the following points in the Policy:
Improve the section on Waste; add the regulation on Baby food formula; make references to other relevant policies in order to be concise; to add the precise roles of the leaders and managers responsible for food safety and hygiene in Saudi hospitals. The following Policy is the revised final version based on these recommendations.

8.2. Size of the individual hospital

Hospital_____(name) is located in _____(city/town/village). It was established in _____(year). Initially it had the following wards: _____,_____,_____; now the hospital has the same capacity/ has increased its capacity by adding the following wards: _____,_____. The hospital has approximately _____employees. (The details of numbers of medical practitioners and catering staff if possible should be added). It has_____(add the number) beds, and receives approximately _____(add the number) patients per year/month. The number of

visitors (including/excluding medical students on study practice _____/number if known). Monthly, approximately_____(add the number) meals are prepared in the hospital, and annually approximately, _____ (add the number) meals are made.

8.3. Scope of the Policy

The policy applies to all **MOH and contracted** employees engaged directly or indirectly in food-related activities. It applies to full/part-time contracts, Supervisors and Managers, patients, any visitors and medical students on study practice. The policy aim is to protect all the aforementioned parties from foodborne diseases, and chemical food contamination due to physical contact or cross-contamination.

8.4. Approval and revision period

The food safety and hygiene management policy for _____(hospital name) is specific to this hospital but will be aligned with other state hospitals in the Kingdom of Saudi Arabia. This policy will be reviewed a minimum of every two years in order to adapt to changes in the operational environment (such as new or updated legislation, etc). The policy will be approved and signed by:

- MOH General Supervisor of Public Administration of Nutrition,
- Head of the MOH Food Safety Department,
- Ministry of Health/Regional Health Affairs, Nutrition Administration Department,
- Hospital Director.

The latest version of the policy has introduced the following section headings and amendments_____,_____,_____.
Hospital staff are responsible to follow the most-updated policy version.

8.5. Assessments and consultations involved

According to Saudi Food and Drug Authority - SFDA (2017), it is mandatory for anyone involved in food (goods), premises and services to people, not to discriminate, unless the food is nationally prohibited, such as alcoholic liquors, pork articles, pigskin and any other products which are against the Kingdom of Saudi Arabia religious Islamic practices - food must be 'halal' (Wenger & Trayner, 2015).

Furthermore, according to _____ (the title of the document, such as and (Ministry of Health Kingdom of Saudi Arabia, 2018)
It is mandatory for hospitals to minimize inequality related to patients; therefore, hospitals must have several consultations with professional bodies and the relevant specialists, as well as patient feedback obtained through patient surveys, before the Food Safety and Hygiene Policy is introduced and this process will review any documented reports before putting any recommendations into practice.

8.6. Aims and Roles with Responsibilities

The main goal of Saudi state hospital catering is to provide safe and protected food to patients, staff and visitors. The hospitals' work is regulated by the following legislation: HACCP According to (FDA, 2014), (*Food safety management systems — requirements for any organization in the food chain*) The Food and Drug Authority (2004), (Ministry of Health Kingdom of Saudi Arabia, 2018)Also, the MOH implements the highest principles and

benchmarks as determined in (Ministry of Health Kingdom of Saudi Arabia, 2018) the policy, therefore, applies to all the employees, including the contracted workers, who have contact with food or are engaged in food-related activities, full and part-time employees, relevant Managers and Supervisors, patients and all the visitors including students on premises.

8.7. Roles

The Policy aims to determine the individuals and teams responsible for implementation of the policy, as listed in the table below (Figure 8. 1) and explained thereafter.

Summary of individual and group roles and responsibilities in Saudi state hospitals.

Table 8-1 Summary of Individual and Group Roles and Responsibilities in Saudi State Hospitals

Summary of Individual and Group Roles and Responsibilities in Saudi State Hospitals
STATE LEVEL
MOH General Supervisor of Public Administration of Nutrition Head and Senior Supervisors of the MOH Food Safety Department
REGIONAL LEVEL
Regional Health Affairs – Nutrition Administration Department New role proposed for the future revision: Nutrition and Food Safety Director
HOSPITAL LEVEL

Hospital Director
Health and Safety Committee and Chairman of the Health and Safety Committee
Head of Clinical Services
MOH Supervisors
Contracted Company Supervisors
Nutrition and Food Safety Lead
Food Handlers

8.7.1. MOH General Supervisor of Public Administration of Nutrition

The person occupying this role is _____ and he/she has the ultimate responsibility for the administration of nutrition in all the state hospitals in KSA. This Policy will confirm their current role and responsibilities biannually after its latest publication.

8.7.2. Head of the MOH Food Safety Department

Head of the MOH Food Safety Department reports to the MOH General Supervisor of Public Administration of Nutrition. The person occupying this role is _____and he/she has the ultimate responsibility for the monitoring of the food safety operational activities in all the state hospitals in KSA. Their role is to organize the audits across the state hospitals in KSA and to monitor the production of the MOH reports with clear action points for each hospital being audited. They will also monitor the hospital food safety developmental plan. The Head coordinates the work of the Senior MOH Food Safety Supervisors in the MOH Food Safety Department. The Policy will confirm their current role and responsibilities.

8.7.3. Ministry of Health/ Regional Health Affaires – Nutrition Administration Department

The Ministry of Health/ Regional Health Affaires – Nutrition Administration Department for the _____ (Region; e.g. Riyadh) state hospitals is ultimately responsible for all the food safety and hygiene activities in all the regional hospitals.

8.7.4. Hospital Director

_____ (Director's full name) is Director of _____ E.g. KFMC) Hospital, for the period of _____ (number of years) years, between _____ (years e.g. 2018-2019). The Director is in charge of all the food safety and hygiene activities in the Hospital and will be using this Policy for the specified two-year period from the date stated in the policy and additional three months during which the Policy revision will be completed.

8.7.5. Head of Clinical Services

_____ (name of the Head of Clinical Services) is in charge of the clinical doctors, head nurse and dietitians. The Head will ensure that the staff under his/her supervision are familiar with the policy and that they respect it in their daily activities. The policy will confirm the Head's name and current role every two years with the maximum cushion period of three months after the expiry deadline.

8.7.6. MOH Supervisors for Nutrition and Food Services

MOH Supervisors have the higher responsibility than Contracted Company Supervisors and the former will monitor and organise regular weekly meetings with the latter. MOH Supervisors are ultimately responsible for any failures due to the contracted workers if they did not demonstrably monitor and manage the Contracted Supervisors adequately. An exception would be if the workers intentionally did not comply with operational policy and practice.

MOH Supervisors will have the additional responsibility for other MOH workers involved in food-related operations and activities in the hospital,

such as food handlers. The MOH Supervisors are also ultimately in charge of the documented training needs and compliance for the MOH food handlers, and for ensuring that the Contracted workers have completed the appropriate food safety and hygiene training (e.g. by checking their certificates or advising on the relevant training if necessary).
Both MOH Supervisors and Contracted Company Supervisors must have well-organised, frequent (e.g. daily) and transparent channels of communication with their workers. They must assess the risks on a daily basis, both individually and as teams (e.g. in the briefings), by applying forward thinking, proactive strategies to prevent any food safety and hygiene related failures and incidents. Their performance rate must be monitored and evaluated for each month of the year.

8.7.7. Contracted Company Supervisors

Contracted catering company's name _____is in charge of the catering activities and food supply for _____ (hospital name). The catering company Headquarters is in _____/place.

Contracted Company Supervisors should report to the MOH Supervisors. Their role is to supervise the work and manage the training needs of the contracted workers. Regarding the food safety processes, Contracted Company Supervisors are responsible for each step of the process - from the food source, transportation and receipt of raw food materials, food preparation and delivery for patient consumption. They will report activity and performance to the MOH Supervisors.

8.7.8. Food Handlers

Food handlers are recruited by the contracted company as contracted caterers. They are responsible for ensuring the total food safety and hygiene in their area of work, which has to be clearly defined. This policy is a zero-tolerance policy, which means it does not accept any personal excuse for non-compliance. Compliance will be reinforced by documented training. Each food handler is responsible for their activities and they must report regularly to their superiors, as a group on a daily basis, and individually as they deem necessary. At the same time, the Supervisors are ultimately responsible in case of the food handler's failure. Therefore, it is the Supervisor's role to encourage the food handlers to report to them via a structured document on a daily basis even when everything seems to be regular. For instance, this can be done by using the individual checklists after the first hour and at the end of the shift, for which a time of up to 10 minutes must be allocated.

This will raise any concerns related to food safety and hygiene for each day. In addition, any urgent matters must be immediately reported to the MOH Supervisor directly or through the Contracted Company Supervisor in case of contracted workers.

8.7.9. Chain of Responsibility and the Proposed New Roles

It is important for each hospital to have a transparent chain of responsibility. The flow chart below summarizes information inputs from stakeholders and reporting up

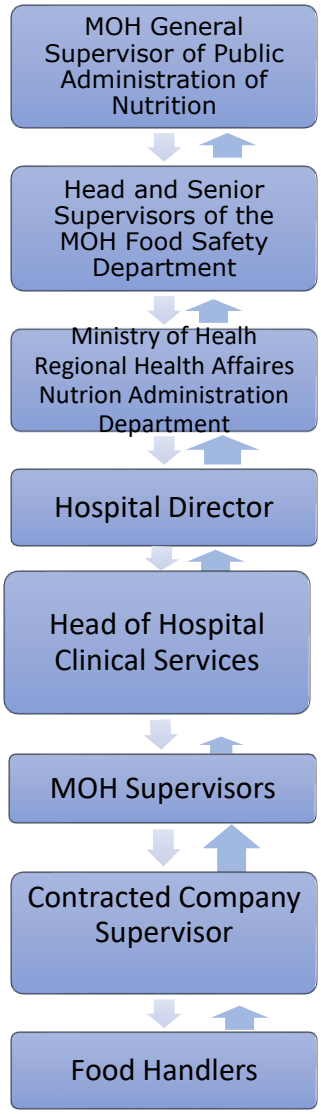


Figure 8-1 CHAIN OF RESPONSIBILITY

8.7.10. Proposed New Roles

The Policy proposes that three new roles at regional and hospital levels should be considered during the period of two years. They are as follows:
At the regional level, under the MOH Regional Health Affairs – Nutrition Administration Department, the role of Food Safety Director could be introduced so that the point of reporting is transparent to the hospital Directors and MOH Supervisors from the region, as well as any other stakeholders, such as patients or clinicians. This role could belong to the Head of the MOH Regional Health Affaires – Nutrition Administration Department or an internal senior employee appointed by the Head of the MOH Regional Health Affairs – Nutrition Administration Department.

At the hospital level, the following two roles could be considered:

General Health and Safety Committee with Chair Person

General Health and Safety Committee will be an advisory body that will contribute to overseeing the following:
- Staff, patients and visitors' health and safety (such as patient falls)
- Facilities health and safety
    - Risk and hazard assessment
    - Manual handling policy
    - Environmental and general safety and security (including fire Safety)

Promotion of health and preventative activities
The Committee will design a programme of work so as to monitor the health and safety standards and compliance. The Committee will have a Chair Person and will report to the Hospital Director.

Nutrition and Food Safety Lead

Nutrition and Food Safety Lead is an advisory role and this person will support the MOH Supervisors and catering teams in terms of monitoring, investigating and assistance in resolving food safety issues. They will also be a member of the General Health and Safety Committee.

8.8. Processes:

A) Processes involved in the Hospital Food Safety and Hygiene Policy include the following:
6.1 Food management
6.2 Kitchen equipment operation and maintenance
6.3 Waste
6.4 Personnel
6.5 Environmental health
6.6 Investigation of complaints
6.7 Routine inspections and hazard warning

B) Roles and departments responsible for the processes are as follows:
Hospital Director: ultimate responsibility for the hospital; report to MOH Regional Health Affairs; writes regular monthly reports and submits the self-assessment report detailing what the hospital is good at and what remains to be achieved including the action plan, roles in charge of individual action points, resources and deadlines. Regional Health Affairs Officers visit the hospital to check if the action plan has been followed, what needs to be improved and by when.

MOH Supervisors: ***Personnel including contracted supervisors.***

Contracted Company Supervisors: kitchen equipment; waste;

MOH Hospital Clinical Service Department Head and Clinical Staff: is in charge of the clinical doctors, head nurse and dietitians.

Head of the Kitchen Department: Food management;

Food Safety Supervisor: Routine inspection and hazard warning;

MOH Food Service Department Officers based in the Hospital Kitchen Department: environmental health

8.9. Food management

Food management includes the following:

A) management of food production; B) premises (pest control; kitchens; staff facilities; cleaning conditions, procedures and the related supervision; restricted access); C) purchasing (contracted and local suppliers, points of control and delivery); D) storage, preparation, temperature control; food stuffs brought into the hospital premises; menus.

8.9.1. Management of food production

According to Hazard Analysis of Control Points (HACCP), food production must be continuously managed and controlled. The MOH applies HACCP to kitchen operations. At the moment, the hospital kitchen is on site, inside the hospital premises and it is run by the contracted company _____ (*insert the name of the company*). The contracted supervisor is in direct charge of food production and any health and safety risks and hazards within the kitchen; they must report to the MOH supervisors on a daily basis. The ultimate responsibility within the hospital lies with Hospital Director who should be in regular communication with the

MOH. In case of any urgent issues the Director shall communicate the problem to the MOH Regional Health Affairs and write a report to them. They will then take the adequate action. In general, each month the MOH supervisors write a food safety and hygiene report, approved and signed by the hospital director; this report must be submitted to the MOH Regional Health Affairs and sent to the MOH General Public Administration.

Note: In the next Policy revision, it should be clarified if the MOH has centralized the hospital kitchen services as well as detailed how the centralized hospital kitchen will be run, including specified responsibilities.

8.10. Premises

Premises involve the control and monitoring of:

- Pest Control
- Kitchens
- Staff Facilities
- Cleaning conditions, procedures and the related supervision
- Restricted Access to Premises.

8.11. Pest control

Kitchens must be pest proof and food debris must be removed after each food production service to deter infestations. If there is identifiable evidence of pests, this must be reported to the Facilities Department. Remedial Action must be carried out by a contracted pest control company.

There must be accurate and up to date records of contractor visits which must include the following:

- Results of the first survey
- Any work carried out as a result of the visit/ survey
- The areas subject to infestation and the type of pests involved. This should include specific reference to any high risk or vulnerable areas.
- Details of the pesticides used and any treatment.
- Details of recommendations made by contractor upon each visit and what action has been undertaken.
- Emergency visit details.
- The name of the contractor's staff who treated the premises as well as the name of the supervisor.

8.12. Kitchens

There are three types of kitchens: main production or regenerated kitchens, staff kitchens, and ward kitchens. Their good design and layout is essential. It is essential for all types of kitchen to provide adequate hand – washing facilities; also, the floors and walls should have smooth, impervious surfaces to allow easy cleaning. Furthermore, equipment such as tables, ovens and refrigerators should be easily moveable and positioned so that they can be cleaned along with surrounding areas.

8.13. Staff Facilities

All catering staff must use onsite toileting and changing facilities which are provided by the hospital. The hospital is legally required to ensure that both sexes are separated in situations where there are more than five staff employed. The area should not directly connect onto a food room. This area should be well lit, ventilated and be capable of being disinfected and washed down. Dedicated staff should be employed to do this. Protective

clothing and waste should be put into lidded bins. Personal lockers should be provided for each individual staff member.

8.14. Cleaning conditions, procedures and the related supervision

There is a requirement for kitchens to have a cleaning schedule. Responsibilities for cleaning and the frequency of cleaning would be arranged at a local level.

It is important that the correct and appropriate cleaning method is specified and understood by the catering staff responsible for undertaking the task. The time schedule must be respected, and correct products must be used to carry out specific jobs. This information should be summarized on a cleaning schedule. The cleaning schedule itself should provide a clear set of standards and have clear check lists which would enable the kitchen supervisor to monitor hygiene standards and ensure that they are maintained (Nottingham University NHS, 2017).

The check lists should include:

- Using the recommended product
- Ensuring the correct product is used for the correct job
- Not to mix cleaning products
- Cleaning up spillages
- Effective staff training- only specially trained staff should clean and sanitize within a kitchen. Regular training should be given in cases of high staff turnover
- Correct storage – a cupboard or separate room should be used for the storage of cleaning chemicals

8.14.1. Cleaning procedures

Cleaning procedures are related to schedule cleaning activities (timetable), which clearly identify the areas and the frequency of cleaning, as well as the equipment that has to be cleaned. Personnel involved in cleaning must be identified and trained. They should also keep transparent records of cleaning activities displayed on the designated noticeboard, doors or walls.

8.14.2. Cleaning Monitoring

Cleaning process must be monitored. This operation involves the following activities:

- Review and completion of the cleaning schedules
- Review and update of COSHH and staff learning records
- Visual checks of personal, equipment and storage areas must be undertaken by the Head Cook, Manager or Catering Supervisor
- This information should all be included in a book signed by the contractor and MOH Supervisor

8.14.3. Cleaning and sterilising feeding equipment

Powdered infant formula is not a sterile product and may be contaminated with pathogens that can cause serious illness. Correct preparation and handling reduces the risk of illness. See appendix B for full instructions (University of Southampton NHS Trust, 2015).

8.15. Restricted Access to Premises

This information relates to the main hospital kitchen which is responsible for the preparation and service of patient meals.

In the interest of safety, no access is to be given to hospital patients. Nursing staff should have limited or no access depending on the size of the hospital. The hospital kitchen should not be used as thoroughfare by staff.

All catering staff will have unlimited access to any area within the department, however all food safety protocols must be adhered to upon leaving and re-entering the kitchen after a lunch break, visiting the toilet or after vising any patient area. Protective clothing uniform must be worn by all staff at all times within kitchen area. Personal visits must be discouraged.

Porters, main maintenance staff and other staff who have access to the kitchen are restricted as arranged locally and as arranged by catering/ housekeeping staff and / or supervisor. All staff must ensure that hands have been thoroughly washed before meal containers are handled. Protective clothing uniform must be worn.

Visitors are required to report to the hospital reception/ office. Protective clothing must be worn beyond the kitchen entrance / office area. Visitors must be accompanied at all times by a member of the catering staff.

Tradesmen who carry out maintenance work within the kitchen must use the rear entrance of the department before reporting at the office or the duty kitchen supervisor. A maintenance record from is required to be dedicated to the catering department.

8.16. Purchasing

- Contracted and Local Suppliers, and
- Control Points and Delivery

Contracted catering suppliers working within the MOH are contracted nationally and must meet specific quality standards. All catering must ensure that recommended food and equipment suppliers are used before considering any other. This ensures that the MOH will be adequately insured if there is an unlikely event of a food related incident.

8.16.1. Local Suppliers

Alternative suppliers must be authorized and approved by MOH General Supervisor of Public Administration of Nutrition if any foodstuff is not available. This is to be done before an order is submitted.

8.16.2. Control Points and Delivery

Food must be bought from reliable sources as stated above. Checks are required on food deliveries against orders placed. If there are any problems with the following, the items have to be rejected:

- Check purchased food dates adequate shelf-life
- Damaged packaging or dented cans should be returned, as well as cracked eggs or improperly packed fresh food, such as meat
- Chilled and frozen food must be kept under the prescribed and detailed conditions for such items
- The suppliers must guarantee that these conditions are met at the point the purchased food items leave their storage for transportation, and the Nutrition and Food Service Department staff will repeat the control at the moment of the bulk delivery to the hospital

- Before these items are actually prepared and used, they must be checked again so as to ensure patients' safety

8.17. Storage, Preparation, Temperature Control; Food Stuffs Brought Into the Hospital Premises; Menus

8.17.1. Storage

It is important to note that at the point of storage food stock needs to be rotated, which involves pulling forward the actual stock before adding the new supply. This means that the current supplies should not go out of date because the newly purchased items are being used immediately. Partly utilized food with opened packaging must have clearly displayed labels with the "use by" date (Northamptonshire Healthcare NHS Foundation Trust, 2017).

8.17.2. Preparation

Due diligence controls must be adopted during the preparation of food. For instance, a special hand-wash basin is provided for food handlers, and separate colour-coded preparation boards should be used for raw and cooked items, as well as for meat (red), vegetables (green) and other clean items, such as bread (white). Wooden utensils such as spoons or chopping boards should not be used in the kitchen as the plastic ones can be sanitized more efficiently.

8.17.3. Temperature Control

Records of operating temperatures must be maintained. Staff must record food temperatures at each critical stage of food production and temperature

control of the stored foods must be recorded before it leaves the kitchen. This is to maintain high food safety standards. Also, temperature control of stored food must be maintained. Records must be filed and kept.

8.17.4. Food Stuffs Brought into the Hospital Premises

There must be full awareness by hospital staff of the consequences and risks of accepting food items for clients. Staff should be made aware of the potential harm to patients with special dietary needs and the consequences of reputational damage to the hospital and operational divisions.

8.17.5. Menus

All patient menus will encourage the five a day fruit and vegetable principle and will be produced based on the Better Hospital Food guidance. Menus will have breakfast, lunch and evening meals. Evening super should also be available and produced within the wards. Outside meal times, additional beverages should also be available.

Menus and the menu cycles are to be reviewed by the Head of Facilities who would liaise with customers and clinical/ non-clinical staff.

Special diets, cultural and ethnic requirements should also be optional within the menu. The menus are made available in different sized prints and different languages.

8.18. Kitchen Equipment

Kitchen equipment use and cleaning including microwaves, wash-ups, dishwasher, cooker and fridge/ freezer for adequate hygiene control:

Regardless of whether the staff use the kitchen equipment or not, all the staff employed in the kitchen must have an awareness of the equipment use and cleaning procedures.

All the staff responsible for cleaning must respect the cleaning timetable and roles for the kitchen.
Only approved cleaning chemicals will be purchased from the designated suppliers approved by the MOH in accordance to their standards. Clear and accurate storage and use instructions must be present with each chemical product and where it is normally kept.

Staff must wear only the provided approved protective uniforms/clothing, in accordance with the MOH standards.

Staff must use only the approved and provided cleaning tools.
Storage of the approved cleaning equipment and chemicals must be according to the provided instructions and that these must be distinctly separate from the food storage and cooking areas.

Equipment used for preparation of raw and cooked food, such as cutting boards and knives, should be colour-coded or marked otherwise.

Large utensils must be washed in a dishwasher at the minimum temperature of 82^{o}C.

Kitchen staff must be assigned clear cleaning job roles to which they must adhere. It is important that the kitchen equipment is checked and serviced officially by a qualified engineer. It is the responsibility of each member of kitchen staff to report any issues to the Contracted Company Supervisor who will then inform the MOH Supervisor about the problem. The Contracted Company Supervisor will then be asked to engage the Company’s engineering services provider to fix the problem. In case of the

absence of the MOH Supervisor (e.g. due to illness) the problem should be reported to the Hospital Director.

Microwaves, cookers and fridge/freezers should be used as advised in the manufacturers' manuals. These manuals must always be visible in the kitchen.

Wash-up: all the equipment that generally requires washing must be cleaned with the approved chemicals, such as detergents. Only clean water must be used for rinsing.

- **Cleanliness Monitoring involves the following:**
- Review and cleaning are performed according to the well-planned cleaning and review schedules;
- COSHH and staff cleaning records are regularly reviewed, updated and kept safely;
- Visual checks of personnel, equipment and storage areas must be undertaken by the Head Cook, Manager or Catering Supervisor;
- This information should all be included in a book signed by the contractor and designated management. Any further treatment should also be included as well as the use of ultra–violet fly killer equipment.
- Adequate cleaning equipment must be provided to all staff.
- Equipment and cleaning chemicals must be stored properly and away from preparation areas and food storage.

8.19. Waste

Hospital waste includes a) general waste, b) food waste and c) cooking oil waste. General waste and food waste are disposed of according to the MOH hospital waste policy. Regarding the cooking oil waste, the oil supplier must

remove it and provide waste transfer records. It is the role of the Contracted Company Supervisor to oversee this process (Ministry of Health Kingdom of Saudi Arabia, 2018).

General food waste also includes the food that patients bring for fridge/freezer storage in the hospital ward. It can be kept there for maximum one day, after which it must be treated as general waste (Lincolnshire NHS Trust, 2014). For this reason, such food staff should have labels with patients' details and the storage date.

In order to protect waste, lidded bins should be provided. It is the duty of the Kitchen Supervisor or Head Cook to ensure food waste is recorded and assessed correctly (Cumbria NHS Trust, 2017). Contaminated waste with pathogens that present a risk must be classified as hazardous with special instructions for carriage, and kept in a special container accessible only to experts. Before disposal, waste should be minimised, segregated and colour-coded for storage (GOV.UK, 2018).

8.20. Personnel responsibilities

Personal responsibilities include awareness and respect of the following: personal hygiene standards, medical screening, hand hygiene, protective clothing and first aid.

8.20.1. Personal Hygiene Standards

As part of the individual training plan, all staff must have training in personal hygiene standards. They must provide a personal health certificate every six months, as stated in MOH Contract Ministry of Health in Saudi Arabia, (2013).

8.20.2. Regular Medical Screening

In addition to the personal health certificate presented twice a year, if a food handler thinks they may have developed an illness that can affect other people they have a responsibility to report this to the cook in charge

and to the Contracted Company Supervisor. If food contamination is suspected, the Contracted Company Supervisor must report the case to the MOH Supervisor, who will immediately inform Hospital Director and the MOH Regional Health Affairs. They will decide on the action to take and inform the Contracted Company.

8.20.3. Personnel and Patients Hand Hygiene

According to Ministry of Health in Saudi Arabia, (2011), "Nutrition contract for Hospitals Catering", all food handlers must wash their hands routinely just before and after touching or transporting food.

Clinical staff are responsible for raising patient awareness of the mandatory hand cleaning/ washing before having food. They will display the posters and distribute leaflets and talk to the new patients, as well as monitor their adherence to the regulations. Also, they should monitor continuous access to the washing facilities and hygiene tissue provision, and make it clear to the patients that hand wash basins must not be used for any other purposes. In case of any issues with the facilities, clinical staff will inform the MOH Hospital Clinical Service Department that will contact the representatives of the Contracted Cleaning Company.

8.21. Protective Clothing

All staff must wear clean protective clothing (apron/ coat and cap, gloves and masque) before entering kitchen premises, especially if preparing or serving food and drinks, so as to avoid food poisoning by pathogens brought in on their clothes or body. When other tasks are performed the protective clothing must be changed. A cupboard with clean protective clothing ready for use and the baskets for the used protective items, must

be located close to the kitchen and it should be replenished and emptied regularly.

Protective clothing guideline must be present on or close to the cupboard and the catering staff must be formally introduced to the regulations by the Head of the Kitchen Department.

8.22. First Aid

Catering staff must have a well-stocked, first aid kit, visible and clearly labelled in the kitchen premises. Its location must be communicated to the new staff.

Staff must inform their supervisor each time they use any item from the first aid box. The supervisor will record the reason why the item has been used and if necessary inform the MOH Supervisor of the case.

8.23. Environmental Health

MOH Food Service Department Officers based in the Hospital Kitchen Department monitor environmental health in the following ways:

- Take records (e.g. photographs) of any food safety hazards;
- Determine if food premises are complying with food safety law;
- Check food premises, report and investigate any issues;
- Check food and equipment (e.g. freezer) temperature;
- Withdraw any food suspected of contamination;
- Warn of, and report, any possibility of legal consequences or closure of premises; (Ministry of Health Kingdom of Saudi Arabia, 2018)
- Request food sample analysis when necessary
- Oversee kitchen procedures

In case of any serious issues, MOH Food Service Department Officers based in the Hospital Kitchen Department, inform both Hospital Director and MOH

Regional Health Affairs Department that will investigate the problem and any complaints, and carry out a full inspection.

8.24. Investigation of complaints

In case of any complaints related to food safety and hygiene in the hospital, depending on the nature of complaints, the ultimate responsibility rests with the Hospital Director, whereas the direct responsibility is with the MOH and Contracted Company Supervisors. The Contracted Company Supervisor is responsible for overseeing the meal distribution and food quality as well as reporting any issues to the MOH Supervisor.

The nature of complaints can be as follows: food taste, smell or appearance as well as hygiene of the service.

The Contracted Company Supervisor will follow up any complaints related to the above-mentioned issues. They will conduct a full investigation and if necessary inform the MOH Supervisor. MOH Supervisor will then inform the Hospital Director in cases when the specialist analysis has to be conducted and will regularly take records of any food safety and hygiene issues which will be presented in a monthly report to the Regional Health Affairs Department and Hospital Director. Each month The Public Nutrition Administration receives all the reports monthly.

If problems escalate and cannot be resolved within the hospital bodies, they will be reported to the Regional Health Affairs Department and The Public Nutrition Administration to resolve the issue.

It is crucial that the patients and other food service users are promptly informed about the causes of the issue and how it was rectified.

8.25. Routine Inspections by Regional Health Affairs

Hospital has an agreement with the Regional Health Affairs Department to conduct routine inspections of the hospital food safety and hygiene policy implementation three times a year. These periodic visits may depend on the risk assessment presented by the Hospital Director and MOH Supervisors. In addition to the regular monthly reports, the Hospital Director must submit the self-assessment report detailing what the hospital is good at and what remains to be achieved including the action plan, roles in charge of individual action points, resources and deadlines. Self-reporting will be followed by the Regional Health Affairs Officers visits when they will check if the action plan has been followed, what else needs to be improved and by when.

The system and visits must be taken seriously and all the documents as well as working areas in the hospital must be available for an inspection during the visit, which will be performed together with the Contracted Company and MOH Supervisors.

The inspection must include the control of the following:
Staff hygiene; cleaning standards; air quality and ventilation; infestation measures; facilities conditions; lighting; temperature control (freezers, fridges and other related equipment); storage.

The Regional Health Affairs Department will provide the verbal feedback during the visit and written feedback will be sent to the Hospital Director and MOH Supervisor. The remedial actions must be followed and the outcomes of the related action points reported timely to the regional Health Affairs Department. Relevant staff must be informed timely and clearly in writing about the actions of interest to their roles.

8.26. Hazard Warnings

The Hospital Director, MOH and Contracted Company Supervisors must remain informed about various sources of food hazard warnings through different channels of communication, such as: attending specialist conferences and even publishing data from their own research; reading the relevant academic journals in the area, becoming a member of a special society.

It is the responsibility of the Head of Food Safety at the General Nutrition Department to ensure expedite communication of all food safety related matters. To reduce the risk of hazards, the Head of Food Safety is also responsible for reviewing policies and making them available. Also, they need to update the in-house training information and be able to request a specific training course on new regulatory sources (Trust, 2014).

8.27. Official trade withdrawal of the items used for food production or cleaning purposes.

In this case the producer is obliged to officially inform the Hospital Director, MOH and/ or Contracted Company Supervisor that a product must be withdrawn and why. The MOH Supervisor will then take records of the product withdrawal and inform the relevant staff about its replacement and evidence this in the monthly report.

8.28. Food hazard warning

Food hazard warning may be sent to the hospital by the Regional Health Affairs Department or the Ministry of Health due to the high risk of continued use of certain products or raw materials, which then requires the urgent withdrawal of the items and cessation of their use.

8.29. Emergency Audit Order

In case the Regional Health Affaires Officers identify immediate risks to health of the food service users and/or other hospital employees or visitors, during their regular audits, they should issue the emergency audit order whereby food preparation and delivery processes can be stopped or other operations and facilities may be closed down. This order must be presented in the written form, and it must be put in force.

8.30. Monitoring and reporting

Any member of staff must inform the more responsible colleague, such as a supervisor or manager about all risks and hazards of any type as soon as they spot them. This information must be dealt with immediately or as soon as possible. If the issue cannot be dealt with locally or in case of serious issues an urgent meeting with the Ministry of Health Regional Health Affairs Nutrition Administration Department must be arranged.

Every two months meetings will be convened to review any reported risks and the status of any investigation, from which the findings will be documented with any remedial actions undertaken. Annual Reports on Food Quality Management and Safety will be officially shared with the Health and Safety Committee. The records of the hazards are then officially passed on to the Head of Clinical Services and these will take any necessary action with the business units they work with. Individual responsibilities have been stated in the section on Roles and Responsibilities (Cumbria Partnership NHS Foundation, 2017).

The hospital must meet the national standards and the best practice as determined by MOH and other related agencies. The Chairman of Health and Safety must ensure that records set out in the Safety Manual are

complied with and that the records are up to date. Supervisor of Nutrition Department are responsible for ensuring that the actions planned are completed.

The aim of the food safety audit is to ensure that the preparation of food and meals is delivered in agreement with Food Safety Legislation.

8.31. Reporting Mechanism

Reporting mechanisms must be transparent and specific to each hospital. On the other hand, the food safety process will follow *ISO22000* (*Food safety management systems — requirements for any organization in the food chain*). This mechanism must be clear to all staff at all levels.
Any staff member, permanent or hired, is responsible for monitoring and reporting food safety issues.

Supervisor, Manager and / or Food Safety Champion will report any risk, hazard or incident to the most Senior Member of staff/ Role in that area (e.g. hospital ward unit).

The issue must be dealt within the unit. If this is not possible it will require an urgent meeting with the Ministry of Health Regional Health Affairs Nutrition Administration Department.

If an external agency contracted by the hospital is involved in the Food Safety Group then the most senior member of staff must be regularly updated on the progress of the solution.

The Group must take its own initiative to monitor the development of the issue and take any further action involving the MOH.

The employees and the patients will be made aware of any decisions agreed by the Group and the senior members of staff that directly affect them.

The Food Safety and Hygiene Management report shall be written at the end of the financial year by ---------- This will enable Leaders to address staff developmental needs and allocate financial resources accordingly. The report must be shared with all management and hospital staff as a newsletter to help promote best practice and awareness of key issues. This will also be available to patients on the ward notice board. When the Patient Partnership Group is introduced, they will be actively involved in future policies. Each policy will be followed by an annual policy effectiveness report with recommendations and justification for future improvements.

8.32. Mandatory Training, Implementation and Resources

Each employee who is directly or indirectly involved in food-related activities must show documented evidence of training in food safety and hygiene starting from Level 1 (Trust, 2014) onwards relevant to their duty in the hospital/company. The training will be recorded electronically as part of staff personal data by Human Resources Department. The Hospital MOH Supervisor _____ (full name) or the Committee_____ (title) will be in charge of organising and monitoring this part of staff training. They will either engage the suitably educated staff already employed by the hospital or a professional supplier of accredited HACCP & Food Hygiene Training that can issue valid certificates to the trained staff. For further details on staff training, the hospital will refer to the Policy on KSA MOH Hospital Staff Food Safety and Hygiene Training its Implementation, Resources and Monitoring.

They will also ensure that the Contracted Company Supervisors have the same evidence for the contracted staff. The training needs of the catering

and related staff will be monitored and identified at the end of the financial year by the same MOH Supervisor or committee, so that the funding can be reserved for the required training in the following year.

The hospital is required to provide the financial resources to provide training and to cover the cost of covering staff attending these sessions. If the contracted company provide training with MOH catering staff, the training will be free for staff, but the Company must provide the cover for the same during the hours they spend on training.

Chapter 9 : Conclusion

The purpose of this study was to critically analyse food safety and hygiene in seven state hospitals in Riyadh, Kingdom of Saudi Arabia so as to establish the knowledge, behaviour and attitudes of Ministry of Health Hospital supervisors, contracted catering supervisors and contracted catering workers engaged in these hospitals. Surveys were conducted with 242 staff with the aim of answering several research questions:

1. Effectiveness of the staff food hygiene-training programme, and general food services in Saudi public hospitals and the methods to improve them.
2. Attitudes towards food hygiene, knowledge and behaviour of the staff and supervisors of the Saudi hospital kitchens.
3. HACCP implementation in Saudi state hospital catering services in Riyadh.
4. HACCP implementation and the related legislation in five large NHS Trust hospitals in England.
5. The differences between food safety regulations in Saudi state hospitals in Riyadh and the representative UK NHS Trusts, and how can this situation be improved in Saudi Arabia?

To answer the above questions, the research was conducted in Saudi Arabia and England. Selected state hospitals in Riyadh were surveyed across three levels: MOH Supervisors, Contracted Catering Supervisors and Contracted Workers. As for England's hospitals, Food Safety Policies in five English NHS Trust hospitals were analysed and compared in order to identify best practice which would then inform the outline of a new Food Safety and Hygiene Policy for Saudi hospitals. Once developed, this policy was then forwarded to the Saudi community of practice, a group of experts in food safety. After obtaining their feedback, and in accordance to the Saudi field analysis and findings, a new Food Safety and Hygiene Policy for Saudi state

(MOH) hospitals was written and proposed in order to enhance the food safety and hygiene practices in the above mentioned hospitals.

Regarding the first research question related to the staff food hygiene-training programme, general food services in Saudi public hospitals and the methods to improve them, the study found different results for the three cohorts of employees: MOH supervisors, contracted catering supervisors and contracted catering workers.

As for the food hygiene-training programme for catering supervisors, it can be concluded that the training is not mandatory. In the Contract (Ministry of Health Kingdom of Saudi Arabia, 2018), the Government requires the hospitals to have at least one Bachelor in Food Safety who will have a training in HACCP or ISO 22000. Most of the contracted catering supervisors do not have the training certificates. Clearly there is a lot of space for improvement in terms of food safety and hygiene training for contracted catering supervisors.

The methods to improve this situation include:

- Face-to-face training on the implementation of HACCP complemented with innovative e-learning technologies (e.g. mobile learning applications).
- Monitoring, recording and reporting the information about the training.
- Closer collaboration between the contracted catering supervisors and MOH supervisors.
- Adopting good practice of England's NHS Trust hospitals and continuously measuring organisational culture against food safety and hygiene to facilitate continuous quality improvement.

Standardised measuring criteria will enable a company to compare and manage specific areas of production and adjust approaches accordingly to help improve services. This will be useful for training as it should be related to specific data. Next, in order to ensure greater connectedness among the supervisors and catering workers, it is recommended that the line managers and supervisor participate in the training sessions as trainers. 'Food Safety Culture Excellence assessment' is a good example that will allow the hospitals more comprehensive control over training. This framework, as a point of reference, will stop the discrepancies identified in this research on Saudi hospital food safety and hygiene.

The benefits of the improved training will be manifold and will be felt across the board. The patients, staff and visitors, including the medical students, will be happier to know their food is safe. The catering workers will have a role model to follow and it is expected that communication channels with better educated and well-trained supervisors will improve. This will largely be due to an increased level of trust and connectedness.

The same is true for MOH supervisors. However, they have more responsibilities for the state hospitals and are officially responsible for food safety and hygiene issues to the Ministry of Health. In addition, they need to be more familiar with the contract and HACCP, international regulations and other hospitals, not just the one they monitor. Their training, therefore, needs to be at the highest level. It is recommended that they participate as trainers in employee training as this will help enhance team bonding. It may also have the additional benefit of improving respect among colleagues as a result of everybody working together. The catering workers will benefit from being provided with theoretical context to the decisions that impact on their daily practice. Such sessions can also be adapted to fit their specific training needs.

It is also essential that the MOH supervisors provide every possible support and guidance to catering supervisors, such as reassuring them that training is an essential component of work and therefore it is acceptable and necessary for catering workers to attend such sessions. This will ensure long-term compliance with HACCP and contract compliance which in turn will benefit the quality of service received by end-users and patients.

The study has shown that the KSA MOH Supervisors' knowledge and practices need to be developed. Their training needs can be divided into the following categories: urgent training, regular but not extremely urgent training, individual or small group targeted training. The following areas for MOH supervisors' training have been identified: a) practices and skills proficiency, b) theory and understanding, c) culture and views on food safety and hygiene, d) working with others and work-related communication. Overall, in terms of training for MOH, it should mainly be standardised across the hospitals, but where necessary individual and small group training addressing attitudes, team work and communication channels at work is also required.

To conclude, the effectiveness of the general food services in Saudi public hospitals can be improved at all three levels of the surveyed cohort. This enhancement will mainly depend on the training which has to be the priority within both MOH and contracted catering companies.

In order to establish the most appropriate training solution in the current Saudi context, food safety and hygiene need to become part of the organisational culture – at all times and everywhere; the managers and supervisors should be directly involved in training as practising trainers, and measuring the culture within the hospitals will enhance food safety and hygiene across the organisation, not only in the kitchen ward.

The study identified several parameters to monitor in terms of organisational culture improvement:

1. Strength of multidirectional communication, in particular in terms of:
   A. Training needs monitoring.
   B. Policy revision and consultations with patients, workers and other staff.
   C. Consultations with the Headquarters of Public Administration of Nutrition of MOH.
   D. Obtaining and implementing the latest international regulations about food safety and hygiene.

2. Innovation in terms of resources, change in attitudes and behaviour, connectedness, processes and services.
3. Agile leadership that seeks regular feedback across the departments or wards and acts upon the identified needs**.**
4. Wellness, in terms of the physical and mental health of staff, and raising awareness of food safety and hygiene across the organisation.
5. The working environment, such as cleanliness, humidity, and light, can impact staff performance and attitudes to work, as well as food safety and hygiene.

The other parameters that can be used to measure organisational culture are collaboration, company support, performance focus, responsibility, and mission and vision alignment.

The above qualities will identify the organisational personality and will demonstrate to what extent the organisation works for the employees. However, the state hospitals in Saudi Arabia need to work on the priorities first, only to develop the organisational culture further in the second stage of refinement.

The MOH could help improve food safety and hygiene culture by moving from a role-based organisational culture to a task-based culture. In other words, job title or role currently defines the level of authority, power and access to resources in Saudi state hospitals as role-based cultures have a top-down decision-making process. This results in disengagement of unmotivated employees.

On the other hand, moving to a task-based culture will support problem solving, encourage team-based approach to resolving issues, and prioritise talent development. Group instead of individual supervisor accomplishments create a sense of a united organisational culture. Therefore, enabling each person to deliver their responsibilities, and raising awareness of how their individual behaviour affects other stakeholders will bring a major improvement in the organisation, such as Saudi state hospitals. However, it is important to accept that the changes in working cannot happen overnight and long-term vision need to be established for this shift.

In conclusion, the insight into the KSA MOH supervisors' knowledge and practices has highlighted various training needs, that have been categorised as urgent and enhanced training, regular (important, but not extremely urgent) and targeted (for individuals or small groups). The training should be related to skills and practices, knowledge and awareness, attitudes towards hygiene and food safety, as well as team work and communication channels in the work place. There is a need for further training among this group since overall they exhibit gaps in their understanding of food safety and hygiene related issues. The supervisors should actually be the champions of food hygiene, act as role models and monitor compliance as their primary job role. Regular training (required but not urgent) is needed where there is a divided understanding among the MOH supervisors, either among the hospitals or among supervisors within the same hospital.

The second research question was related to Saudi staff's and supervisors' attitudes towards food hygiene, knowledge and behaviour in the state hospital kitchens. Employees' attitudes, behaviours and life-long learning orientation definitely affect food safety and hygiene in hospital kitchens in particular. This research has shown that the appropriate training can improve the situation, and not only the training related to knowledge of the subject matter, but also effective communication skills, life-long learning, leadership and team work.

It was concluded that the most appropriate method of the delivery will be group sessions for the subject matter, discussions and forums to improve the attitudes and online learning for revision. In addition, some other support could be offered, such as language support and computer skills support. Moreover, the managers and contracted company supervisors should participate in training both as learners in their specific groups, and catering workers' trainers, which will altogether lead to an enhanced mutual understanding, improved rapport and team work. Furthermore, such behaviours and practices will ensure increased mutual respect and clearer communication channels for more effective multidirectional information exchange. Similar to other studies, this one has also shown that attitudes were malformed based on the irregular reactions and behaviour, as well as a lack of training.

Regarding HACCP implementation in Saudi state hospital services, discussed in research question three, this study has confirmed that HACCP has been introduced by MOH to hospitals as a very large document translated into Arabic, official language of Saudi Arabia. However, due to its size, it is difficult to implement it without breaking it into small-size working documents and policies. In addition, different roles and responsibilities will require different levels of in-depth or basic knowledge, which need to be passed on to the workers through training activities and

tested in various ways that suit the employees. Furthermore, the pre-requisite programmes should be more specific, focussing on the clearly described points, proactive activities, monitoring, remedial activities and recording.

As for the comparative analysis of the HACCP implementation and the related legislation in five large NHS Trust hospitals in England, it was conducted to identify the best practices and implement them in Saudi state hospitals. It can be concluded that these hospitals have moved far from the initial stages, and that at the moment they have their food safety and hygiene policies, based on the same regulations. Nevertheless, some of the hospitals have more specific and user friendly policies. In other words, there is a need for more standardised policies, and some hospitals can learn more from the others, although their characteristics may differ. It is certain that these hospital policies and practices can serve as a model to Saudi hospital food safety and hygiene activities.

Comparative analysis of food safety and hygiene regulations in Saudi Arabia and England state hospitals has established that there is not much difference in the core regulations, such as HACCP. However, UK NHS Trust hospitals have the related policies which may be further broken down (for instance, Training policy), and in order to improve the clarity and transparency, the key Food Safety Policy then makes cross-reference to other more detailed and specific policies and regulations.

In Saudi Arabia the situation is much behind that of England’s, and there are only large regulations such as HACCP translated into Arabic, but not broken down to small-size units that the related roles can focus on. Therefore, there is a lack of clarity and transparency when it comes to implementation, in particular in relation to the catering workers, but also catering supervisors. This means that the Saudi MOH can learn a lot from England’s NHS hospitals, not only in terms of the subject knowledge, but

training and implementation methodology. The best practice of England's surveyed hospitals were summarised and in agreement with the established needs of Saudi state hospitals, the proposed Food Safety and Hygiene Policy for Saudi state hospitals was sent to and discussed by the Saudi community of practice comprising of the experts in food safety field. On the other hand, this research has been beneficial to England's NHS Trust hospitals in terms of identifying the need for a greater standardisation of the NHS Food Safety and Hygiene policies.

The surveys have revealed that is a lack of pre-requisites programmes in hospitals which means that the HACCP system is not fully understood and therefore is not being implemented properly. Most foodservices staff had a limited understanding of the food safety systems which needs to change if risks are to be reduced. The Ministry of Health has the power to change this by improving PRPs within hospital through financial support and by making such training a legal requirement. This should be standardised across all Saudi hospitals to ensure uniformity. Nutrition contract terms needs to be reviewed regularly to ensure staff have appropriate education and training to perform their duties. Poor knowledge about food safety is the main factor restricting HACCP implementation or any other food management safety system. The information gathered from this study suggests the necessity of improving staff knowledge through regular training and also as a means of helping staff feel valued and part of the organisation.

9.1. Recommendations

The conducted study has its limitations due to the range of questions asked. For example, respondents were not asked about processes for administering infant milk formula – baby formula milk does not protect infants against disease as breastfeeding does. Therefore, nurses, midwifes and the kitchen staff must take extra care and correctly follow procedures

when preparing the formula milk, using sterilised equipment, but also during the storage (Losio et al., 2018) to prevent outbreaks of Salmonella Agona and Cronobacter sakazakii. In order to assess the respondents' knowledge of hospital safety and hygiene as well as HACCP (this question should have been included in the conducted survey.

Also, questions regarding food waste disposal in hospitals should have been specifically added to the survey in relation to the process of separation, collection, storage and waste removal. Health and safety procedures should have been identified in each of these steps and respondents should have been asked about them as they pose a risk to hospital staff, patients, kitchen staff and the public, including the local environment (Kumar et al., 2015).

As these processes appeared in some of the NHS Hospital policy documents it would have been useful to test this knowledge within KSA hospitals in order to gain an understanding of attitudes regarding these issues. The findings from these questions could then have been used to help inform processes outlined in the researcher's own food policy. Likewise, open-ended questions regarding background and education may have allowed more insightful correlations to have been observed about attitudes towards food safety. This is important as background and education may be factors determining job satisfaction, which in turn influences efficiency of workers employed in hospitals, both contracted and regular workers (Dixit et al., 2017).

Socio-economic and cultural factors can play an important role in determining what and where individuals study, as well influencing career aspirations (Angel-Urdinola, D.F. and Tanabe, 2012). Given so many catering workers felt they could not miss work if they were ill through fear of losing their job suggests that economics and education are an important variables in determining attitudes towards food safety. More specific

questioning of these factors could have helped determine critical points in learning and in turn enabled suggestions on how to address these challenges to support these workers (Heckman, J.J., 2011).

The results of the survey highlighted a lack of standardisation in approach knowledge among the catering workers, catering supervisors and the MOH supervisors. This may have been due to not fully understanding what was being asked. For example, when asked, what are the monitoring procedures in HACCP Principle 4, five contracted managers at three hospitals correctly identified specific things that needed to be monitored, such as refrigerators or critical points, but the correct answer was 'all of the above' as more than one element had to be monitored. In cases like this study, demographics, degree of education and service length may be inconsistently related to the pattern of answers (Buccheri et al., 2007)

Conducting in-depth interviews could allow the researcher to prompt the respondent or reiterate the question to ensure they clearly understood what was being asked. Interviews can reveal many issues not highlighted in the survey such as food service and working conditions (Clayton, 2015). However, given the breadth of educational background and competence in the study languages of Arabic and English this may have raised concerns amongst staff and lead to reduced compliance.

However, rather than performing individual surveys, group interviews may have enabled a deeper understanding of knowledge of HACPP as the researcher would be able to observe employers debating and discussing issues, possibly correcting or confronting each other. This would have provided a useful understanding of knowledge and values. However, this would have been very difficult to arrange given the time pressures on workers and the logistics of liaising with seven hospitals.

The study may also have been enhanced through a participant observation as this method would have allowed the researcher to witness and record cross-contamination incidents and compare these with the results from the surveys. For instance, Clayton (2004) found that observations enabled confirmation that de-contamination activities could be delivered inadequately.

An observational study would have allowed the researcher to check the design of kitchens and whether these were following the principles of HACCP – such as partitioning off kitchens for the preparation of different types of food and if colour coded utensils were being used. Observing catering workers in their natural environment would also have helped the researcher identify what kind of pressures they were placed under by their supervisor, how much guidance they received, and how problems were dealt with, all of which would have helped determine specific training programmes. Fly on the wall observations can be useful but also have the potential to affect the normal actions of the staff under study.

The main purpose of this study was to demonstrate to a wider academic audience the need for policy writing in KSA and to prepare a policy that will meet the needs of the three groups of stakeholders: MOH managers, contracted company supervisors and catering workers. Although the clarity of the questions could have been improved, and further questions, such as those regarding baby milk formula could have been added, the disparity of answers in the survey questions asked clearly confirmed the need for a food safety policy in KSA hospitals. The researcher hopes that in developing the first food policy of its kind for KSA hospitals will help address an important gap in food safety. The researcher acknowledges this is the first stage and that the policy is likely to evolve and improve as and when it is adopted.

Statistical analysis using Chi Square and correlations have shown that there is some inconsistency in the answers received. Although this does not affect the outcome - a need for the policy, it does provide suggestions on how the policy may be implemented, and the subsequent challenges for all the stakeholders. For example, there is significant variation within the demographic factors underlying the survey.

9.2 Recommendations from survey informing policy design

The following recommendations are based on the results of the surveys. They are addressed specifically to workers, catering supervisors and MOH supervisors. However, it is worth stating that all will require significant training based on the lack of consistency in the survey responses. The researcher has indicated in each section how these recommendations have informed the design of the food safety policy in chapter eight.

Catering workers

Training may help catering workers feel more valued and supported. This might help address another issue, low employment lengths. All catering workers had a mean of 31.6 months of service with a median of 24 months. This is evidence of high workforce turnover. The lowest median of employment length in this study was two months for workers in PMAH hospital where ten participants out of 18 have been employed for just two months.

Given the high proportion of foreign catering workers, all training manuals need to be made available in Arabic and English. English is a common second language to workers, particularly as a high proportion are from India. It is recommended that workers are given the option to read food training manuals in their preferred language and that any signage in food areas is reflective of the workforce.

Females were more likely to have more hygiene training than males within this sample. The results showed that workers who had hygiene training had a mean length of employment of almost three years (35.8 months) and a median of 24 months. Workers who did not attend any hygiene training had a mean length of employment of less than two years (23.8 months) and a median of 12 months. Therefore, it is recommended that all staff receive regular hygiene training as a means of maintaining their employment. In my proposal for a standardised food safety policy I have included specific information on 'storage and preparation' to ensure workers are fully aware of relevant processes involved in their daily duties (chapter 8)

The catering worker survey revealed a lack of awareness of appropriate temperatures with regards to cooking chicken, refrigerators, and ready to eat meals using a Bain-marie. Therefore, specific and regular training is required to ensure compliance with food safety procedures. It was also found that workers were more likely to comply with food regulations when a supervisor was present. This is another reason for regular and informed training, particularly sessions which help bring about a shift in attitudes and emphasise the importance of individual accountability. Another area of personal accountability that needs to be addressed is related to personal hygiene in order to breakdown stigmas regarding absence from work due to illness. Workers who had received hygiene training were more likely to act responsible when ill than workers who had not attended hygiene training. Therefore, individual training needs to be closely monitored and acted upon accordingly. In the proposed standardised food safety policy I have included a section on Personal Hygiene Standards (8.19.1) that ensures all staff have regular training and that a certificate is produced every six months to prove this.

Catering Supervisors

Catering supervisors were from either KSA, Egypt or India. The least suitably qualified catering supervisors were both Egyptian males from the youngest age groups with a Bachelor of Commerce and a Bachelor of Hospitality. Therefore, it is recommended that all catering supervisors should hold a suitable qualification.

Although all fourteen respondents in the survey defined HACCP correctly and understood its importance, there were some discrepancies in terms of understanding exactly what needs to be monitored. Similar issues arose elsewhere with only six supervisors correctly understanding the aims of verification. There was a lack of consensus on whether HACCP had been implemented in some hospitals, and three hospitals were not monitoring these procedures, so this process needs to be made explicit to everyone. These processes can be reinforced through visual aids posted throughout the hospital. However, thorough training is required to clarify the entire process of HACCP.

There was disagreement among catering supervisors as to whether hospitals should be involved with the planning of hospital menus. Likewise, four supervisors had never implemented any tests for food pathogens in four hospitals. Therefore, overall knowledge of nutrition is required, as is actively encouraging supervisors to help develop menus to reinforce personal accountability.

In my proposed standardised food safety policy, I have included a section (8.31) on 'Mandatory Training, Implementation and Resources' to ensure staff are suitably qualified and aware of HACCP. This should help remove any ambiguity regarding HACCP. There is also a Reporting Mechanism section (8.30) which states reporting mechanisms must be transparent and specific to each hospital and follow ISO22000 (*Food safety management systems — requirements for any organization in the food*

chain). This mechanism must be clear to all staff at all levels and would be illustrated through prominent visual signage.

MOH Supervisors

There was a high proportion of female MOH supervisors (47). They were, proportionally, the most suitably qualified, with 28 qualified in Food Sciences (28). It is recommended that the MOH continue its strategy of addressing gender inequality by employing more women.

HACCP training is required of MOH supervisors due to a lack of understanding of this process. As was found with catering supervisors and workers, MOH supervisors understand the importance of HACCP but differ in what exactly this entails. For example, in PMBA, one third (29%) of the supervisors thought that HACCP is just about temperature control. Likewise, in KSH hospital, 85% of supervisors thought that control of critical points through activity monitoring was sufficient whereas five hospitals had no idea. Specific training that addresses each process of HACCP is required. This needs to be regularly monitored.

As pre-requisites programs are not implemented properly in the selected hospitals, HACCP will not be implemented successfully. Therefore, the MOH needs to investigate the hygiene status in all other hospitals prior to including HACCP in a nutrition contract. The Food Safety and Hygiene department in the MOH is required to visit foodservice departments and check the extent of the implementation of pre-requisites programmes in these hospitals. Staff should have suitable knowledge about food safety in general. After acquiring the required knowledge, training on HACCP can be applied. Therefore, the MOH should review nutrition contracts and include staff training as a condition before commencing work in foodservices. Training should include all foodservices staff who work for catering companies and as well as MOH staff.

It is recommended that catering companies hire workers with appropriate education. To support food safety training in Saudi Arabia in general, governmental authorities, such as SFDA, should support establishing national and international schools that provide food safety training. Also, they should set up a new regulation that requires all food businesses to train their staff before starting work.

In my proposal for a standardised food safety policy, I have included a section (8.31) on 'Mandatory Training, Implementation and Resources' to ensure staff are suitably qualified and aware of HACCP. This relates to every employee involved with food-related activities and is recorded electronically as part of staff personal data by Human Resources Department. The Hospital MOH Supervisor is designated in charge of organising and monitoring this part of staff training. They will either engage the suitably educated staff already employed by the hospital or a professional supplier of accredited HACCP & Food Hygiene Training that can issue valid certificates to the trained staff.

9.3. Future work

Although the results presented here have demonstrated the current status of hospitals food hygiene, more research is needed in this field. It is recommended applying the intervention to the foodservices managers and catering supervisors. This may be achieved by using high level of training programmes, such as training on the operation of HACCP systems (level 2, 3 and level 4). This is because several supervisors had flawed knowledge of food safety.

Based on the limitations discussed, there is scope for the methods applied in this research to be enriched and improved so that this framework becomes transferrable and usable in similar contexts among the Gulf

Cooperation Council (GCC) countries as a reliable research tool for developing countries to meet food safety needs.

This study focussed on seven hospitals in Riyadh, therefore future research may wish to focus in on the challenges faced in rural hospitals who do not receive the same volume of patients or may not receive the same level of monitoring from the MOH as city-based hospitals. It is recommended to investigate these and compare results with urban based hospitals. For similar purposes it is also suggested to include self-catering hospitals in future work. The self-catering system is mainly applied in the private hospitals and also in the semi-governmental hospitals. The nutrition contract (MOH) is not adopted in these types of hospitals. Therefore, the hygiene status of these hospitals needs more attention if collectively efficient levels are to reach a suitable level across Saudi Arabia.

Reference:

Al-Asfour, A., Tlaiss, H.A., Khan, S.A. & Rajasekar, J. (2017). Saudi Women's Work Challenges and Barriers to Career Advancement. *Career Development International*. [Online]. 22 (2). p.pp. 184–199. Available from: http://www.emeraldinsight.com/doi/10.1108/CDI-11-2016-0200.

Al-Busaidi, M.A. (2017). *Effective seafood safety and quality management systems: an analysis of the situation in the Sultanate of Oman*. [Online]. (Doctoral dissertation, University of Reading). Available from: http://centaur.reading.ac.uk/73263/7/21815745_Al_Busaidi_thesis_edited.pdf.

Al-Mohaithef, M. (2014). *Food hygiene in hospitals: evaluating food safety knowledge, attitudes and practices of foodservice staff and prerequisite programs in Riyadh's hospitals, Saudi Arabia*. [Online]. University of Birmingham. Available from: https://etheses.bham.ac.uk/id/eprint/5194/.

Alahmadi, H.A. (2010). Assessment of patient safety culture in Saudi Arabian hospitals. *Qual Saf Health Care*. [Online]. 19 (5). p.pp. 1–5. Available from: https://qualitysafety.bmj.com/content/qhc/19/5/e17.full.pdf.

Alamri, Y.A. (2010). Emergency management in Saudi Arabia: Past, present and future. *Un. of Christchurch report, New Zealand*. [Online]. 10 (21). p.pp. 1–21. Available from: https://training.fema.gov/hiedu/downloads/compemmgmtbookproject/comparative em book - em in saudi arabia.pdf%0Ahttp://www.training.fema.gov/EMIWeb/edu/Comparative EM Book - EM in Saudi Arabia.pdf.

Alshemimry, A. (2016). *An investigation of health and safety issues*

in Saudi Arabia's construction projects: challenges and solutions. [Online]. (Doctoral dissertation). Available from: http://clok.uclan.ac.uk/13795/.

Angel-Urdinola, D.F. and Tanabe, K. (2012). *Micro-determinants of informal employment in the Middle East and North Africa region*. [Online]. Available from: http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Labor-Market-DP/1201.pdf.

Angelillo, I.F., Viggiani, N.M., Rizzo, L. & Bianco, A. (2000). Food Handlers and Foodborne Diseases: Knowledge,Attitudes, and Reported Behavior in Italy. *Journal of food protection*. [Online]. 63 (3). p.pp. 381-385. Available from: http://www.ncbi.nlm.nih.gov/pubmed/10716569.

Bakri, M. et al (2017). Food Hygiene in Past Ten Years in Saudi Arabia. *EC Microbiology*. 1. p.pp. 4–13.

Bakri1, M., Amin, F. AL, Saleh, A.F., , AL Taib Saeed, M.N., Haroon, M. & Mohamed, K. (2017). Food Hygiene in Past Ten Years in Saudi Arabia. *EC Microbiology*. [Online]. 7 (1). p.pp. 4–13. Available from: https://www.ecronicon.com/ecmi/pdf/ECMI-07-00195.pdf.

Ball, B., Wilcock, A. & Aung, M. (2010). Background factors affecting the implementation of food safety management systems. *Food Protection Trends*. [Online]. 30 (2). p.pp. 78–86. Available from: https://www.researchgate.net/publication/228682480_Background_Factors_Affecting_the_Implementation_of_Food_Safety_Management_Systems.

Bartlett, M. (2017). *Five Main Advantages of Contract Catering*. [Online]. 2017. Available from: http://www.bartlettmitchell.co.uk/expert-guides/5-advantages-of-contract-catering/.

Bloss, J. (2017). The Wiley Blackwell Encyclopedia of Gender and

Sexuality Studies. *Reference Reviews*. 31 (3). p.pp. 13–14.

Buccheri, C., Casuccio, A., Giammanco, S., Giammanco, M., La Guardia, M. & Mammina, C. (2007). Food safety in hospital: knowledge, attitudes and practices of nursing staff of two hospitals in Sicily, Italy. *BMC health services research*. 7 (1). p.p. 45.

Burgess, T.F. (2001). Guide to the Design of Questionnaires. A general introduction to the design of questionnaires for survey research. *University of Leeds*. p.pp. 1–27.

Cania, L. (2014). The impact of strategic human resource management on organizational performance. Economia. *Seria Management*. [Online]. 17 (2). p.pp. 373–383. Available from: http://www.management.ase.ro/reveconomia/2014-2/14.pdf.

Care Quality Commission (2017). *United Lincolnshire Hospitals NHS Trust Quality Report*. [Online]. Available from: http://www.cqc.org.uk/sites/default/files/new_reports/AAAG3119.pdf.

Castro, A., Santos, C., Meireles, H., Silva, J. & Teixeira, P. (2015). Food handlers as potential sources of dissemination of virulent strains of Staphylococcus aureus in the community. *Journal of infection and public health*. [Online]. 9 (2). p.pp. 153–160. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26424093.

Clayton, D.A. and Griffith, C.J. (2004). Observation of food safety practices in catering using notational analysis. *British Food Journal*. 106 (3). p.pp. 211–227.

Clinical, N.N. & Group, C. (2018). *NHS Nene Clinical Commissioning Group Communication and Engagement Strategy 2017-2019*. [Online]. Available from: https://www.neneccg.nhs.uk/resources/uploads/Nene_CCG_Easy_Read_Comms_and_Engagement_Strategy_DRAFT_4_05072017.pdf.

Codex (2003). General Principles of Food Hygiene. *Codex Alimentarius - Basic Texts Food Hygiene*. [Online]. p.pp. 1–31. Available from: http://www.fao.org/.

Cohen, L., Manion, L. & Morrison, K. (2002). *Research methods in education*. 5 th Editi. Routledge.

Committee on Freedom of Association (2009). *International Labour Office, Governing Body. 306th Session, Body Committee on Legal Issues and International Labour Standards (LILS) Improvements in the standard-related activities of the ILO: Towards a final plan of action for the implementation of the s*.

Committee Quality Assurance & Nutrition Leicestershire (2018). *Protected Mealtimes Policy - For Inpatients Use*. [Online]. Available from: http://www.leicspart.nhs.uk/Library/ProtectedMealtimesPolicyexpJun20.pdf.

Commonwealth Fund (2017). *Health Care System Performance*. [Online]. 2017. Jonas' Introduction to the US Health Care System. Available from: https://www.commonwealthfund.org/chart/2017/health-care-system-performance-rankings. [Accessed: 5 May 2017].

Creswell, J.W. and Creswell, J.D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. 4th Ed. J. Creswell (ed.). Sage: Los Angeles, London, New Delhi, Singapore, Washington DC.

Creswell, J.W. (2009). Research Design: Qualitative, Quantitative, and mixed method approaches. *Canadian Journal of University Continuing Educationanadian Journal of University Continuing Education*. 35 (2). p.pp. 121–123.

Cumbeia Partnership NHS Foundation (2016). *Annual Report and Accounts 2016/17*. [Online]. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/634110/CUMBRIAPART_An

nual_Report_and_Accounts_2016-17.pdf.
Cumbria Partnership NHS Foundation (2017). *Food Safety Policy*. [Online]. Available from: https://cdn.cumbriapartnership.nhs.uk/uploads/policy-documents/Food_Safety_Policy_POL-002-041.pdf.
Dench, S., Hurstfield, J., Hill, D. & Akroyd, K. (2006). *Employers use of Migrant Labour: Main Report.*
Department of Health (2017). *Compliance with Hospital Food Standards in the NHS. Two Years on: A Review of Progress Since the Hospital Food Standards Panel report in 2014*. [Online]. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/586490/HFSP_Report.pdf.
Department of Health (2014). *Establishing Food Standards for NHS Hospitals*. [Online]. Available from: https://www.gov.uk/government/publications/establishing-food-standards-for-nhs-hospitals.
Desmarchelier, P. (2016). *Foodborne Illnesses Reduction Strategy Review*. [Online]. Available from: http://www.foodauthority.nsw.gov.au/_Documents/scienceandtechnical/foodborne_illnesses_reduction_strategy_review.pdf.
Dixit, J., Goel, S. & Sharma, V. (2017). A Comparative Study on the Level of Satisfaction Among Regular and Contractual Health-Care Workers in a Northern Cty of Lndia. *Journal of Family Medicine and Primary Care*. 6 (2). p.pp. 416–423.
Van Duynhoven, Y.T.H.P., De Jager, C.M., Kortbeek, L.M., Vennema, H., Koopmans, M.P.G., Van Leusden, F., Van der Poel, W.H.M. & Van den Broek, M.J.M. (2005). A one-year intensified study of outbreaks of gastroenteritis in The Netherlands. *Epidemiology & Infection*. 133 (1). p.pp. 9–21.
Egan, M.B., Raats, M.M., Grubb, S.M., Eves, A., L., M.L., Dean, M.S. & Adams, M.R. (2007). A Review of Food Safety and Food

Hygiene Training Studies in the Commercial Sector. *Food Control*. [Online]. 18 (10). p.pp. 1180–1190. Available from: https://pdfs.semanticscholar.org/0944/7c26c9a1c500f729b9220d8ced4d9b8f822e.pdf.

Elnaga, A. and Imran, A. (2013). The Effect of Training on Employee Performance. *European Journal of Business and Management*. [Online]. 5 (4). p.pp. 2222–2839. Available from: https://pdfs.semanticscholar.org/354c/2c8c60f37f5e25f63f557b3573ec366197ae.pdf.

Ertel, A., Eng, R. & Smith, S. (1991). The Differential Effect of Cigarette Smoke on the Growth of Bacteria Found in Humans. *Chest Journal*. [Online]. 100 (3). p.pp. 628–30. Available from: http://journal.publications.chestnet.org/article.aspx?articleid=1064203.

European Parliament (2002). EUR-Lex - 32004L0008 - EN - EUR-Lex. *Eur-Lex.Europa.Eu*. [Online]. Available from: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32004L0008.

Evšnik, M., Hlebec, V. & Raspor, P. (2008). Food Safety Knowledge and Practices Among Food Handlers in Slovenia. *Food Control*. [Online]. 19 (12). p.pp. 1107–1118. Available from: http://ssu.ac.ir/cms/fileadmin/user_upload/Mtahghighat/tfood/asil-article/amuzesh-Behdasht-Ghaza/Food_safety_knowledge_and_practices_among_food_handlers_in_Slovenia.pdf.

FAO (2018a). *Food and Agriculture Organization of the United Nations*. [Online]. Available from: http://www.fao.org/home/en/. [Accessed: 10 October 2018].

FAO (2018b). *Food Safety and Quality: Good Hygiene Practices and HACCP*. [Online]. 2018. Food. Available from: http://www.fao.org/food/food-safety-quality/capacity-development/haccp/en/. [Accessed: 4 January 2018].

FDA (2014). *Hazard Analysis Critical Control Point (HACCP) - HACCP*

Application Guidelines. [Online]. 2014. Available from: https://www.fda.gov/Food/GuidanceRegulation/HACCP/ucm2006801.htm. [Accessed: 10 October 2018].

Feldman, A., Altrichter, H., Posch, P. & Somekh, B. (2018). *Teachers investigate their work: An introduction to action research across the professions*. third edit. Routledge.

Food Standards Agency (2018). *Chilling: How to Chill, Freeze and Defrost Food Safely*. [Online]. Available from: https://www.food.gov.uk/safety-hygiene/chilling. [Accessed: 30 January 2018].

Food Standards Agency (2017). HACCP. In: *Meat Industry Guide*. [Online]. Food Standards Agency, pp. 1–29. Available from: https://www.food.gov.uk/sites/default/files/media/document/Chapter9-HACCP-Principles.pdf.

Food Standards Agency (n.d.). Hospital Caterers Association. *International Journal of Food Sciences and Nutrition*. [Online]. 4 (3) p.pp. 99–99. Available from: https://www.hsl.gov.uk/media/108292/foodhandlersireland1009.pdf.

Food Standards Agency (2015). Meat Industry Guide: Training. In: *Designing and Building Security Operations Center*. [Online]. pp. 151–171. Available from: https://www.food.gov.uk/sites/default/files/media/document/Chapter7-Training_0.pdf.

Food Standards Agency (2012). *Personal Hygiene*. [Online]. p.p. 2. Available from: https://www.food.gov.uk/sites/default/files/media/document/sfbb-retailers-personal-hygiene.pdf.

Food Standards Agency (2007). *Safe Catering - Your Guide to Making Food Safely*. [Online]. Available from: https://www.food.gov.uk/sites/default/files/media/document/safe-catering pack.pdf.

Fraser, A. (2012). *Factors affecting microbial growth*. [Online]. Available from: http://www.foodsafetysite.com/educators/competencies/general/bacteria/bac2.html.

de Freitas Saccol, A.L., Serafim, A.L., Hecktheuer, L.H., Medeiros, L.B. & Silva Jr, E.A.D. (2016). Food safety in feeding services: a requirement in Brazil. *Critical reviews in food science and nutrition*. [Online]. 56 (8). p.pp. 1363–1369. Available from: https://www.ncbi.nlm.nih.gov/pubmed/24915334.

Fsis, U. (n.d.). *Prerequisite Programmes Support the HACCP Plan*. [Online]. p.pp. 1–19. Available from: https://www.fsis.usda.gov/wps/wcm/connect/19de69c2-8b28-45e7-8c3d-2a8252c1b75d/Training_Prerequisite_Programs.pdf?MOD=AJPERES.

Gonzalez, E., Leidner, D., Riemenschneider, C. & Koch, H. (2013). The impact of internal social media usage on organizational socialization and commitment. *Icis*. [Online]. 7 (2). p.pp. 93–106. Available from: http://aisel.aisnet.org/icis2013/proceedings/OrganizationIS/1/.

GOV.UK (2016). *Food Business Registration*. [Online]. 2016. Available from: https://www.gov.uk/food-business-registration. [Accessed: 5 April 2018].

GOV.UK (2013). *Keep an Accurate Check on Food Safety Procedures Within your Business*. (5).

GOV.UK (2018). *The best place to find government services and information Simpler, clearer, faster*. [Online]. 2018. Available from: https://www.gov.uk.

Government of Alberta (2015). *Supervisor Roles and Responsibilities*. [Online]. Available from: https://open.alberta.ca/dataset/b67b7f59-babe-42ad-9c86-2e5b0a68691a/resource/dcfcbf3b-0e4f-4b72-b5de-

0bd334f42a96/download/2015-03-ohs-best-practices-bp020.pdf.

Habbash, M. and Alghamdi, S. (2015). The perception of earnings management motivations in Saudi public firms. *Journal of Accounting in Emerging Economies*. 5 (1). p.pp. 122–147.

Health Protection Scotland (2015). *HPS Norovirus Outbreak Guidance Season*. [Online]. Available from: http://www.documents.hps.scot.nhs.uk/hai/infection-control/toolkits/norovirus-control-measures-2015-09.pdf.

Heckman, J.J. (2011). The economics of inequality: The value of early childhood education. *American Educator*. 35 (1). p.p. 31.

Van Den Heever, A., Scribante, J., Perrie, H. & Lowman, W. (2016). Microbial Contamination and Labelling of Self-Prepared, Multi-Dose Phenylephrine Solutions Used at a Teaching Hospital. *Southern African Journal of Anaesthesia and Analgesia*. 22 (6). p.pp. 175–179.

Hertzman, J. and Barrash, D. (2007). An assessment of food safety knowledge and practices of catering employees. *British Food Journal*. 109 (7). p.pp. 562–576.

Hertzman et al (2007). An Assessment of Food Safety knowledge and Practices of Catering Employees. *British Food Journal*. [Online]. 109 (7) p.pp. 562–576. Available from: https://www.emeraldinsight.com/doi/abs/10.1108/00070700710761545?mbSc=1&fullSc=1&journalCode=bfj.

Howard, M., Galbraith, A. & Hons, B.A. (2004). *RR259 - Occupational Health and Safety Enforcement Strategies to Promote Concordance in the Hospitality Industry*. [Online]. Available from: http://www.hse.gov.uk/research/rrpdf/rr259.pdf.

Hussain, M. and Dawson, C. (2013). Economic impact of food safety outbreaks on food businesses. *Foods*. [Online]. 2 (4). p.pp. 585–589. Available from: http://www.mdpi.com/2304-

8158/2/4/585/.

Hutter, B.& & Amodu, T. (2008). Risk Regulation and Compliance : Food Safety in the UK. *Political Science*. [Online]. (70527). p.pp. 4219–4243. Available from: http://new.wales.gov.uk/ecolidocuments/NCP/NCP.04219.pdf.

Hyde, R., Hoflund, A.B. and Pautz, M. (2016). One HACCP, Two Approaches: Experiences With and Perceptions of the Hazard Analysis and Critical Control Point Food Safety Management Systems in the United States and the EU. *Administration & Society*. [Online]. 48 (8). p.pp. 962–987. Available from: https://journals.sagepub.com/doi/abs/10.1177/0095399714548266?journalCode=aasb.

IFST (2018). *The Voice of the Food Profession*. [Online]. 2018. Available from: https://www.ifst.org/home. [Accessed: 15 September 2018].

ISO. *Food safety management systems — requirements for any organization in the food chain*. (2018).

ISO (2018). *ISO 22000: Food Safety Management Systems - Requirements for any Organization in the Food Chain*. [Online]. Available from: https://www.iso.org/standard/65464.html.

Joseph Rowntree Foundation (2015). *What do Low-Paid Workers Think Would Improve Their Working Lives?* [Online]. 2015. Available from: file:///Users/alialrasheed/Dropbox/Resources 2018/Chap 5 supervisor/What do low-paid workers think would improve their working lives%3F %7C JRF.webarchive. [Accessed: 14 August 2018].

KSA (2017). *Tate Export Guide - SAUDI ARABIA* -. [Online]. 2017. Available from: http://www.tatesexportguide.co.uk/Country/SAUDI_ARABIA.asp. [Accessed: 10 October 2018].

Kumar, R., Shaikh, B.T., Somrongthong, R. & Chapman, R.S. (2015). Practices and challenges of infectious waste

management: A qualitative descriptive study from tertiary care hospitals in Pakistan. *Pakistan journal of medical sciences*. 31 (4). p.p. 795.

Läikkö-Roto, T. (2016). *Enhancing the efficacy of local official food controls in Finland*. [Online]. (Doctoral dissertation). Available from: https://helda.helsinki.fi/bitstream/handle/10138/166836/ENHANCIN.pdf?sequence=1.

Losio, M.N., Pavoni, E., Finazzi, G., Agostoni, C., Daminelli, P., Dalzini, E., Varisco, G. & Cinotti, S. (2018). Preparation of Powdered Infant Formula: Could Product's Safety Be Improved? *Journal of pediatric gastroenterology and nutrition*. 67 (4). p.pp. 543–546.

MacIntyre, C.R. & Chughtai, A.A. (2015). Facemasks for the Prevention of Infection in Healthcare and Community Settings. *BMJ (Online)*. [Online]. 350. p.pp. 1–12. Available from: https://www.bmj.com/content/350/bmj.h694.

May, K. & Media, D. (2015). *Causes and Effects of High and Low Staff Turnover*. [Online]. 2015. Available from: https://smallbusiness.chron.com/causes-effects-high-low-staff-turnover-33939.html. [Accessed: 23 September 2016].

Ministry of Health Kingdom of Saudi Arabia (2018). *Conditions and Specifications of Nutrions in Hospitals MOH*.

Ministry of Health Kingdom of Saudi Arabia (2017). *Kingdom of Saudi Arabia - Ministry of Health Portal*. [Online]. 2017. Available from: http://www.moh.gov.sa/en/Pages/Default.aspx. [Accessed: 1 February 2017].

Ministry of Municipal and Rural Affairs (2018). *Ministry of Municipal and Rural Affairs*. [Online]. Available from: https://www.saudi.gov.sa/wps/portal/snp/pages/agencies/agencydetails/organization-AC174.

Moore, R., Endorsed by:, McQueen, F., Calderwood, C., Parr, R.M.,

Taylor, M. & Macaskill, D. (2017). *National Infection Prevention and Control Manual*. [Online]. 2017. NHS National Services Scotland. Available from: http://www.nipcm.hps.scot.nhs.uk/. [Accessed: 22 May 2017].

Al Mutairi, S.K. (2013). *Saudi food inspector: a focused ethnographic study in regulation and law enforcement (Doctoral dissertation)*. University of Nottingham.

NHS, G. (2018). *Catering Assistant Job Specification*. [Online]. Available from: https://jobs.scot.nhs.uk/uploads/56/0000050448g.pdf. [Accessed: 20 August 2002].

Northamptonshire Healthcare NHS Foundation & Trust (2017). *Annual Report and Accounts 2016/17*. [Online]. Available from: https://www.nhft.nhs.uk/download.cfm?doc=docm93jijm4n7359.pdf&ver=17537.

Northamptonshire Healthcare NHS Foundation Trust (2017). *Food Hygiene Guidelines*. [Online]. Available from: https://www.nhft.nhs.uk/download.cfm?doc=docm93jijm4n819.pdf&ver=20555.

Nottingham University Hospital NHS Trust (2017). *Annual Report*. [Online]. Available from: https://www.nuh.nhs.uk/download.cfm?doc=docm93jijm4n2243.pdf&ver=3305.

Nottingham University Hospitals NHS Trust (2015). *We Are Here For You*. [Online]. Available from: file:///C:/Users/stxaa76/Downloads/NUH Values and Behaviours Booklet (2).pdf.

Nottingham University NHS (2017). *Food Safety Policy*. [Online]. Available from: https://www.nuh.nhs.uk/download.cfm?doc=docm93jijm4n1482.pdf&ver=1587.

NSW Food Authority (2015). *NSW Government Food Safety*

Strategy 2015 – 2021. [Online]. Available from: http://www.foodauthority.nsw.gov.au/_Documents/corporate/Food_Safety_Strategy.pdf.

Nyamari, J.A.C.K.I.M. (2013). *Evaluation of compliance to food safety standards amongst food handlers in selected hospitals in kenya*. [Online]. Kenyatta University. Available from: http://etd-library.ku.ac.ke/bitstream/handle/123456789/7042/Nyamari Jackim.pdf?sequence=1&isAllowed=y%0Afile:///C:/Users/MBIRIRI/Desktop/Food safety/Nyamari Jackim-1 Kenya.pdf.

Omair, K. (2008). Women in management in the Arab context. *Education, Business and Society: Contemporary Middle Eastern Issues*. 1 (12). p.pp. 107–123.

Preece, D. (2014). *Nottingham University Food Safety Policy*. [Online]. Available from: http://www.nuh.nhs.uk/about-us/our-policies-and-procedures/health-and-safety-policies-and-procedures/.

Regulation (EC) (2004). Corrigendum to Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the Hygiene of Foodstuffs. *Official Journal of the European Union*. [Online]. (June). p.p. L 226/3-21. Available from: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:226:0003:0021:EN:PDF.

Rennie, D.M. (1994). Evaluation of Food Hygiene Education. *British Food Journal*. [Online]. 96 (11). p.pp. 20–25. Available from: https://www.emeraldinsight.com/doi/full/10.1108/00070709410074650.

Rotherton, A., Simmonds, N., Bowling, T. & Stroud, M. (2012). Malnutrition Matters - Meeting Quality Standards in Nutritional Care. *Clinical Risk*. [Online]. 17 (4). p.pp. 137–142. Available from: https://www.bapen.org.uk/pdfs/bapen_pubs/bapen-

toolkit-for-commissioners-and-providers.pdf.

Rudiger, K. (2013). *Employers are from Mars, young people are from Venus: addressing the young people/jobs mismatch.Today's young people, tomorrow's workforce*.

Russotto, V., Cortegiani, A., Raineri, S.M. & Giarratano, A. (2015). Bacterial contamination of inanimate surfaces and equipment in the intensive care unit. *Journal of intensive care*. [Online]. 3 (1). p.p. 54. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26693023.

Saunders, M., Lewis, P. & Thornhill, A. (2009). *Research methods for business students*.

Schmidt, R.H. and Rodrick, G.E. (2003). *Food safety handbook*. [Online]. John Wiley & Sons. Available from: https://muhammadsubchi.files.wordpress.com/2010/04/food-safety-handbook.pdf.

Scottish Government (2016). Food in Hospitals: National Catering and Nutrition Specification for Food and Fluid Provision in Hospitals in Scotland. *Scottish Government*. [Online]. Available from: http://www.gov.scot/resource/doc/229423/0062185.pdf.

Seaman, P. (2010). Food hygiene training: Introducing the food hygiene training model. *Food Control*. 21 (4). p.pp. 381–387.

Seaman, P. and Eves, A. (2010). Perceptions of hygiene training amongst food handlers, managers and training providers–A qualitative study. *Food Control*. [Online]. 21 (7). p.pp. 1037–1041. Available from: http://dx.doi.org/10.1016/j.foodcont.2009.12.024.

SFDA (2017). *Saudi Food and Drug Authority*. [Online]. 2017. SFDA. Available from: http://www.sfda.gov.sa/en/food/Pages/default.aspx. [Accessed: 3 March 2018].

Sharif, L. and Al-Malki, T. (2010). Knowledge, attitude and practice of Taif University students on food poisoning. *Food Control*.

[Online]. 21 (1). p.pp. 55–60. Available from: http://dx.doi.org/10.1016/j.foodcont.2009.03.015.

El Sheikha, A.F. (2015). Food safety issues in Saudi Arabia. *Nutrition and Food Technology*. [Online]. 1 (1). p.pp. 1–4. Available from: https://www.sciforschenonline.org/journals/nutrition-food/.

Sidorova, A., Evangelopoulos, N., Torres, R. & Johnson, V. (2013). *A survey of core research in information systems.* A. Sidorova, N. Evangelopoulos, R. Torres, & V. Johnson (eds.). Springer: New York Heidelberg Dordrecht London.

Soliman, M.I., Taha, H.A. & Banjar, S.A. (2013). Intestinal parasitic infections among expatriate workers in Al-madina Al-munawarah, kingdom of Saudi Arabia. *Tropical Biomedicine*. [Online]. 30 (1). p.pp. 78–88. Available from: http://www.msptm.org/files/78_-_88_Hoda_A_Taha.pdf.

Susan Clows (2017). *Shaping the Future of Work*. [Online]. 2017. Available from: http://www.acas.org.uk/index.aspx?articleid=1461. [Accessed: 20 July 2017].

Todd, E. (2017). Foodborne disease and food control in the gulf states. *Food Control*. [Online]. 73. p.pp. 341–366. Available from: https://www.sciencedirect.com/science/article/pii/S0956713516304510#!

Todd, E.C., Michaels, B.S., Smith, D., Greig, J.D. & Bartleson, C.A. (2010). Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 9. Washing and drying of hands to reduce microbial contamination. *Journal of food protection*. [Online]. 73 (10). p.pp. 1937–1955. Available from: http://jfoodprotection.org/doi/abs/10.4315/0362-028X-73.8.1552.

Toure, O. (2009). *Implementation of the Hazard Analysis Critical*

Control Points (HACCP) Method to Improve Microbiological Food Safety in Peri-Urban Mali. (Doctoral dissertation, London School of Hygiene & Tropical Medicine).

Trust, L.C.H. (2016). *Annual Report and Final Accounts*. [Online]. Available from: https://www.ulh.nhs.uk/content/uploads/2015/06/Annual-Report-2016-17-with-accounts.pdf.

Trust, L.C.H. (2014). *Food Safety Policy Lincolnshire Community Health Services*. [Online]. Available from: http://www.lincolnshirecommunityhealthservices.nhs.uk/sites/default/files/documents/policies_guidance/P_HS_06 Food Safety Policy.pdf.

UK Nursing Labour (2011). *Join the Royal College of Nursing*. [Online]. 2011. Royal College of Nursing. Available from: https://www.rcn.org.uk/congress?gclid=EAIaIQobChMIofaUk-3r2QIVTZ4bCh2iPgO4EAAYASAAEgK2XPD_BwE. [Accessed: 22 March 2016].

University Hospital Southampton NHS Foundation Trust (2012). *Patient Experience Strategy*. [Online]. (December) p.p. 23. Available from: http://www.uhs.nhs.uk/Media/Controlleddocuments/General/Patient-Experience-Strategy.pdf.

University of Southampton NHS Trust (2016). *Food Hygiene Policy*. [Online]. Available from: http://www.uhs.nhs.uk/Media/Controlleddocuments/Infectioncontrol/Foodhygienepolicy.pdf.

University of Southampton NHS Trust (2015). *Health and Safety Policy*. [Online]. Available from: http://www.uhs.nhs.uk/Media/Controlleddocuments/Governanceandsafety/HealthandSafetyPolicy.pdf.

Vision 2030 (2016). *Saudi Vision 2030*. [Online]. 2016. Kingdom of Saudi Arabia. Available from:

http://vision2030.gov.sa/en/node/10.

Walker, E., Pritchard, C. & Forsythe, S. (2003). Food Handlers' hygiene knowledge in Small Food Businesses. *Food Control*. [Online]. 14 (5). p.pp. 339–343. Available from: http://ssu.ac.ir/cms/fileadmin/user_upload/Mtahghighat/tfood/asil-article/amuzesh-Behdasht-Ghaza/Food_handlers_hygiene_knowledge_in_small_food_businesses.pdf.

Wallace, C. and Williams, T. (2001). Pre-requisites: A Help or a Hindrance to HACCP? *Food Control*. 12 (4). p.pp. 235–240.

Wearden, G. (2018). Carillion Collapse Exposed Government Outsourcing Flaws. *The Guardian*. [Online]. Available from: https://www.theguardian.com/business/2018/jul/09/carillion-collapse-exposed-government-outsourcing-flaws-report. [Accessed: 2 March 2018].

Wenger, E. & Trayner, B. (2015). *Introduction to Communities of Practice*. [Online]. 2015. Wenger-Trayner. Available from: http://wenger-trayner.com/introduction-to-communities-of-practice/. [Accessed: 12 June 2017].

WHO (1986). *Dengue haemorrhagic fever: diagnosis, treatment and control.* [Online]. Geneva: World Health Organisation. Available from: https://www.bmj.com/content/350/bmj.h694.

WHO (2015). Food Safety: What You Should Know. *Searo*. [Online]. Available from: http://www.searo.who.int/entity/world_health_day/2015/whd-what-you-should-know/en/.

WHO (2017a). *WHO Food Safety*. [Online]. 2017. WHO. Available from: http://www.who.int/news-room/fact-sheets/detail/food-safety. [Accessed: 31 October 2018].

WHO (2017b). *World Health Organization 2017*. [Online]. Available from: https://www.ecolex.org/details/legislation/regulation-ec-no-8522004-of-the-european-parliament-and-of-the-council-on-

the-hygiene-of-foodstuffs-lex-faoc063426/.

Willis, C., Jorgensen, F., Elviss, N., Cawthraw, S., Randall, L., Ellington, M., KL Hopkins, Swift, C. & Woodford, and N. (2018). *Surveillance Study of Antimicrobial Resistance in Bacteria Isolated from Chicken and Pork Sampled on Retail Sale in the UK*. [Online]. Available from: https://www.foodstandards.gov.scot/downloads/AMR_in_chicken_and_pork_Final_Report_July_2018_Final.pdf.

Wilson, S., Tyers, C. & Wadsworth, E. (2015). *Evidence Review on Regulation Culture and Behaviours*. [Online]. Available from: https://www.food.gov.uk/sites/default/files/media/document/Evidence Review on Regulation Culture and Behaviours.pdf.

Wong, J.E., Parnell, W.R., Black, K.E. & Skidmore, P.M. (2012). Reliability and relative validity of a food frequency questionnaire to assess food group intakes in New Zealand adolescents. *Nutrition Journal*. [Online]. 11 (1). p.p. 65. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3495845/.

World Economic Forum (2015). *The Global Gender Gap Index 2015*. [Online]. Available from: http://www3.weforum.org/docs/GGGR2015/The Global Gender Gap Index 2015.pdf.

World Health Organisation (2018). *WHO | Whole Genome Sequencing for Foodborne Disease Surveillance*. [Online]. Available from: http://www.who.int/foodsafety/publications/foodborne_disease/wgs_landscape/en/. [Accessed: 30 April 2018].

World Health Organization (2006). *FAO/WHO Guidance to Governments on the Application of HACCP in Small and/or Less-Developed Food Businesses.*

Zaręba Krzysztof (2003). *The State of Environment in Poland: 1996-2001*.

Appendix A: Participant Consent Form

The University of Nottingham

School of Sociology and Social Policy
Title of Project: **Food Safety Policy and Management in UK and KSA hospitals**

Researcher's name: Ali Alrashee

Name of Supervisors: Prof. Ian Connerton

□ I have read the Participant Information Sheet and the nature and purpose of the research project have been explained to me. I understand and agree to take part.

□ I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

□ I understand the purpose of the research project and my involvement in it.

□ I understand that my participation is voluntary and I may withdraw from the research project at any stage and that this will not affect my status now or in the future.

□ I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential.

□ I understand that data will be stored electronically and in hard copies and the researcher and his supervisor will have access to them.

□ I understand that I may contact the researcher or supervisors if I require further information about the research, and that I may contact University of Nottingham, if I wish to make a complaint relating to my involvement in the research.

Signed……..……..

(Research participant)

Print name

……..……..

…. **Date**

…..……..……

Appendix B: Ethics Checklist

REFERENCE	Signed off by Supervisor	Referred to REC

School of Sociology & Social Policy
Research Ethics Checklist for Students and Staff

The University of Nottingham's Guidance on Ethical Review states: "Ethical review (and approval) is required for all projects where the research involves participation of human subjects, their data and/or their tissue (even where the applicant indicates that there is only minimal risk)."

This form must be therefore be completed for all research projects, research assignments or dissertations/theses which are conducted within the School and involve human participants or data that are sensitive or protected**. You must not begin data collection or approach potential research participants until you have completed this form and received ethical clearance including the required signatures.**

If the study is based only on a review of documentary sources already in the public domain and involves NO fieldwork of any sort, then this form does not need to be completed.

Completing the form includes providing a summary of the research in Section 2 and ticking boxes in Section 4. Ticking a shaded box in Section 4 indicates that the study is above minimal risk and requires further action by the researcher. Two things need to be stressed:

- Ticking one or more shaded boxes does not mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.
- Avoiding the shaded boxes does not mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics need to be informed - for everyone and in every project – by an ongoing process of reflection and debate throughout the study.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

The checklist must be completed electronically and submitted on line to Alison.Haigh@Nottingham.ac.uk**. For all undergraduate and postgraduate taught students the checklist must be accompanied, where appropriate, by a completed Participant Information Sheet and Consent Form (Guidance and templates are included in Annex A below – these should be tailored to the individual project in the form they will be used in the field). All Ethics Checklists must be accompanied by a completed Fieldwork Risk Assessment Form (Please see School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx).**

The School also has guidance on researcher safety, lone working, working abroad, the Mental Capacity Act 2005 and the archiving of research data.

For further information on these and other ethical issues, please consult the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx

SECTION 1: THE RESEARCHER(S)

To be completed in all cases

Title of project:

Name of principal researcher:

Status: □ Undergraduate student

□ Postgraduate taught student

X Postgraduate research student

□ Staff

Email address:

Names of other project members:

To be completed by students only:

NAME IN CAPITALS
ALI FARAJ ALRASHEED

Student ID number: 4218470

Degree programme: PhD

Module name/number: Food Microbiology (JACS code: C56P).

Supervisor/module leader or tutor: Prof. Ian Connerton

SECTION 2: RESEARCH WITHIN OR INVOLVING THE NHS OR SOCIAL CARE

Does this research involve the recruitment of patients, staff, records or other data through the NHS or involve NHS sites or other property?

□ Yes

X No

If you have answered **YES** to the above question, ethical approval **MUST** be sought from the relevant NHS research ethics committee. Evidence of approval from such a committee **MUST** be lodged with the School office prior to the commencement of data collection.

Does this research involve the recruitment of users, staff, records or other data through social service authorities (children and adult services) or involve social service sites or other property?

□ Yes

X No

If you have answered **YES** to the above question, then you must check whether or not the relevant social service authority has its own ethical scrutiny procedures. If appropriate, evidence of approval from such an authority **MUST** be lodged with the School office prior to the commencement of data collection.

Even where external ethical approval has been obtained from an NHS committee or social service authority, completion of this form is mandatory.

SECTION 3: THE RESEARCH

Please provide brief details (50-150 words) about your proposed research, as indicated in each section

1. Research question(s) or aim(s)

Evaluation of Food Service Operations in Saudi Hospitals for comparison with UK policies: Food Safety, Quality for improved patient health and satisfaction. The project will examine the causes of the inadequate implementation of HACCP (Hazard Analysis and Critical control Points) food safety measures.

1. To determine the extent to which policies and food safety systems are executed in hospitals in Saudi Arabia for comparison with UK policies.

2. To test hygiene training programme specifically designed for hospitals in KSA to evaluate the knowledge; self-monitoring and attitude of food handlers working in Saudi hospital catering.

3. To develop a new hygiene training programme based on the good practice in the UK and to test its effectiveness and success with regard to safety and HACCP implementation in Riyadh's state hospitals.

4. To assess if hospitals in Saudi Arabia have a sufficiently high standard of knowledge to be able to successfully implement HACCP.

2. Method(s) of data collection

The Methodology used in this study involves primary data research.

The methods include qualitative analysis of the data obtained through questionnaires conducted in KSA MOH hospitals. The questionnaire is

based on the parameters for hazard control Knowledge, Attitude and Practice (KAP).

The research has also included the secondary data from the UK, public domain NHS Trust Hospital Food safety policies which will be compared to the KSA situation.

Two different types of questionnaire will be prepared for three different members of staff as follows:

1. Hospital Catering Manager/Supervisor (questionnaire B): These are the heads of department within the Ministry of Health responsible for food safety and nutrition in Saudi hospitals. They are MOH hospital-based Staff and they work in hospitals as general supervisors (ie they are not only responsible for food and food safety).

2. Contracted Catering Supervisors (questionnaire B): Questions will include those related to how these workers apply food safety management within the hospital.

3. Catering worker (Cooks & Waiters) (questionnaire A): These are contracted workers that are involved in preparing and serving food within the hospital environment. The questionnaire seeks to record their food safety training and awareness.

Each participant will indicate whether they are the MOH or Contracted employees, so as to enable the researcher to make comparisons between the MOH and contracted staff knowledge and attitudes. For example, it may be possible to conclude that the MOH supervisors have better knowledge and attitude towards food safety than the contracted staff or vice versa. This is likely to have further implications in relation to the need for standardized training.

Additionally, across the groups (supervisors and workers) and subgroups (MOH and contracted staff), the participants will indicate on the questionnaires whether they have had any previous food safety training or not. This will enable the researcher to make

conclusions about the differences in the training needs among each subgroup of participating supervisors and other workers and participants respectively (e.g. trained vs. untrained workers). This can potentially indicate not only the level of knowledge, but also the ways the knowledge was gained (e.g. formal training, peer observation, supervisor's feedback and comments, self-trained, common sense), which can further influence the knowledge transfer models. This implies that knowledge and good practice can be obtained not only through official training but in other ways as well.

The survey will inform decisions about the existing practice in Riyadh's state hospitals and any intervention recommendations will be applicable to the usual conditions of work. The answers to the surveys which are conducted in typical hospital settings may be varied between similar respondents, by preference and due to different institutional practices and policies.

Group sampling will determine the need for training and other additional means of knowledge transfer and sharing of best practice within the groups, and how these relate to each other. The questionnaire drafts provided have been evaluated by nutrition professionals but will be piloted in two of the state hospitals in Riyadh and amended as appropriate.

The researcher will address the staff at break times and leave the questionnaires for the staff to collect as they see fit. The questionnaires available will correspond with the target staff groupings identified above. A notice providing the simplified participation information will be placed in a communal area with copies of the information to take away (Arabic and English). This will also be preferably the location of the deposit box. The questionnaires will have no identity codes other than the date of distribution and hospital for reference. The researcher will outline the wider benefits for the improvement of food standards within hospitals, which will

also be provided within the introduction note about the project. A statement will be included that participation is completely voluntary and any worker can withdraw at any time without giving any reasons.

All participants will speak Arabic but they may not read and write the language. Overseas workers are common within the workplace in KSA. Many of these will read and write English and will be given the option to make use of this version of the questionnaire. However, it is anticipated that some workers will not be literate in either language. If these workers wish to participate then their views will be transcribed by the researcher and read back to the participant if he receives such as a request. With the participants permission an audio recording detailing the conditions of consent, as indicated within the consent form, will be made clear and that the participant understands and accepts these before any information is collected. The questionnaire seeks to establish training, knowledge and operating practices of the individual and does not seek to identify illegal practices. However, under these circumstances it will be made clear that any illegal practice will be reported because the recipients of the food could be vulnerable hospital patients.

3. Proposed site(s) of data collection

(Please see University's Lone Worker Policy and Working Abroad Policy on the School's Ethics page: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx)

Riyadh City, Kingdom of Saudi Arabia at the public hospitals of Riyadh.

We have chosen these hospitals because they are based in the largest city in Saudi Arabia and because I work in the General Administration of Nutrition, which is based in Riyadh. Also, the largest concentration

of patients is in Riyadh, which suits my research. The University foreign worker policy will be adhered to, and a risk assessment has been performed, scrutinized and accepted before presenting this case for ethical permission

The survey will be conducted within the context of everyday hospital practice with relatively unselected participants from the three groups as explained above, and under relatively flexible conditions (e.g. questionnaires will be available to the groups of participants during their daily break at a central community area). The researcher being a KSA national, a former MoH hospital worker and a citizen of Riyadh, has a clear understanding of custom and practice in the KSA hospital workplace.

4. How will access to participants be gained?

Initially, access is based on the rersearchers own experience as, a dietician working in the MOH (Ministry of Health) for more than eight years.

As an employee of the MOH, he has been given specific permission to undertake this study and has a letter from General Administrator for Nutrition Supervision at the MOH that allows him to speak to participants at different hospitals. The researcher will address the staff at break times and leave the questionnaires for the staff to collect as they see fit. The questionnaires and participation information will be placed in communal areas with copies of the information to take away (Arabic and English).

SECTION 4: ETHICAL CONSIDERATIONS

Please answer each question by ticking the appropriate box. All questions in section 4 **must** be answered.

4.1 General issues

	Yes	**No**
Will this research involve any participants who are known to be vulnerable due to: Being aged under 18? Residing in institutional care (permanently or temporarily)? Having a learning disability? Having a mental health condition? Having physical or sensory impairments? Previous life experiences (e.g. victims of abuse)? Other (please specify)…		√
Will this research expose participants to any significant risk of physical or emotional harm?		√
Will this research involve any physically invasive procedures or the collection of bodily samples?		√
Will this research address sensitive issues, for example, abuse, illegal activities, sex, sexuality, drug use, serious illness? (This list is not exhaustive)		√
Will this research involve deception of any kind?		√
Will this research involve access to personal information about identifiable individuals without their knowledge or consent?		√

I will inform immediately the School's Ethics Officer if I change the method(s) of data collection, the proposed sites of data collection, the means by which participants are accessed, or make any other significant changes to my research inquiry	√	

4.2 Before starting data collection

	Yes	**No**
I have read the *Research Code of Conduct* guidelines of the University of Nottingham, particularly section 4 on Data, and agree to abide by them. The *Research Code of Conduct* can be found on the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx.	√	
For those intending to work with children and/or vulnerable adults: I have read the University's *Guidance on the Protection of Children and Vulnerable Adults* The Guidance can be found on the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx).	N/A	
My full identity will be revealed to all research participants	√	
All participants will be given accurate information about the nature of the research and the purposes to which the data will be put	√	

All participants will freely consent to take part, and this will be confirmed by use of a consent form.		√
One signed copy of the consent form will be held by the researcher and another will be retained by the participant		√
It will be made clear that declining to participate will have no negative consequences for the individual	√	
It will be made clear that participation is unlikely to be of direct personal benefit to the individual	√	
Participants will be asked for permission for quotations (from data) to be used in research outputs where this is intended	√	
Incentives (other than basic expenses) are offered to potential participants as an inducement to participate in the research. (Here any incentives include cash payments and non-cash items such as vouchers and book tokens.)		√
For research conducted within, or concerning, organisations (e.g. universities, schools, hospitals, care homes, etc) I will gain authorisation in advance from an appropriate committee or individual. (This is in addition to any research ethics procedures required by those organisations, particularly health and social care agencies – see Section 2 above.)	√	

4.3 During the process of data collection

	Yes	**No**
I will provide participants with my University contact details, and those of my supervisor, so that they may	√	

make get in touch about any aspect of the research if they wish to do so		
Participants will be guaranteed anonymity only insofar as they do not disclose any illegal activities. This will be made clear before any data are collected	√	
Anonymity will not be guaranteed where there is disclosure or evidence of significant harm, abuse, neglect or danger to participants or to others. This will be made clear before any data are collected	√	
All participants will be free to withdraw from the study at any time, including withdrawing data following its collection	√	
Data collection will take place only in public and/or professional spaces (e.g. in a work setting). If fieldwork takes place in the respondent's home please outline in Section 6 what steps will be taken to ensure your safety. You must read the University's Lone Worker Policy and may wish to consult the SRA researcher safety guidelines (Please see School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx)	√	
Research participants will be informed when observations and/or recording is taking place	√	
Participants will be treated with dignity and respect at all times	√	

4.4 After collection of data

	Yes	No
Where anonymity has been agreed with the participant, data will be anonymised as soon as possible after collection	√	
All data collected will be stored in accordance with the requirements of the Data Protection Act 1998	√	
Data will only be used for the purposes outlined within the participant information sheet and consent form	√	
Details which could identify individual participants will not be disclosed to anyone other than the researcher, their supervisor and (if necessary) internal and/or external examiners without their explicit consent	√	
I will inform my supervisor and/or the School's Research Ethics Officer and (if necessary) statutory services of any incidents of actual or suspected harm of children or vulnerable adults which are disclosed to me during the course of data collection	√	

4.5 After completion of research

	Yes	No
Participants will be given the opportunity to know about the overall research findings	√	
Data must be submitted to the School office and will be retained (in a secure location) for 7 years from the date of any publication based upon them, after which time it will be destroyed.	√	

All hard copies of data collection tools and data which enable the identification of individual participants will be destroyed	√	

SECTION 5: ETHICAL APPROVAL

Declaration of ethical research

1. ***If you did not tick any of the shaded boxes*** *in section 4 of this form*, please sign and date below **and** get the checklist countersigned (see below for who the checklist must be countersigned by).

   Keep one copy of this form for your personal records.

   Students who undertake research involving primary data collection on non-dissertation modules must submit the authorised checklist along with their assessed work to Alison Haigh in the School Office.

   Undergraduate dissertation students who intend to conduct fieldwork should include **two hard copies** of the checklist with their dissertation plans submitted to dissertation tutors in the autumn. Then assuming the checklist is signed and authorised by their dissertation supervisor, **students should confirm this authorisation in a section discussing ethics in the text of the dissertation**. Failure to do so may incur penalties when the dissertation is marked. Some undergraduate module convenors will also distribute a short 'ethical declaration' that you will have to sign.

   Principal investigators and other researchers, including postgraduate research students and postgraduate taught students, should keep a copy of the authorised checklist on file.

   By signing this form you are agreeing to work within the protocol which you have outlined and to abide by the University of Nottingham's Code of Research Ethics. If you make changes to your protocol which in turn would change your answers to any of the above questions then you **must** complete a

new form and submit a copy to Alison Haigh or for undergraduates to your tutor/supervisor.

Signed ……  ……..Date ……5/7/2016……..

2. If you ticked any of the shaded boxes in section 4 of this form, then you must complete SECTION 6 (overleaf). You must then discuss all ethical issues arising, record the outcome, including the supervisor's or REO's response, and have this form countersigned (see below)

Authorisation

This section **must** be completed in **all** cases – by type of investigator the form must be countersigned by the following personnel:

Undergraduate student (no shaded boxes ticked) → module convenor or tutor/project supervisor

Undergraduate student (shaded boxes ticked) → module convenor or tutor/project supervisor → School Research Ethics Officer (REO)

Postgraduate taught student (no shaded boxes ticked) → dissertation supervisor

Postgraduate taught student (shaded boxes ticked) → dissertation supervisor → School Research Ethics Officer (REO)

Postgraduate research student → supervisor/upgrade panel → School Research Ethics Officer (REO)

Staff → School Research Ethics Officer (REO)

Having reviewed the ethical issues arising from the proposed research:

x I am happy for the research to go ahead as planned

□ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes

- □ This project must be referred on for more detailed ethical scrutiny by the REO/Research Ethics Committee
- □ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed  ……Date ……5/7/2016……

Role ……PGR Supervisor……....

Having reviewed the ethical issues arising from the proposed research:

- □ I am happy for the research to go ahead as planned
- □ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes
- □ This project must be referred on for more detailed ethical scrutiny by the REO/Research Ethics Committee
- □ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed …… Date ……

Role

……

……...

School REO…… Date

……

Note: **any** research protocols lodged with the School Office may be subject to review by the School's Research Ethics Officer

SECTION 6: FURTHER INFORMATION & JUSTIFICATION OF METHODOLOGY

One box should be completed for **each** shaded box ticked in section 4 of this form.

Ethical issue: Data will be collected in the form of a voluntary questionnaire, which implies the participants have given their consent by filling in and returning the document. Whereas all participants will speak Arabic, they may not read and write the language. Some overseas workers will read and write English and will be given the option to make use of this version of the questionnaire. However, it is anticipated that some workers will not be literate in either language. If these workers wish to participate then their views may be transcribed by the researcher and read back to the participant if he receives such as a request. Under these circumstances anonymity with respect to any

illegal practice cannot be guaranteed because the recipients of the food could be vulnerable hospital patients.

Rationale for chosen methodology and/or how ethical issue is to be addressed:

It is proposed that under these circumstances that an audio recording be made to confirm participation prior to transcription of the information, and that the details of the consent form are understood and accepted before any information is to be collected. The consent form will also be annotated to note the conditions of it's use.

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Ethical issue:

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Ethical issue:

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Ethical issue:

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Please continue on separate sheets if required

School Research Ethics Officer on behalf of
Research Development Group

September 2014

ANNEX A

This annex contains:

- A suggested format for a written consent form
- A suggested format for Participant Information Sheets

We hope you find these documents useful and that you will give us any comments for improvement.

All researchers

For all research the Ethics Checklist must be accompanied by a completed Fieldwork Risk and Assessment Plan (Please see School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx)

Undergraduate and postgraduate taught students only

You must include drafts of your Consent Form and Participant Information Sheet when you submit your completed Research Ethics Checklist for scrutiny to your supervisor and to the REO/Research Ethics Committee. These should be tailored to the individual project in the form they will be used in the field.

CONSENT FORMS

Research that involves the collection of personal or other sensitive data cannot proceed until potential participants have formally given

their consent. However, consent forms are not required where consent is implied, for example, the anonymous return of questionnaires by mail.

When seeking consent adults are assumed to be competent to do so unless the researcher judges that they are unable to assess the information provided to make a decision.

Where potential participants are aged *either* under 18 years *or* 18 years and over and are unable to make an informed decision about participation in the research, additional separate consent forms are required for a relevant third party, such as parents/guardians or partners/carers. In such cases the consent form will invite the third party to sign a statement that they have read and understood the Participant Information Sheet, and agree that the potential participant can take part in the research. In addition, children and young people should be asked to sign a consent form in their own right, even where parents have signed one.

Where potential participants are aged under18 years then you are required to undergo a **Disclosure and Barring Service** check. The responsibility for completing this satisfactorily is yours (see https://www.gov.uk/government/organisations/disclosure-and-barring-service) Proof of successful completion must be made available at all times.

In certain circumstance the researcher may also require the consent of an independent party, such as a Headteacher when fieldwork is being conducted in a school.

When a potential respondent declines to give consent, the researcher is allowed to offer further information or explanation about the

research but must not apply any moral or other pressure to get the individual to agree to take part.

The signed Consent Form is returned to the researcher and must be securely retained with any field notes and interview transcriptions. The participant (or third party) may retain a copy of the Participant Information Sheet.

Consent Form(s) for your research project

This guidance includes a template for writing a Consent Form for your research – variations to suit particular projects are allowed. Notes are given in *italics*.

Consent Forms may be produced on plain paper (rather than letterhead) since, unlike the Participant Information Sheet, they are collected and retained by the researcher.

School of Biosciences

University of Nottingham

Participant Consent Form

Evaluation of Food Service Operations in Saudi Hospitals for comparison with UK policies: Food Safety, Quality for improved patient health and satisfaction.

In signing this consent form I confirm that:

I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me.	Yes ☐	No ☐
I have had the opportunity to ask questions.	Yes ☐	No ☐
I understand the purpose of the research project and my involvement in it.	Yes ☐	No ☐
I understand that my participation is voluntary and I may withdraw from the research project at any stage, without having to give any reason and withdrawing will not penalise or disadvantaged me in any way.	Yes ☐	No ☐
I understand that while information gained during the study may be published, any information I provide is confidential (with one exception – see below), and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published.	Yes ☐	No ☐

I understand that the researcher may be required to report to the authorities any significant harm to a child/young person (up to the age of 18 years) that he/she becomes aware of during the research. I agree that such harm may violate the principle of confidentiality.	Yes ☐	No ☐
I agree that extracts from the interview may be anonymously quoted in any report or publication arising from the research.	Yes ☐	No ☐
I understand that data will be securely stored	Yes ☐	No ☐
I understand that I may contact the researcher or supervisor if I require further information about the research, and that I may contact the Research Ethics Officer of the School of Biosciences, University of Nottingham, if I wish to make a complaint relating to my involvement in the research.	Yes ☐	No ☐
I agree to take part in the above research project.	Yes ☐	No ☐

Participant's name (BLOCK CAPITAL)	Participant's signature	Date
ALI ALRASHEED		

Researcher's name (BLOCK CAPITAL) Contact details: stxaa76@nottingham.ac.uk Phone Number : +447479060111	Researcher's signature	Date

[Include following if third party/independent witnesses required]

Third party's name (BLOCK CAPITAL)	Third party's signature	Date

GUIDANCE AND TEMPLATE FOR PARTICIPANT INFORMATION SHEET

The Participant Information Sheet is given to potential participants so that they can give informed consent to participate in the research.

The Participant Information Sheet should:

- Clearly identify the School and the University – this can normally be achieved by using letterhead paper.
- Be written in clear and accessible style.
- Include the title of the research project.
- Identify the name of the researcher and give contact details.
- A statement of the aim/purpose of the research.
- Outline what groups of people are being asked to take part in the research, and if relevant how they are being identified/selected.
- Outline what the individual is expected to do as a participant in the study. This will include a statement of the likely time commitment involved and any inconvenience/discomfort that might be incurred.
- A description of any financial or other incentives for taking part in the research.
- A description of the possible benefits for participants/society of participation.
- An assessment of any foreseeable risks that participation might entail.
- A statement that participation is voluntary and s/he can withdraw at anytime without giving any reasons.

- A statement of what will happen to the collected information, including where it will be stored and details of access and when it will be destroyed.
- A statement of what will happen if researcher becomes aware of significant harm to a child/young person up to the age of 18 years and what this implies for the confidentiality of the research.
- If relevant, a statement that the participant will be allowed to comment on the transcript and/or given a report of the (main) research findings.
- An outline of intended research outputs, and a statement of whether anonymity will be maintained and whether anonymous quotes will be used in reports/publications.
- If relevant, a statement that the data may be used (by others) in secondary analysis.
- Contacts for staff who can deal with (a) any queries about the research (this will normally be the principle investigator or the student's supervisor; and (b) formal complaints about the researcher or other aspects of the research.

As appropriate the information sheet (and associated consent form) should be made available in languages other than English and in other formats.

In certain circumstances the Participant Information Sheet may be accompanied by a covering letter or incorporated in an opt-in or opt-out letter. With an 'opt-in' potential participants are asked to contact the researcher if they want to take part in the study, whilst with an 'opt-out' potential participants contact the researcher if they do not want to take part in the study.

This guidance includes a template for writing a Participant Information Sheet for your research – variations to suit particular projects are allowed. Notes are given in *italics*.

Participant Information Sheet may be produced on letterhead paper because they may be retained by participants as a record of the research.

PARTICIPANT INFORMATION SHEET

Food Safety Policy and Management in UK and KSA hospitals

Researcher name: Ali Alrasheed

Email:stxaa76@nottingmah.ac.uk

Phone number: 00447479060111

Aims of the study:

1. To determine the extent to which policies and food safety systems are executed in hospitals in Saudi Arabia for comparison with UK policies.
2. To test hygiene training programme specifically designed for hospitals in KSA to evaluate the knowledge; self-monitoring and attitude of food handlers working in Saudi hospital catering.
3. To develop a new hygiene training programme based on the good practice in the UK and to test its effectiveness and success with regard to food safety and HACCP (Hazard Analysis and Critical Control Points) implementation in Riyadh's state hospitals.
4. To assess if hospitals in Saudi Arabia have a sufficiently high standard of knowledge to be able to successfully implement HACCP.

Objectives

1. To carry out a survey on selected state hospitals (rural and urban) in Riyadh, Saudi Arabia to measure the implementation of food safety systems.
2. To survey the staff working in Saudi Arabia and the UK hospitals to establish the existing level of their food hygiene knowledge, their monitoring and attitudes to hygiene
3. To design and deliver a hygiene training programme specifically designed for food handlers in Riyadh's hospital kitchens and measure the beneficial effect, if any, on their food hygiene knowledge, behaviours and attitudes towards hygiene.

Three different types of questionnaire will be prepared for different members of staff as follows:
1. Hospital Catering Manager/Supervisor: These are the heads of department within the Ministry of Health responsible for food safety and nutrition in Saudi hospitals.
2. Contracted Catering Supervisors – Questions will be related to how they apply food safety management within the hospital.
3. Catering worker (Cooks & Waiters) – These are contracted staff that are involved in preparing and serving food within the hospital environment. The questionnaire seeks to record their food safety training and awareness.

- Answering the questionnaire is voluntary. No incentive or financial benefits will be provided.
- By answering the questionnaire you will contribute to improved food standards within Riyadh hospitals.
- Participation is completely voluntary; any worker can withdraw at any time without giving any reasons.
- Participants will be guaranteed anonymity only insofar as they do not disclose any illegal activities.

- Staff will require between 20-30 minutes in order to complete the questionnaire. The questionnaire can be completed in private and returned to the collection point or if assistance/clarification is sought any staff member may contact the researcher.
- The paper copies of the questionnaires will be scanned and destroyed. The electronic files will be kept in secure workspace until completion of the study when they will be erased.
- Findings will be published in a peer-reviewed journal and will be available for access to the general public. General findings will be forwarded to the Ministry of Health in KSA for the sole purpose of improving the standards of food hygiene in KSA. Anonymity will always be maintained in all research outputs.

Any queries about the research will be dealt with by (A) the principle investigator or (B) their supervisor. Also, formal complaints about the researcher or other aspects of the research should be sent to (B) the principle investigator's supervisor

(A) Contacts for the principle investigator

Researcher name: Ali Alrasheed
Email:stxaa76@nottingmah.ac.uk
Phone number: 00447479060111

(B) Contacts for the principle investigator's supervisor

Supervisor's name: Prof. Ian Connerton
Email:scziac@nottingham.ac.uk
Tel: +44 115 9516161

Complaint procedure

If you wish to complain about the way in which the research is being conducted or have any concerns about the research then in the first instance please contact the supervisor of the student (Prof Ian Connerton, Head of Food Sciences, School of Biosciences, Sutton Bonington Campus, University of Nottingham, Loughborough LE12 5RD,Tel +115 9516161, Fax +115 9516162,e-mail ian.connerton@nottingham.ac.uk).

If this does not resolve the matter to your satisfaction then please contact the School's Research Ethics Officer, Dr Kate Millar Tel: +44 (0)115 9516303; e-mail: kate.millar@nottingham.ac.uk, Sutton Bonington Campus, Loughborough, Leics, LE12 5RD, Centre for Applied Bioethics, University of Nottingham.

Appendix C: Process for handling milk formula

‘’**Wash hands** thoroughly in warm soapy water before cleaning and sterilising feeding equipment.

Wash Bottle thoroughly by removing the teat and other parts. Scrub thoroughly so that all feed is removed. Once washed, rinse the bottle thoroughly under the tap

Sterilising bottles

- Fill a large pan with boiling water and completely submerge all feeding equipment, ensuring there are no air bubbles trapped
- Cover the pan and boil for at least 10 minutes.
- Keep the pan covered until equipment is needed.
- Wash hands thoroughly and clean the surface around the steriliser before removing equipment.
- If the bottles are not being used immediately, they should be fully assembled with the teat and lid in place to prevent the inside of the sterilised bottle and the inside and outside of the teat from being contaminated.

Guidance for Preparing Feeds

1. Clean the surface thoroughly on which to prepare the feed
2. Wash hands with soap and water and then dry.
3. Boil fresh tap water in a kettle. Alternatively bottled water that is suitable for infants can be used for making up feeds and should be boiled in the same way as tap water.
4. **Important:** Allow the boiled water to cool to no less than 70o C. This means in practice using water that has been left covered, for less than 30 minutes after boiling.
5. Pour the amount of boiled water required into the sterilised bottle.

6. Add the exact amount of formula as instructed on the label always using the scoop provided with the powdered formula by the manufacturer. Adding more or less powder than instructed could make the baby ill.
7. Re-assemble the bottle following manufacturer's instructions.
8. Shake the bottle well to mix the contents.
9. Cool quickly to feeding temperature by holding under a running tap, or placing in a container of cold water.
10. Check the temperature by shaking a few drops onto the inside of your wrist – it should feel lukewarm, not hot.
11. Discard any feed that has not been used within two hours.

It is best to make up infant formula fresh for each feed but, there are times when this may not be practical and feeds need to be prepared in advance. For example, when taking an infant to a **nursery**.

Preparing powdered feeds for later use

- 1-9 Follows the steps above.
- Store the feed in the fridge at **below 5o C**. Prepared bottles are best kept in the back of the fridge and not in the door.
- The temperature of the fridge should be checked regularly using a fridge thermometer. A fridge that is opened frequently may need to be set at a lower temperature to ensure that it does not rise above 5 oC during times of frequent access.
- Feeds should never be stored for longer than 24 hours and this length of time is no longer considered ideal especially for young babies.
- Label each bottle with a date and time so it can be monitored.

Re-warming stored feeds

- Only remove stored feed from the fridge just before it is needed. Re-warm using a bottle warmer, or by placing in a container of

warm water. Microwaves should never be used for re-warming a feed.

Never leave a feed warming for more than 15 minutes.

- Shake the bottle to ensure the feed has heated evenly.
- Check the feeding temperature by shaking a few drops onto the inside of the wrist - it should be lukewarm, not hot.

Transporting feeds

- Ensure feed has been in the fridge for at least one hour before transporting.
- Only remove feed from the fridge immediately before transporting.
- Transport feeds in a cool bag containing a frozen ice brick.

  Feeds transported in a cool bag should be used within 4 hours.''

(ref:(University of Southampton NHS Trust, 2016). Please note: These instructions are directly taken from Southampton's Policy)