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Project Title:

**How Do Students Obtain Evidence-Based Health Information? A Study of Nursing Interns
in Clinical Practice in Saudi Arabia**

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Abstract

Background: Healthcare professionals can access massive amounts of online health data to drive cutting-edge evidence-based practice. This is particularly important for nursing students on clinical placement, to bridge the theory-practice gap as they prepare for clinical practice. This difficult transition requires investigation to identify the ways nursing students source and apply available information in terms of their skills and decision-making. This is the focus of the current study in the context of Saudi Arabia, identifying related behaviours and their implications for outputs, based on the theoretical basis of Dervin's model of sense-making. This thesis analyses nursing students' decision-making and cognitive mechanisms pertaining to their sourcing and evaluation of healthcare information resources. Comprehending related phenomena can identify challenges faced, enabling the development of optimal strategies to improve informational skills among nursing students and (subsequently) clinical practitioners.

Methods: Semi-structured interviews and Think Aloud protocols were deployed in this study to determine and analyse nursing interns' experiences and strategies of sourcing and deploying evidence-based information in clinical practice. Online Think Aloud sessions enabled participants to express their cognitive processes in navigating various educational resources, including online journals and databases, and determining the reliability of sources, indicating their strategies for information seeking. The interviews enabled analysis of instrumental factors pertaining to their information-seeking, identifying their ideal sources of information and perceived barriers to access and use. Validity and reliability was supported by data triangulation, analysing and comparing data from the interviews and sessions, and thematic analysis was applied to generate the main conclusions on nursing interns' strategies and application of evidence-based data.

Findings: The main emergent themes identified included the ubiquitous deployment of online search engines as the main source of information-seeking, especially Google, and the relative lack of utilisation of respected professional databases. Easy access and user convenience were clearly the instrumental factors in this behaviour, which has troubling implications for the lack of use of higher quality resources (e.g., from peer-reviewed academic journals). Identified challenges encountered during resource access included limited skills of critical evaluation of information credibility and reliability, signalling a requirement for improved information

literacy skills. Participants acknowledged the importance of evidence-based, high-quality information, but faced numerous barriers, such as restricted access to professional and specialty databases, a lack of academic skills training, and practical (time) constraints. Think Aloud outcomes led to the introduction of the Performance Tool, which was geared toward investigation of information accessing and evaluation effectiveness with regard to nursing students' deployment of evidence-based health information, which identified needs and led to suggestions to improve efficiency and quality.

Conclusion: The outcomes of this thesis offer important findings on nursing interns' information-seeking behaviour in Saudi Arabia and the observed outputs. The Dervin model of sense-making and the developed Performance Tool advance understanding of how nurses in Saudi Arabia access and evaluate evidence-based health information acquisition, and inform practical suggestions to improve the skills of nursing students (and, subsequently, practitioners) to facilitate the diffusion of high-quality evidence-based practice in clinical settings.

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List of Abbreviations

AC	Assessment criteria
ARDS	Acute respiratory distress syndrome
CS	Clinical statement
EBHI	Evidence-based health information
EBI	Evidence-based information
EBP	Evidence-based practice
ECMO	Extra corporeal membrane oxygenation
FMHS REC	Faculty of Medicine and Health Sciences Research Ethics Committee (UoN)
GCS	Glasgow coma scale
HCPs	Healthcare professionals
HINs	Health information needs
HISBs	Health information-seeking behaviours
ICT	Information and communication technology
ISBs	Information-seeking behaviours
ISP	Information-seeking process
MENA	Middle East and North Africa
MoH	Ministry of Health (Saudi Arabia)
NISs	Nursing intern students
PT	Performance Tool
QoC	Quality of care
RN	Registered nurse
SSI	Semi-structured interview
TA	Think Aloud
TAP	Think Aloud Protocol
TU	Taibah University
UoN	University of Nottingham
WHO	World Health Organization

Chapter 1

Introduction and Background

Nursing intern students (NISs) are students who are working in clinical practice, during their nursing internship program on several nursing specialty areas in hospitals, health care centres and communities (Smith, 2008). To successfully participate in clinical practice, NISs must become adept at choosing, evaluating, and learning from different health resources, in order to enhance their knowledge and clinical reasoning skills (Alotaibi, 2019, Aboshaiqah and Qasim, 2018). They need to determine which information sources to navigate and select what to read, how to recognise unverified health information, and how to undertake active roles in constructing meaning and evaluating health resources (Alharbi and Alhosis, 2019). Initially, information-seeking behaviours (ISBs) studies focused on the library and information science disciplines to identify areas for improvement in library services or source development; however, the direction of more recent research has shifted towards information users, and seeks to understand the users' behaviour when interacting with information and the information environment within their contexts (Aakre et al., 2019, Ali et al., 2017). Therefore, this study focuses on strategies of seeking health information, by analysing NISs' verbal responses together with their screen sharing activities, to explore their information-seeking process (ISP) in clinical scenarios, along with how they obtain health information in a clinical environment.

1.1 Health information resources: a brief introduction

It is assumed that healthcare professionals' need for information, within the context of their daily clinical work, leads to the use of different types of resources to obtain health information (Ricks and ten Ham, 2015b). These resources could be human, printed or digital resources (Mai, 2016). The term 'human resource' in the context of information seeking refers to all types of health information that are obtained by communicating with other people, such as colleagues, experts and specialists (Anker et al., 2011). The term 'printed resource' is generally understood to mean paper-based resources, such as books, journals, textbooks, and leaflets (Farokhzadian et al., 2015). While printed resources were traditionally the mainstay of healthcare research and Evidence-based practice (EBP) dissemination, they are considered

relatively inaccessible and impractical nowadays (relative to soft-copy and online resources), due to taking a long time to be available, having high purchase costs, and being difficult to use in practice in terms of locating or accessing information (Clarke et al., 2013, Eden et al., 2016).

Online resources can broadly be defined as web pages and documents on the internet that provide useful health information, and supporting software available online, such as databases (Suresh and Natarajan, 2021). Online health information resources afford access to huge volumes of high-quality, current, and relevant healthcare information (Alving et al., 2018a). Thus, scholarly interest in the ways knowledge is sought, found, created, disseminated, and used has also increased (Green et al., 2009, Mahaliyanaarachchi, 2017). Research has shown that physicians and nurses are typically busy, and they do not have sufficient time to search extensively for health information from online resources (Haruna et al., 2017, Aakre et al., 2019).

Online resources are essential tools for supporting nursing students due to their convenience, ease of use, and reliability in terms of fast access to quality and affordable healthcare resources (Lee et al., 2019). Online health information resources are available on many different forms, from various websites and providers of varying quality and reliability (Kahouei et al., 2013). Therefore, nursing students might rely on online resources that are not from quality-assured websites, such as those belonging to special interest or patient groups (Jacobs et al., 2017). Healthcare organisations such as the World Health Organization (WHO), recognised the need to develop online portals that provide reliable information to the public (Pittet et al., 2008). Together with other reputable websites and medical databases, these websites collect and disseminate health information based on scientific evidence, clinical guidelines, and expert consensus (AbouZahr and Boerma, 2005). Even when using authoritative health information, they could be accessing outdated research and guidelines (Li et al., 2021). The access to and use of such low-quality resources could establish unreliable health information for making clinical decisions (Kahouei et al., 2013).

Nowadays on the basis of this technology, generative artificial intelligence (AI) based on large language models, such as ChatGPT enables users to have natural, human-like conversations with a virtual assistant (Mijwil et al., 2023). The usage of ChatGPT to discover health information may increase online information accessibility (Kung et al., 2023). However,

further study is required to determine the optimal approaches for building and using technology decision-making assistants, as these technological tools are themselves novel and evolving, and their application by healthcare professionals (HCPs) is subsequently an emerging area of research (Kung et al., 2023, Biswas, 2023a).

Overall, many newly qualified HCPs prefer to obtain information from online resources due to a lack of experiences and hesitancy to ask human resources in practice (Wahoush and Banfield, 2014a, Ellis, 2017). Access to quality and affordable online health resources is, in many cases, limited for many nursing students (Farokhzadian et al., 2015). The situation is worse in many countries due to inadequate online health resources and a lack of a understanding the need to critically evaluate the health information resources accessed by nursing students (Bernard et al., 2012, Kitson and Harvey, 2016).

1.2 The history of evidence-based health information (EBHI)

The term 'evidence-based health information' was pioneered in the UK by Entwistle et al. (1998), to refer to healthcare decision making that based on integration the best available and reliable information with patient preferences and clinical expertise. Coulter (1998) similarly defined EBHI in healthcare as the use of available up-to-date and valid sources of information relating to patient care. The definition of EBHI has evolved in healthcare to allow the obtaining of new scientific evidence to update the healthcare system, review healthcare guidelines, and make efficient clinical decisions (Kahouei et al., 2012). In the Middle East and North Africa (MENA), EBHI remains poorly understood, and should be explored carefully due to direct correlation with patient safety (Alhawassi et al., 2018). This understanding was quickly applied to understand ISBs in relation to purposively searching to attain specific information (Ellis et al., 2002), and Mishra et al. (2015) reported that information-seeking illustrates a conscious effort from the human to acquire certain information already recognised from reliable sources. Following the same perspective, Savolainen (2016b) discussed it as an acquisition of information taken from certain sources. He described it as a seeking behaviours, to change a state of knowledge.

ISBs are widely recognised to be a key component of seeking health information, which seek to promote HCPs obtaining evidence-based information (EBI) in healthcare (Pang et al., 2015).

The core processes involved in behaviours of seeking information were defined by (Marchionini and Komlodi, 1998):

- Focusing on the aim for which the information-seeking is undertaken.
- Adaptation of the resources available for information acquisition.
- Evaluation of the information obtained.

ISBs are the activities of a person who can recognise their information needs, searching for such information in any way to use or transfer such information (Scott et al., 2018). Many studies about ISBs in health concluded that finding and using information is defined as the process of identifying health information needs (HINs), locating, collecting, reviewing and using the retrieved information to obtain information based on evidence (Nadzir and Salim, 2013, George et al., 2006, Wyse et al., 2017, Xing et al., 2018, KHademian et al., 2020). Healthcare environments without a common source of information exhibit a decentralised nature, which makes ISBs the primary mechanism for accessing EBHI or applying quality assessment (Krikelas, 1983, Halder et al., 2017). ISB models are described in more detail in the following chapter, with a view to selecting a suitable model to classify the target elements. ISB can be applied to any field of education or learning; within healthcare practice it is particularly important, and it forms part of the field of EBHI, which sits at the heart of contemporary healthcare practice (Pang et al., 2015).

In recent years, there has been a growing emphasis on promoting the use of evidence-based health information and enhancing health literacy (Scott et al., 2018, Lee et al., 2019). There is a significant correlation between nursing students' ISBs and their preference for EBHI. Nursing students who actively seek out evidence-based sources demonstrate a commitment to incorporating the best available research into their practice, thereby laying the groundwork for delivering high-quality patient care (Wahoush and Banfield, 2014b). However, the quality of the information varied massively, which made it a challenge for students to distinguish between EBHI and misinformation in clinical practice (Hogan et al., 2018). The following is the conceptualising of ISBs adopted by the present study.

1.2.1 Defining ISBs for the purpose of the study

The concept of ISBs emphasises the human behaviours associated with the sources and channels of information (Younger, 2010). Wilson (1999) emphasised that ISB is a response to

a need recognised by the user, which results in taking action to fulfil this need. The term 'ISBs' is used in this thesis to refer to how the NISs recognise the health information gap, and seek and evaluate information to fulfil specific clinical learning goals. It includes the utilisation of information and communication technology (ICT) or human-to-human interaction (Alving et al., 2018a, Asl et al., 2019). HINs occur when NISs identify gaps in their nursing knowledge or skills, which then triggers information-seeking actions in order to close gaps in their existing knowledge and skills resources (Baro and Ebhomeya, 2013). NISs fundamentally need the information to fulfil their practice and promote patient safety, which leads to improved quality of care (QoC) and good quality practice (Clarke et al., 2013). In this study, it was assumed that the daily clinical practice of NISs give rise to HINs and that need to enhance their own knowledge by seeking health information.

Throughout this thesis, the term 'information-seeking process' (ISP) is used to refer to the activities in which NISs engage when they perceive a need for information. It describes NISs' thoughts, feelings, and actions in their information-seeking activities, and how their pre-existing knowledge changes in the process (Hamid et al., 2016). The ISP involves searching for health information through various resources (Ruppel and Rains, 2012). Moreover, information evaluation in nursing practice refers to how nurses judge the relevance of health information, by checking the validity and reliability of the content, the source of the information, publication date, applying critical thinking, and checking author information and credentials (Williamson et al., 2015).

1.3 The research context

1.3.1 Nursing internship

The nursing internship is a necessary transitional period in Saudi context to practice nursing care, bridging the years of nursing education and the years of nursing practice (and the implicit theory-practice gap), helping students successfully transition to working as professional clinical nurses and shaping their future clinical practice (Aboshaiqah and Qasim, 2018). The Bachelor of Nursing program comprises four academic years and one internship year program, rotating through different units in several different hospitals. The internship program in Saudi comprises 12 months of intensive clinical practice, wherein interns are assigned to individual clinical units after four years of study. Table 1.1 demonstrates the

clinical internship rotation which shows a need to assess NISs understanding of EBHI in this range of specialties.

Table 1.1 Internship rotations include the following clinical areas from Taibah University (TU)

Surgical rotation	2 months	6 weeks male or female 2 weeks Operation room
Medical rotation	2 months	6 weeks male or female 2 weeks dialysis (optional)
Maternity rotation	2 months	3 weeks obstetric 3 weeks Gynaecology 2 weeks Labour & delivery
Paediatric rotation	2 months	3 weeks medical 3 weeks surgical 2 weeks neonatal or paediatric intensive care unit (optional)
Critical Care rotation	2 months	4 weeks Emergency room 4 weeks intensive care unit (ICU)
Clinical elective area	7 weeks	

This program is required before nurses can receive their certificate of completion, to allow them to work in healthcare facilities in Saudi Arabia (AlYami and Watson, 2014, Grande et al., 2021). NISs play an important practical role in providing nursing care independently in their internship year, due to the shortage number of nurses and workload (Alzahrani and Kyratsis, 2017). NISs may focus on simple routine care in each unit, such as participation in patient care and procedures such as blood culture procedure, blood transfusion monitoring, or administration of medications. It has been reported that the idea of a nursing internship positively prepares an intern to practice (AlThiga et al., 2017).

A successful internship programme should provide appropriate training and encourage continuous learning to help intern nurses transition from beginner to more advanced roles with demonstrable performance in stressful situations (AL-MAHMOUD et al., 2013). Whether interns are fully ready to perform the functions of registered nurses (RNs) is continually debated in Saudi (AlThiga et al., 2017). Therefore, there is a real need for ongoing support with regards to their behaviour and competency on the job, which will help interns

successfully transition to professional nurses in their clinical placements (Almutair, 2015). Internships are considered essential work experience for promising employees, and can help familiarise them with the potential role in nursing practice (Aboshaiqah, 2016, Aboshaiqah and Qasim, 2018). Table 1.2 illustrates the main goals and objectives of the internship based on Bachelor’s degree programs in nursing faculties in Saudi Arabia, which helps distinguish the importance of good ISBs to achieve objective 6. Additional information on Saudi nursing settings is shown in Appendix 1.

Table 1.2 Nursing internship goals and objectives in Saudi Arabia from Taibah University.

Internship Program
<p>Goals</p> <ul style="list-style-type: none"> • To provide nursing students with an opportunity to strengthen nursing skills, apply their knowledge in various clinical practices and demonstrate competency in practical skill and procedure. • To facilitate the transition to professional role.
<p>Objectives</p> <ol style="list-style-type: none"> 1. Be acquainted with hospital policies and procedures. 2. Apply theoretical knowledge into various clinical setting. 3. Enhance effective communication skill. 4. Develop professional relationships with patients and members of the multidisciplinary healthcare providers. 5. Improve the ability to act independently and implement appropriate nursing intervention. 6. Utilize appropriate available resources in patient care. 7. Ensure safe environment for patients, families and healthcare personnel. 8. Provide organized and quality patient care.

In the context of globalisation, where healthcare and educational practices are becoming increasingly interconnected, this study gains significant relevance by situating itself within the broader scope of global research in evidence based health information. It recognises that as healthcare systems and practices develop globally, the need for nursing students to proficiently navigate and critically evaluate information sources becomes not just a local necessity, but a global demanding (Melody et al., 2022). This research acknowledges the shared challenges faced by nursing students worldwide in finding reliable health information such as lack of level of experience, skills and time, and it emphasises the role of NISs as essential in shaping EBP across varied healthcare fields (Argyri et al., 2014, Clarke et al., 2013, Stokes et al., 2021a). By mentioning the universal aspects of ISBs and encouraging for a standardised approach that respects regional and cultural variations, the study contributes to

a more profound understanding of the global dynamics in nursing practice. It underscores the necessity of preparing nursing professionals who are not only competent in their local healthcare environments but are also equipped to contribute in a globalised healthcare scenario (Manca et al., 2021). According to this, the study ambitions to have a far-reaching impact, fostering a global community of nursing practitioners who can construct meaning, critically evaluate health resources, and actively contribute to the advancement of healthcare on an international scale, to improve information-seeking skills so that NISs and others can access EBHI in clinical practice.

The relationship between the theoretical underpinnings of nursing education and the hands-on experience during internship year is crucial for shaping competent for health care professionals, including nursing students (Fred, 2008, Ewertsson et al., 2017). However, a notable challenge arises as information seeking behaviours become a potential weakness during this transitional phase (Humbhi and Tareen, 2022). While the seek information is inherent in nursing practice, an excessive reliance on it may indicate a hesitancy to apply reliable information, hindering the integration of theory into clinical practice . This problem has the potential to unfavourably impact clinical competence, leading to delays in decision-making and compromising patient care (O'leary and Mhaolrúnaigh, 2012). Addressing this challenge is mandatory by implementing a curriculum that integrates theoretical foundations, real clinical scenarios, critical thinking skills, information-seeking skills and mentorship programs.

In the dynamic field of nursing, staying informed about evolving medical knowledge, technological advancements, and EBPs is crucial (Clarke et al., 2013). ISBs when approached correctly, empower NISs to make informed decisions, contribute to evidence-based care, and enhance patient care (Cederbaum and Klusaritz, 2009, Joshua, 2017). Thus, fostering a balance between theoretical understanding, practical application, and a constructive information-seeking process is essential for cultivating NISs who are not only familiar in established principles but also equipped to obtain reliable and up to date health information in clinical practice.

1.3.2 Statement of the problem and its importance

Various national and international recommendations have been formulated for HCPs about obtaining and assessing EBHI, all of which stress that good ISB performance can provide self-directed skills to filter resources while looking for health information, to avoid any uncertainties or risks that might be inherent in such information (Vogelsang and Besse, 2019, Baro and Ebhomeya, 2013, Alving et al., 2018a). Extensive research has shown that the ability to use critical thinking among nursing interns while seeking health information is limited. Along with difficulties on other aspects such as analysing complex patient situations and the ability to predict patient needs and potential outcomes, newly graduated nurses are dependent on help and guidance from experienced nurses and other HCPs in practice settings (Voldbjerg et al., 2016, Wangensteen et al., 2010, Profetto-McGrath et al., 2003, Moussa and Aboshaiqah, 2015). This issue has to be explored and recognised to enhance the ISBs and critical thinking dispositions with which newly qualified nurses enter practice, which is directly rooted in their experiences from internship programs (Voldbjerg et al., 2016).

A recent qualitative study in the region discussed the theory-practice gap during the transition to practice of nursing students in the United Arab Emirates. Nursing students referred to the inconsistency between the theoretical knowledge acquired during their education and the need to seek practical information in their clinical practice. The findings suggest the need for enhanced clinical supervision and increased support from clinical instructors and healthcare institutions (Saifan et al., 2021). Similarly, in a study of ISBs factors for NISs working in clinical practice in Malaysia, Nadzir and Salim (2013) identified that 60% were unfamiliar with how to obtain EBHI when they were observed within the healthcare setting, which was attributable to a lack of training sessions on ISBs during undergraduate training.

Commensurate with the main goals, objectives, and clinical rotation of the internship programs in Saudi settings, as explained above, effective strategies must be implemented when seeking health information independently within clinical practice, to deliver optimum healthcare services and advance nursing practice (Alkhazim and Althubaiti, 2014, Al-Dossary, 2018). In Saudi context, Hamaideh (2017) revealed that the least frequently used resources among Saudi intern nurses were digital ones, due to a lack of skills in seeking health information and applying quality appraisal. Similarly, Omer (2012) conducted a study to collect data from 413 newly qualified nurses in three cities (Alahsa, Riyadh, and Jeddah), and

they identified many barriers to obtaining EBHI in nursing practice. These included insufficient skills and time, lack of knowledge to evaluate health resources, and lack of physicians' cooperation to guide them; these factors were reiterated more recently by Al-Hanawi et al. (2019).

Researcher found similar barriers which were insufficient skills and time, lack of knowledge to evaluate health resources, and lack of physicians' cooperation to guide them, which were also mentioned by other studies (Alkhazim and Althubaiti, 2014, AlYami and Watson, 2014, Hamaideh, 2017, Alotaibi, 2019), despite one of the nursing internship program objectives being to utilise appropriate available resources for patient care, to improve the ability to act independently, and implement an appropriate nursing skills to seek health information and satisfy patient care needs. Moreover, the issue of unavailable human resources, such as nurses or clinical instructors in clinical practice, is a major concern for interns in Saudi healthcare settings due to several factors, including workload, staff shortages, lack of communication, and hesitancy to ask questions (Alkhazim and Althubaiti, 2014, Al-Dossary, 2018). NISs in Saudi are reluctant to ask questions due to high power distance and respect for educators or senior nurses (AAI, 2015, Alsaqri, 2017).

The policy of the Saudi Ministry of Health (MoH) and higher education have encouraged the use of EBHI in practice to advance clinical practice and ensure patient safety (Jamal et al., 2015, Elsheikh et al., 2018). The Saudi national development plan, Vision 2030, articulates that future Saudi nurses should ensure the delivery of healthcare services that meet national and international standards by seeking up-to-date health information and making accurate clinical decisions (Al-Dossary, 2018). NISs may have training sessions in universities and educational organisations which covered knowledge and skills relating to the search for resources for conducting research but not for seeking EBHI in the clinical practice or evaluating the resources (Jamal et al., 2015, Alharbi and Alhosis, 2019). They must be objectively informed about ISBs in practice, and how to utilise their skills to attain EBHI (Mears and Blake, 2017, El-Gilany and Abusaad, 2013). Nurses, including those who are intern students, are also challenged by the lack of adequate information-seeking sessions on training courses about how to obtain EBI in healthcare in universities and hospitals (Hamaideh et al., 2017). Nursing practice, nursing education, and nursing research must all converge to investigate this issue and support the actualisation of this vision in real clinical practice

contexts. Thus, it will be important to explore some of these challenges in this study and consider them in the context of nursing students training in practice. No studies were found exploring ISBs among NISs in Saudi settings.

1.4 The purpose of the thesis

Looking back to the goals and objectives of the internship program, there is a need of the education and training sector under the Saudi MoH to provide all available sources of health information in practice, with appropriate training and use of clinical instructors for such pedagogical purposes, and improving interns' skills to obtain EBHI. However, the information seeking strategies in the internship year remains unclear in Saudi Arabia, and existing research conducted in the country to explore EBHI in practice is limited, notwithstanding a few dedicated studies have explored how Saudi NISs seek health information related to their clinical practice, and the factors and strategies that support or hinder their accessing of high quality resources (Alkhazim and Althubaiti, 2014, Al-Dossary, 2018, Hamid et al., 2016). Thus, the purpose of this thesis is to explore the ISBs of nursing interns in KSA by diving deeply into their HINs, which may not be understood with necessary richness and depth when studying a broader group.

This study differs from existing research by exploring ISBs among nursing students in Saudi clinical settings, offering an exploration of the unique aspects within the Saudi healthcare environment. Unlike previous research that may have provided more generalised insights such as recruiting participants who was not working in clinical practice (Dastani et al., 2019, Gray et al., 2005, Palmer et al., 2009, Andrews et al., 2005, Al-Moteri, 2023), other studies have focusing on different settings and care pathway levels, such as physicians (Archambault et al., 2012b, Chiu et al., 2012, Weng et al., 2013, Mikalef et al., 2017a). This study delves into the specific practical challenges and strategies applied by NISs in this characteristic context. The multifaceted exploration encompasses aspects such as cognitive process, practical research skills, and healthcare infrastructure, which collectively shape the information seeking strategies of NISs. By providing a detailed account of these contextual details, this study holds the potential to inform targeted improvements in internship program and educational practices within the concept of EBHI. It also may uncover common patterns and

variations in seeking health information among nursing intern students across diverse cultural and clinical placement.

This thesis seeks to address this research gap, which comprises the justification for exploring the ISBs of NISs, which might have an impact on patient safety and nursing practice. The researcher's own experience of working with internship and training units has prompted a personal interest in this research. The researcher became interested in what health information resources NISs use for clinical decisions and patient care, and seek to understand the extent to which they ask colleagues or interact with other health information resources. Whether they use EBHI resources to make clinical decisions, and what factors and strategies they deploy when seeking health information from a wide range of sources. This study not only delves into the strategies and factors of seeking health information among NISs but also emphasises the practical implications. By analysing verbal responses and screen-sharing activities, the study aims to contribute insights that can potentially enhancing the efficiency of NISs' ISP. It also could inform the design of educational modules to enhance nursing students' proficiency in obtaining reliable health information. Moreover, by understanding how NISs navigate and obtain health information, the study provides insights into the criteria of evaluating the reliability and relevance of health information, contributing to the ability to develop critical thinking and decision-making skills among NISs. The following chapter presents a scoping review of ISP among clinical nurses, examining many factors that influence obtaining EBHI, together with the barriers and strategies that might affect nursing interns and novice practitioners when seeking health information.

1.5 Structure of the thesis

The thesis chapters are summarised as below.

Chapter 1: describes the parameters of this study, including the operational definitions of EBI and ISBs in healthcare, which play an important role on understanding NISs' behaviours while looking for health information. It explains the contextual background of nursing education and internships in Saudi Arabia, particularly the nursing internship program, including all important information related to Saudi settings, such as training and roles. It explains the purpose of the study and its justification.

Chapter 2: presents a scoping review conducted to provide a critical analysis of the literature surrounding the process of seeking health information among clinical nurses in practice, to attain an understanding of their HISBs. This is followed by an evaluation of the of ISB models undertaken to provide a firm model on which to build the scoping review and the study. Finally, the chapter presents the thesis aim and objectives.

Chapter 3: sets out the justification for the use of a qualitative approach as a methodology of choice. It also includes a discussion of the philosophical perspective and the study design, followed by the model used in exploring of NISs ISBs, and explanation of the Think Aloud (TA) method.

Chapter 4: describes the pilot study that is presented, described, and discussed, along with the modifications to the actual TA method. The aim of the pilot study is to see if the main study can proceed with or without modifications. In this Chapter, the process of moving to the online TA method through a pilot study is also discussed.

Chapter 5: outlines the methods employed in the actual study. TA was selected to examine and observe NISs' behavioural responses during a clinical scenario, and a semi-structured interview (SSI) technique was adopted to understand the perception of the use of information within a professional environment. The chapter explains the data collection and analysis procedures used, and addresses the quality of the research process through triangulation and reflexivity. It then describes the study population, setting, and recruitment. The chapter ends with the ethical considerations adhered to throughout the research process.

Chapter 6: presents the findings from the application of TA, identifying NISs' strategies of locating health information, constructing meaning, and assessing the information obtained, along with factors that facilitated or hindered the process of seeking health information.

Chapter 7: presents the findings from the SSIs. It concludes that most NISs had diverse HINs when training in clinical practice due to a lack of knowledge, expertise, monitoring, and confidence. Accordingly, identifying HINs in clinical practice at the point of care and obtaining the information accurately and efficiently have emerged as NIS issues in this study. There were some negative comments about a lack of knowledge to understand and interpret health information findings, unfamiliarity with the English language, and difficulty accessing high-quality resources. They expressed their need to develop their way of seeking health

information through a training course on how to obtain the best available evidence in clinical practice.

Chapter 8: presents the development of the Performance Tool (PT) along with findings and discussion. The PT helps to distinguish NISs' strategies and skills for obtaining EBHI by emphasising various aspects such as prior knowledge, keywords, databases, comparing resources, assessing author information, and more.

Chapter 9: presents a discussion of the results obtained from TA sessions and SSIs, including the ISBs, factors, and strategies that contribute to obtaining EBHI within patient care among NISs.

Chapter 10: presents the strengths and limitations of this study derived from all phases, along with the impact of the thesis. This chapter concludes the thesis by reviewing and evaluating the extent to which the research's aims and objectives were achieved.

Chapter 2

Literature Review

This scoping review focused on the experiences that nurses or nursing students' encounter while seeking health information from health-related resources within clinical practice. The findings of this literature review will provide an understanding of the main areas where significant gaps exist in terms of obtaining evidence-based health information (EBHI) in practice. Also, it helps to understand how nursing intern students (NISs) might access and assess health information in clinical practice. A scoping review was conducted to explore the process of seeking health information among nurses who were placed in clinical practice to attain an understanding of current health information-seeking behaviours (HISBs). In addition, an evaluation of the information seeking behaviour models was done to help with understanding where to focus to best explore these behaviours.

2.1 Understanding nurses' information-seeking process (ISP) in clinical practice: A scoping review

The previous chapter presented an overview of the literature concerning how Saudi NISs obtain EBHI in their internship year. Despite the exploding availability of information on healthcare and the ongoing pressure from authorities, the application of EBHI in nursing practice is limited (Breimaier et al., 2011, Lee et al., 2019). While there is little direct evidence about information seeking behaviours (ISBs) by nurses, there is some evidence of the barriers they may face in this area from studies that have focused on understanding their health information needs (HINs), rather than their behaviour (Gilmour et al., 2016a, Wahoush and Banfield, 2014b, Lialiou and Mantas, 2016b, Sarbaz et al., 2016b). These studies show that the most important barriers are: information overload; lack of knowledge, skill, or experience with the resources or respective technology; complexity of electronic information resources and organisational procedures and policies; lack of value for research in practice; and difficulty in accessing or understanding research materials (Wahoush and Banfield, 2014a, Casafont et al., 2021). Considering the challenge of information overload in the healthcare sector, and the complexities and overload of nurses' roles in clinical practice, researchers

acknowledged that a comprehensive understanding of the ISBs in practice would be a pre-requisite (Norbert and Lwoga, 2013, Khaleel et al., 2020).

A few studies have recommended exploring the actual process of seeking health information resources to support accessing high-quality health resources among nurses, specifically NISs in clinical practice (Sarbaz et al., 2016c, Alving et al., 2018b). Some parallels can be drawn from studies that recruited participants who was not working in clinical practice, such as students or patients (Dastani et al., 2019, Gray et al., 2005, Palmer et al., 2009, Andrews et al., 2005, Al-Moteri, 2023). Also, other studies have focused on different settings and care pathway levels, such as physicians (Archambault et al., 2012b, Chiu et al., 2012, Weng et al., 2013, Mikalef et al., 2017a). However, it is necessary to look specifically at seeking health information in nursing in clinical practice. Therefore, using literature on nurses or students who are placed in clinical practice might illustrate how NISs might access and evaluate health information within practice.

2.2 Aim of the literature review

The present review aimed to explore and synthesis a full understanding of the nurses' clinical information needs and the process of information-seeking used to satisfy those needs. The following objectives were developed:

- To identify clinical nurses' ISBs.
- To identify different strategies for evaluating health information resources by clinical nurses.
- To explore the barriers and facilitators affecting the nurses' ISP in practice.
- To identify the ISB models used in studies in the field of obtaining and utilising evidence-based health information.
- To discover how NISs behaviours of seeking health information in practice are explored in the literature.

A scoping review question articulated to help in searching for evidence is:

What behaviours do clinical nurses engage in when seeking health information in clinical practice?

The literature review in this research utilised a scoping review approach to meet specific criteria essential for the study's objectives. By analysing existing literature on the process of seeking health information among clinical nurses in practice, the scoping review aims to unravel the details of their HISBs. The scoping review shows useful in its ability to map the diverse literature comprehensively, providing an inclusive overview of the existing knowledge and find gaps (Pollock et al., 2021). Moreover, the review evaluates ISB models to established a robust foundation for the overall study. It studies the strengths and limitations of existing ISB models, offering a comprehensive understanding of their applicability in the context of clinical nurses' health information-seeking processes. The scoping review approach is underscored by its suitability for this study's broad nature, allowing the principle researcher to encompass a wide range of literature and diverse methodologies.

A scoping review is a preliminary evaluation used to establish research agendas and the scope of available research for a study to determine the nature and extent of research on a particular topic (Grant and Booth, 2009). It is commonly used in the field of nursing to identify gaps in the literature and to facilitate the formulation of research questions and methods (Maalouf et al., 2018). In contrast to systematic reviews, which focus on specific research questions and employ rigorous inclusion and analysis criteria, scoping reviews seek to identify the breadth of evidence and knowledge deficits in a broad subject area. The primary purpose of a scoping review is to investigate the scope, nature, and distribution of research on a specific topic, which makes it useful for identifying key concepts, evidence sources, and research methodologies. It can help researchers understand the existing literature, identify gaps in knowledge, and provide an overview that informs future research directions (Munn et al., 2018).

In comparison to other models of review, such as systematic reviews and meta-analyses, scoping reviews offer a broader overview of a research topic without aiming for exhaustive evidence synthesis. They are particularly useful in areas with limited research or emerging fields where a comprehensive understanding of existing literature is needed (Peterson et al., 2017). In contrast, systematic reviews focus on specific research questions, follow a stringent methodology, and aim to synthesise and analyse data quantitatively when possible (Harris et al., 2014). Scoping reviews have some limitations. Due to their broad nature, they may not provide a detailed synthesis of individual study findings or assess the quality of evidence in

depth. The inclusion of diverse study designs and the potential for including lower-quality evidence may affect the overall rigor and reliability of the review. Additionally, scoping reviews do not typically involve a formal assessment of bias or risk of bias, which is a common component of systematic reviews. However, one of the strengths of a scoping review is its ability to encompass a wide range of study designs and sources of evidence, including both published and unpublished literature. It allows for the inclusion of diverse types of research, such as empirical studies, conceptual articles, and grey literature, providing a comprehensive view of the topic under investigation (Pham et al., 2014).

Overall, scoping reviews provide a valuable approach for mapping the existing evidence, identifying research gaps, and informing future research directions. While they may not provide detailed synthesised findings or assess the quality of evidence to the same extent as systematic reviews, they serve a distinct purpose in the research landscape, helping to establish the current state of knowledge in a given field (Munn et al., 2018). Therefore, this review aimed to explore the process of seeking health information among clinical nurses to attain an understanding of current HISBs. Exploring clinical nurses' information resource factors (time, skills, accessibility, usability and the resources sought) and the effectiveness of information sources (traditional or digital) would assist in understanding how they might access and utilise EBHI. The word 'clinical' is used to differentiate it from the ISBs associated with teaching, research, and administration.

2.3 Steps in conducting scoping review

The question and objectives of this literature review are expansive, requiring a systematic approach to identifying a wide relevant range of research studies. However, the question missed the specificity needed by the systematic review approach. Therefore, this review utilises a scoping review approach to examine the relevant literature on the subject of seeking health information in clinical practice for either nurses or nursing students and to identify the research gaps in the available literature. The study is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for Scoping Reviews (PRISMA-ScR) checklist (Tricco et al., 2018). According to Peters et al. (2020), who have been significant in conducting and recommending scoping reviews, the strategy selected for finding literature in a scoping research project needs to accomplish both in-depth and wide

outcomes, and it must identify all relevant literature regardless of study design. Therefore, reviewers might modify search terms and conduct more sensitive literature searches. The process of scoping is not linear, but rather iterative, requiring reviewers to interact with each stage in a reflective manner and, if required, repeat stages to guarantee full coverage of the literature. This scoping review used the Joanna Briggs Institute’s (JBI) six-step approach for conducting a scoping review (Table 2.1).

Table 2.1 Scoping review stages

1	Identify the research question
2	Identify relevant studies
3	Study selection
4	Charting the data
5	Collating, summarising and reporting results
6	Expert consultation (optional and included)

Source: (JBI, 2015)

2.4 Identifying relevant studies

A scoping review was undertaken to identify the ISBs and what beyond that towards discovering health information from different resources among nurses in clinical practice. Quantitative, qualitative and mixed-method studies were included in order to consider different aspects of exploring ISBs. Papers were excluded if they did not fit into the conceptual framework of the study. There were some excluded studies associated with the use of health information (Dastani et al., 2019, Gray et al., 2005, Palmer et al., 2009, Andrews et al., 2005, Wang et al., 2021), because their study did not recruit participants who work in clinical practice in a hospital.

The question mentioned above posed three criteria were categorised according to the broad Population—Concept—Context (PCC) which recommended by Peters et al. (2020) to construct a clear and meaningful title and inclusion criteria for a scoping review.

Population: Nurses and nursing students.

Concept: Information-seeking behaviours (ISBs).

Context: Clinical practice.

2.5 Search strategy

As suggested by the Joanna Briggs Institute, the personal researcher should start with a comprehensive search to inform subsequent search strategy (Peters et al., 2015). Then, to select the studies relevant for the answer to this review question, three stages were employed with a specially designed search strategy (Peters et al., 2020). The table provides an outline of the search strategy stages (Table 2.2).

Table 2.2 The search strategy stages

Stages	Description
1	The first step was carried out on the two largest databases in nursing and general medicine which are MEDLINE, as the major healthcare database, and CINAHL as the major nursing database. The key purposes of a preliminary search can be listed as follows: 1) to inspect the availability of published studies to review focus, 2) to identify topical keywords, index terms and main subject headings from the titles, abstract, to support in developing the database search terms, and MeSH descriptors on the review PCC framework and 3) determining whether any review had already been conducted or published about this topic.
2	Then, key terms, thesaurus and MeSH terms were used in a second comprehensively search through following databases: PubMed, EMBASE, Web of Science (WoS), CINAHL (1982 to present), the Cochrane Central Register of Controlled Trials (CENTRAL), AMED, and MEDLINE (Table 2.3). Databases have different structured index terms and subheadings; hence, creating a unique strategy for each database is important. The key terms were therefore modified and applied according to each searched database to explore all relevant studies. The search terms were modified together and linked by the Boolean operator 'OR.' Then the results were combined with AND. Table provides search from one database. Appendix 2 provides an overview of the search term and (MeSH) used regarding PCC framework from Medline database. Moreover, a hand search in some key journals or reviews was conducted.
3	A total of 7957 studies were exported to reference manager Endnote. The reference lists and bibliographies of all retrieved studies were screened against the eligibility criteria of this review to identify relevant articles. A librarian was consulted to ensure that the best effort was made to undertake thorough searches, thereby ensuring that all articles that may be pertinent to the review focus were retrieved.

Table 2.3 Search terms and Medical Subject Headings (MeSH) used with PCC framework to identify synonyms and combine keywords

Column terms combined with	Population	Concept	Context
Key component	Clinical nurses	Information-seeking behaviours	Hospital/Clinical practice
Databases <i>Ovid MEDLINE, CINAHL, Cochrane Library, PubMed, WoS, EMBASE, AMED, PsycINFO</i> OR	Nursing staff* MH. Nurse* m.p. Nurse clinician* MH. Internship m.p. Clinical nurse* m.p. Bedside nurse*. m.p. Hospital nurse* m.p. Students, Nursing. MH. Education, Nursing.MH. “Internship and Residency”* MH. Nursing student*. m.p. Hospital nursing staff. m.p Nurse practitioner*. MH. Nursing intern*. m.p	Information need*.mp. Information Behaviours.mp. Information Behaviour*.mp. Information-Seeking Behavior. MH. Information Behaviors.mp. Information-Seeking Behaviour. m.p. Information search.mp. Information seeking.mp. Information usage.mp. EBI.mp. Information-Seeking Process. MH. Information use*. m.p. Information Skill* MH.	Hospitals. MH. Workplace. MH. Hospital m.p. Nursing Staff, Hospital/. MH. practice* MH. Nurse* practice. m.p. Nurse* performance.m.p. Clinical performance. MH.
m.p.: key word, MH: medical subject heading.			

2.6 Inclusion and exclusion criteria

Table 2.4 shows the Eligibility criteria that were developed following the PCC framework. The inclusion criteria for the chosen articles were full-text format and English language composition. This analysis included only peer-reviewed journal papers and excluded articles published in formats other than the original paper, including reviews and editorial letters, as well as proceedings.

Table 2.4 Review of eligibility criteria

Framework	Inclusion criteria	Exclusion criteria
Population	The study focuses on both registered nurses and nursing students, encompassing a diverse range of healthcare professionals within the field. Clinical nurses are defined as: <i>'nurses who are directly related to nursing care and nurses' daily clinical work'</i> (Poorchangizi et al., 2017) (Registered Nurse Requirements)	-Administrative nurses. -Other healthcare providers. - Other nurses who working in different units such educator nurses. -Undergraduate or postgraduate nursing students who study at universities.
Concept	Information-seeking behaviours (ISBs) explored in-depth, including the specific methods employed by nurses and nursing students to seek health information. This involved examining their preferences for information sources, modes of information retrieval, and potential challenges encountered during the information-seeking process.	-This review excluded any interest not relevant to ISBs and health resources. - Studies about the effectiveness of education and training courses on clinical practice. -Studies about applicability or acceptability of health information.
Context	The research unfold in various clinical practice settings, including hospitals, clinics, and community healthcare environments. Factors influencing ISBs within these contexts, such as technological infrastructure, organisational support, and time constraints, were analysed to provide a comprehensive understanding of the ISBs in clinical practice	- Studies seeking health information off healthcare facility.
Study design	Can either be a quantitative synthesis, a qualitative synthesis of data or mixed methods.	-Review articles, experts' opinions, editorial letters and unpublished literature.
Publication date and language	-The search was limited to: English-language publications and primary research articles conducted in any countries.	Non-English studies.

2.7 Study selection

This review used a narrow definition for clinical nurses, encompassing general nurses and intern nursing students who faced some questions and health inquiries during their clinical practice and needed clinical information to answer them. This study did not include physicians, medical students, librarians, care managers, or any other patient care professionals owing to the differences between clinical practice and other disciplines, such as different educational backgrounds, employment in different environments, and ways of assisting patients. In order to produce more specific, homogeneous, and integrated findings, the papers that used a population consisting of clinical nurses and other care professionals were eliminated. Further, this review excluded articles about nurses' information-seeking outside the context of seeking health information freely, such as the effectiveness of health websites or health applications. Data extracted was performed by the principle researcher and guided by the supervisors. The results was reported considering numbers of citations screened, duplicates removed and full-text documents assessed, ideally with PRISMA flow diagram (Tricco et al., 2018). Figure 2.1 shows A PRISMA flowchart used to display the final numbers of the included studies (Stovold et al., 2014), which were recognised as appropriate to include based on inclusion and exclusion criteria (Table 2.4).

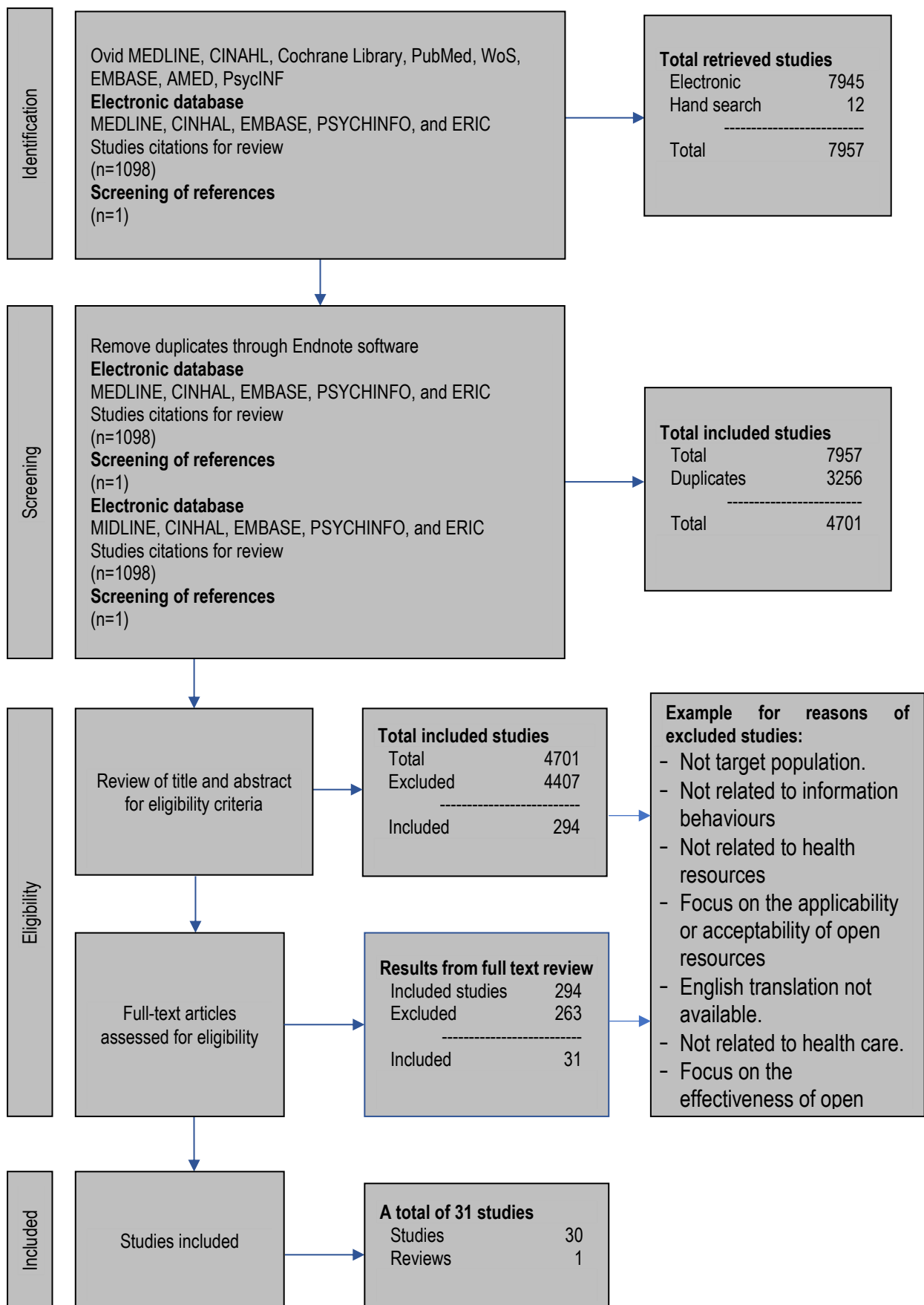


Figure 2.1 PRISMA flow diagram for the scoping review process

2.8 Charting the data

Data was extracted along with the tabulated results. A charting table frame was developed to document selected studies, including study characteristics.

- Nurses' HINs in clinical setting.
- Health Information sources used by the nurses such as text, electronic or interpersonal.
- Information-seeking strategy that consider by nurses to obtain EBHI.
- Factors that can be facilitators or barriers.
- Studies conducted with a model to understand ISBs.

A data extraction tool were adapted and utilised from the JBI guidance to conduct a scoping review (Peters et al., 2020). Table 2.5 presents the principal findings of the studies included in the review.

Table 2.5 Summary of included studies and review

N	Authors	Background		Research		Information				
		Participants	Country	Design	Tools	Needs	Sources	Process	Factors	Models
1	Lathey and Hodge (2001)	Nurses	USA	Quantitative	Questionnaire	Yes	Yes	No	Yes	No
2	Cogdill (2003)	Nurses	UK	Mixed method	Questionnaire; interviews	Yes	Yes	Yes	Yes	Yes
3	Stokes and Lewin (2004)	Nurses	UK	Mixed method	Questionnaires, interviews and informal observation.	Yes	Yes	Yes	Yes	Yes
4	Estabrooks et al. (2005)	Nurse	Canada	Quantitative	Questionnaire	Yes	Yes	Yes	Yes	No
5	Dee and Stanley (2005)	Nursing students and nurses	USA	Mixed method	Questionnaire; interview; observation	Yes	Yes	Yes	Yes	No
6	McKnight (2006)	Nurses	USA	Qualitative	Observation / interview	No	Yes	No	Yes	No
7	Tannery et al. (2007)	Nurses	USA	Quantitative	Questionnaire	Yes	Yes	No	No	No
8	Turner et al. (2008)	Nurses	UK	Qualitative	Semi-structured, in-depth interviews	Yes	Yes	Yes	Yes	No
9	Koivunen et al. (2010)	Nurses	Finland	Quantitative	Questionnaire	Yes	Yes	Yes	Yes	No
10	Ross (2010)	Nurses	USA	Quantitative	Questionnaire	Yes	Yes	No	Yes	No
11	Jones et al. (2011)	Nurses	USA	Qualitative	Observation (TA/Field note)	Yes	Yes	No	Yes	No
12	Mashiach Eizenberg (2011)	Nurses	Israel	Quantitative	Questionnaire	No	Yes	No	Yes	No
13	Stokes and Urquhart (2011)	Nursing students	UK	Quantitative	Questionnaire	Yes	No	Yes	Yes	Yes
14	Duncan and Holtslander (2012)	Nursing students	Canada	Qualitative	Semi-structure interview	No	Yes	Yes	Yes	Yes

Table 2.5 Summary of included studies and review

N	Authors	Background		Research		Information				
		Participants	Country	Design	Tools	Needs	Sources	Process	Factors	Models
15	O'Leary and Mhaolrúnaigh (2012)	Nurses	UK	Mixed method	Questionnaire; interview	Yes	Yes	Yes	Yes	Yes
16	Baro and Ebhomeya (2013)	Nurses	Nigeria	Quantitative	Questionnaire	Yes	Yes	No	Yes	No
17	Shaheen et al. (2013)	Nurses	Singapore	Quantitative	Questionnaire	Yes	Yes	Yes	Yes	No
18	Argyri et al. (2014)	Nurses	Greece	Quantitative	Questionnaire	Yes	Yes	No	Yes	No
19	Wahoush and Banfield (2014)	Nursing students and nurses	Canada	Mixed method	Questionnaire; interview	Yes	Yes	No	No	No
20	Farokhzadian et al. (2015)	Nurses	Iran	Quantitative	Questionnaire	Yes	Yes	Yes	Yes	No
21	Kumaran and Chipanshi (2015)	Nurses	Canada	Mixed method	Questionnaires, interviews	No	Yes	No	Yes	No
22	Ricks and Ten Ham (2015)	Nurses	South Africa	Quantitative	Questionnaires	Yes	Yes	No	Yes	No
23	Stokes and Urquhart (2015)	Nursing students	UK	Qualitative	Interviews	Yes	Yes	Yes	No	No
24	Gilmour et al. (2016b)	Nurses	New Zealand	Quantitative	Questionnaires	No	Yes	No	Yes	No
25	Lialiou et al. (2016)	Nurses	Greece	Quantitative	Questionnaires	Yes	Yes	No	Yes	No
26	Sarbaz et al. (2016a)	Nurses	Iran	Quantitative	Questionnaires	No	Yes	No	Yes	No
27	Intas et al. (2017)	Nursing students	Greece	Quantitative	Questionnaires	No	Yes	No	Yes	No
28	Diekema et al. (2019)	Nurses	USA	Quantitative	Questionnaires	Yes	Yes	No	Yes	No
29	Lee et al. (2019)	Nurses	Denmark	Quantitative	Questionnaires	Yes	Yes	No	Yes	No

Table 2.5 Summary of included studies and review

N	Authors	Background		Research		Information				
		Participants	Country	Design	Tools	Needs	Sources	Process	Factors	Models
30	Gkorezis et al. (2021)	Nurses	Greece	Quantitative	Questionnaires	Yes	Yes	No	No	No

N	Authors	Area	Review	Aim
1	Davarpanah and Aazami (2011)	Nursing practice	Systematic review	To review literature on ISBs among nurses and identify their HINs.

2.9 Collating, summarizing and reporting the results

A goal of this study is to explore how NISs obtain EBHI in a clinical environment. Nursing internship programmes allocate NISs to clinical practice to help them demonstrate clinical performance within the set standards and cope in a real-life situation (Alharbi and Alhosis, 2019, AL-MAHMOUD et al., 2013). Therefore, this scoping review focused on the factors and experiences that clinical nurses encounter while seeking health information from health-related resources within their clinical practice. The findings of this scoping review will provide the main areas of interest to draw attention to where significant gaps might exist in terms of EBHI. These findings of the different information-seeking strategies, such as ISBs or assessing the quality of resources, will assist in the understanding of how NISs might access and utilise health information in clinical practice. This section would strengthen our understanding of current health ISBs and the factors that influence their acquisition of health information.

For study selection, articles published between 2000 and 2023 were considered, focusing on quantitative synthesis, a qualitative synthesis of data or mixed methods written in English. The inclusion criteria encompassed research involving both registered nurses and nursing students, exploring ISBs in clinical practice. Studies exclusively focusing on other healthcare professionals or non-clinical settings were excluded. In terms of synthesis, the findings were categorised and interpreted in relation to ISP among nurses and nursing students in clinical practice. Each category was carefully examined, encompassing various settings, populations, models, and study designs. The scoping review approach provided a comprehensive synthesis within each category. All included studies recruited nurses in a healthcare setting and shared the objective of examining nurses' ISBs and their evaluation of the quality of information resources. The following subsection presents the principal findings of the current review.

2.9.1 Study characteristics

This review focused on investigating how student nurses and registered nurses within their clinical settings access information sources and the factors that they encounter while seeking health information from health-related resources. The findings of this study drew attention to key areas where considerable gaps may exist in terms of EBHI. All included studies were conducted in a clinical setting and shared the objective of examining nurses' ISBs. There were different elements extracted from selected studies to be addressed under nurses' HINs,

information sources, ISP, facilitators and barriers to information seeking, and studies conducted with the model. All of the studies included were qualitative, quantitative, or mixed methods; they used different tools such as questionnaires, interviews, field notes, or observations. Moreover, it was noted that one of the included studies used the TA method to observe nurses behaviours while seeking health information (Jones et al., 2011). All included studies considered specific population characteristics, such as nurses or nursing students who work in clinical practice. The sample sizes ranged across different clinical settings (medical, surgical, and critical). Table 2.5 summarises the characteristics of the included studies. The following subsection presents the principal findings of the current review.

2.9.2 Nurses' health information needs

Table 2.6 lists the types of patient-care-related information that nurses need. In this part, the clinical information requirements of nurses were detailed; however, non-clinical information requirements such as education and research were ignored. Within all the included studies, 21 studies mentioned clinical information needs and considered it to be any information related to patient care in practice. Following this, 14 studies mentioned keeping personal knowledge up-to-date and considered it any information related to continuous professional development (CPD). Meanwhile, the medication information needs, which related to any information related to medication such as indication, side effects, and interactions, were mentioned in 7 studies. In addition, government regulations relating to healthcare were another source of information mentioned in the articles, generally in 5 articles. It referred to any information that regulates nurses' work, which is the least amount of information a nurse needs in a clinical setting.

Table 2.6 Nurses' health information needs

N	Authors/ year	Government regulations relating to healthcare	Personal knowledge up-to-date	Clinical needs	Medications information
		Any information to regulate nurses work	Any information related to CPD	Any information related to patient	Any information related to medication
1	Lathey and Hodge (2001)	Yes	Yes	Yes	Yes
2	Cogdill (2003)	-	-	Yes	Yes
3	Stokes and Lewin (2004)	Yes	Yes	Yes	-
4	Estabrooks et al. (2005)	-	Yes	Yes	-
5	Dee and Stanley (2005)	-	Yes	Yes	Yes
6	Tannery et al. (2007)	-	-	Yes	-
7	Turner et al. (2008)	-	Yes	Yes	Yes
8	Koivunen et al. (2010)	-	Yes	Yes	-
9	Ross (2010)	-	-	Yes	-
10	Jones et al. (2011)	Yes	Yes	Yes	-
11	Stokes and Urquhart (2011)	-	Yes	-	-
12	O'leary and Mhaolrúnaigh (2012)	-	-	Yes	-
13	Baro and Ebhomeya (2013)	-	Yes	Yes	Yes
14	Shaheen et al. (2013)	-	Yes	Yes	-
15	Argyri et al. (2014)	Yes	-	Yes	-
16	Wahoush and Banfield (2014)	-	-	Yes	-
17	Farokhzadian et al. (2015)	-	-	Yes	-

Table 2.6 Nurses' health information needs

N	Authors/ year	Government regulations relating to healthcare	Personal knowledge up-to-date	Clinical needs	Medications information
		Any information to regulate nurses work	Any information related to CPD	Any information related to patient	Any information related to medication
18	Ricks and Ten Ham (2015a)	-	-	Yes	Yes
19	Stokes and Urquhart (2015)	-	Yes	-	-
20	Lialiou et al. (2016)	-	Yes	Yes	-
21	Intas et al. (2017)	-	-	-	-
22	Lee et al. (2019)	Yes	Yes	Yes	-
23	Diekema et al. (2019)	-	Yes	Yes	Yes
24	Gkorezis et al. (2021)	-	-	Yes	-

2.9.3 Nurses' health Information sources

Table 2.7 presents the information sources utilised by nurses for their HINs in clinical practice. The sources of information were classified into four main categories: textual, digital, interpersonal, and others. Due to the high number of sources collected and the variety of methodologies used in each study, only the frequency of sources was provided, and the ranking of sources was ignored. Also, most publications showed that the most common place for clinical nurses to look for clinical information was at work, such as in hospital units. Only a small number of nurses did their search at home to obtain the clinical information they needed. Within the 29 studies that included studies that analysed nurses' health information sources, Stokes and Urquhart (2011) recruited a model that did not focus on the source of the information. The digital sources to which the nurses most often referred to satisfy their informational needs were mentioned in 25 studies, such as internet websites or databases. Then, the text sources to which the nurses referred in order to satisfy their informational needs were 22 studies, such as books and nursing journals. Followed by the interpersonal

sources to which the nurses referred in human resources with 20 studies, such as colleagues. Finally, in other sources, such as conferences that are utilised by nurses, there are 13 references.

Table 2.7 Information sources used by the nurses

N	Authors/ year	Text sources	Digital sources	Interpersonal sources	Other sources
1	Lathey and Hodge (2001)	<ul style="list-style-type: none"> • Articles • Books 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	<ul style="list-style-type: none"> • Conferences • Library
2	Cogdill (2003)	<ul style="list-style-type: none"> • Articles • Books • Printed reference 		<ul style="list-style-type: none"> • Colleagues • Other HCPs 	
3	Stokes and Lewin (2004)	<ul style="list-style-type: none"> • Books • Journals 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • Colleagues 	<ul style="list-style-type: none"> • Conferences • Library
4	Estabrooks et al. (2005)	<ul style="list-style-type: none"> • Books • Journals 		<ul style="list-style-type: none"> • Colleagues • Physicians 	
5	Dee and Stanley (2005)	<ul style="list-style-type: none"> • Books • Journals 	<ul style="list-style-type: none"> • E-books • Databases 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	<ul style="list-style-type: none"> • Conferences
6	McKnight (2006)	<ul style="list-style-type: none"> • Textbooks 		<ul style="list-style-type: none"> • Colleagues 	<ul style="list-style-type: none"> •
7	Tannery et al. (2007)	<ul style="list-style-type: none"> • Articles • Books 	<ul style="list-style-type: none"> • Databases 		<ul style="list-style-type: none"> • Library
8	Turner et al. (2008)	<ul style="list-style-type: none"> • Books 		<ul style="list-style-type: none"> • Colleagues • Clinical instructors 	<ul style="list-style-type: none"> • Conferences
9	Koivunen et al. (2010)		<ul style="list-style-type: none"> • Databases • Websites 		
10	Ross (2010)	<ul style="list-style-type: none"> • Books • Journal • Printed reference 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • Colleagues 	<ul style="list-style-type: none"> • Library
11	Jones et al. (2011)	<ul style="list-style-type: none"> • Books • Journals • Printed reference 	<ul style="list-style-type: none"> • Websites 		
12	Mashiach Eizenberg (2011)	<ul style="list-style-type: none"> • Journal 	<ul style="list-style-type: none"> • Websites 		
13	Duncan and Holtslander (2012)		<ul style="list-style-type: none"> • Databases 		
14	O'leary and Mhaolrúnaigh (2012)	<ul style="list-style-type: none"> • Books • Journals • Printed guidelines 	<ul style="list-style-type: none"> • Websites • Databases 	<ul style="list-style-type: none"> • Colleagues • Clinical instructors • Other HCPs 	<ul style="list-style-type: none"> • Study days/Training event

Table 2.7 Information sources used by the nurses

N	Authors/ year	Text sources	Digital sources	Interpersonal sources	Other sources
15	Baro and Ebhomeya (2013)	<ul style="list-style-type: none"> • Books • Journals 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • Colleagues 	<ul style="list-style-type: none"> • Library
16	Shaheen et al. (2013)	<ul style="list-style-type: none"> • Books • journals 	<ul style="list-style-type: none"> • Databases • E-books • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	
17	Argyri et al. (2014)	<ul style="list-style-type: none"> • Journal 	<ul style="list-style-type: none"> • Websites 	<ul style="list-style-type: none"> • Colleagues 	<ul style="list-style-type: none"> • Library
18	Wahoush and Banfield (2014)	<ul style="list-style-type: none"> • Books 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	<ul style="list-style-type: none"> • Library • Conference
19	Farokhzadian et al. (2015)		<ul style="list-style-type: none"> • Databases • E-books • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	
20	Kumaran and Chipanshi (2015)	<ul style="list-style-type: none"> • Books • Journal 	<ul style="list-style-type: none"> • Databases • E-books • Websites 	<ul style="list-style-type: none"> • Colleagues 	<ul style="list-style-type: none"> • Library
21	Ricks and Ten Ham (2015a)	<ul style="list-style-type: none"> • Books • Journals 	<ul style="list-style-type: none"> • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	
22	Stokes and Urquhart (2015)	<ul style="list-style-type: none"> • Books • Journals 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • 	
23	Gilmour et al. (2016)		<ul style="list-style-type: none"> • Websites 	<ul style="list-style-type: none"> • Colleagues 	
24	Lialiou et al. (2016)		<ul style="list-style-type: none"> • Databases • Websites 		
25	Sarbaz et al. (2016)	<ul style="list-style-type: none"> • Textbooks • Journals 	<ul style="list-style-type: none"> • Databases • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	<ul style="list-style-type: none"> • Conference
26	Intas et al. (2017)	<ul style="list-style-type: none"> • Printed material 	<ul style="list-style-type: none"> • Databases 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Conferences
27	Lee et al. (2019)	<ul style="list-style-type: none"> • Books 	<ul style="list-style-type: none"> • Databases • Websites • Hospital e-resources 	<ul style="list-style-type: none"> • Colleagues 	
28	Diekema et al. (2019)		<ul style="list-style-type: none"> • Databases • E-book • Websites 	<ul style="list-style-type: none"> • Colleagues • Other HCPs 	
29	Gkorezis et al. (2021)		<ul style="list-style-type: none"> • Websites 		

2.9.4 Information-seeking strategies by the nurses

Information-seeking strategies refer to the methods that nurses use to find health information. As shown in Table 2.8, all the items about nurses' information-seeking strategies are categorised into two general groups: search strategy and consequences. The four retrieved articles indicated that the nurses used clinical queries and keywords in their search strategy. Other studies mentioned that a large number of nurses were not aware of the role of keywords and Boolean operators in the search process. According to Estabrooks et al. (2005), nurses made their search strategies based on recommended health sources for clinical practice from their hospitals without using controlled terms. Another study concluded that nurses used Google in their search strategy rather than bibliographic resources such as PubMed or MEDLINE (Turner et al., 2008). Only one study in this regard found that nurses used filters to avoid the extensive use of synonyms because it was time-consuming (Shaheen et al., 2013).

The most prevalent consequences regarding nurses' strategies resulting from clinical ISB include reduced delay in commencing treatment and increased nurses' confidence in making clinical decisions (Shaheen et al., 2013). Ricks and Ten Ham (2015a) and Diekema et al. (2019) mentioned communication improvement with colleagues as well as professionals, whereas Koivunen et al. (2010) reported that some nurses needed to have training courses on Information-seeking skills. Estabrooks et al. (2005) and Turner et al. (2008) reconsider implementing new health information-seeking strategies, such as consulting a human resources consultant. Other studies did not mention this aspect.

Table 2.8 Nurses' information-seeking strategies

N	Search strategy	Authors/ year	Consequences
1	Using keywords	Cogdill (2003), Dee and Stanley (2005), Duncan and Holtslander (2012), Stokes and Urquhart (2015).	<ul style="list-style-type: none"> • Generating specific and additional search terms • Engaging in less complex and more intuitive search strategies that involved a narrowing of their results, rather than expanding health information resources.
2	Consulting with colleagues	Estabrooks et al. (2005), Ricks and Ten Ham (2015), Diekema et al. (2019)	Asking expert nurses who had an experience with nursing practice can provide recommendations for credible health information resources.
3	Consulting with librarians.	Stokes and Lewin (2004), Shaheen et al. (2013).	Asking librarians who were trained in information retrieval and provide guidance due to lack of nurses skills.
4	Using Boolean operator in databases.	Koivunen et al. (2010).	Using databases to access to peer-reviewed journal articles to access EBI.
5	Considering the reliability of the source of the information	Turner et al. (2008).	<ul style="list-style-type: none"> • Resources should be reliance on professional organisations to increase accuracy. • Nurses had a tremendous need to access to reliable and easy health information resources.

2.9.5 Factors

Based on the included studies regarding the factors that can be barriers and facilitators. These factors can be divided into personal, organisational, and technical factors. Several factors have been studied in the included studies, such as time, skills, access, and others. According to Table 2.9, the findings of the retrieved articles revealed that nurses cited several barriers and facilitators to meeting their information needs and accessing health information resources. In 22 articles, information-searching skills were cited as the most common factor among personal factors. Time was the next factor, listed sequentially with 16 references. The most frequently reported factors among organisational factors were institutional support (referred to in 12 articles) and training (with 8 references). Providing Internet access was mentioned under organisational support in seven studies. In the technical category of factors, navigation and searching difficulties were regarded as the most common barriers, with 13 references.

Table 2.9 Factors underlying seeking of health information

N	Factors	Type	Authors/ year
1	Personal factors	Time	Lathey and Hodge (2001), Cogdill (2003), Stokes and Lewin (2004), Estabrooks et al. (2005), Dee and Stanley (2005), McKnight (2006), Ross (2010), Baro and Ebhomeya (2013), Shaheen et al. (2013), Argyri et al. (2014), Farokhzadian et al. (2015), Kumaran and Chipanshi (2015), Ricks and Ten Ham (2015), Gilmour et al. (2016), Intas et al. (2017), Lee et al. (2019).
		Skills	Lathey and Hodge (2001), Cogdill (2003), Stokes and Lewin (2004), Estabrooks et al. (2005), Dee and Stanley (2005), McKnight (2006), Turner et al. (2008), Koivunen et al. (2010), Ross (2010), Jones et al. (2011), Mashiach Eizenberg (2011), Stokes and Urquhart (2011), Baro and Ebhomeya (2013), Shaheen et al. (2013), Argyri et al. (2014), Kumaran and Chipanshi (2015), Ricks and Ten Ham (2015), Lialiou et al. (2016), Gilmour et al. (2016), Intas et al. (2017), Lee et al. (2019), Diekema et al. (2019).
		Knowledge	Cogdill (2003), Estabrooks et al. (2005), Sarbaz et al. (2016), Diekema et al. (2019).
		Confidence	O’Leary and Mhaolrúnaigh (2012), Farokhzadian et al. (2015), Lialiou et al. (2016).
2	Organisational factors	Institutional support	Lathey and Hodge (2001), Cogdill (2003), Stokes and Lewin (2004), Estabrooks et al. (2005), Ross (2010), Jones et al. (2011), Mashiach Eizenberg (2011), Stokes and Urquhart (2011), Shaheen et al. (2013), Farokhzadian et al. (2015), Ricks and Ten Ham (2015), Lialiou et al. (2016).
		Training	Lathey and Hodge (2001), Dee and Stanley (2005), Koivunen et al. (2010), Baro and Ebhomeya (2013), Argyri et al. (2014), Kumaran and Chipanshi (2015), Lee et al. (2019), Diekema et al. (2019).
		Access	Dee and Stanley (2005), McKnight (2006), Turner et al. (2008), Baro and Ebhomeya (2013), Gilmour et al. (2016), Sarbaz et al. (2016), Diekema et al. (2019).
3	Technical factors	Navigation/searching difficulties	Cogdill (2003), Estabrooks et al. (2005), McKnight (2006), Turner et al. (2008), Jones et al. (2011), O’Leary and Mhaolrúnaigh (2012), Baro and Ebhomeya (2013), Farokhzadian et al. (2015), Kumaran and Chipanshi (2015), Lialiou et al. (2016), Sarbaz et al. (2016), Lee et al. (2019), Diekema et al. (2019).
		Information overload	Lathey and Hodge (2001), Shaheen et al. (2013), Farokhzadian et al. (2015), Ricks and Ten Ham (2015), Lialiou et al. (2016), Gilmour et al. (2016), Lee et al. (2019).

2.9.6 Studies conducted with model

Based on the results of this analysis, fewer models relating to ISB were used in the design of tools in these studies. Table 2.10 depicts the models employed in the papers that were retrieved. Cogdill (2003) utilised the subjective, objective, assessment, and plan (SOAP)

model, which remains useful as a significant component for understanding information behaviours. This model was found to have value as a research tool as well as for practical application. Stokes and Lewin (2004) applied Foster’s model, which focused on a non-linear model of ISB. whereas Stokes and Urquhart (2011) utilised Dervin’s sense-making model, which focused on closing the gap between the information need and the outcome. Duncan and Holtlander (2012) used Kuhlthau’s model, which considers the ISP as a series of thoughts, feelings, and actions. Another study used Wilson’s (1999) information-seeking model to focus on the process of information-seeking because it detaches the process from the context to do so (O’leary and Mhaolrúnaigh, 2012). See Section 2.10.2 for more information about these models.

Table 2.10 Studies that applied ISB models

Study	Model
Cogdill (2003)	Temporal model which has subjective, objective, assessment, plan (SOAP) model.
Stokes and Lewin (2004)	Foster’s model.
Stokes and Urquhart (2011)	Dervin model.
Duncan and Holtlander (2012)	Kuhlthau’s Information Search Process (ISP) Model.
O’leary and Mhaolrúnaigh (2012)	Wilson (1996) model.

2.9.7 Key findings summary

The key findings summarised in this review are:

- Almost all of the studies asked the participants to mention retrospective HINS (interview) and their way of seeking health information (questionnaire).
- There is only one study observing nurses actual HINs and strategies to meet this need based on patient questions (Jones et al., 2011).
- Nurses’ clinical information needs, treatment, and diagnosis linked to patient care ranked as the highest priorities.
- The obtained results indicated that nurses utilised human, printed, or online resources for the purpose of gaining health information, with an increase in the use of online resources between 2010 and 2019.

- Recent years have seen a shortage of studies that explore nurses information-seeking strategies.
- Factors in ISBs reflect on time, skills, language, accessibility, and usability.
- Fewer models relating to ISB were used in the included studies.

2.10 Discussion

2.10.1 Information-seeking process

This review identified and examined several types of information needs requested by nurses during clinical care, including nursing assessment, intervention, aetiology, diagnosis, protocol, and medications. Current studies indicate that the ability to rapidly search for knowledge of clinical conditions and treatment is the primary data need for the majority of nurses. There are some discrepancies in these studies that may complicate a direct comparison of the results. These differences are caused by several factors such as differing nursing specialities, the experiences of the participants and a variety of search methods used when analysing the results. Del Fiol et al. (2014) conducted a methodical examination involving distinct groups of nurses and nurse practitioners. This review suggests that 34% of searches carried out by these groups were related to medication and 24% were associated with diagnostic test results, physical findings, or investigating symptomatic causes. Turner et al. (2008) and Kumaran and Chipanshi (2015) confirm that most clinical inquiries and information requests occurred while the patient was being cared for. While Jones et al. (2011), asked participants to verbalise their information process while seeking health information through web search to answer patient encounter question. Despite the increasing range of online sources, some questions remained unresolved.

This contradiction resulted in the identification of a need to provide nurses with opportunities to acquire improved research techniques. They should also be encouraged to carry out investigations independently and a work-based structure should be developed to assist, motivate, and encourage them (Lee et al., 2019, Diekema et al., 2019). If an individual's knowledge needs are to be met, then work-based support is vital in ensuring that all nurses have access to the relevant medical databases (Koivunen et al., 2010, Farokhzadian et al., 2015, Moynihan et al., 2021). An organisation can achieve effectiveness by providing online access to well-respected databases and ordering the evidence to increase ease of use by all

relevant groups, and educating nurses in the use of efficient search techniques (O’leary and Mhaolrúnaigh, 2012, Lee et al., 2019). Moreover, McKnight (2006) confirmed that nurses agree about information service available to them at all hours of the day or night shifts would be very useful.

Several studies have obtained data revealing that even the smallest search or navigation obstacle can prevent the retrieval of necessary evidence (Cogdill, 2003, Estabrooks et al., 2005, O’leary and Mhaolrúnaigh, 2012, Baro and Ebhomeya, 2013, Lialiou and Mantas, 2016a, Lee et al., 2019, Diekema et al., 2019). One of the most important strategies for an effective search, and the retrieval of the necessary information, is that of creating a searchable strategy from a medical query (Falzon et al., 2010, Aslam and Emmanuel, 2010). An inability to do this results in the creation of unsuitable search phrases and, if combined with spelling inaccuracies, makes it almost impossible to create a clinical question and accurately interpret any results (O’leary and Mhaolrúnaigh, 2012).

Choosing an incorrect database (Baro and Ebhomeya, 2013), using limited synonyms (Shaheen et al., 2013), or experiencing information overload can be regarded as alternate examples of an incorrect approach to information searching (Farokhzadian et al., 2015, Lialiou et al., 2016). In most cases, this lack of skill is the result of a shortage of time (Lathey and Hodge, 2001, Estabrooks et al., 2005, Kumaran and Chipanshi, 2015, Lee et al., 2019), whereas the problem might lie in the nurse’s chosen search strategies. Nursing students expressed that finding suitable search terms would more likely help to find relevant resources (Stokes and Urquhart, 2015).

The studies identified several recurring difficulties experienced by nurses when performing searches including an excess of information to unravel, inadequate research skills, an absence of support from the institution, and insufficient time (which was considered to be the largest barrier). Nurses have indicated that a lack of time and insufficient skills to create effective search terms and analyse results, meant that they preferred to confer with colleagues and use physical resources (books and journals) rather than use any technological means (Diekema et al., 2019). Teaching the appropriate skills and increasing accessibility to medical information would reduce the time lost on creating ineffective searches (Lathey and Hodge, 2001, O’leary and Mhaolrúnaigh, 2012, Farokhzadian et al., 2015). There has been little

improvement in this situation over the years and most of the difficulties remain unchanged (Lathey and Hodge, 2001, Diekema et al., 2019).

Some types of information were considered time-sensitive, especially when concerning patient care (Davies, 2007). Moreover, the majority of the participants (n = 58; 42.6%) conducting searches indicated that they were too busy, resulting in a lack of time to search correctly for health information (Ricks and Ten Ham, 2015a). Tawfik et al. (2014) performed a comparison between the browsing method and the semantic search approach method, which involves the generation of the most precise results by a search engine. When using the browsing method, it was found that the average navigation rate was thirty-five clicks per item lasting approximately 239 seconds. In contrast, the semantic search resulted in eleven clicks per item and a total time of 140 seconds. Therefore, the amount of time spent searching can be reduced by educating nurses in more efficient methods (Lialiou et al., 2016, Lee et al., 2019). There is a requirement to create a method which allows researchers to observe how the participants searched.

Technology can make the ISP more accessible, and the team members can participate and cooperate effectively to obtain the appropriate answers (Shaheen et al., 2013). However, nurses tend to use more traditional methods, such as colleagues and other medical professionals, than up-to-date resources such as electronic databases and journals to make clinical decisions (Farokhzadian et al., 2015). This outcome is contrary to that of Sarbaz et al. (2016) who found the most frequently used sources among 131 nurses were Internet (54.8%) followed by personal experiences (48.2%).

Recently, several reviews have concluded that many nurses use work computers for their HINs (Baro and Ebhomeya, 2013, Kumaran and Chipanshi, 2015, Lee et al., 2019). These findings are similar to the findings of Scott et al. (2018) as they also included professional groups such as physicians, nurses, and allied health workers from Canadian paediatric centres. A total of 1312 participants (which represents 91.4% of the total) used desktop computers for accessing information in the workplace environment. Scott et al. (2018), also demonstrated that professionals in a workplace environment experienced many barriers to implementing research in practice, including a lack of skills and an inability to reliably assess clinical information. More attention has focused on the time spent searching. Ebiye (2015) study indicated that 342 (81.4%) of 420 medical and nursing students confirmed using smartphones

had a positive effect on their behaviour-seeking regarding medical information due to ease of use, saving time and fast access. Clinical librarians should be employed to train nurses to conduct efficient searches, improve information retrieval skills, familiarise them with current information sources and assist them with their clinical information requests (Shaheen et al., 2013). However, of all the articles mentioned in this report, only two (Dee and Stanley, 2005, Mashiach Eizenberg, 2011) referred to the importance of the role of clinical librarians and the benefits they offer. This may be because further research regarding the use of information sources and their impact on nurses' behaviour needs to be conducted.

The literature revealed that colleague consultation, internet websites, journal articles, databases and textbooks were sequentially regarded as the most frequently used information sources among nurses. For years, textbooks have been among the most used thanks to their easy accessibility, credibility, relevance, and reliability over other sources (Lathey and Hodge, 2001, Estabrooks et al., 2005, O'leary and Mhaolrúnaigh, 2012, Baro and Ebhomeya, 2013). However, some studies indicate that, since 2013, the most frequently used and reliable sources have been technological resources such as internet websites and databases (such as MEDLINE/PubMed) and questioning colleagues (Shaheen et al., 2013, Farokhzadian et al., 2015, Kumaran and Chipanshi, 2015, Lialiou et al., 2016, Lee et al., 2019, Diekema et al., 2019). Only one study observed books as the primary source (Ricks and Ten Ham, 2015a). These results demonstrate that there has been a shift in preference amongst nurses in recent years. In current times, nurses have access to a large number of information sources. However, to maximise their decision-making efficiency, they are inclined to use a preferred source. This choice is made according to their location when the need for data arises (such as office, hospital or educational hospital) and the urgency of the patient's condition (Wahoush and Banfield, 2014a) as well as their judgement of the reliability of each source (Ricks and Ten Ham, 2015a). Commonly, the ability to discuss treatment with a colleague is a preferred option owing to its immediacy and efficiency (Ricks and Ten Ham, 2015a). However, Shaheen et al. (2013) suggested that training and education could improve nurses' information-seeking skills by increasing their familiarity with Boolean operators to formulate appropriate search statements.

According to Ricks and Ten Ham (2015), online databases contain an abundance of current information compared to textbooks. Thanks to their ability to be easily updated, they are

more able to reliably evaluate the articles (Zhang et al., 2015). Ricks and Ten Ham (2015a) suggest that ready access, and support in using online evidence information systems, may improve patient care and clinical routines. However, electronic resources should employ professional organisations to monitor them and increase their accuracy (Turner et al., 2008). The Cochrane Library is an easy-to-understand and accessible online database that organises and appraises evidence. It is admired and mentioned in many research articles (along with Medline, CINAHL and PubMed) as an easy-to-use information resource thanks to its extensive knowledge base, allowing the use of a variety of search methods and a simple user interface (O'leary and Mhaolrúnaigh, 2012, Diekema et al., 2019). Chiu et al. (2012) determined that there was a variance between nurses' ISBs and their reasons for accessing online databases. It is considered that some databases are more valuable than others for specific types of review and that the Cumulative Index to Nursing and Allied Health Literature (CINAHL) is one of the most frequently used sources within the nursing profession (Wright et al., 2015). Overall, Dawes and Sampson's systematic review has established that convenience of access, habit, reliability, quick use, and relevance were the reasons for nurses' preferences (Younger, 2010).

Stokes and Lewin (2004), stated that the increase in the accuracy of data gathering and analysis based on certain databases allowed companies to build certain standards helping out physicians and nurses in enhancing making a clinical decision. An example of such an approach was reported in Bynum et al. (2011) and the vaccination problem, where most of the physicians were relying on the vaccination assertion from healthcare professional organisations which increased the accuracy of vaccine information to 62% in comparison with unreliable resources at 31.8%. Such reliance improves QoC because the decisions are resultant of EBI based on several studies and defined databases. Moreover, physicians were most satisfied in locating health information from specific, reliable resources that were provided by the health institution (Cheng and Lam, 1996). This result may be explained by a recent review on seeking information within clinical practice made difficult due to a lack of reliable resources, skills, and time in care settings (Daei et al., 2020). The following section evaluated the models in a broader way to explore how well they capture ISB in clinical practice.

2.10.2 An evaluation of ISB models

ISB models represent the methods by which individuals seek information (Kuhlthau, 2005, Pang et al., 2015, Kundu, 2017), of which there are many commonly used varieties (Fisher et al., 2005, Ellis and Haugan, 1997, Marton and Wei Choo, 2012). The traditional information-seeking model, for instance, provides a linear process in which individuals begin by identifying their information needs, then search for appropriate information, assess the information discovered, and finally utilise the knowledge to meet their information needs. Non-linear models offer more flexible (or possibly nebulous and confusing) methods, whereby the analysis moves back and forth between process steps to refine information needed and evaluate information obtained. Thus, the ISP can be shaped by the individuals' experiences and information-need context. Multidirectional models involve using multiple formal or informal resources, such as colleagues or friends, and information gained is utilised to guide subsequent decision-making (Pang et al., 2015).

Overall, each type of ISB model has advantages and disadvantages, and the selection of a model may rely on the particular research question and context. However, multidirectional models are considered as more realistic and comprehensive, since they represent the complexity and dynamic nature of ISB more accurately (Kundu, 2017, Garg, 2016, Esew et al., 2014b). Five major ISB models were identified from the studies included in this scoping review that provide valuable frameworks for understanding ISBs and guide the development of effective information services and interventions, as summarised below:

SOAP (1968): emphasizes the dynamic nature of information seeking and its incorporation into decision-making (Cogdill, 2003).

Foster (2003): considers personal, situational, and professional factors influencing information seeking (Stokes and Lewin, 2004).

Dervin (1983): focuses on the interactive sense-making process of seeking and using information (Stokes and Urquhart, 2011).

Kuhlthau (2004): describes the emotional and cognitive aspects of information seeking through stages of the process (Duncan and Holtslander, 2012).

Wilson (1996): highlights the cognitive activities and interactions with information sources (O’leary and Mhaolrúnaigh, 2012).

The analysis revealed that all of these models distinguish between good and poor ISBs in terms of how individuals approach the process of seeking health information. The Dervin model posits that a clear understanding of information need leads to finding relevant information (Stokes and Urquhart, 2011). Kuhlthau’s model stated that an individual who critically evaluate the information obtained would be more likely to find accurate information (Duncan and Holtslander, 2012). Moreover, Foster’s model suggested that using a variety of sources could help to gather more comprehensive information (Stokes and Lewin, 2004). Most general behavioural models of seeking information seem to recognise that a user in need of information can access a variety of sources of information, resources or even contact colleagues to solve a problem or obtain information (Pang et al., 2015). The Dervin model offers a sense-making approach to understanding information seeking. It emphasises the importance of context, personal relevance, and the iterative nature of the ISP (Reinhard and Dervin, 2012). Researchers may find the Dervin model useful if they aim to explore the interactive and dynamic aspects of how individuals seek and use information, and how meaning is constructed during this process (Liu, 2013, Esey et al., 2014a).

However, it should be noted that while the reviewed studies explores these five models in detail, they consequently ignored the potential and theories of other specialists, such as Ellis and Haugan, 1997 Ellis, Cogdill (2003) and Kuhlthau (2004), who crafted concepts which focus on the behaviours of academics, scholars, and other professionals. Only one study was found that concerns itself with the real clinical environment, which stated that the daily routine, daily tasks, and needs of primary care providers regulate how, when, and where they locate the required information (Stokes and Urquhart, 2011). This finding confirms that nurses require access to the latest and best medical evidence to aid them in making critical clinical decisions to ensure patient well-being, which results in a wider variety of information requirements and search behaviours.

ISB concepts or models in healthcare are sometimes criticised for limiting the perspective of patient safety, because they do not deal with critical evaluation (Lopatovska and Arapakis, 2011, Akakpo, 2022). Similarly, all models caution that relying on a single source of information would lead to missing out of obtaining a comprehensive information that can be

gathered from multiple resources. In addition, unreliable sources of information, such as websites containing faulty or biased material, may result in individuals making bad decisions based on inaccurate information. HCPs give no evidence of causative factors of the behaviours while seeking health information, and therefore does explicitly recommend to conduct observational studies to understand the behaviours (Kundu, 2017).

The Dervin model mentions that individuals with a rigid information-searching behaviours may miss out on important information that might alter their viewpoint or influence their decision-making (Reinhard and Dervin, 2012). Seeking health information in clinical settings may be a back-and-forth, non-sequential process regarding patient condition, up-to-date information or health peer reviewing (Foster, 2005, Godbold, 2006, Bukhari et al., 2018). One significant aspect of Foster's non-linear model of ISB is that the level of experience and prior knowledge is considered the primary trigger of the process of seeking information; consequently, difficulties may arise when an attempt is made to explore the ISBs of students or interns in clinical placement, due to their inherent lack of experience.

Overall, Dervin's model suggests that people can construct a temporary ordered reality when they perceive that they are facing a situation in a particular time and space, and this reality will guide their behaviour. Dervin's gap which refers to the discrepancy between an individual's current ISBs and their desired or optimal information state, can entail and include a multi-directional process expanded list of modes of ISBs (Foster, 2005, Godbold, 2006). Dervin's model is considered more multi-directional, flexible, and contemporary, because it suggests that not all situation-facing is linear or purposive (Esew et al., 2014b). Dervin's (1983) sense-making approach is focused on the users' need for information and their experience within the context of their situations (Figure 2.2) (Garg, 2016). The model illustrates the information related to the problem, which initiates the need and determines information resources that could be used to meet the need, based on information-seeking strategies (Dervin, 1999). Its effectiveness stems from proposing a model for interns whereby the experience variable is less instrumental (Dervin, 1999). Consequently, Dervin's model was selected to be used in this thesis to understand health ISBs among nursing students.

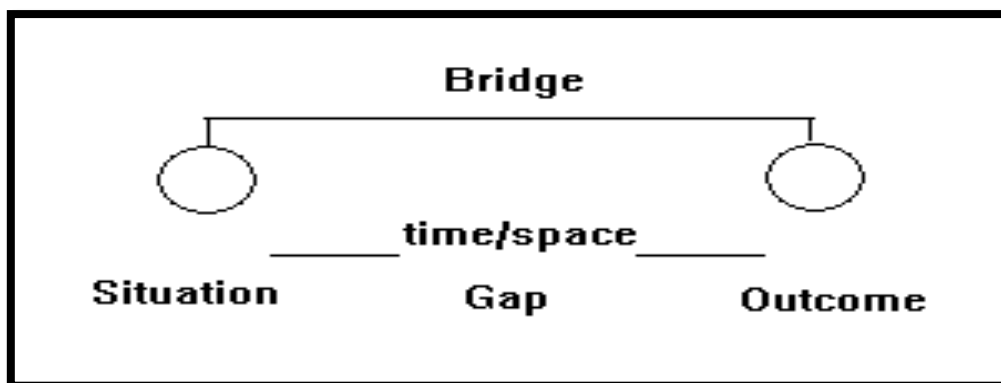


Figure 2.2 Dervin's 'sense-making' model

Source: Adapted from Esew et al. (2014)

ISBs in healthcare are germane to Dervin's sense-making metaphor (Savolainen, 2006, Esew et al., 2014b), whereby the model is formulated in terms of a chain of different process linked to individual behaviour as shown in Table 2.11 (Garg, 2016):

Table 2.11 Dervin's (1999) four chains

1	A situation description.	Dervin's model represents the problem statement which is the initiator of the act of information seeking and this is defined in time and space.
2	Gap generation.	The gap is defined as the difference between the situation and the expected outcome to reach the intended output of the information-seeking process. The gaps in certain research areas differ based on the outcome and aim of the paper study
3	The bridge.	It is the tool or the variable used to close the gap between the situation and the outcome.
4	The outcome of the situation.	The outcome is the result of the information seeking and behaviour processes (the decision made and its consequences).

2.11 Summary of scoping review

The aim of this review was to explore the evidence that would give a comprehensive understanding of the ISBs among nurses in clinical practice, their HINs, and explore the methods used to assess the health information obtained. The review accomplished its aims and arrived at the following conclusions.

According to Ross and Estabrooks (2008), nurses play a crucial role in patient care, and their ability to obtain and utilise accurate and relevant health information is essential for delivering high-quality patient care. However, the scoping review revealed a notable research gap

concerning the exploration of diverse strategies employed by clinical nurses for seeking health information. Additionally, there is a lack of research addressing the systematic assessment methods utilised by clinical nurses to evaluate the reliability and credibility of the information sources they encounter. Most of the included studies focused on information resource factors (e.g., time, skills, accessibility, usability, and the resources sought) and the effectiveness of information sources (traditional or digital). Thus, there is a need for further detailed studies into the strategies of obtaining EBI at clinical practice to identified the gap of the process of assessing the quality of resources in clinical practice (Shaheen et al., 2013, Farokhzadian et al., 2015, Kumaran and Chipanshi, 2015, Lialiou et al., 2016, Lee et al., 2019, Diekema et al., 2019).

This review in the field of HISBs in clinical practice has uncovered a number of limitations in research methods used in related studies, including bias and/or small sample sizes, lack of model utilised and the use of instruments with questionable validity and reliability. At first glance, the concept of HISBs seems to be well developed and used without apparent arguments or controversies about its meaning or applications on nursing practice. However, no paper reviewed to date critically examined the concept of the HISB framework. Hence, this study may explain the concept of HISB and lead to a more fully developed framework and more robust quality assessment.

Moreover, most of the included studies used quantitative designs, with most of them deploying questionnaires about HINs, sources, and factors, although a small number of studies used qualitative methods with focus on previous HINs incidence in practice. Thus, there is a need for further research, specifically a qualitative that aims to explore and observe the participants to address current challenges in evaluation health information resources and to explore the experience of obtaining EBHI more deeply.

Almost all the included studies identified various barriers to nurses' ISBs in practice, which could be categorised as personal, organisational, or technical, including a lack of time, access, support, or training. This is perhaps because the main aims of the included studies were to assess the factors of seeking health information in clinical practice. Despite the differences among the information resources utilised by nurses in the included studies, a lack of skills (related to searching for, evaluating, and operationalising information) was the most commonly highlighted barrier. Therefore, the scoping review revealed a gap in the existing

literature regarding the exploration of NISs behaviours in seeking health information in their practice. Further research is required to investigate and understand the ISBs of NISs, providing insights into their approaches, preferences, challenges, and strategies, thereby enhancing their role and effectiveness in acquiring health information.

To sum up, it appeared that it would have been possible to include all nurses in the remit of this study, as all were required to interact with evidence-based healthcare information to some extent. However, this review identified that registered nurses relied on their knowledge or experience more than seeking health information. A possible explanation for this might be that they had more clinical experience, knowledge and lack of time due to the workload in clinical practice. Furthermore, nursing interns and newly qualified nurses are more grounded in academic research as they seek to navigate the theory-practice gap during their transition to clinical practice, and they lack the experiential knowledge utilised by clinical practitioners with some years of experience.

Therefore, for the clarity and interpretation of the current study, it was felt better to focus on a group with a specific set of HINs and a comparable background in terms of their education in this area. Also, focusing on nursing interns allows the study to deep dive into HINs, which with a wider group may not get such a rich and deep understanding. This review confirmed that a reasonable approach to advance the understanding of obtaining EBHI in nursing practice could be to focus on NISs. Moreover, a further observation study with more focus on recruiting clinical scenarios that would trigger individuals to seek and obtain EBHI was therefore suggested.

2.12 Research aim and objectives

The primary focus of this study is to examine the ISBs of NISs in healthcare settings, with a specific emphasis on the quality assessment aspects. The study aims to explore the factors and strategies that influence NISs' ability to access and obtain evidence-based information. By conducting this study, it is expected to bridge the existing gaps in the literature by providing a comprehensive understanding of the ISBs among NISs in relation to quality assessment. This study will also investigate the specific factors that either facilitate or hinder NISs' ISP, highlighting the challenges they face and the strategies they employ to overcome them.

The outcomes of this study will add to what we know by shedding light on the ISBs of NISs. By pointing out the gaps and challenges in the current practices, this research will give valuable insights for clinical instructors, policymakers, and educators to improve training and teaching for NISs. It is anticipated that this study will have a positive effect on evidence-based healthcare practices and clinical decision-making processes by encouraging NISs to find and use health information more effectively. So, the objectives of this study are as follows:

- To explore NISs' strategies for seeking health information.
- To identify the type of health information needed by NISs, and the challenges of obtaining EBHI in real clinical practice settings.
- To identify how NISs assess the quality of health information resources.
- To write recommendations for best practice in supporting NISs to search for and find high quality health information.

2.13 Research questions

- How do NISs access EBHI within patient care settings?
- How do NISs assess the quality of EBHI within patient care settings?
- What are the factors and strategies that contribute to the ability of NISs to access and utilise EBHI within healthcare?

2.14 Summary

The scoping review demonstrates that access to health resources in practice is valuable to nurses. However, there is no evidence of how they assess the health information obtained. A reasonable approach to advance the understanding of obtaining EBHI in nursing practice could be to focus on information evaluation among NISs. The evaluation of ISB models reveals that Dervin's model can construct a reality situation in a particular time and space, and this reality will guide ISBs. Therefore, it is used as a framework for this thesis. The aim and objectives of the current study were mentioned. The next chapter will discuss the methodology that was utilised for this study.

Chapter 3

Methodology

3.1 Introduction

The previous chapter reviewed literature around the nursing intern students' (NISs) information-seeking behaviours (ISBs) in practice. Methodology is the established of methods, procedures, and techniques utilised to conduct research. This chapter outlines the methodology in the study. It includes a discussion of the philosophical perspective, study design followed by the model used in exploring of NISs' ISBs and TA. It then describes the process of moving to online TA method conducted through pilot study.

3.2 Philosophical underpinning

Kuhn (1962), described the paradigm as a set of beliefs to provide theoretical foundations on which to base the research plan. Researchers are often encouraged to classify their research according to the paradigm chosen (Doyle et al., 2009), which guides specialty beliefs and practices in a specific area (Morgan, 2007). Positivists generally focus on using measurable tools, and the traditional concept is a single reality (Gendron, 2009). Nevertheless, post-positivists argue that positivists face difficulties with this traditional view when examining human behaviours and actions because of one truth (Sharp et al., 2011). Contrastingly, the interpretivist approach is based on each person's perspective of events, and, therefore, a plethora of interpretations will be the result (Potrac et al., 2014). Therefore, the results of an interpretivist study will be contextual, comprehensive, and flexible (Thanh and Thanh, 2015).

Pragmatism is the foundation of mixed-methods research, which can imply interpretivism and positivism paradigms to draw knowledge (Creswell, 2013). It is also possible that pragmatism does not necessarily require mixing methods to answer the research question and definitely does not exclude qualitative or quantitative methods (Morgan, 2007, Allmark and Machaczek, 2018). Rather, it aims simply to address the research question, explore a phenomenon, or test a theory, as well as utilise different forms of data collection with the most appropriate research method (Maarouf, 2019). It is also important, for pragmatists, that the best method is the one that is most effective in producing the desired consequences of the inquiry and emphasising the research problem through using a single method, multiple methods, or a mix

of methods (Kaushik and Walsh, 2019, Biddle and Schafft, 2015). Therefore, a researcher's worldview not only directs them to use a pragmatic approach with mixed-method research but also allows the possibility of choosing the appropriate research methods or design. This, in turn, allows this thesis to use two qualitative methods to address the research question and fulfil the research aim and purposes. The following will briefly describe how pragmatism's standpoints relate to this research's purposes and some shortcomings.

The principal researcher (PR) considers pragmatism beneficial because the truth is uncertain and reality is continually changing, and the ultimate goal of the study is to strengthen the human welfare promoted by pragmatism (Barreto and Whitehair, 2017, Goldkuhl, 2012). In this study, the truth is tentative, which is expected to change in the future due to growing access to digital and other resources such as ChatGPT. Moreover, according to Richard Rorty's pragmatist theory, he argues that the function of any inquiry is to bring relief and benefit the condition of man, to make humans happier by enabling them to cope more successfully with their conditions (Rorty, 1982). This concept of pragmatism is in tune with my purpose for conducting this research. One of my interests is the experience of NISs seeking health information in a real clinical environment, which might improve self-directed training and resource evaluation skills when looking for health information.

Pragmatism is based on an epistemological undertaking whose theory of truth and meaning is fundamental to it (James, 2020). This theory suggests that truth can only be understood through its practical consequences and is therefore not an absolute truth but an individual or social matter (Blackburn, 2005, James, 1995). I strongly believe that interacting with NISs and health resources will help me gain a meaningful understanding of ISBs and their consequences through exploring how they have sought health information, assessed the quality of resources, and made sense of their experiences to give a thoughtful and thorough description of these experiences.

Nonetheless, pragmatism, like other philosophies, is not without limitations. Pragmatists have been criticised for valuing the research question more than either the underlying methodology or paradigm (James, 1995). It could be argued that the research question does not seem to suggest clearly which methodology should be adopted for the inquiry (Mitchell and Education, 2018, Creswell and Clark, 2007). This is particularly relevant where this concept of pragmatism coincides with my position as a researcher. At the beginning of this

research, I sought out how best to answer the research question. I was open to all methodologies to determine the best way to find a solution to the research question. Moreover, pragmatism may facilitate gradual change in society rather than more fundamental systemic or revolutionary change (Glasgow and Riley, 2013). However, it may be argued that these gradual changes could equally be the outcome of traditional postpositivist and constructivist paradigms. In other words, regardless of the results, applying any new changes, in particular, introducing the evidence-based health information (EBHI) and making a change to the Saudi nursing interns in clinical practice, might require much time.

A further criticism of pragmatism is that researchers sometimes fail to acknowledge for whom and how well the research is meant to be useful (Nowell, 2015, James, 2020). In order to answer these questions within the current study, the anticipated outcome is to improve the nursing internship experience, in particular in the Saudi context. That is, the capability of obtaining EBHI in practice could contribute to improving nursing students' EBP and clinical decision-making. Overall, pragmatism offers the opportunity for researchers to use many strategies and methods to understand the problem and answer the research question (Morgan, 2007). Therefore, pragmatism has been identified as the most acceptable epistemology for triangulation studies (Morgan, 2013). Accordingly, this research employed the triangulation approach, which involves the use of multiple methods of data collection to generate supportive evidence for use in this research study (Benton and Craib, 2010, Kaushik and Walsh, 2019). Thus, the use of a pragmatic perspective fits this study's use of double methods, besides different ways of collecting the data and analysing it.

3.3 Why qualitative methods for this research?

Qualitative research aims to understand people's experiences, behaviours, and interpretations of events and phenomena (Frasso et al., 2018). In addition to the broad research approaches, particular methods and strategies are used within each approach to try to answer research questions. For instance, qualitative research employs several data collection techniques, such as in-depth interviews, focus groups, observation, and content analysis (Jamshed, 2014). To answer the research questions, two major areas were investigated: data on NISSs' strategies for seeking health information and obtaining health

information in clinical practice, both of which were forms of human behaviour; thus, this study was approached qualitatively.

This study developed a theoretical framework and approached the relationship between the research and the theory mainly deductively, with an inductive element in some cases. A qualitative study is attempting to understand the particular situations as part of a defined context and the experiences within (Willig, 2013). Qualitative research attempts to understand the nature of a particular setting and give in-depth, textured data, often called thick description (Ormston et al., 2014). The researcher is the primary instrument for the collection and analysis of the data in qualitative research (King et al., 2018). Through his interaction with participants, the researcher expands his understanding through both verbal and nonverbal communication, which produces description data for qualitative inquiry (Ajagbe et al., 2015). A qualitative approach would involve words and pictures instead of numbers to report what a researcher has learned about a particular phenomenon or inquiry (Pistrang and Barker, 2012). The data included in the qualitative studies is in the form of quotes, field observations, and interviews extracted from video or audiotape.

The generic qualitative approach is a flexible and open-ended research technique that may be applied to a wide range of research questions and contexts (Percy et al., 2015). It enables researchers to explore complex and multifaceted situations in detail and identify patterns and themes in the data (Kahlke, 2014). It is an interpretive and descriptive study that explores people's descriptions of their subjective opinions, beliefs, attitudes, or reflections on their experiences that may be difficult to measure quantitatively (Percy et al., 2015, Kamal, 2019). The researcher is interested in understanding how individuals make meaning of a phenomenon or situation (Kahlke, 2014). This meaning is reported by the researcher as the research instrument (Merriam, 2002). Data collection in a generic qualitative approach might be done through semi-structured interviews, surveys, or a specific activity to observe participants talking about their experiences (Percy et al., 2015). It does have an inductive approach and an interpretive description (Kahlke, 2014). (For the full qualitative approaches, see Appendix 3).

The generic qualitative method provides rich and in-depth insights into individual experiences or social phenomena, but it has some limitations. Qualitative research in general is based on a small sample and is subjective in nature; therefore, it is frequently criticised for lacking

generalisability (Kahlke, 2014). In addition, qualitative data analysis can be subjective and time-consuming, as it depends on the researcher's interpretation of the data (Ajagbe et al., 2015). The generic qualitative approach is a good research strategy that can be utilised to investigate complex and multifaceted situations in depth. Nonetheless, it is essential to be aware of its limitations and to select the appropriate method for your particular research question and context. It is also essential to be transparent about your process for data collection, so that others can understand and assess your results. Thematic analysis is a process that is used to analyse qualitative data (Castleberry and Nolen, 2018). While it does not represent a complete research design, it offers a data analysis process that is compatible and flexible with many qualitative research approaches, particularly generic qualitative analysis (Castleberry and Nolen, 2018, Braun and Clarke, 2022). Figure 3.1 shows the study design.

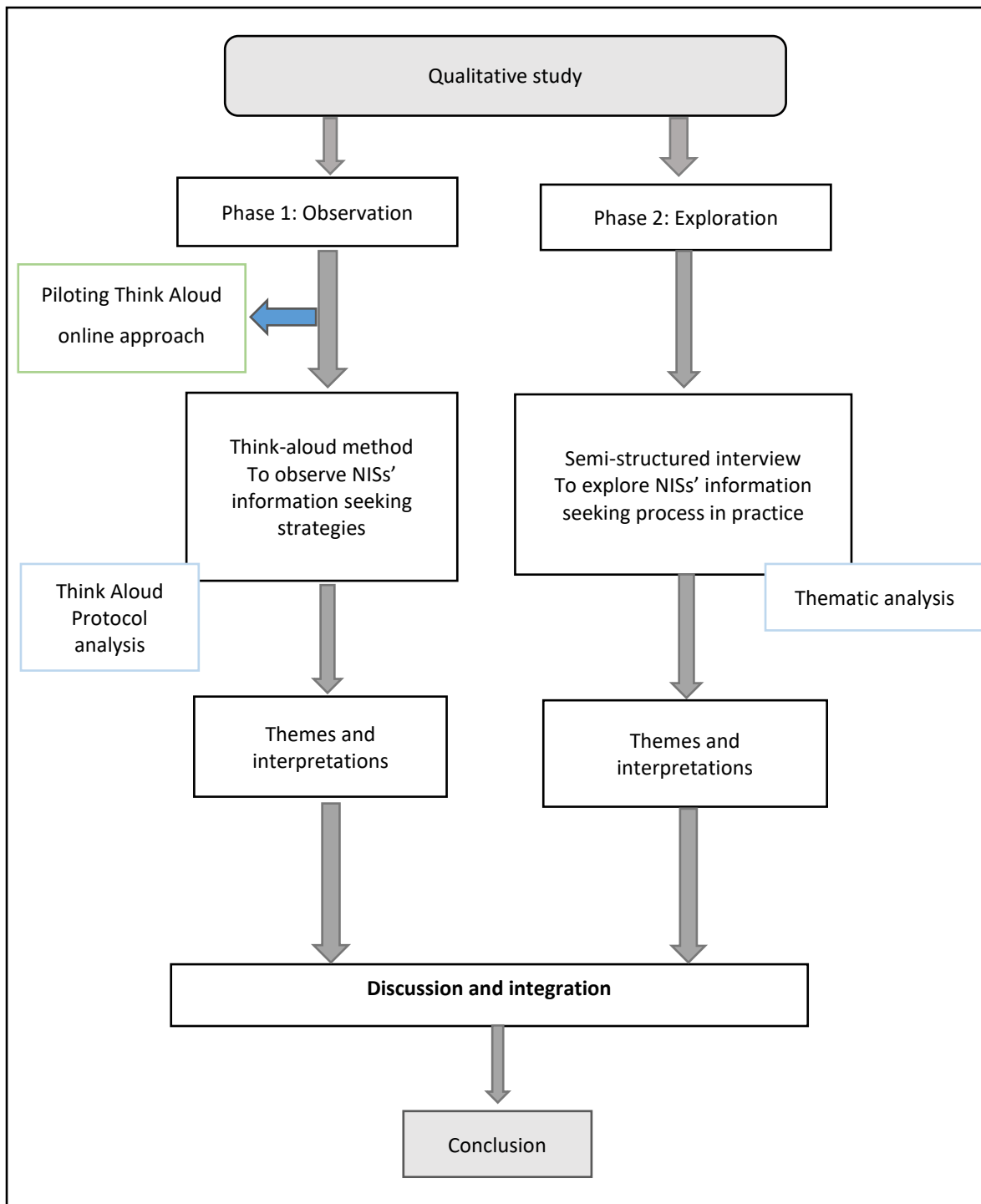


Figure 3.1 Study design

3.4 Dervin's Model used in exploring of NISS' ISBs

Lynn Dervin developed Dervin's Model, a communication-based theory of information seeking, in the late 1970s. The model proposes that people engage in ISBs in order to address gaps or ambiguities in their worldview (Dervin, 1999). The Dervin model offers a user-centred

approach to studying health ISBs, taking into account individuals' perspectives and needs. It focuses on sense-making, allowing researchers to explore how people interpret and apply health information in their decision-making processes (Garg, 2016). The model recognises the dynamic and iterative nature of information-seeking, capturing evolving behaviours and contextual factors over time (Esew et al., 2014b). By considering a wide range of information sources, including formal and informal channels, the Dervin model provides a holistic view of the information landscape. Its versatility makes it applicable to diverse research contexts, enabling researchers to tailor it to their specific objectives and methodologies (Agarwal, 2022).

ISBs, according to Dervin (1999), are a process that individuals engage in to integrate their present understandings with new information (Sualman and Jaafar, 2011). This process is often triggered by a gap or uncertainty in a person's knowledge of a subject, which they attempt to fill by obtaining and processing new information (Esew et al., 2014b). Dervin's Model acknowledges that information seekers are driven by both external and internal contexts, such as the task they are attempting to complete or the setting in which they are seeking information (Agarwal, 2022). Dervin's model provides a paradigm for researchers and practitioners to better understand the motivations, behaviours, and outcomes of information-seeking in different circumstances (Garg, 2016).

As explained in the literature review chapter, the model is helpful for understanding why individuals seek health information and how they take part in the process of seeking information. Dervin's gap can entail and include a multi-directional process and an expanded list of modes of ISBs (Foster, 2005, Godbold, 2006). Dervin's model is considered more multi-directional, flexible, and contemporary because it suggests that not all situation-facing is linear or purposeful (Esew et al., 2014b). Dervin's Sense-making approach is focused on the users' need for information and their experience within the context of their situations (Garg, 2016). The model illustrates the information related to the problem that initiates the need and the information resource that could be used based on information-seeking strategies (Dervin, 1999). It would be effective because it proposes a model for interns where the experience variable is less prominent (Dervin, 1999). Overall, Dervin's Model provided a unique perspective on health ISBs by highlighting the importance of the process along with the role of clinical practice in shaping ISBs. Also, it helped to understand and identify how

information evaluation may contribute to obtaining EBHI. As seen in Figure 3.2, the mapping template added the category locations that would represent the ISBs.

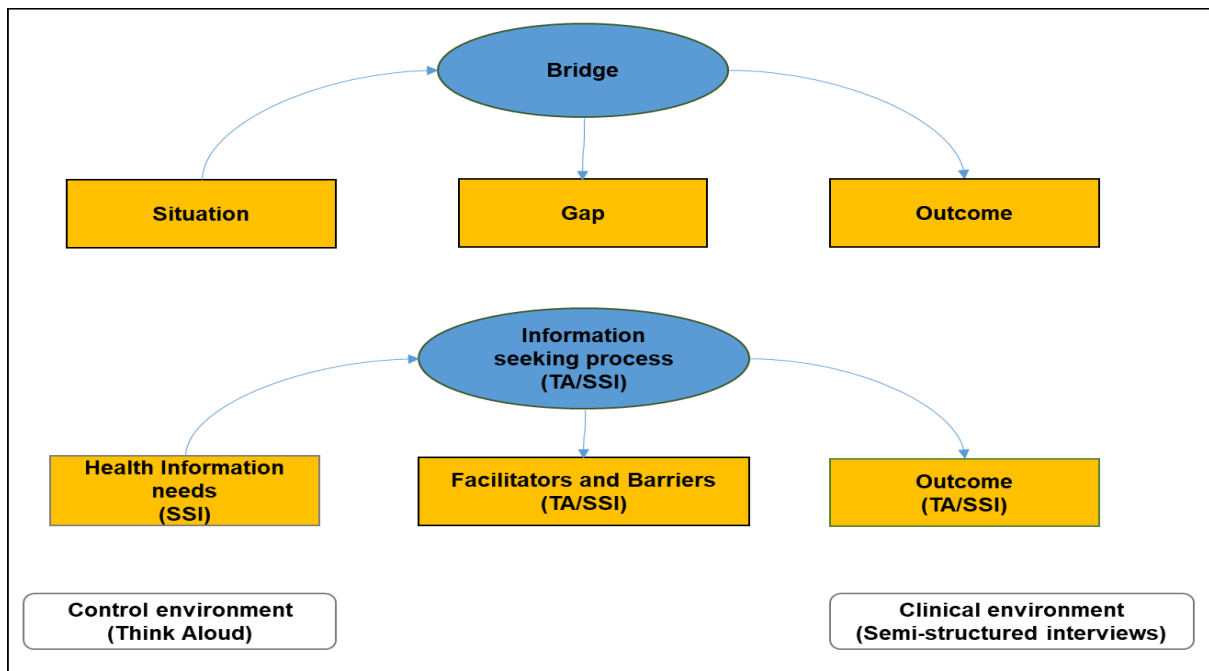


Figure 3.2 ISBs metaphor

3.5 Think Aloud (TA)

3.5.1 Overview

Think Aloud (TA) as a qualitative data collection method has been widely utilised in cognitive psychology as a means of gathering verbalisations regarding productive thinking and as a means of understanding the development of thought in individuals (Jaspers et al., 2004, Banning, 2008). The terms 'TA method' and 'TA protocol' are frequently used interchangeably, because they refer to the same research technique. The practice of asking participants to verbalise their thoughts while conducting a task or solving a problem is described by both terms (Fonteyn et al., 1993). However, if we were to differentiate between the two, we could say that 'TA method' refers to the overall approach of having participants TA during a task, whereas 'TA protocol' refers to the specific guidelines and procedures followed when conducting TA sessions (Koro-Ljungberg et al., 2013).

In selecting a TA method, many issues needed to be considered. A method was required that allowed the participants to navigate through online resources and helped the researcher capture which areas of the ISP made them respond and verbally comment on their way of

seeking health information resources. It was anticipated that this method would allow the researcher to gain a deep understanding of the participants' strategies for seeking health information and explore ways of evaluating the information obtained among them. It was also considered a method that would reflect as close to real life as possible (Robson and McCartan, 2016). The information could then be categorised into themes that demonstrated the ISP, evaluation, gaps, and outcome.

The TA approach is a research method in which participants speak aloud any words in their minds as they complete a task (Abdel Latif, 2019). A review of the relevant literature demonstrates that TA research methods have a solid theoretical foundation and are a reliable source of information regarding the psychological mechanisms and knowledge structures underlying human problem-solving activities with regard to specific tasks, such as problem solving, reading, composing, human-computer interactions, second language learning research, counselling, business, etc. (Sonnenwald et al., 2001, Sharkey et al., 2012b, Wolcott and Lobczowski, 2021). TA is commonly used to gather verbalizations with high-quality user feedback (Eccles and Arsal, 2017). The use of the TA method to observe the participants provides an accurate reflection of their behaviour (Ericsson and Simon, 1998, Zhang and Zhang, 2019).

An example of the TA method's application in usability testing of websites or software interfaces. Participants are asked to navigate through the interface while verbalising their thoughts, providing valuable feedback on the user experience, comprehension of information, and potential areas for improvement (Jaspers et al., 2004). This method has strengths in capturing participants' thought processes, uncovering cognitive strategies, and identifying usability issues. It allows researchers to understand the reasoning behind participants' actions and provides rich qualitative data (Eccles and Arsal, 2017). However, the TA method also has some limitations. Participants may modify their thought processes or become self-conscious when asked to verbalise their thoughts, potentially leading to altered behaviour (Charters, 2003). This limitation should be considered when interpreting the findings, and researchers should create a supportive and non-judgmental environment to minimise participant self-consciousness. Additionally, the TA method heavily relies on participants' ability to articulate their thoughts effectively, which could be challenging for complex or automatic cognitive processes (Wolcott and Lobczowski, 2021).

TA data can be collected from a variety of sources, including direct observation of participants who share details of what they are trying to do, as opposed to simply telling the observer what they think they want to hear (which creates social desirability bias) (Leighton, 2017). The verbal response is recorded with an audio or video recorder or by taking observation notes as participants work through the TA Protocol (TAP) (Whalley and Kasto, 2014). These have to be analysed and examined systematically and in depth in order to generate data about each participant's behaviours and their approach to cognitive reasoning, as demonstrated while they act (Johnsen et al., 2016). Raw TAP data needs further processing and interpretation to provide deep insights on the way in which individuals perform activities (Sharkey et al., 2012b).

3.5.2 Choosing concurrent Think Aloud and protocol analysis

The concurrent Think Aloud and protocol analysis was employed in this study as it met the research requirements (Ericsson and Simon, 1993). Three TA methods were identified to produce verbal reports: concurrent protocol (in which participants verbalise their thoughts while performing a task or activity), retrospective protocol (in which comments describing the task are gathered after performing the task), and post-reflective protocol (where the participants are encouraged to give reasons for their actions) (Jääskeläinen, 2010). This approach relates to the mental processes of the verbalised individual, especially the sequence of thinking processes or cognitive events between the predefined task or problem and the final outcome. Verbalizations (i.e., the eponymous 'TA') are a subgroup of the cognitive processes that result in the execution of an action or behaviour (Zhang and Zhang, 2019).

The participants should be encouraged to verbalise while 'thinking aloud' their thoughts, actions, or feelings as much as possible as they are conducting the task in order to understand their interactive behaviour in the presence of a facilitator (Eccles and Aarsal, 2017). The verbal response can be captured with a tape or video recorder or by note-taking to collect TA protocols (TAP) (Jääskeläinen, 2010). These TAP are used as raw data and require substantial analysis and interpretation to gain deep insights into the way participants perform tasks (Abdel Latif, 2019). Figure 3.3 presents the main stages of the concurrent TA method adapted and modified from (Sharkey et al., 2012a).

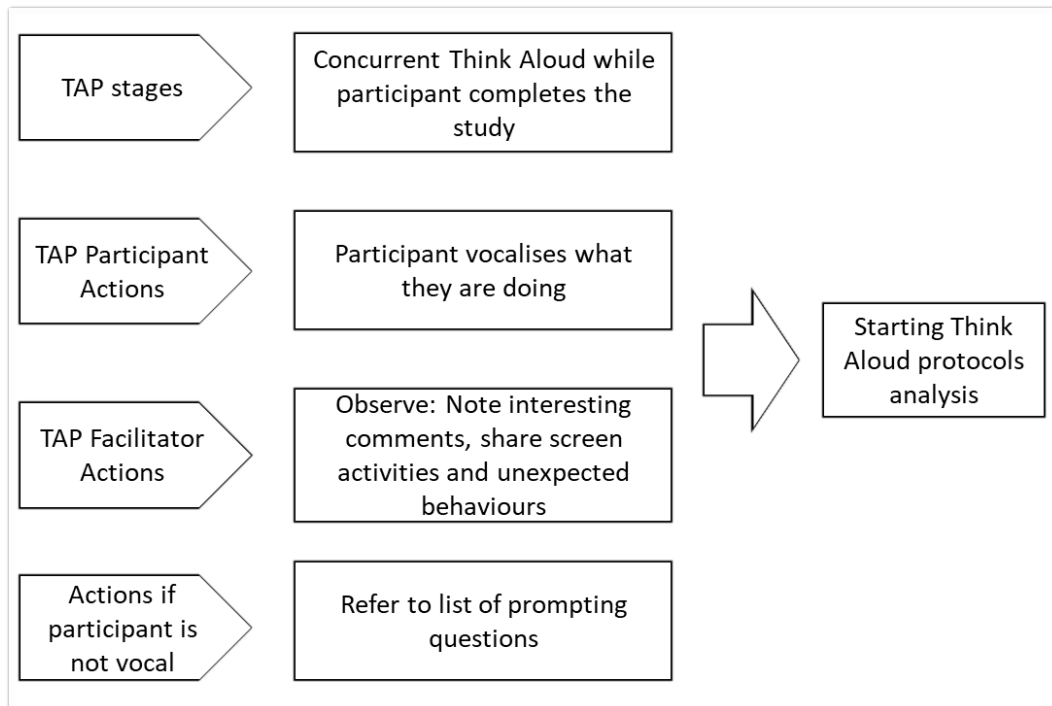


Figure 3.3 Summary of the main stages of TA method

Adapted and modified from Sharkey et al. (2012)

Many advantages of concurrent TA methods have been identified. This method, in many cases, is a unique source of information on cognitive processes as it generates direct data on the ongoing thought processes during task performance (Ramey et al., 2006). In this method, data is available from a wide range of sources, such as direct observation of what the participants are doing and hearing what they want, or are trying, to do (as opposed to simply telling the researcher what they thought they wanted to hear) (Fan et al., 2019). The observer also has the chance to clarify the situation if participants get into difficulties. There is a degree of flexibility, and the presence of many people allows meaningful, direct dialogue (Sharkey et al., 2012a). A high face validity is related to a concurrent TA as the resulting findings are objective because of the openness and accessibility of the evidence (Todhunter, 2015). A small number of participants can provide a rich source of evidence associated with cognitive and decision processes (Van den Haak and De Jong, 2003).

The concurrent TA method is not without drawbacks, such as the fact that the internal thoughts of participants might not be verbalised as they are focusing on the completion of the task (Fonteyn et al., 1993). Moreover, the process of gathering, transcribing, coding, and analysing data from the TA method could be time-consuming and require more resources

than other methods. The main criticism of the concurrent TA method concerns the fact that not everybody is appropriate for concurrently thinking and verbalising because thought tends to co-occur with a silent period after speech (Alshammari et al., 2015). Asking the subjects to TA while performing a task synchronously always requires more time than asking them to work in silence would (Abdel Latif, 2019). This issue needs to be considered in the research design. There seem to be subtle but important differences between quantity and quality of verbal fluency (Eccles and Arsal, 2017). Moreover, a pilot study was used to minimise the drawbacks of the concurrent TA method.

3.6 TA pilot study

The pilot study was conducted using the same methods as the main study but with samples of five participants and two different tasks. To make the findings as relevant as possible for a normal situation, researchers suggest that the qualitative method be piloted to test the practical conditions prior to the actual study (Pitkaaho et al., 2011, In, 2017). Thus, the pilot study was to prepare a clear platform to conduct the actual TA sessions in terms of setting, choosing a task, and coding scheme. Moreover, it helped the researcher prepare and be more confident for the actual study and to manage any unexpected situations.

It was noteworthy that the pilot study focused on evaluating the participants' reactions to the tasks, duration, and digital issues and improving upon the study design before the actual study. The two different tasks were conducted, respectively, following all the ethical considerations similar to the actual study. They were nursing care plan, and the clinical statement. The two tasks were designed to promote and encourage participants' use of diverse health resources during the TA session. Then, the researcher compared them to choose the most suitable one to map clinical intern nurses' behaviours in obtaining health information, which was the clinical statement task. Participants were instructed to TA in order to ensure that all of their activities during the seeking process were captured on the shared screen and audio recording. The subsequent paragraphs highlight the considerations for the actual conduct of the TA and For full details, see Appendix 4:

3.6.1 Choice of online platform

Student reactions to using Microsoft Teams (MS Teams) to conduct TA sessions were generally positive. MS Teams empowered students to actively participate in online tasks,

fostering collaboration and communication between the researcher and participants. It offered features to facilitate the online task such as chat, screen sharing, and video recording options that help maintain the stability of the session. However, some participants asked the researcher to share their screen and show them how to use MS Teams to allow them to do active participation. Therefore, it was suggested that the researcher should send a tutorial video before the actual session. Moreover, as shown in Figure 3.4, the researcher could not follow a participant while undertaking the task, due to access from smartphone leading to confusion with the *ad hoc* organisation of the pages. The researcher also needed to consider that participants needed to be in possession of a laptop with camera with audio input and share-screen capability in order to be able to utilise the system effectively. The overall convenience and efficiency of using Teams contributed to smoother and more effective online TA sessions. The prolific use of Teams during COVID-19 lockdowns meant that many participants were familiar with the platform and related concepts, which facilitated its use.

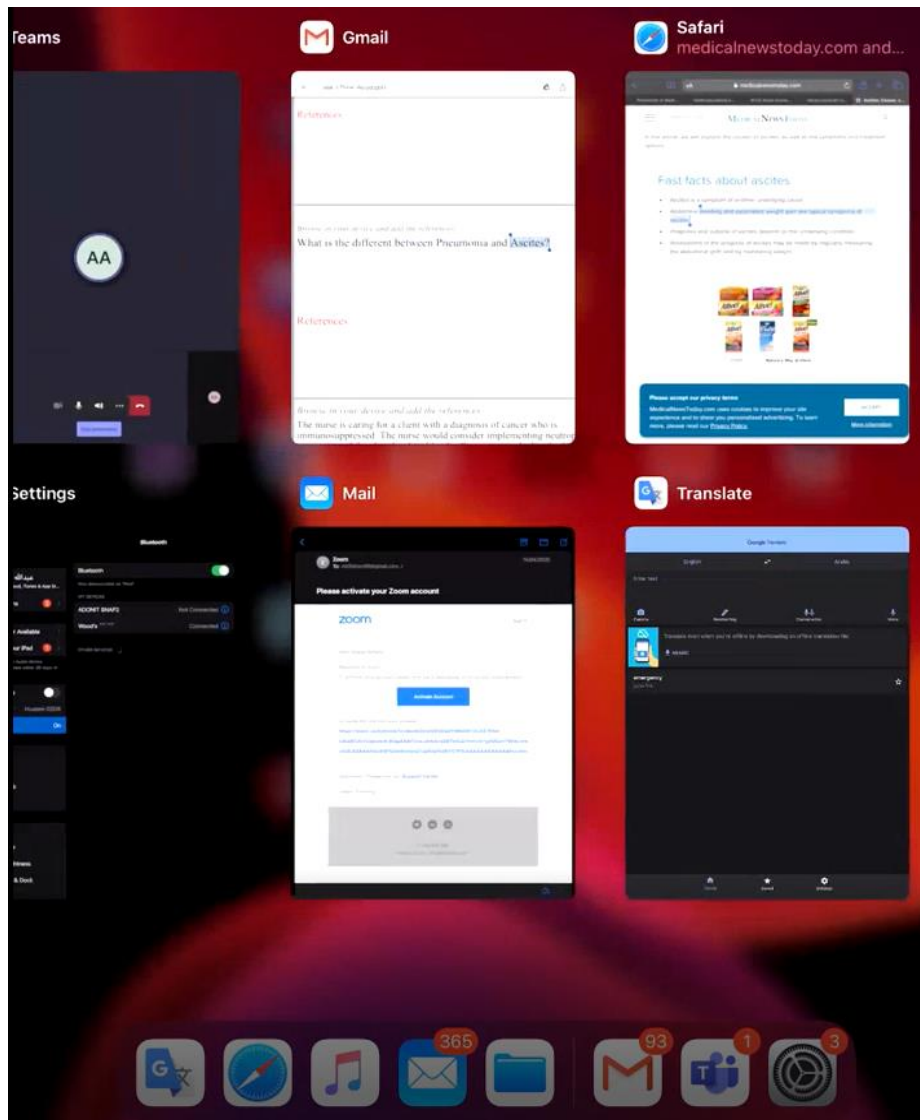


Figure 3.4 Participant access to TA session using smart phone showing many webpages

3.6.2 Conducting the tasks

The participants were asked to allow the researcher to observe them as they completed the task. Moreover, they were asked to explain and verbalise what they were doing step-by-step, which led to addressing and identifying their ISPs. The pilot study revealed that participants preferred to speak Arabic, with which they felt more comfortable and confident. The researcher needed to consider allowing participants to choose their preferred language in the actual sessions.

The nursing care plan and clinical statements tasks were designed to promote and encourage participants' use of diverse health resources during the TA session. The researcher then compared the two tasks to choose the most suitable task to map clinical intern nurses'

behaviours of obtaining evidence-based nursing information. The pilot with nursing care plan revealed the difficulty to concentrate on the primary interest of this study. These tasks focused more on academia perspective rather than seeking health information freely. On the other hand, the clinical statements task was initially to freely select any of the resources to answer the clinical statements. This allowed the researcher to offer minimum prompts, and focus more on observing the participants in more realistic information-seeking contexts. Also, it allowed the participants to be unconstrained in moving to any spaces within the available resources.

In addition, search time is an important factor to decide the number of clinical statements. Previous studies reported that the time per TA session typically ranges from 20 to 45 minutes (Alhadreti and Mayhew, 2018, Samson et al., 2017, Jahandar et al., 2012, Jayathirtha et al., 2020). In the clinical statements task, participants were able to freely navigate health information for around 27 to 33 minutes without a specific task to complete. This time allowed them to complete around 8 to 10 clinical statements. Therefore, the researcher needed to consider the clinical statements of the actual stage based on pilot findings, expert opinions, and supervisors' revisions.

Other criteria such as the task instructions helped in explaining the tasks clearly, with some required modifications to read or write the instructions in English and Arabic language. One participant struggled to understand exactly what they needed to do, and so kept asking the researcher; it must be remembered that fundamental pedagogical obligations to provide appropriate support for each individual learner must never be sacrificed on the altar of technology adoption for its own sake (Rasmitadila et al., 2020). Consequently, modification for personal needs was considered during the actual deployment and data collection. Importantly, the researcher was able to practice how to facilitate and control the TA sessions, and manage to listen and ask without interfering with the participants thoughts. This helped in developing an appropriate guide with prompts and props, and pretested them for suitability of wording and responses. Finally, the researcher gained a sense of confidence for conducting the actual TA sessions.

3.6.3 Development of coding scheme to characterise TA activities

The researcher had a coding scheme that contained observable categories derived from Dervin model for when, what, and how the participants applied the ISP. The TA method was used in combination video and audio recording to get a deep understanding of the verbal protocols and screen sharing of how NISs sought resources. Protocol analysis involves categorising the verbalisation according to the task that produced them (Ericsson and Simon, 1993). Thus, considerations on the coding scheme pinpointed the requirement for two different sources of information:

- The coding was the verbal commentary that depended on the verbal comments (verbalisation) articulated by the participants, which reflected their ISBs in relation to the clinical statements. The audio recording captured the participants' commentary on each part of the ISP.
- The coding was screen sharing activities that reflected the participants' interactive screen actions while seeking health information. The video recording captured the screen to catch what participants were navigating (or mouse-clicking) on the webpage.

These two levels of coding were constructed to indicate the fit between the task and the behavioural interaction by the NISs while seeking health information. The task phases and the assigned codes were required to reflect the participants' behaviours that could be observed and analysed (Alshammari et al., 2015), in order to provide evidence regarding the strategy, and engagement with the EBHI. In the design process, a pilot activity was conducted to identify a list of codes, beginning with a master code to indicate data segments. It was conducted to test and refine the coding scheme, ensuring that it accurately captured the ISBs for subsequent data analysis. This iterative process enhances the reliability and validity of the coding strategy, facilitating a more robust and meaningful interpretation of the study finding (Braun and Clarke, 2012). The list was then modified and examined closely against the Dervin model for fitness and utility. The main consideration was to identify strategies that reflected participants' ISB with the task.

The pilot study revealed the following parameters for the main study:

- Hardware as well as software availability and access is necessary for students to engage in TA activities, with avoidance of distractions such as extraneous smartphone applications in the learning environment. This was evident from the observation during the pilot study that using laptops in particular enabled students to remain engaged in tasks, while offering a comfortable and appropriate platform to facilitate task performance and content navigation.
- Clinical statements comprise the core focus of the TA task, rather than care planning nursing items, as the pilot revealed that the former incited more thorough and in-depth responsiveness from students, thereby affording deeper indications of their ISBs and cognition during task execution.
- The main study's coding entails analysing TA task activity-sharing alongside verbal recording, to generate a comprehensive picture of learners' decision-making and cognition.

3.7 Summary

This chapter outlines the philosophical underpinnings, methods, and techniques utilised to collect data. The pilot study served to set parameters for the TA method to be deployed in the main study. After presenting the methodology in this chapter, the next chapter describes how the TA process was designed and conducted in an online context.

Chapter 4

Exploring and Implementing the TA Method in Online Context: A Pilot Study Approach

Due to COVID-19 social distancing practices, field research hitherto normally conducted face-to-face had to be transferred online (otherwise it had to be suspended or cancelled altogether). Designing and implementing TA online was a challenging task, as it required simulating all tasks that were performed in face-to-face settings; therefore, Microsoft Teams (MTs) and PowerPoint were used to remotely replace onsite activities.

In this Chapter, the transfer of the TA approach to online will be described and a pilot study to determine its efficacy will be presented. The aim of the pilot study was to understand the necessity of exploring the best approach to conducting actual online TA involving nursing students, along with its benefits and challenges. Moreover, the findings helped the researcher prepare and be more confident for the actual study and to manage any unexpected situations.

4.1 The purpose of doing the online pilot study of TA

Conducting research during the COVID-19 pandemic has provided unprecedented insights into the potential and pitfalls of online research methodologies and approaches (Dodds and Hess, 2020). Enforced social distancing practices meant field research originally being conducted face-to-face had to be transferred online during COVID-19 (Alanazi et al., 2021). A considerable amount of literature has been published on the benefits and limitations of online methods in general, which offer obvious expedient and practical advantages in terms of ease of recruitment and ability to recruit from various locations (Campbell et al., 2008, Atherton et al., 2019). Collecting data online obliterates traditional time and geographical barriers and financial constraints for researchers, all of which adversely affect onsite data collection, but it has traditionally been viewed as sacrificing quality in the interests of expediency. For instance, when conducting quantitative data about personal and/ or emotional subjects, the traditional face-to-face, in-person interview has been assumed to be preferable due to the trust and rapport fostered between interviewers and interviewees, which could not be emulated by traditional distance interview methods such as telephone or email interviews (Cater, 2011, Almost et al., 2019). In this thesis, the transfer of the TA approach online is

outlined using a pilot study, to explain the provenance of TA and how it operates in online contexts, which has been published in the Healthcare Journal (Alhejaili et al., 2022).

4.2 Pilot study of online approach

4.2.1 Moving to online methods

The literature search undertaken by the researchers identified no reports of modifying the TA methodology for online delivery, and the nature of online TA remains unclear. To our knowledge, no one has investigated 'online TA,' where participants are seated and perform TA tasks remotely within a session over an Internet Protocol (SoIP) network. Therefore, this pilot study attempts to address this by providing a critical reflection on the implications of online TA. The study was designed in order to contribute to this underdeveloped area of the online qualitative methodology literature. It is worth noting that the points were raised in this article were of a conceptual nature, focusing on developing recommendations for the use of online TA as an observation tool in qualitative research.

In this piloting, the study presented a clinical statement task to conduct online TA via SoIP applications by Microsoft Teams (MTs). The participant connected via video conferencing tool to do online clinical statement tasks related to nursing work. The goal of this pilot study was to understand the necessity of exploring the best approach to conducting actual online TA involving nursing students, along with its benefits and challenges.

4.2.2 Materials and Methods

4.2.2.1 Study design

To fulfil its aim, the current pilot study utilised a clinical statements task to communicate participants' intent to seek information through different online resources, thus engaging the participants to contribute in concurrent TA in a remote setting. Participants were given instructions and a brief description of the TA technique. For each clinical statement, a PowerPoint slide popped up to show the new clinical statements with instructions to guide them through a task. The nine statement represented a typical nursing care encounter, with decision-making focused on a request for formulating a clinical decision for a patient. Then, the participants were asked to seek and obtain EBI related to the clinical statement.

This task was followed by semi-structured interviews conducted to explore benefits and challenges during the online TA sessions. The data obtained through the interviews was then analysed thematically using Braun and Clarke (2006) guidelines to explore the emergent factors related to online TA from participants' perspectives (Castleberry and Nolen, 2018). This method allowed me to concentrate on recruiting participants, developing rapport with them, and honouring ethical requirements in order to gain a better understanding of the specific needs within each of the identified themes. The piloting analysis focused on the benefits and challenges of online TA. It included an analysis of the findings from the semi-structured interviews along with some online TA troubleshooting. The data was digitally recorded with the consent of participants, transcribed, and imported for analysis. Data collection and analysis were undertaken by the principle researcher, and verified and reviewed within the research group.

4.2.2.2 Participant recruitment

Seven participants were recruited to conduct the pilot test. These participants were subject to the same inclusion and exclusion criteria as those who took part in the main study (as described below), but their results were not included for analysis in the latter. Various studies have assessed the efficacy of various pilot study sample sizes. While there is no universal blueprint, the sample is inevitably relatively small, particularly for qualitative research (In, 2017, Alshammari et al., 2015, Razali et al., 2020). One rule of thumb is that the pilot study sample should be 10% of the final study sample size (Alshammari et al., 2015). The main study aims to recruit 14 participants for the actual TA, which compares favourably with a similar previous empirical study which used a convenience sample of five participants (Joe et al., 2015). This study started with TA sessions followed by semi-structured interviews to evaluate the usability of a system.

The sample in the pilot research must be similar to the sample in the main study (in order to be effective in piloting the research instruments as a testing phase) (In, 2017). Sampling is based on the relevance of the participants to answer the research question. Inclusion criteria were calibrated to recruit a sample of nursing students in possession of a laptop with a camera, audio input, and share-screen capability. They completed all the educational requirements at Taibah University. At the time of recruitment, an invitation letter was sent to 30 nursing interns who had begun the program. Four participants (P1-P4) were nursing intern

students (NISs) at an internship program at Taibah University (Saudi Arabia). Furthermore, two PhD students (P5 and P6) and one experienced TA researcher (P7) volunteered to complete the same online task to experience doing the online sessions (Table 4.1).

Table 4.1 Participants' overview.

Participant 1-4 (P1-P4)	NISs
Participant 5-6 (P5-P6)	PhD students
Participant 7 (P7)	TA researcher

They all then participated in semi-structured interviews in order to explore their experiences of taking part in a TA session online approach. Verbal data was gathered, documented, and transcribed, and was then thematically analysed (Braun and Clarke, 2006). This entails a constant cross-checking process between the data set, coded extracts, and generated data (Leech and Onwuegbuzie, 2007). The developed themes were checked repeatedly to determine whether it was appropriate to split or merge themes (Castleberry and Nolen, 2018). Feedback and thoughts about the online TA and suggestions for improvement were gathered from the participants during the semi-structured interviews. These codes for the pilot study of the online TA approach were then shared with and critiqued by the research team.

4.2.2.3 Ethics

Ethics is central to data collection methods in every piece of research (Olsen, 2011, Markham et al., 2018). Ethical concerns include those pertaining to intellectual property, informed consent, the right to withdraw, unintended deception, accuracy of portrayal, confidentiality, and financial gain (Facca et al., 2020). With the advent of online research, the above concerns are still valid, but less easy to define. In particular, the online world raises ethical issues around access to data and techniques for the protection of privacy and confidentiality (Gelinis et al., 2017).

The pilot study was carried out after receiving ethical approval from the Research Ethics Committee of the Faculty of Medicine and Health Sciences at Nottingham University, and the Faculty of Nursing at Taibah University. Nursing and PhD students read the participant information sheet (PIS) and completed the consent form online. Participants were informed

that their TA and semi-structured interview sessions would be recorded with their permission, and that they could stop the recording at any time or withdraw from the research. They were given the opportunity to choose the day and time of their sessions and interviews.

4.2.2.4 Evaluation of online TA method

It is important to consider the perspectives of both participants and researchers in terms of the process of conducting and contributing to an online TA study, thus direct observation of TA was used. Direct observation is a popular method to explore participants' understanding of online sessions. This was followed by reflective semi-structured interviews, to gain a deeper understanding of participants' experiences of the online TA study (Table 4.2).

Table 4.2 Semi-structured interview questions.

How easy was it to participate in the online TA session?
How difficult was it to participate in the online TA session?
Do you think that doing a TA session online encouraged you to participate in the research?
Do you have any general comments about the online session?

4.2.3 Results from pilot study

The results of this piloting indicate several factors perceived by participants as beneficial and challenging regarding online TA. The interview questions were used to organise the presentation of the data. Overall, there was agreement among researchers and participants that online TA was a useful method for conducting qualitative interviews. Participants frequently reported the following points, recruitment, rapport, and ethical concerns. Similar studies that looked at online methods to collect qualitative data also identified the salience of these categories (Alanazi et al., 2021, Johnson et al., 2019, Deakin and Wakefield, 2014). Quotes provided in this section are illustrative excerpts from interviews of themes that were common across multiple participants' accounts (the analysis of the interview transcripts formed the basis of the thematic analysis presented below).

4.2.3.1 Recruitment

The majority of students agreed that using Microsoft Teams helped greatly widen the range of our recruitment without being physically present, thus incorporating wider experiences in the research by allowing the researcher to reach many different participants without

geographical limitations. A couple of students mentioned that it was important to consider the clinical workload and assigned an appropriate time to encourage participation. P5 said this method allowed respondents more flexibility with regard to participating, since he had lack of time due to the workload in clinical practice. He thought that doing the TA session online provided more convenience in terms of time and space, *'Yes, because I have a lot to do in clinical practice regarding nursing responsibilities, so I could now find a suitable time out of my duty shift to participate.'* Additionally, researchers' assistance and instruction were found to be very useful, and some students found written instructions more helpful than oral instructions. As P3 noted, *'I think written instructions should be fine, because it was easy to go back and read them.'*

Participants' concerns were expressed about technological expertise of familiarity with using MS Teams. Two participants revealed that the using MS Teams was complicated, which they mainly attributed to a lack of familiarity. They did not know how to use MS teams, which meant that those with little technological expertise needed to be trained. One asked to use another platform instead of MS Teams. P2 said *'Because it was my first time and I had no idea how to use Microsoft Teams. Can I use Skype for the session instead of Microsoft Teams?'* Moreover, P3 asked the researcher to show him how to use MS Teams as follows:

P3: I do not know how to use Microsoft Teams in this task. Could you teach me?

Researcher: I will share my screen and explain to you how to use it.

Another common obstacle to using online TA was the ability to access to a computer with the necessary software. Participants were not able to choose to have the TA sessions face-to-face, which meant that those with no laptop might be excluded. P6 was not able to volunteer for an online session at the chosen time and needed to reschedule the TA session:

Researcher: Which device do you use to enter Teams?

P6: Hi! I am using my smartphone?

Researcher: Sorry, can you use a laptop to enter? Because it is necessary to participate in this study, due to the nature of the TA session.

P6: I do not have a laptop right now.

Researcher: Sorry, I have to rearrange this session for another time, thank you for your willingness to participate.

4.2.3.2 Rapport

Participants mentioned a number of advantages of the online TA that enhance rapport. Participants who were not comfortable with being physically observed could be anticipated to experience stress. However, most participants reported that online TA has some flexibility. This was supported by P3, who mentioned that doing the TA task online could be more relaxed and less intimidating than face-to-face activities in the same physical space which maintain rapport. He said that *'I think because of physical distance, I feel more relaxed to do the task without being observed and evaluated in the physical presence of a researcher.'*

Correspondingly, P7 thought that the online session helped to avoid embarrassment brought about by presence of a researcher. He expressed a preference for online tasks, arguing that he felt more comfortable not being able to observe his facial reactions or the researcher expressions. He stated that, *'Because I can't see your facial expressions. I feel more comfortable to interact in the session more than speaking to you face-to-face.'*

There were some occasions when the researcher needed to say prompting words during the sessions, whenever the participants became silent to resume their actions and thoughts, which allowed us to obtain better data. For example, in one session there were some prolonged pauses (silence), during which participants were induced to speak to ensure the maintenance of rapport:

Participant: [Silent for 40 seconds]

Researcher: Keep on talking...

Participant: I will thanks. [P2]

There was no problem with regards to online sessions interrupted by the loss of connection. In one session the internet video call was established as the audio and video clarity were checked, then the interaction was lost. I then sought clarification of the connection quality, instead of continuing with the exchange of conversations. After that I resumed the conversation to sustain rapport:

Participant: [Call disrupted for 20 seconds]

Researcher: Hi! I cannot hear you?

Researcher: How are you?! [Connection back]

Participant: I'm good thanks.

Researcher: Can you complete sharing screen and resume again?

Participant: I can... yes, It's fine. [P4]

4.2.3.3 Ethical concerns

For the purpose of carrying out online TA sessions in this thesis, the researcher followed standard ethical procedures to address all ethical concerns. The volunteers had a chance to pre-read the consent form, and they were pre-warned and asked if the interviews could be recorded. They were informed that the recording of the sessions could be stopped at any time on request, and that they could withdraw at any time from the research; they were given the opportunity to choose the location, day and time of their session. With the advent of online research, the privacy and confidentiality concerns are still valid. With conducting TA sessions through Microsoft Teams, there are some additional ethical considerations to take into account, namely the issues created by the fact that the interaction is mediated through the use of technology (which is owned by third parties), the verification of participant's identity; and issues raised by the interview environment and the nature of recording this. P2 in response to difficult of participation mention that it was important for both the researcher and the platform to protect all participants' identity information. He stated that, *'It might be an issue in terms of privacy and confidentiality with online sessions, particularly for me as a student, in terms of evaluating my nursing performance. I might be concerned if this session was shared with my clinical instructors.'*

To start the session, participants needed to open a new window in the search engine. The researcher noted that this might show some previous webpages sought by the participants, and thus asked the participants to close all the windows and opened one window with erasing their previous history, in order to maintain their privacy. A couple of participants felt uncomfortable about the potential to show their search history unintentionally (*'It would be better to delete previous search history'*).

4.2.4 Discussion of the online TA pilot study results

Despite the challenges described above, online TA was overwhelmingly perceived to be beneficial by the participants. One main reason given was that the online approach provided the participants with flexibility in terms of not having to be in a particular physical location to attend. Using an online approach, the researcher was able to transcend geographical boundaries, nullifying distances and eliminating the need to visit an agreed location for interview (Janghorban et al., 2014, Hewson, 2017, Alanazi et al., 2021). Also, when using MS Teams and other similar technologies, TA session can easily be conducted from the comfort of one's home, eliminating not only the need to travel, but also the need to find a venue to do the TA sessions (Fox et al., 2007, Berger et al., 2018). Logistical issues were also eliminated in this study with regards to access to certain spaces such as a classroom, meeting room, and hospital areas. However, participants may have felt uncomfortable being recorded or filmed in their own homes.

Ideally, researchers need to decide on the type and level of difficulty of the research processes, and the degree of prompting which is appropriate to meet the demands of a TA task (Miller et al., 2003, Watanabe-Galloway et al., 2015, Hewson, 2017). With the use of online methods, materials used in the TA task were minimized by the researcher, to facilitate conducting the fieldwork in a more flexible way, built around the needs of participants. However, two participants needed a tutorial session on how to use MS Teams, which could be linked to the cognitive overload of using the technology in itself, in addition to the focus on the content of the activity (Rutkowski and Saunders, 2018). It would be preferable to send pre-prepared tutorial videos before sessions to avoid any anxieties or delay during the real tasks. Potential participants could be deterred and even refuse to participate due to a lack of familiarity with using MS Teams. Another obstacle to conducting online TA was the issue of access to a computer with the necessary software and the ability to use it during the session (as explained above, P6 had expected to be able to conduct the task using a smartphone and did not have a laptop available). Therefore, an important inclusion criterion for participants is to be able to use a laptop with audio input and the capability to share screen for the duration of the task.

Previous studies mostly defined rapport as the degree of comfort in the interactions between the researcher and participants (Frisby and Martin, 2010, Gansen, 2017). For participant

observation, rapport refers to the quality of the relationships that the researcher makes at the field site (Bonner and Tolhurst, 2002, Gansen, 2017). One of the most important benefits of online TA was that participants felt more comfortable, which facilitated their task execution. A study of participants in a hospital setting were not able to speak openly, which undermined the richness of the data; the subsequent use of complementary telephone interviews produced much better data (Carr and Worth, 2001). This finding was also reported by other studies Gill et al. (2008). Despite the reported benefits, the necessity of access to high-speed Internet, familiarity with online communication, and having digital literacy should be mentioned among the inclusion and exclusion criteria. Another contentious issue around SoIP technologies and their limitations is the building of rapport. For example, three of the seven interview participants indicated that they had difficulties with online communication. The absence of face-to-face interaction in online settings presents a difficult to interactions with participants Hewson and Stewart (2014). Thus, there is a need to work with participants to overcome the difficulty of communication in an online environment.

In this method, there are several concerns with regards technical difficulties or loss of internet connection that might affect rapport. Similarly, digital issues can lead to a loss of consistency Mealer and Jones (2014). For instance, if the internet connection is lost during performing a TA task or an activity, it might generate an unexpected interruption and rupture of the TA session that it is subsequently hard to move forward from (after resuming the connection) (Seitz, 2016). In the context of the TA sessions, the researcher found that there was no problem with regards to rapport: even on those rare occasions when the call was interrupted by the loss of connection or screen freeze, there was no problem resuming the conversation. This is not a new challenge for online methods in general. Numerous researchers have studied the absence of connection in online methods (Cater, 2011, Deakin and Wakefield, 2014, Lo lacono et al., 2016, Hewson, 2017). To avoid a sense of ambiguity, the researcher should provide instructions to follow at the beginning of a project include expecting a soon reply by the research to resume the session or sending e-mail. These strategies can assist to let participants know about these challenges and help them to overcome the difficulties of online connection.

One of the most significant current discussions in online methods involves challenges to the traditional axiom that the rapport and richness of interpersonal interactions may be lost when

using online methods, which is an increasingly archaic presumption when modern internet and communication technologies are available (Rowley, 2012, James, 2016). Although often overlooked in formal processes, rapport is essential to ethical practice, particularly in terms of building a research relationship founded on respect (Abbe and Brandon, 2014). While it might initially seem that it is harder to offer the same level of rapport via online tools such as MS Teams compared to offline face-to-face contexts (Gratch et al., 2006), the reduced non-verbal communication cues in online TA compared to face-to-face sessions or on-site observational studies that might have limited rapport were not evident in this pilot study. Overall, this study has raised important questions about whether online or face-to-face TA sessions are better to build rapport. With conducting TA sessions through MS Teams, there are some additional ethical considerations to take into account, mentioned by the participants, which pertain to the interaction being mediated through the use of technology (which is owned by third parties), the verification of participant's identity, and issues raised by the interview environment and the nature of recording. After data collection, data was transcribed and stored in password-protected computer files accessible only to the authors.

The COVID-19 pandemic required us to think creatively about the ways we conducted research to ensure that it was still robust, ethical and safe, whilst being carried out at a distance. It is true to say that we have learnt a lot about the fundamentals of research and the affordances of new technology within this field. The TA process is a good example. TA is based on a social interaction between the participant and the researcher, as the researcher observes and questions the participant's interaction with a particular artefact or process. Whilst, we might have considered physical proximity to be an essential part of this, we have learnt that this technique can function very well at a distance using new social technology. Moreover, this understanding opens up very real and exciting opportunities for the use of the technique, enabling flexibility in terms of location, as participants to be located anywhere globally as long as they have access to the internet and the factor being investigated, flexibility of time, meaning research can more easily be managed around clinical practice, for example, flexibility of environment, meaning that the TA process can be brought more easily into clinical environments, for example and flexibility of participation meaning that many more people can participate in such studies.

4.3 Summary

The COVID-19 pandemic has dramatically revolutionised the way research can be carried out, and created a need to continue research activities in diverse fields while keeping research fields safe and academically robust. Researchers have been compelled to find innovative solutions in order to conduct research, including TA sessions, as face-to-face sessions were no longer possible during periods when social distancing measures were applied. After presenting the pilot studies in this chapter, the next chapter will present the methods of the actual study.

Chapter 5

Methods

This chapter outlines the methods employed in the main study. It includes data collection and analysis. It then describes the study population, setting and recruitment. The chapter ends with ethical considerations.

5.1 Data collection

The aim of this study was to explore the factors and strategies contributing to the ability to access and utilise evidence-based health information (EBHI) in clinical practice. Also, it explored their broader experience of information-seeking in a real clinical environment. Online TA was preferred as a method to investigate NIS information-seeking strategies through direct observation. Then, semi-structured interviews were used to explore factors that might contribute to obtaining EBHI during clinical practice. The TA method and the semi-structured interview used in this study were conducted in two phases: observation and exploration, as shown in the previous chapter at Study Design Figure 3.1.

A review of the literature (see Chapter 2) revealed that previous research has used a range of methods for exploring information-seeking behaviours (ISBs) in clinical practice, such as questionnaires and interviews about the seekers skills and the resource chosen for obtaining health information. While the findings were of potential interest and could provide data on clinical nurses' ways of seeking health information using human, printed, or online resources. Also, these methods were unable to evaluate participants' interactions and strategies with the information obtained.

Observation is a data source which researchers use to explore and understand a group or culture of social phenomena (Holloway and Galvin, 2017) and is commonly used in the exploratory phase (Robson and McCartan, 2016). It can include: participant observation, when the researcher is directly involved with participants in the study; unstructured observation, conducted to observe events or natural phenomena without guidelines; and structured observation, conducted to look at specific features of phenomena with guidelines (Robson and McCartan, 2016, Yin, 2014). The purpose of this stage was to observe NISs' behaviours while seeking health information through information sources. TA plays an

important role in evaluating cognitive involvement, acceptability, critical thinking, response and usability of using health resources (Forsberg et al., 2014). Due to Covid-19 and social distancing this thesis had to transfer to an online approach for data collection. The transfer of the TA approach to online was outlined in the previous chapter using a pilot study, to see if the main study could proceed with or without modifications.

5.1.1 Actual TA session

5.1.1.1 Selecting clinical statements

The proposed task was to provide participants with a scenario that represents a patient that they might come across in their clinical practice. The researcher adopted the idea of a problem-solving task through a clinical scenario to motivate participants to explore their ISBs with objectives that closely align with clinical practice. The researcher needed to consider the clinical statements of the actual stage based on pilot findings, expert opinions, and supervisors' revisions. The experts were two clinical instructors who provide direct supervision to NISs in clinical placements for training purposes such as education and teaching nursing skills. The 'expert opinions' were taken into consideration to choose 8 clinical statements out of 15 (see Appendix 5). They were asked to evaluate all the statements in terms of readability and suitability for NISs. Table 5.1 shows the eight clinical statements' and their focus.

Table 5.1 Clinical statements

N	Focus	Clinical statements
1	Sepsis	Serum lactate is an important indicator of the septic patient's prognosis, with mortality dropping significantly as the lactate level decreases.
2	NGT contraindication	A nasogastric tube is considered as a contraindication in a patient with a basal skull fractures.
3	Glasgow coma scale (GCS)	Patients with GCS lower than 8 requires urgent airway and breathing management.
4	Extra Corporeal Membrane Oxygenation (ECMO)	ECMO is a support not a treatment to provide stability while underlying cause is treated.
5	Patient position	Prone positioning might improve overall survival in severe ARDS.
6	Pain management	No laboratory test can determine the presence or severity of pain.

7	Medication indication	Heparin reduces pulmonary compromise and intravascular coagulation in fat embolism patients.
8	Patient education	A patient asked about the purpose of the pursed-lip method of breathing

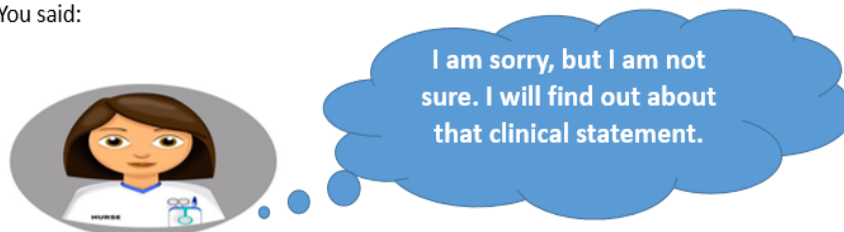
5.1.1.2 TA session

The participants were requested to take part in a TA session where they were given a task and asked to talk through where they would seek information to understand and act on this clinical statement. PowerPoint was used to present the clinical statements, and MS Teams was used to contact the participants. The researcher also presented himself with the purpose of the study, giving them direct, specific instructions, as mentioned in Figure 5.1. The participants undertook the process and explained what they were doing, thinking, and feeling as they went through the task.

The clinical scenario:

During a discussion with your colleague to make a clinical decision within a patient care. Your colleague mentioned a clinical statement that relevant to the patient care.

You said:



Your task is

- To seek and obtain evidence based information related to the clinical statement.
- Allow the researcher to observe as you complete the task.
- Explain and verbalise step by step what are you doing.
- You will have different clinical statements and the session will take 30 minutes.
- Please **mention and value** the references from where you provided this evidence (more than one reference)
- Take a break when you need.

Please go to the next slide to do warming up task

Figure 5.1 TA instruction

Participants were given instructions and a brief description of the TA technique. For each clinical statement, a PowerPoint slide popped up to show the new clinical statements with instructions to guide them through a task. Participants chose which resources of information to see first and how. The statement represented a typical nursing care encounter, with decision-making focused on a request for formulating a clinical decision for a patient. A

warming-up task was employed to ensure the participants were assured and encouraged. As recommended by Sharkey et al. (2012b), the warming-up task was a rehearsal that lasted for a short time to settle the participant into the task and get used to the presence of the researcher and the recorders of video and audio. Also, it allowed the researcher to verify that the MS Teams recorder documented correctly, with the participants' verbalisation captured during the session but then immediately deleted. For the different information-seeking exercises, they had access to a range of web resources or they could navigate health information freely, such as by Googling to obtain resources. The video was recorded using the MS Teams sharing option. After that, tracing NISs patterns and strategies of seeking health information to determine their interest in specific interactions and whether they were following a proper ISP. Figure 5.2 shows an example clinical statement and how a participant interacted during the thinking aloud online session.

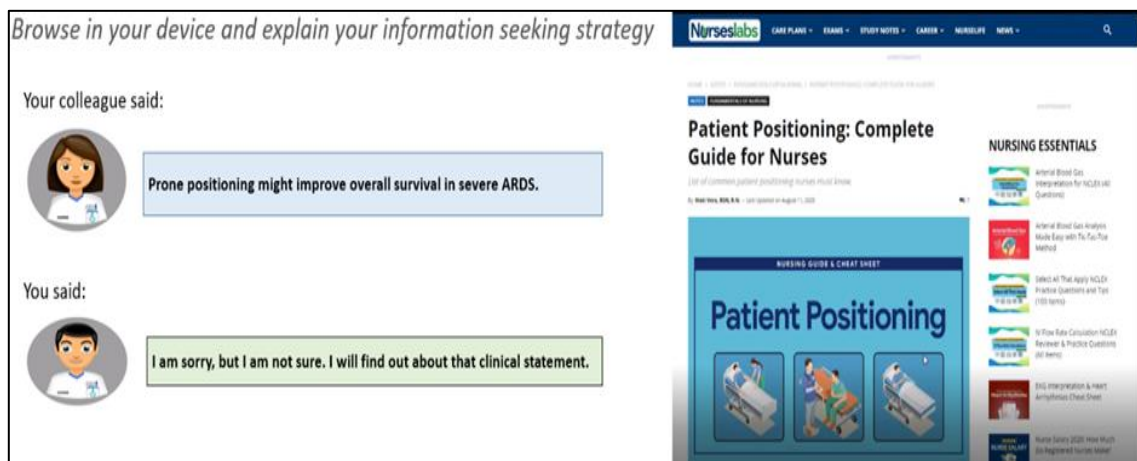


Figure 5.2 TA session

5.1.2 Semi-structured interviews

The semi-structured interview method was used to collect data regarding NISs' awareness of obtaining and utilising health information in clinical practice, their attitude towards the health information needs (HINs), the benefits they derive from seeking EBHI, and the challenges they face in using the resources. SSI plays an important role in allowing participants to express their views in their own terms, which provides reliable, comparable qualitative data (Gugiu and Rodríguez-Campos, 2007). Throughout qualitative health research, SSIs are often used to discuss topics that are unique and sensitive, which can identify potentially modifiable factors for healthcare practice behaviours (Tong et al., 2007). Wilson (2014) utilised SSIs to

understand the broader context of information-seeking in a real clinical environment for physicians. SSIs explore their experience seeking health information in clinical practice. This helps to identify the challenges among physicians of seeking information in clinical practice. It also reflected on their activities regarding EBP and clinical decision-making in practice.

A literature review acknowledged that NISs had limited insight into the factors that influence their engagement with information sources. Therefore, it was important to explore users' views as part of the SSI to develop a data collection framework or recommendations that accommodate the needs of the target population (Welsh et al., 2010, Marmo, 2014, Amato et al., 2015). Thus, to be able to gain further understanding and appreciation of the experiences and the feedback given, the SSI approach was employed to explore the NISs' experience of using health data from various sources.

This method offered an effective way to provide valuable data and important insights and also, to build rich data that relates to the research objectives (Fergie et al., 2016). In addition, the SSI added comments that were not verbalised during the sessions to understand their information behaviours (Blandford, 2013, Magaldi and Berler, 2020). Also, it was valuable to add SSIs to the more controlled tasks in the TA study. Teo et al. (2017) indicated that the interview is considered semi-structured because the researcher can change the order of questions, omit questions, ask for clarification, or vary the wording of the questions depending on what happens at the interview. So, the interviewer might reword, reorder, or clarify the questions to further explore the concepts the participant had introduced. Table 5.2 shows the proposed questions that were adapted for this study.

Table 5.2 Questions adapted in the semi-structured interview.

These questions is based on wider ISBs activity in 'reality'
In a confidential way, can you describe a clinical situation in the last couple of weeks where you had to seek health information?
What types of information did you seek to help you answer the questions you had? What type of source you had thought about it initially during this situation to find answer to your question? and why? what sources did you use to find the health information, why did you choose to use that way to find health information; are there any other ways but you choose not to use them, why; did you get an answer to your inquiries (if no why)
How easy was it to find the information you needed? How difficult was it to find the information you needed?
What do you think about the quality of the information you found? How satisfied with the answer that you get, what would have helped, does it play any role in your clinical decision, is there anything else that might explain why you asked that questions.
How typical is this example to how you seek information in your clinical role? Generally how satisfied are you with your ability to access the information you? What would help?

The semi-structured interview was conducted over the internet. Voice over Internet Protocol (VoIP) technologies encouraged interviewees who had time and place limitations for face-to-face interviews to participate in research due to Covid-19. After the participant's agreement to take part in the study conducted with VoIP, the time of the interview was arranged. The participants were asked to answer open-ended questions that aim to explore their wider experience of seeking health information and strengthen their understanding of the factors and strategies that contribute to the ability to obtain EBHI in a real clinical environment. After the SSI was collected, the participants were given the opportunity to provide feedback before their data was used. In order to protect the data collection techniques, participants' safety, and their right to privacy, the researcher would mention any issues raised by the interview environment and the nature of recording.

5.2 Data analysis

TA includes videos and verbal comments that were gathered, documented, and transcribed into protocols for TA. Then, the protocol was assigned to thematic analysis. Qualitative semi-structured interviews were transcribed verbatim and analysed using thematic analysis, which

included initial and focused coding, constant comparison, and the identification of major categories to support the themes in the results. The data were coded based on Dervin's model. Several core categories emerged from analysing the data collected for this thesis. Table 5.3 defines each of the categories that focus on ISBs that occur when an NIS seeks health information in practice in specific situations. Moreover, analysis was not a linear process that simply moves from one phase to the next. Instead, it was a more recursive process, with movement back and forth as needed throughout the phases. Manual coding was undertaken for this data to define key themes. It was coded and evaluated with supervisory team guidance.

Table 5.3 Categories definition

Dervin's model elements	Model focus (core categories)	Definition
Context	Clinical practice	This category focused on the NISs' health information needs and their experience within the context of clinical practice in which information problems arise to secure clinical practice along with clinical statements in TA task.
Bridge	Information-seeking process	This category was used to identify the strategies of searching for information to evaluate and obtain the appropriate information from relevant sources in clinical practice.
Gap	Hindrances	This category was used to identify the barriers between the situation and desired outcome that hinder NISs seeking of the health resources.
Outcome	The consequences of the process.	A series of actions and decisions that researcher might be interested in to help and facilitate the process of seeking health information in clinical practice.

5.2.1 TA analysis

The video helped to code more comprehensively and provided access to a range of perspectives, such as unexpected seeking-information behaviours. The TA analysis was based on the protocol, which means that data was gathered from various sources, including audio and video. Then, the protocol was assigned to thematic analysis (Al-Janabi et al., 2013, Ogden and Roy-Stanley, 2020). After the verbal data was collected from the TA, it was transformed through the transcription and translation processes into TA protocols (TAP) for each group based on the identified code scheme and assigned to thematic data analysis. The process of

thematic analysis for qualitative data, as described by Clarke and Braun (2021) (Table 5.4), was used on both methods.

Table 5.4 The process of thematic analysis

Stage	Process
Data familiarisation	With the process of transcribing and translating, the researcher became familiar with the raw data through listening and repeating reading of the transcripts. It helped to gain a comprehensive understanding of its content, context, and any relevant background information.
Generating initial codes	Generating initial codes during further readings of the transcripts. The researcher identified significant units or segments and assigned codes to these segments, representing meaningful concepts, ideas, or patterns within the text. This could involve tagging or labelling specific words, phrases, or sentences that capture the essence of the data.
Generating initial themes	Searching for themes within the sets of codes. The researcher detected similarities and relationships among the codes to create broader categories that capture the main ideas or concepts present in the data. These initial themes provide an organisational structure for the subsequent analysis.
Reviewing themes	The researcher reviewed and refined the initial themes to ensure their coherence and relevance. This involved examining the codes within each theme, considering their context, and assessing how well they represent the data. The researcher modified, merged, or split themes as needed to ensure they accurately reflect the content and capture the richness of the data.
Defining and naming themes	Once the themes finalised, the researcher defined and described each theme in a clear and concise manner. This step involved articulating the boundaries and content of each theme, providing a coherent and meaningful description. Supervisors assisted by discussing any issues related to code extraction which helped to create precise definitions and assign appropriate names to the themes.
Reporting	The researcher presented the results of the thematic analysis in a comprehensive report.

Source: (Clarke and Braun, 2021)

While the data was analysed thematically, it often requires a constant process between the data set, coded extracts and generated data (Leech and Onwuegbuzie, 2007). The lack of clear and descriptive criteria for thematic analysis means that the researcher must be clear and explicit about what he is doing and what he is saying must correspond to what he is doing (Antaki et al., 2003). The researcher used thematic analysis to organise, report and explain the data in detail. All the different codes were rearranged into the potential themes deductively, merging some of the TA themes with semi-structured themes. The defining and additional refining of the themes and determining the ‘real meaning’ of each theme took place. Flexibility is one of the benefits of thematic analysis (Castleberry and Nolen, 2018).

Though there is a logical process to analysing the qualitative data, it involves constant reviews and revisions between the data set, coded extracts, and produced data.

Finally, data was extracted to provide evidence of the themes within the data. Themes can be identified in two ways: data-driven, otherwise known as inductively (themes identified are strongly linked to the data themselves), or theoretically driven, otherwise known as deductively, where the researcher uses the data to explore particular theoretical ideas (Azungah, 2018a). Using a hybrid approach in thematic analysis (Braun and Clarke, 2006, Castleberry and Nolen, 2018), all themes were derived deductively from the data, but with the additional option of adding new codes inductively, as anticipated in advance in data analysis.

5.2.2 SSI analysis

In the semi-structured interview phase, thematic analysis was recommended to be used to identify, interpret, and document theme patterns in the interview data collected (Azungah, 2018b). The SSIs were recorded and transcribed by the researcher through thematic analysis, as presented in Table 5.4 (Clarke and Braun, 2021). The process of SSI data analysis started with coding the transcribed data through two primary steps: initial coding using line-by-line coding, which involves giving a name to each line or part of the data. Then, focused coding, which uses the most frequent initial codes, is used to sort and categorise a large amount of data. The data were collected and analysed separately before being combined using data synthesis (Burbeck et al., 2014). From the analysis, the researcher identified the themes in the NISS' experiences. Then, the themes were narrowed to those central to answering the research question.

5.2.3 Transcription and translation

As the sessions and interviews that were used in this study were based on the Arabic language, the data were translated into English with an attempt to keep the Arabic meaning as close as possible. The transcribed protocol was translated into English before analysis; thus, it was easier to code the data. The task of translating Arabic interviews and sessions was not straightforward. Arabic is a rich language; it has different words or terms referring to one English equivalent. With translation, there was a risk of losing what the participant was saying

by not using her or his own words, such as slang words. However, having a good command of both languages, the researcher invested effort in conveying the exact meaning of the participants' accounts; in other words, the researcher traded exact words for exact meanings. Moreover, to ensure the accuracy of the translation, the researcher translated the Arabic version into English with an independent, accredited translator. Some minor amendments were undertaken for greater accuracy, and another forward and back translation was conducted to validate both versions.

The researcher transcribed each session verbatim and in a highly detailed way that included all potentially important nonverbal cues, interactive screen actions, evaluating information, search time lengths, seeking information, verbal commentary, etc. The researcher read through each transcript and made notes, including points of consensus and diversity, themes, representative quotes, explanatory theories, processes, and typologies. Then, these notes were put into related piles of cards, which were used to make the themes and subthemes.

5.2.4 Data synthesis

As the qualitative data were collected and analysed separately, data synthesis was applied to combine the analysis (Burbeck et al., 2014). The SSIs delve into participants' verbal responses, unravelling their decision-making rationale in information seeking, while the TA captures screen-sharing activities, enabling an in-depth exploration of verbal responses along with navigational strategies and cognitive processes. The study aims to provide a comprehensive understanding of how NISs interact with ISP and informing improvements in user interface design and information retrieval strategies in the context of the clinical practice. The initial code scheme categories included HINs, ISP, facilitators and barriers, and outcomes. This code guide helped shape the NISs' experiences and behaviours. The researcher then narrowed the themes to those central to answering the research question. The themes were then synthesised from all the TA protocol and interviews. The researcher wanted to access a range of perspectives and use TA and SSI methods for triangulation. For the purposes of qualitative analysis, different types of data were generated via general codes through the following process:

- The majority of the codes were derived from the main data, as mentioned verbally by the participants themselves, along with screen-sharing activities.

- As more transcripts were coded, the codes were changed to make sure they accurately described the attached quotations.
- All of the quotations linked to each code were routinely reviewed to ensure that the newly created themes and subthemes were proper.
- Codes that had particularly large numbers of quotations were then subdivided into subthemes.
- Some codes with very few or similar quotations were merged wherever feasible.
- The number of quotes assigned to each code varies from code to code.

5.3 Quality of research

Jackson et al. (2007) noted that when conducting qualitative studies, the quality of the study might be measured by the experience and perspective of the researcher who becomes a qualitative research instrument (Ajagbe et al., 2015). The researcher in qualitative studies is the primary instrument for data collection (Guba and Lincoln, 1982, Creswell and Clark, 2017). A proper collection of data will partly demonstrate methodological rigour (Sam, 2012, Peyrin-Biroulet, 2020). The researcher iteratively looked at the cases and underwent frequent debriefing with supervisors, to ensure that the data were examined from more than one viewpoint while maintaining a robust audit trail.

The TA provides a more suitable method to observe the participant's behaviours applied during fieldwork (Sharkey et al., 2012b). The semi-structured interview data is verbatim transcribed, and quotations are used to illustrate clarity in the final report (Castleberry and Nolen, 2018). Triangulation between TA and SSI was in the form of looking for patterns of thoughts, behaviours, and the experience of seeking health information (Anney, 2014). In addition, reflexivity allowed the researcher to establish credibility by gaining insight into their role in data processing and the different ways in which this could be analysed and interpreted (Clancy, 2013). Appendix 6 shows the lists of trustworthiness criteria in qualitative research along with triangulation and how to apply them during research which enhances establishing an accurate study (Anney, 2014).

5.3.1 Triangulation

Dawes and Sampson (2003) highlighted how the act of seeking information and the process employed together with the critical analysis conducted on the sources identified will vary between individuals based on the experiences they have gone through (Sinclair et al., 2015, Hagerman et al., 2017, Dawes and Sampson, 2003). Thus, triangulation refers to the employment of more strategies to ensure the generation of comprehensive knowledge, less bias and various angles that would enhance the analytical process (Heale and Forbes, 2013, Grissom and Loeb, 2011). The term triangulation can be used to describe the process of studying a situation using different methods to gain a complete picture (O’Cathain et al., 2010, Al-Janabi et al., 2013, Molbæk and Kristensen, 2020). Method triangulation accomplished in this study by using two methods which are the TA and SSI to develop a deeper understanding of the research topic. The researcher triangulated by looking for outcomes that were behaved and experienced by NISs.

Data triangulation through recruiting separate groups will give additional interpretations and rich data (Blandford, 2013). Thus, the researcher did not use the same participants for both techniques to avoid any contamination on their behaviours or perceptions. The process of triangulating findings from different methods took place at the integration stage when both data sets had been analysed separately. The triangulation findings have a concern about the issue of acceptability and data synthesis (Joslin and Müller, 2016, Casey and Murphy, 2009). But this is not to the exclusion of other issues such as practical difficulty in analysis when having a second researcher due to possibility of time consuming and argument (Wilson, 2014). Therefore, the researcher listed the findings from each component of a study and consider the results to identify areas of divergence and uncertainties. Explicitly looking for disagreements, similarities and differences between findings in triangulation is an important part of this process (Leech and Onwuegbuzie, 2007). It was not a sign that something was wrong with a study. But, it lead to an understanding of how NISs obtain EBHI.

5.3.2 Reflexivity

Qualitative researchers agree that the writing of qualitative research cannot be separated from the author’s thoughts and opinions, how it affects the study context, and how readers interpret it (Killam and Heerschap, 2013). As Mauthner and Doucet (2003) noted, the findings

of the study could be misinterpreted without such reflexivity and reliable transparency. Reflexivity gives useful, practical information regarding observational bias at the evidence collection stage (Medico and Santiago-Delefosse, 2014). There are a number of studies using the TA approach that mentioned how they have dealt with the challenges of reflexivity. Jaspers et al. (2004) pointed out how the presence of the researcher may undermine the evidence collection. Therefore, their study gave useful insight to minimise interaction with participants. For instance, if the researcher limits his movements and comments, this would deem the best means of lessening the effect on the study.

As mentioned by Duncan and Holtslander (2012), nursing faculty could assist students and nurses in developing searching strategies to enhance obtaining EBI in healthcare. Therefore, based on the researcher experience in this field, the researcher strived to apply a variety of clinical tasks during the TA phase. This would aid participants in outlining their perspectives which allowed further assessment of the behaviours of participants when researching health data and the impact of gaining evidence-based data for use in clinical care (Durning et al., 2011, Tutticci et al., 2016). The SSI allowed the researcher to understand how individuals experience the ISP (Sloan and Bowe, 2014). Also, the TA pilot study allowed the researcher to understand how this method can be done online and avoid mistakes during the data collection. Overall, reflexivity can be one way of minimising bias in such experiences through considering the principles, interests, expertise and biases of the researcher (Medico and Santiago-Delefosse, 2014, Aléx and Hammarström, 2008).

5.4 Research setting and population

5.4.1 Participants sampling, selection recruitment

The participant population for this study was composed of NISs from Taibah University (TU). TU was chosen as the key focus area, which is located in Medina, Saudi Arabia. For the primary research, a list of nursing interns for the academic year 2021–2022 was taken from the internship programme record. It was chosen on purpose because it is one of the largest nursing colleges in KSA, offers clinical placement for intern students, and serves Medina hospitals. A participation informational sheet (PIS) was handed out online during the internship induction days to help identify the number of participants until the saturation point was reached. The researcher worked closely and collaborated with TU and MoH faculty

members to improve access to the research settings and contact with participants through gatekeepers when needed. The response rate has two options. First, the low response rate could be sorted out by recruiting the sample from other accessible settings. Second, the high rate of response could be sorted out by recruiting the first responders who sign the participants' information sheets. In terms of this study, a total of 26 NISs volunteered to participate in the research.

This thesis utilised convenience sampling, which is a common method in qualitative research. A non-random strategy, purposeful sampling, does not need simple theories, nor does it require a specific number of participants that researchers have to comb through and find detail-rich cases to use (Côté and Turgeon, 2005, Bowling, 2014). In qualitative research, convenience sampling is a typical technique for selecting participants based on their availability and accessibility to the researcher (Etikan et al., 2016). This sample method is often used when the study question is exploratory, the goal is to gain insight into a specific experience, along with the availability of participants (Stratton, 2021). The researcher decides what information was applicable and selected people willing to provide information based on their knowledge and experience (Etikan et al., 2016). Therefore, the sampling was based on the intention or purpose of the study, e.g., we wanted to understand the thought process of the NISs who were interested in seeking health information in clinical placement, and then the selection criteria were allocated to the internship program.

The sample was divided into two separate groups. The first group was for the TA, which involved 14 participants. Researchers acknowledged that the sample size in TA ranges from 8 to 50 participants (Lundgrén-Laine and Salanterä, 2010, Reinhart et al., 2022, Todhunter, 2015, Abdel Latif, 2019). They suggested that a small number of participants can provide a rich source of evidence related to cognitive and decision processes. The second group was saturation sampling for the SSIs, which recruited 12 participants. Hennink et al. (2017), suggested that saturation in SSIs can be achieved at 9 interviews, but for concrete codes, high prevalence and depth require additional data, especially for codes of a more conceptual nature, where saturation requires 12–22 interviews. Data saturation is the point at which no further dimensions or insights into issues are identified (Francis et al., 2010). Additionally, a small number of respondents offer clear source evidence for cognitive processes and decision-making processes (Francis et al., 2010).

5.4.2 Eligibility criteria

The participants were recruited during the internship year (2021-2022), which starts in July 2021. The research used the internship programme record to obtain a list of nursing interns for the academic year. Those interns from the bridging programme who had previous job experience before the internship year were excluded from the study.

5.4.2.1 Inclusion criteria

Nursing students who have:

- Completed all the educational requirements.
- Are performing nursing care at healthcare organisations.
- Are in possession of a laptop with a camera, audio input, and share-screen capability.
- Have the ability to read and understand English.

5.4.2.2 Exclusion criteria

- Any other discipline or not completed the educational requirements.
- Unable to understand the study requirements or give informed consent.
- Not completing all nursing modules

Participants' eligibility criteria were discussed with the gatekeeper (clinical instructor) to invite the relevant participants. The participants were recruited during the internship year (2021–2022). The researcher or gatekeepers at the induction days distributed the invitation letter to intern students after the approval had been confirmed. The researcher contacted the intern students, who responded to the participant information sheet (PIS) of the TA or SSI. PIS informed the potential participants briefly about the study and sent them a link to it, which included the research topic and study materials, including participant consent. The principal researcher instructed the participants to read the PIS and fill out the consent form online (on a dedicated website; once they ticked their consent, they proceeded to the information about recruiting for the TA or semi-structured interview). Then, the principal researcher contacted the potential participants a week later via email or telephone, giving them sufficient time to decide whether to join the study or not.

The researcher considered clinical working hours and assigned an appropriate time to encourage participation. After receiving authorisation to conduct the project from both ethical committees, the researcher communicated with the faculty of nursing at TU and the

MoH coordinator for approval to do the study. The participants signed an agreement to record video or audio, and the data was kept confidential. The researcher explained the study as well as the right to withdraw at any time. The study was carried out online due to social distancing.

5.5 Ethical considerations

This project was considered a low-risk study; however, there are important ethical considerations in the form of a qualitative study. For instance, Dickson-Swift et al. (2009), reported that interviewing could trigger emotional reactions; study participants may reveal highly sensitive information in responding to questions designed to open them up. It was, therefore, critical that the researcher be prepared to manage these situations. One of the ethical issues in the qualitative study is that the researcher-participant relationship would have a potential power imbalance. Issues concerning a potential power imbalance between researchers and participants are considered intrusive, unsettling, and embarrassing for participants (Hewitt, 2007). However, researchers' power cannot be ignored, which requires the researcher to consider his role carefully (Green, 2013). The qualitative study needs the development of trust between researchers and participants, and both must understand their roles as well as the processes and intent of the research (Berry, 2016). Therefore, the researcher controlled what questions were asked and not asked, minimising interaction with participants in the TA and SSI.

There were some additional ethical considerations to take into account, namely the issues created by the fact that the interaction was mediated through the use of technology (which is owned by third parties), the nature of recording, and the issues raised by the interview environment (Ozair et al., 2015). Therefore, the researcher ensured that the participants had a chance to read the consent form before clicking on the link to start the study. They were asked for their permission to record the TA or SSI. They were informed that the recording could be stopped at any time on request and that they could withdraw at any time from the research. They were warned and asked if the interviews could be recorded. To ensure confidentiality, after the TA session or SSI collected the data, participants were given the opportunity to listen to their comments before using their data. The researcher talked about any problems that might come up during the sessions and interviews and how the recording

works to protect the data collection methods, the safety of the participants, and their right to privacy.

5.5.1 Ethical approval process

The study carried out with the ethical approval of the Research Ethics Committee was approved by the Faculty of Medicine and Health Sciences at Nottingham University, the Faculty of Nursing at TU, and the Saudi MoH. The University of Nottingham (UoN) Faculty of Medicine and Health Sciences Research Ethics Committee (FMHS REC) offered a favourable opinion in August 2020 without making any changes to the initial submission (Appendix 7). Another ethical approval of the Research Ethics Committee was approved by the Faculty of Medicine and Health Sciences at Nottingham University to evaluate the tool developed for additional robustness. The UoN FMHS REC was accepted in September 2022 without making any changes to the initial submission. There was no data collection, and no individuals would be contacted without the Research Ethics Committee's permission. At each stage of the study, all ethical issues, such as informed consent, anonymity, privacy, and data protection, were taken into account.

Research topics and study materials, including the PIS, participant consent, and links, were all included on one website to be shared with the participants. The participants received all the relevant information about the study, including the participant information sheet, online before starting the study. The participant information sheet presented the nature of the study and all other relevant information for participants, such as study implications and constraints. All the participants were required to read and sign the consent form before joining the trial. A copy of the consent form was provided to each participant, and the researchers kept the original forms for recording purposes.

5.5.2 Informed consent

The participation sheet was distributed to the research sample. The sheet explained in detail the purpose of the research, the process of data collection, and ethical guidelines, including confidentiality and the ability of participants to withdraw freely from their participation at any time without offering any reason. The PIS included a clarification of what is needed and the right to withdraw at any time. Before conducting the sessions or interviews, full voluntary participation was restated orally. Participants were informed that their sessions would be video and audio recorded for research purposes only. Then, participants had the opportunity

to ask questions regarding the process before the TA and SSI started and provide signed consent forms.

5.5.3 Confidentiality and data protection

To conduct the study, the researcher needed to collect the participant's data, and all this data was kept confidential throughout the study. Participants were certain of anonymity, confidentiality, and protection, and the researcher sought to protect participants' privacy rights. After the approval of the participants, ethical compliance did not stop; ethics were implemented throughout the research process as an ongoing process. The participants had the opportunity to ask the researcher any questions about the study. This would be respected if a participant did not want to be included in the study any longer, and they would be excluded from the study. A decision with all participants would not result in any disadvantages. Moreover, intern nurses were told that their involvement in the study would not affect their clinical practice and that everyone would withdraw from the study whenever they felt it was necessary.

5.5.4 Data management

Researchers acknowledged that data management in qualitative research refers to the process of organising and storing data along with analysing and interpreting the data (Nowell et al., 2017, Medico and Santiago-Delefosse, 2014). The study ensured that all the data was recorded accurately and completely. In this study, each file containing contact data was labelled to represent the participant (i.e., NIS). The participants' data would be kept secure on a safe and password-protected computer. Only the researcher and supervisors, as well as examiners if necessary, would have access to the data and a means of confirming our data analysis and interpretations for adequacy. The data were coded manually and converted to digital format using Word to be subsequently analysed. The interpretation of the data was ensured to be consistent with the research questions and objectives.

5.6 Summary

This chapter presents the method of data collection selected in this thesis. Fourteen TA sessions were conducted, followed by Twelve semi-structured interviews. Data analysis methods were presented, including the method of translating and transcribing the data

collection. After presenting the method and analysis used in this thesis, the next chapter will present the findings from the TA.

Chapter 6

TA Findings and Summary

This chapter presents the findings and discussions from the first phase (see study design Figure 3.1), which was the TA. This chapter reports on the results of the perceptions of nursing intern students (NISs) regarding their strategies for seeking health information. It aimed to observe NISs' behaviours while seeking health information through various information sources. It reflected the participants' activities regarding clinical statements that represented a typical nursing care encounter and how a participant interacted during the online session. Finally, it will discuss the developmental stage of the scoring system for the process of seeking health information.

6.1 Demographic data

Twenty-six participants were recruited to the two studies, fourteen in the TA study (3 male; 11 female) and twelve in the semi-structured interview study (4 male; 8 female). NISs' ages ranged from 22 to 23 years of age across the two studies. The characteristics of the participants were similar because they received the same nursing education program in Saudi at Taibah University and started the internship year together. They had no previous experience of working in clinical practice. Therefore, in this study, there was no value in investigating the impact of demographic factors such as age, gender, or level of education.

6.2 Task characterised and performance

Each participant was asked to read eight clinical statements and obtain evidence-based health information (EBHI) related to each statement, meaning that a total of 112 tasks were performed by participants. Participants in the TA sessions successfully completed 112 statements out of a total of 112 statements (100% success rate). For each TA session, the time that participants spent on the tasks was calculated. Table 6.1 presents the time spent on all tasks by all participants and the mean time spent on tasks. These results reveal that P5 took longer to complete the tasks compared to other participants. P5 spent 61 minutes on tasks, whereas P8 and P9 spent a total of 54 minutes and 51 minutes, respectively. P11 took the

shortest time to complete the tasks, at 30 minutes. For the 8 clinical statements, the average time to finish the tasks was 43 minutes (+/-).

Table 6.1: Time on tasks for TA methods

NIS	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14
Time (m)	44	45	35	53	61	33	43	54	51	42	30	48	35	34
Overall time spent on sessions (m)							608							
Mean time spent on sessions (m)							43							

6.3 Mapping information-seeking behaviours (ISBs)

Dervin’s model helped to explore NISs’ information-seeking strategies. In addition, it helped to understand and identify how information evaluation may contribute to obtaining EBHI. The first step involved mapping the ISBs by using Dervin’s ‘sense-making’ model as a deductive tool for capturing the essence of the sense-making complexities of the situations (Heit and Rotello, 2010). Figure 6.1 illustrates Dervin’s ‘sense-making’ model and a modified Dervin’s sense-making model. Since a descriptive analysis involves the direct observation of target behaviour in natural contexts to gather information that is correlated with the occurrence of some target responses and as a part of a comprehensive assessment of problem behaviour (Kemp et al., 2018). A descriptive analysis was used to discuss the outcome theme of the TA results. All the NISs’ responses (n = 14) to the clinical statements are in Appendix 8.

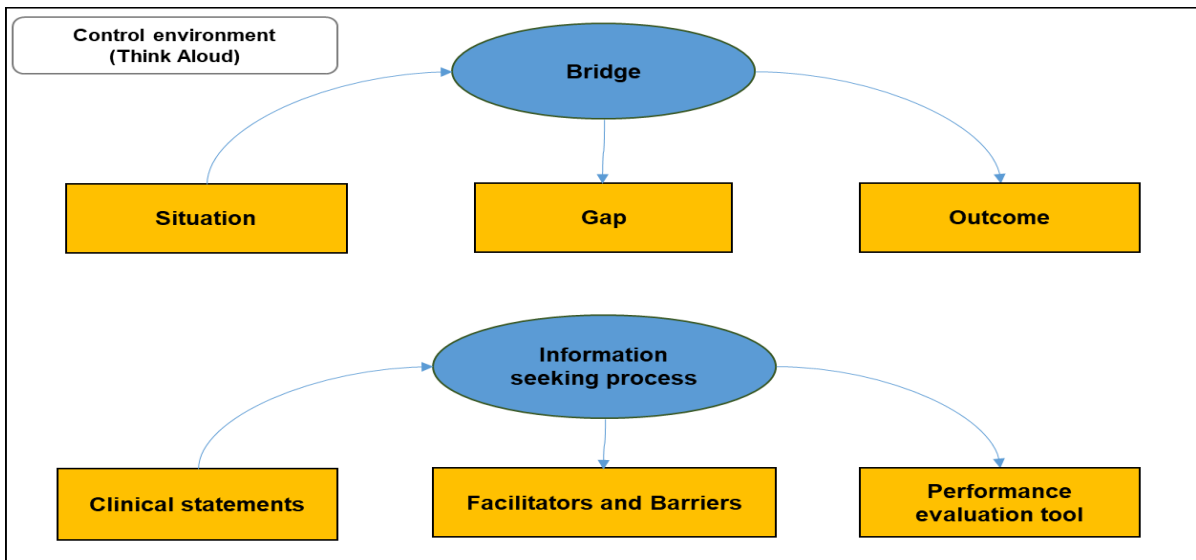


Figure 6.1 Modified Dervin's model

6.4 Information-seeking process in control environment

ISP is a method with unique strategies to obtain health information during TA sessions. NISs intended to show their process through their comments, thoughts, or screen sharing activities during the sessions. Furthermore, by exploring how NISs apply strategies to obtain EBHI, it may be possible to recommend strategies for providing better ISP to obtain health information. Figure 6.2 shows the categories and subcategories that came out of this theme's analysis.

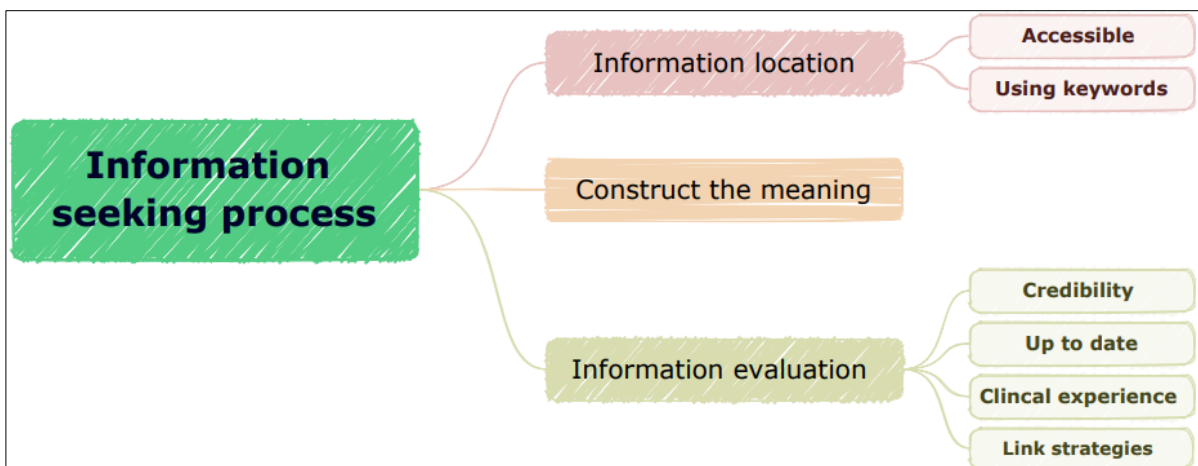


Figure 6.2 ISP categories

6.4.1 Information location

This theme focused on NISs' strategy to explore and locate useful health information from health information resources. NISs explored similar ways to locate health information in order to find health information related to clinical statements. The following findings of the TA revealed NISs ways to navigate formal or informal health information sources, which resulted in success or failure to fulfil this need.

6.4.1.1 Accessibility

Accessibility was a key factor in NISs' selection of an information source to obtain health information during TA sessions. It referred to the ease of access and search preferences without restrictions such as a need to sign up or make a payment to get more information or unavailability. NISs focused on free and easy-to-find materials to make sure that resources were especially helpful and accessible. P8 said, *'This is a good website, but unfortunately, its disadvantage is that it is a paid website.'* They seemed to have concerns about sources that require more effort, such as the need to sign up. P2 said:

'I need to register to carry on. I will leave this website and switch to Google again.'

NISs often tested the waters by typing a few words or phrases into Google to see if information was accessible. P1 response to clinical statement about ARDS;

'I am searching generally on Google to see what's out there and what's easy to access. Now, I found information regarding prone ventilation.'

The majority of NISs used Google to find health information due to its ease of access. According to P12, *'Google provides a lot of health information resources that are easy to access.'* A small number of NIS, on the other hand, considered switching to Google Scholar to obtain more evidence-based content. P1 had a situation when he preferred Google Scholar because it helped him to focus on his search preference, *'I am using Google Scholar now with the ability to focus on recent research.'* Some NISs tried to use databases at the beginning of their search for health information. But, the quotations below demonstrate their search was not productive when it was difficult to access. Finding quality and relevant resources in medical databases was time-consuming and difficult for many NIS. P13 stated that when he was looking for information relevant to a pain assessment statement, *'I think this website*

(PubMed) provides related information to pain assessment. But, one of the main issues is that it is difficult to access. I will focus on using Google.'

6.4.1.2 Using keywords

The fact that NISs cannot locate health information during TA sessions might make them cautious about the relevance of the information obtained. Thus, they might change their strategy of seeking health information to locate other resources, such as by using different keywords or changing search terms. Using keywords would be useful when locating potential information resources. For example, P1 used 'nurse' as a keyword to enhance the search results: *'I am using the word "nurse" as a key word in the search engine to get information related to nursing.'* P4 assumed a direct link between keywords and obtaining the required information when locating information related to the sepsis statement. He expressed his strategy by saying, *'I am using other keywords, like "septic shock" and "nursing management" to get more results; now I have got results related to serum lactate implications.'*

According to some NISs, they did not have a strong understanding of the search using keywords and acknowledged the difficulty of identifying appropriate keywords. P3 stated that *'It's hard to say what it is exactly, what keywords fit. I do not know how to choose keywords for searching.'* Another NIS copied and pasted the entire clinical statement concerning NGT contraindications. P8 shows that *'I wrote the whole clinical statement as the search keyword to get results about Basal Skull Fracture.'* When an NIS used keywords, they were able to find information that was related to the ECMO statement, but they were mostly worried about how frustrating the search process would be and how much information they would find. P10 stated when responding to CS4, *'I looked for different words like "machine similar to Heart - Lung," "Machine" "Support" "Patient" and "Treatment" I got frustrated with it because I had too many results and it would take me so long to read and extract the information, so I will leave it and try another way.'*

6.4.2 Construct the meaning

This theme focuses on NISs' strategy of making meaning from multiple information resources, and this process helped them generate an initial assumption about the information obtained. During the TA session, NISs took an active role in building meaning from the resources they accessed. They decided where to go and what to read from different health information

resources. Two strategies for constructing meaning regularly occur in the TA sessions: 1) Applying prior knowledge; and 2) detecting unknown words and searching for meaning.

Prior knowledge helped NISs gain an initial overview of the clinical statement. Then, they tried to identify and find health information aligned with their prior knowledge in the accessed resources. They also interpreted health information by using prior knowledge or experience to evolve meaning and generate initial assumptions. For example, in the statement patient position with ARDS, P1 connected this statement to prior knowledge from which he had practiced. He then integrated this understanding into his search strategy. He expressed that, *'I have an idea about Patient with ARDS I remembered that I have seen patients related to COVID-19 on "Prone Positioning," so this can help me understand this statement.'* P13 identified a topical 'dictionary' to translate a medical term, noticing the importance of a better dictionary as described in the following quote: *'What does pulmonary compromise mean? I am using "Oxford" translator, I expect it to be better and more accurate than Google Translator in translating medical terms' (P13-TA-ECMO statement).*

On the other hand, another participant believed that mistranslations or misunderstandings of words could lead to uncertainty. He mentioned that *'This browser translates it into Arabic, and it was difficult for me to understand the medical content in Arabic because I studied it in English. I felt the meaning had changed.'* P10 stated that *'This browser translates it into Arabic, and it was difficult for me to understand the medical content in Arabic because I studied it in English. I felt the meaning had changed.'*

6.4.3 Information evaluation

The sessions demonstrated that the NISs evaluated and critiqued different aspects of health information as they examined the resource itself. Prior to selecting a specific piece of health information, NIS assessed its relevance by checking the validity and reliability of the content, the source of the information, the publication date, applying critical thinking, or checking author information. Some NISs used different strategies to assess the health information obtained. Consider the responses below:

6.4.3.1 Credibility

NISs considered the credibility of a resource that could be trusted. Resources with Edu or Org domains were preferred by NISs because they thought the information was trustworthy. For

example, P3, in the following screen sharing activities, pointed at the link '.org' as a reliable source. He mentioned that, *'I am looking at the URL name of this website (points at the link org); I noticed words such as "org."; this site is related to a health organisation, so it is reliable.'* Also, he expressed his concerns about reliability in terms of a resource that others can adjust easily, *'Wikipedia is an unreliable resource. This source is not accurate because information can be edited, replaced, or omitted easily.'* Other NISs agreed and expressed concerns about obtaining health information from some sources; because anyone can modify information, their credibility may be questioned. For example, P4 stated that *'I am going to ignore Wikipedia and news websites because they are unreliable sources. It is allowed for anyone to add, edit, or omit the information. So, I may get improper information.'* Even though some NISs agreed that certain websites, such as Wikipedia, could be helpful in terms of obtaining an overview of health information, P4 in his interaction with a statement related to ECMO said, *'I expect that Wikipedia is an easy-to-access site that provides general information at least, so that I'll have an overview of the device, even if it's not a reliable site.'*

Some NISs needed to determine the credibility of both the author and the content of a website. P4, P8, and P11 were sure about using the article they had accessed based on the author's speciality and the website's reputation. P2 was aware that the health information to be used in clinical practice must be evaluated by healthcare institutions in Saudi Arabia, as the following quote indicates, *'Good source with an authorised author along with their email contact (Points at the web address of the National Library of Medicine) that's probably pretty reliable..., but we should refer to the Saudi guidelines, and Saudi guidelines follow USA guidelines.'* Some NISs referred to whether the resources were valid and accepted based on previous recommendations. P1 said, *'I access the "Nurses-Lab" site because it is one of my favourite sites; it is conveniently accessible; its information is very reliable; most nurses recommend me using it.'*

6.4.3.2 Up-to-date

Five NISs seemed to think that finding recent information in health resources would increase the reliability of that information. P12 said, *'I don't often care for the date of publication; however, I prefer to get the required information from the most recent references. This source is reliable as it clearly provides recent information, as the date of publication is 2020.'* P4 and P7 were not in favour of the outdated resources in the TA sessions as they had to narrow their

search to the most up-to-date information. P4 said when he was dealing with the sepsis statement, *'I am checking the date of publication to get the last updated septic care bundle.* Where P7 stated that, *'The "references" were published in 2010, ten years ago, making them "outdated" So, I will change these resources to keep my resources up-to-date.'* On the other hand, an NIS did not know how to locate the date of publication. P10 highlighted that *'I want to check if the information is up-to-date, but the problem is locating the date of dissemination.'*

6.4.3.3 Clinical experience

When confronted with health information that contradicted their clinical practice, NISs tended to be unsure whether to reject or accept it. They might seek further information to eliminate the uncertainty. NISs' repeatedly demonstrated their perception of a direct link between their level of experience and the information sought, as the following comments illustrate. P1 stated when responding to sepsis statement, *'I am confused and am not getting the right answers. It was mentioned that the rise of lactate leads to higher hypoperfusion, which is not true based on my prior knowledge.'* Where P7 stated that, *'I found this site, but the information is unreliable according to my experience. I need to seek more to get the right health information.'*

Even though P10 had less working experience in clinical practice, he was motivated to verify their search about medication indication statement: *'I found this site mentions heparin information (pointing at the nursing responsibilities), but I wanted to know about the patient's condition so I could think about possible side effects.'* While P12 assessed how well the information resources could be understood and used in clinical practice. He assumed that, *'Actually, it is a very convenient website due to procedure explanations similar to clinical practice.'*

6.4.3.4 Link strategies

NISs applied linking strategies through comparing and contrasting to identify interconnections of health information on different websites or evidence of relationships in health information. Some NISs were able to figure out what information they needed and compare the evidence well. P2 claimed that:

'I am looking for another source to understand the clinical information, and I found this one. It is almost the same information as the previous one.'

Some NISs integrated and assessed health information from different resources to increase reliability. For example, P3 reported the following:

'I'm looking for information on more and more resources to make sure I've got it right.'

A NIS was able to identify conflicting information among two health resources while doing a sepsis statement, as the following quote indicates, *'I am making a comparison between the websites; I found information that says that the decrease of "Lactate" indicates mortality dropping, which conflicts with the previous website'* (P1-TA-Sepsis statement).

6.5 Gap

This theme covers the facilitators and barriers that NISs encounter when seeking health information, as shown in Figure 6.3.

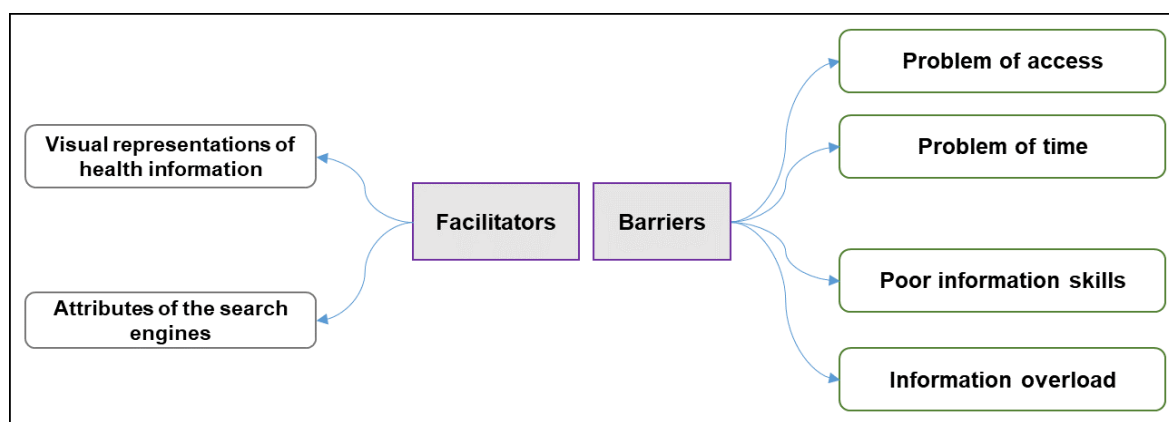


Figure 6.3 Gap themes

6.5.1 Barriers to information-seeking by NISs

The most significant barriers mentioned against NISs' information-seeking include lack of time, unavailability of resources, lack of necessary information-seeking skills, information overload, and unfamiliarity with information resources.

6.5.1.1 Problem of access

Several NISs reported the inability to access relevant health information as a hindrance. P1, P6, and P11 mentioned that some websites that requested a sign-up could lead to a complex access method that prevented them from continuing. For example, P6 claimed, *'I am required to register with a valid email address. This is very annoying.'* Furthermore, P2 and P8 added advertisements that could be an interruption during searches or websites' requests to pay for more information. P2, *'I am not going to waste time on watching this video; also, there are many disturbing ads on this site!,'* and P8, *'This is a good site, but its main disadvantage is that it is a paid site.'*

6.5.1.2 Problem of time

Some NISs pointed out that lack of time and doubt about the existence of relevant health information were regarded as the main barriers. Most NISs spent a significant amount of time experimenting with different terms and attempting to determine which terms would retrieve the most relevant results. P7 stopped his searching process for this reason: *'I get enough of the required information, so I stop searching for more to avoid wasting time.'* Moreover, P1 spent time and effort locating and examining a variety of resources during the TA session. He excluded e-books from his search process due to their time consumption. He stated that *'I excluded e-books because it takes me a lot of time to find the required information.'* While P2 stated that the time required to conduct information-seeking that leads to reliable information may not be available in their clinical workflow, as the following quote indicates, *'In practice, I don't have much time, it's hard to read the whole article, and it will take a long time.'*

6.5.1.3 Poor information skills

NISs highlighted the significant need to have skills to search specialised databases such as CINAHL and MEDLINE efficiently. P5 said that, *'If I had better experience in using medical databases such as PubMed, I think I could find more appropriate nursing information.'* According to NISs, having necessary information-seeking skills enabled them to get relevant information. P12 said that *'This article is too detailed, but I managed to scan the whole article to get the required information!.'* NISs had language barriers as a challenge, as most of the databases have English as a search language. NISs stated that they may use inappropriate

search terms or make spelling errors, or they may have difficulty interpreting, tracking, and formulating a clinical question. P4 was unable to read English to strengthen competencies in information retrieval and promote the reading of scientific literature. P4 found that *'I can't get the required information in a direct and convenient way. I am somehow having difficulty getting the required information from English resources.'* While others thought they did not have enough skills to read in English. In P10, when reacting to the ECMO statement, he mentioned that *'I don't know how to write the sentence in proper form to get results related to the topic that I want to seek, which is ECMO.'*

6.5.1.4 Information overload

Finally, NISs are regarded as having too much information to scan and a low correlation between the sources discovered and the information required, which acts as a barrier. P1 mentioned that *'I don't prefer Medscape because it has a lot of information that I don't need, so I can't get the required information easily and quickly from Nurses-lab site.'* Another NIS mentioned that it might prohibit him from obtaining relevant information. P2 said, *'I found that the information in this resource is overwhelming and does not have relevance to the nursing field.'* In another example, P4 incorporated what he thought about e-books in the following quote: *I don't prefer e-books. Because they have too much information, I can't easily get what I'm looking for!.*

6.5.2 Facilitators to information-seeking by NISs

6.5.2.1 Visual representations of health information

Generally, visual information includes pictures, motion pictures, video or audio recordings, or visual presentation services to present content (Lee et al., 2017). As mentioned, visual media helped NISs to clarify and comprehend information because they were able to avoid misinterpretation. P1 thought visual information could help him to get a first impression and enable him to navigate the text and read selectively. He said, *'I am checking the images as they help me with assimilation of the parts related to the nursing field. Usually, in the practical parts, these images help me understand clinical practise.'* On the other hand, P5 appeared to totally refuse the idea of using images because he could not evaluate information authentication; he said, *'I am not going to count on these pictures. Some of them don't provide me with essential information, such as their sources or published dates.* Furthermore, the

layout of the website played an important role in increasing access to information. Several NISs reported that the ideal website layout was symmetrical, clear, and orderly. P4 was frustrated because there was too much content on the screen. Without a layout, it was too much to take in, so he left the website, as the following quote indicates. P4 stated that, *'This article is very long, so it is very difficult to pick out the required information.'*

6.5.2.2 Attributes of the search engines

The fact that some NISs were able to find the existing supports and services for finding information, like answer boxes, highlighted text, bold text, and 'People also ask,' made the process of seeking health information quicker. For example, P12 stated that *'Some texts are very attractive as the text is written in bold; also, I like highlighted text; and also, Google provides me with a "People who Ask" section, which gives me answers to my research questions.'*

6.6 Summary

The data from the TA in this chapter revealed three themes. These themes explored the various aspects that participants covered while seeking health information. The findings from the TA method provide evidence that obtaining EBHI would be challenging and show NISs' thoughts towards seeking an evidence based resource. Findings revealed that most of the NISs preferred the easy access resources compared with other health database resources, such as Wikipedia compared to Medline. According to some participants, it would be a good quality but not trusted resource. Also, the findings revealed that most of the NISs navigated the health resources easily. However, some aspects related to the NISs' skills or resource characteristics, such as the need to sign up, prevented them from navigating the health information required smoothly. Furthermore, the findings indicate many positive aspects of the engagement with the clinical statements, which provide evidence that the TA task captured their attention. All NISs did not show any disengagement response to the clinical statements.

NISs' strategies for seeking health information were captured at a more in-depth level using a newly developed tool called the Performance Tool (PT). The intention of the PT is to look from different perspectives to evaluate NISs performance in terms of access, assessment, skills, and integration of the online health resource.

Chapter 7

Semi-Structured Interview Findings and Summary

This chapter presents the findings from the second phase, which was the semi-structured interviews (see study design Figure 3.1). This chapter reports on the results of nursing intern students (NISs) experiences seeking health information in clinical practice. It reflected their activities regarding EBP and clinical decision making in practice. They mentioned a clinical situation they had during practice and how they interacted with and sought health information.

7.1 Mapping information-seeking behaviours (ISBs)

This thesis focused on key factors relating to NISs seeking of evidence-based health information (EBHI) in both experimental and real clinical practice. This helped to identify the challenges of doing ISBs in clinical practice. In the previous chapter, the process of data collection and analysis undertaken for the thesis was described. In the current chapter, Dervin's model helped to explore NISs' awareness of obtaining and utilising health information in clinical practice, their attitude towards the HINs, the benefits they derive from seeking EBHI, and the challenges they face in using the resources. The first step involved mapping the ISBs by using Dervin's sense-making model as a deductive tool for capturing the essence of the sense-making complexities of the situations (Heit and Rotello, 2010). Figure 7.1 shows Dervin's sense-making model, and a modified revised version.

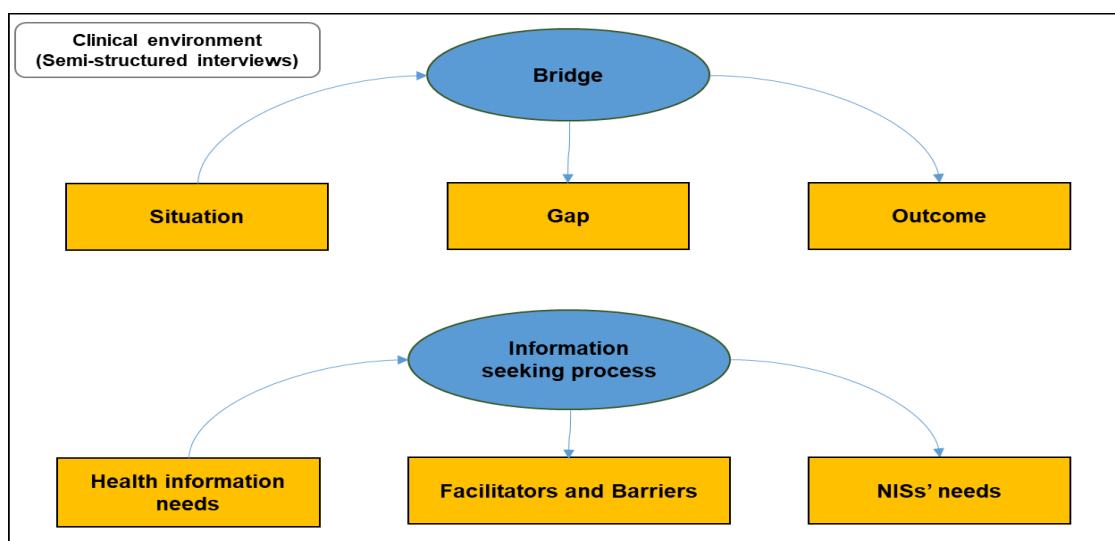


Figure 7.1 Modified Dervin's model

This phase 2 study had twelve participants (p1-p12), who were NISs at the internship programme at Taibah University. Verbal data gathered from interviews was documented, transcribed, and analysed thematically (Blandford, 2013). While the data is analysed thematically, it often requires a constant process between the data set, coded extracts, and generated data (Leech and Onwuegbuzie, 2007). The following findings and discussion from the semi-structured interviews were selected to indicate the meaning of ISBs covered by NISs in their clinical practice. Table 7.1 shows a breakdown of the themes, core categories, and sub-categories found in the SSI questions. All the NISs' responses (n = 12) to the open-ended questions are presented in Appendix 8.

Table 7.1 The themes, the core categories and sub-categories derived from interview questions

SSI questions	Themes	Categories	Subcategories
In a confidential way, can you describe a clinical situation in the last couple of weeks where you had to seek health information?	Health information needs	Medication	Indication
			Side effects
			Dosage
		Diagnosis	-
		Guidelines	-
What types of information did you seek to help you answer the questions you had?	ISP	Information location	-
What do you think about the quality of the information you found?	ISP	Information evaluation	Ask colleagues
			Link strategies
How easy was it to find the information you needed? How difficult was it to find the information you needed?	Gap	Information overload	-
		Problem of access	-
		Organisational support	-
		Problem of time	-
		Knowing preferred sites	-
How typical is this example to how you seek information in your clinical role? What would help?	Outcome	NISs' needs	Information skills training
			Information channels

7.2 Health information needs (HINs)

It is recognised that this phase focused on asking NISs about scenarios that happened in clinical practice and where they sought health information. One significant advantage of this goal is that it may aid in the provision of efficient and effective additional information services. The findings from the semi-structured interviews identified some different types of HINs. Based on the analysis, they were divided into three main categories: needs for medication information, which was the most needed information, followed by diagnosis and guidelines. Almost all NISs expressed that they experienced situations where they needed detailed information about a particular medication in order to administer the medication safely. Medication information seemed to be the most needed type of information in clinical practice. Medication indication is a type of information needed to understand the course of patient treatment using medicines. Because of the large number of medications available, it is difficult for NISs to remember all indications and contra-indications. P4 and P7 thought that seeking medication indication information helped them understand medications properly. They stated respectively,

'Since medication would be quite ineffective after eight hours from the occurrence of a stroke, as they told us in the lectures. I searched for the medication used in stroke cases, and their indications.'

'It is difficult to memorise all kinds of medications indications. The answer I got from Google was very simplified and far from comprehensive.'

Additionally, dosage information was another type of information needed for the patient's treatment. It was important for the NISs to seek the right dosage before medication administration to avoid any side effects during the patient's treatment. P10 said, *'A physician asked me to prepare a medication called Epanutin; it was the first time I heard about it. The physician did not mention the dosage. So, I sought the medication dosage on Google.'* Moreover, NISs experienced situations where the patient was taking a particular medication and wanted to find out whether it had any effect that caused a health problem. P9 had a situation where his patient asked about adverse effects, and a lack of information made it more difficult to tell the patient, *'I was very confused about the side effects of paracetamol, so I looked it up on Google. I need to inform the patient about them.'* P11 expressed

information needs regarding being aware of possible adverse effects: *'I looked online to see if Voltaren was linked to any health issues when injected intravenously.'*

Similarly, most of the NISs indicated HINs related to diagnosis and guidelines. NISs thought that knowing the disease conditions might contribute to understanding the treatment plan. According to P8, *'I seek medical information to help me address certain clinical situations in order to identify things like a nursing diagnosis of chest pain.'* Additionally, nursing guidelines refer to official documents that can support and direct nursing practise by identifying the criteria that help with nursing assessment, diagnosis, and intervention. P7 emphasised the importance of hospital policies when making clinical decisions; they indicated a need to check the nursing guidelines before applying the information. He said:

'Yes, information obtained from various resources plays a very useful role, but I first have to check applicable policies at the hospital before I can go ahead and apply such information.'

7.3 Information-seeking process in clinical environment

NISs said that different ways have been used to find and evaluate health information to meet their HINs during clinical work, as follows.

7.3.1 Information location

The NISs also looked into the information's accessibility. They mentioned different types of resources used in clinical practice, such as UpToDate, Medscape, Nurses-Lab, Google, and institutional documents. General medical websites that can be accessed anytime, anywhere, were reportedly beneficial to NISs who were looking for flexible options in the use of health information. P8 identified general medical websites to fulfil their clinical information needs. He stated that *'I usually use the general medical websites, where you can find several websites that support nursing, such as Nurses Labs, which is very helpful and accessible.'* Some NISs noted that even though online access was not always possible, they found ways to continue to use their own devices. According to P6, *'Workplace computers were not easy to access whenever you needed them. So I used my own phone to access Wikipedia.'* Smartphones were identified as the information-seeking devices mostly used by NISs. They regarded accessibility as the most important characteristic of a source that influences their approach to locating

various health information sources. Accessing online information in clinical practices through the use of a personal phone was more common. Textbooks were identified as another source to find information with some limitations, as identified by P1: *'books could contain information that may no longer be recommended.'* Social media was also mentioned by P2 with limited access in terms of connection: *'I did not have a connection to access certain channels, such as Telegram.'*

7.3.2 Information evaluation

In this theme, NISs explored their way of evaluating resources to support evidence-based practice. In this study, NISs often thought about whether they should keep looking for EBHI or stop. This was based on how relevant and trustworthy the information was and how well it fit the need.

7.3.2.1 Ask colleagues

Most of the NISs preferred consulting nurses and other healthcare providers, especially physicians, for evaluating the information obtained. They agreed that it was easy to evaluate by asking their colleagues, either nurses, physicians, or interns. For example, P2 said, *'I usually check with physicians to make sure that such information is correct.'* P4 was not in favour of the health information obtained from social media, as he thought this information was adjustable. Thus, he checked for reliability by asking a registered nurse. He stated that, *'I tried to get reliable information from Twitter, but the person posting the information may not be specialised in the nursing field. So, I had to check that the information was correct by asking a senior nurse.'* Some NISs considered that the experienced staff was more reliable, even if the resource was reliable. They would feel more comfortable when asked by an experienced healthcare professional. P5 said, *'Even if the website is reliable, I have to ask the experienced staff members'* and P11 said, *'I felt more comfortable and satisfied when I asked a nurse or physician with more experience about health information. I can't rely on online information alone, especially during my internship.'*

7.3.2.2 Link strategies

NISs used linking strategies such as comparing and contrasting resources to identify interconnections of health information on different websites and detect inconsistencies or evidence of relationships in health information websites before applying findings to clinical

practice. Some NISs mentioned that using more than one website helped ensure finding reliable health information. P9 said that *'I usually search for health information on more than one site. Thus, I can better integrate EBHI.'* Another NIS referred to comparing any information obtained from two well-known health websites. P1 considered the Medscape and nurses-lab websites to be reliable and authentic for use in clinical settings. P3 claimed that if he found two websites with similar health information, he would be correct to use it in clinical practice. He said that, *'When two websites have similar answers, I consider the information correct.'*

Indeed, some NIS related the obtained health information to clinical practice applicability. They tended to be uncertain when deciding whether to reject or accept health information when they found it at odds with their clinical practice. P5 stated that, *'Every time I look for information from e-resources in clinical practice. I linked this information to clinical practice to determine its reliability.'* Another NIS emphasised the difficulty in understanding how health information discovered integrating into clinical practise relates to poor quality. P11 mentioned that, *'I suppose that the information that I get from Google is of poor quality because it is hard to apply in actual nursing practice.'* So he might seek further information to eliminate the uncertainty.

7.4 Gap

This theme covers the facilitators and barriers that NISs encounter when seeking health information in clinical practice. When NISs were asked about the facilitators or barriers to finding the information needed in clinical practice, most of the NISs agreed that the organisation's support played an important role in their clinical ISP. Furthermore, several factors for seeking EBHI in clinical practice have been mentioned, including information overload, preferred websites, access issues, and time constraints.

NISs' concerns were expressed about organisational support in terms of healthcare professional collaboration, computers, and access to websites to provide a climate for EBHI implementation. P6 said, *'The difficulty lies in the fact that there is no website approved or created by the hospital where I trained.'* For P4, he believed that a clinical instructor played a huge role in integrating EBHI into clinical practice, *'In fact, the clinical instructor told me that I was an intern nurse and that I didn't have to know about seeking information-related to clinical practice.'* However, NISs also identified facilitators to accessing and utilising EBHI in

clinical practice. NISs noted that it takes more time to access a unit computer than it does to complete a Google search on a smart phone. NISs recognised the importance of seeking information while working and the importance of organisational support to do this. Comments from two participants highlighted the challenges of accessing information in the workplace. *'I have access to the hospital's website as well as a variety of educational programmes that are available at all times and are constantly updated to meet information needs' (P1-SSI).* *'I can use a digital library that is provided by the hospital to learn the names of various medications and their side effects. In fact, it is much easier to use that system than to look it up on Google and have to read through thousands of side effects' (P4-SSI).*

Most of the NISs agreed that the internship policy might be a barrier to seeking health information in practice. P1 pointed out, *'I am not allowed to use a smartphone during clinical practice.'* Furthermore, prohibit NISs from the use of mobile phones, even though they are using them for work purposes and for the benefit of their patients. P5 said, *'I have to leave my mobile phone in my locker because we are not allowed to carry it around with us.'* Thus, some NISs mentioned that a limit on the seeking of health information might affect a patient's situation. NISs agreed that hospital training centres had a role to play in supporting NISs' access to EBHI resources; clinical instructors themselves must take certain actions to ensure NISs effective use of the resources. P2 illustrated, *'As often happens, I could not look up the insulin sliding scale on the internet at practice because the clinical instructor prohibited us from using our mobile phones during working hours.'*

One of the barriers was time spent seeking health information. NISs mentioned that some HINs in clinical practice were particularly time-sensitive, either in locating the information or due to the busyness of the source, such as a clinical instructor. P1 replied that *'I have some troubleshooting, such as a lack of time to complete searches.'* Another NIS, P4, brought to attention that nurses' lack of time stopped him from asking questions: *'I could not ask nurses because they were too busy to answer my questions.'* Moreover, P3 believed that poor English may prevent him from seeking health information quicker: *'The problem is that it took me a long time, probably because of my poor English.'*

With regards to the website, information overload and preferred websites might be factors that relate to the source of the information. NISs mentioned that information overload can negatively affect the ISP. P1 and P11 said that seeking health information started with finding

too little information and quickly became overwhelmed, often with irrelevant or unreliable health information, *'Medscape never gives you the information you need straightaway, and you have to read through a lot of things that you don't need,'* and *'I found additional information with limited value, which made it difficult.* Some NISs preferred to use recommended health information resources for Internet access because they agreed that it allowed for efficient health information. *'I usually get revision medical information from two specialised medical websites, Medscape and nurses-lab, because our clinical instructor recommends using them in practice,* P1 explained. Overall, the success of NIS searches was critical because it determined whether time, skills, and effort were properly utilised. The time issue could be related to time spent searching or workload, as mentioned. Thus, NISs need to learn how to obtain EBHI at any time.

7.5 NISs' needs

Some NISs indicated a need for a training programme to develop their information-seeking skills so they could conduct more efficient searches using different electronic search methods. The most significant outcomes that give rise to the development of the ISP in clinical practice may be indicated by NISs' needs.

7.5.1 Training course

NISs mentioned a need for specific training and resources so that they can supply EBHI in clinical practice efficiently. Some NISs indicated a need for a training programme to develop their information-seeking skills in order to be able to conduct more efficient searches using different electronic search techniques during clinical practice. P1 said that *'I definitely need courses that help me to seek and evaluate medical information and adopt an evidence-based approach to nursing clinical practice.'* P2 added more information about the course's aim and frequency. He stated that *'I mean that if they administered classes to nursing interns even once a week, focusing on obtaining EBHI in the shortest possible time.'* P10 thought these courses might increase the quality of nursing practice.

7.5.2 Channels

Results show that NISs needed different sources of information to fulfil their HINs in clinical practice. Initially, they highlighted the need to assign someone in clinical practice to ask when

they have HINs. As P2 stated, *'The hospital is supposed to have specialised personnel available to answer students' questions.'* According to some students, a librarian or even a small library would be useful for obtaining health information in clinical practice. P3 thought that, *'I suppose that if there were a small library in the hospital, it would have been helpful to find accurate resources.'* Another NIS said that even a digital, reliable library would be a useful health information source to use. P4 commented that, *'If we had a digital library at the hospital, I would not even think of using Google.'* Then he added, *'It will minimise medical mistakes resulting from getting the wrong information from unreliable sources.'*

7.6 Summary

NISs had diverse HINs when training in clinical practice due to a lack of knowledge, expertise, monitoring, and confidence. The analysis showed that, among the 12 participants medication information were the top information needs, followed by diagnosis and guidelines. As a result, identifying HINs in clinical practice at the point of care and obtaining the information accurately and efficiently have emerged as NIS issues in this study. ISBs result in particular HINs in clinical practice, which are, in turn, affected by factors such as source availability, assessment of the quality of the information obtained, individual skills of the user, and the environment around them.

In clinical practice, data in this study showed several different information sources were available to support NISs' HINs. Some of this information is based on search engines, e-books, professional organisation websites, and general medical websites. Most of the participants agreed with the statement that easy access is the main criterion used in the choice of information sources. There is a risk that NISs may accept practices without questioning if the underlying information is based on the best available evidence. Providing access to online resources in clinical wards can also encourage NISs to learn about and use these resources. There were some negative comments about a lack of knowledge to understand and interpret health information findings, unfamiliarity with the English language, and difficulty accessing high-quality resources. Therefore, they mentioned that a training course would be a useful educational support to uplift their skills and obtain EBHI in clinical practice. The following sections will present the process of developing and utilising the Performance Tool (PT) in TA sessions, along with the findings.

Chapter 8

Scoring System for HISB

8.1 Introduction

There are several tools to assess nursing students' performance of a specific task in clinical practice, as affirmed by numerous nursing studies (Cowin et al., 2013, Ličen and Plazar, 2015, Havola et al., 2020). One commonly used tool to assess knowledge and skills for practice is the National Council Licensure Examination for Registered Nurse (NCLEX-RN) (Glasgow et al., 2019). Another tool is using simulation labs to allow direct observation of nursing students' performance and ability to make clinical decisions in controlled environments. In such assessments, students are given scenarios and asked to deliver care based on the checklist according to the local standard of care (Khalaila, 2014). In addition, clinical instructors can provide a performance evaluation for their students due to observing and monitoring them during their clinical rotations. This method of evaluation can provide a valuable insight to assess students' performance and progression in practice (Ismail et al., 2016). Students' performance can also be assayed through self-assessment, whereby students can evaluate their own knowledge or skills and their ability to apply them in practice (Cadorin et al., 2017). These methods of evaluation can provide comprehensive insights into students' strengths and weaknesses in practice, mainly in terms of correct knowledge and deployment of clinical skills, but there are no tools available to assess nursing students' performance of seeking health information in clinical practice.

Several factors emerged from the TA data that allow assessment of students' skill and performance in seeking quality of health information, thus I decided to use these factors to create an innovative tool to assess their performance. The main aim of this phase was to develop a tool that could be used by students and educators to gauge their understanding and skill in seeking health information. Moreover, this tool is intended to achieve different outcomes such as enhancing critical thinking and increasing their independence in practice. It is really important to approach this tool in a systematic process, based on an evidence-based model, to allow any adjustments to be made before full implementation (Button et al., 2014). Therefore, this stage of the research focused on the development of the Performance Tool (PT); a new measure for evaluating the skills of seeking evidence-based health

information (EBHI) among nursing students. In particular, it was intended to develop a practical tool that may help in evaluating the quality assessment and provide a means for seeking health information in practice along with the possibility of exploring this area with a larger population of participants in similar or different contexts. This chapter presents and discusses the development stages of the tool, its reliability, and the subsequent results and discussion, to understand how the PT can help to evaluate NISs' engagement with ISP.

8.2 Development of the Performance Tool (PT)

TA involved having NISs verbally express their thoughts, observations, and actions while they were engaging with a clinical statement task. It was able to show some factors that described information seeking performance, as mentioned in Chapter 6. Researchers acknowledged that the TA method has been successful in providing an understanding of participants' skills and behaviours when completing tasks about health-related information (Cruz-Benito et al., 2015, Lundgrén-Laine and Salanterä, 2010, Eccles and Arsal, 2017). However, the lack of tools identified in HISB field provides an opportunity to further understand and measure seekers' strategies (Zimmerman and Shaw Jr, 2020). Therefore, several studies have highlighted that using TA to develop a tool that would support the understanding of the complex web-based strategies of seeking health information (Carioli and Peru, 2016, Fan et al., 2020). Thus, these factors were used to create a scoring system that would evaluate the quality of the ISP in terms of obtaining EBHI, thereby allowing a more objective metric for measuring performance. Integrating the PT to assess NISs regarding health information-seeking behaviours (ISBs) can be a valuable process for obtaining EBHI in practice. A well-designed tool can help NISs to acknowledge their own strengths and weaknesses, consequently helping to enhance EBP and decision-making, and no pre-existing tool for this purpose was found in the literature search. Performance was scored using the tool based on NISs' responses to clinical statements in TA sessions using resources with different ways to find and evaluate the information to meet their needs.

This scoring system is derived from the data itself. The first step in this process was undertaken after collecting TA data. Three sources—participants' thoughts, screen sharing activities, and the researcher's notes—provided the data used to create the scoring system (see Chapter 6). Similarly, an observational study aims to identify and validate behaviour and

engagement indicators of information retrieved from educational resources, to determine how participants engaged and behaved to represent an appropriate approach to improving learning (Cruz-Benito et al., 2015). Once the patterns were extracted based on TAP, the process of creating the PT started. All of the tool's items were reviewed, revised, and resolved with the supervisory team, who shared their insights, reviewed the features and functionality, and gave their feedback on its usability. This process helped refine the concept, make improvements, and facilitate the adoption of the scoring tool. Finally, Cohen's Kappa was used for reliability to show how high the agreement was between two raters, as described in the following sections. Figure 8.1 shows the tool development stages and process.

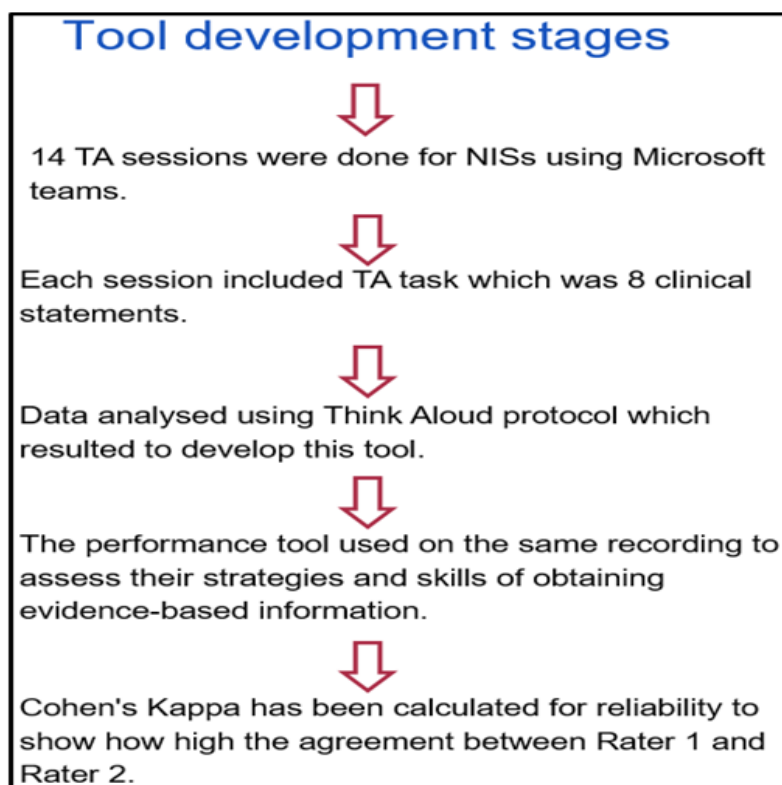


Figure 8.1 Stages of development of the Performance Tool (PT)

An overall ranking was done based on 17 questions with yes or no answers (Table 8.1). Table 8.2 presents an example of using the tool to record the performance of an NIS to obtain EBHI for clinical statement number one, to illustrate part of the performance score. All NISs' scores using the PT are shown in Appendix 9. This stage recorded all participants who had finished eight clinical statements using the TA method. This tool can be used to explore the relationship between performance and other independent variables such as information quality assessment, clinical statement level, and gender score to further analyse information-

seeking skills. These relationships were analysed using SPSS to extract the median, minimum, and maximum values, as well as to create a boxplot. The median is a measure of central tendency, which is used instead of the mean if the normality of the data distribution is not known (hard to verify in his study with only fourteen participants) (Leys et al., 2013); the median identifies the typical and outlying responses in a data set. Due to the distribution of multiple datasets, boxplots were used to present the data graphically. They were useful for identifying similarities and differences between datasets.

Table 8.1 Yes/no questions derived from criteria emerging from the collected TA data

N	Question	Criteria	Focus
1	Does the NIS correctly interpret the clinical statements?	Interpretation	There was no need to ask the researcher to clarify the clinical statements.
2	Does the NIS use appropriate keywords while seeking health information?	Using keywords	NIS used keyword to expand and enhance their search results.
3	Does the NIS able to use search engine properly?	Search engine properly	NIS was able to transform a clinical question or a need for health information into a searchable sentence.
4	Are the sources sought by NIS relevant to address the clinical statement?	Relevant	NIS was able to find resources related to the clinical statement.
5	Does the NIS search mainly professional health information?	Authorised	NIS used professional organisation websites (NICE, NHS, WHO, MoH) or hospital websites.
6	Does the NIS use their prior knowledge to construct meaning?	Prior knowledge	NIS was able to use his/her prior knowledge to construct the meaning.
7	Does the NIS seek clarification of the meaning when they detect unknown words, abbreviation or medical terminology?	Seek clarification	When the NIS detected unknown words while seeking health information, he/she sought meaning to satisfy the health information needs.
8	Does the NIS check the domain name? (.edu, .gov)	Check domain name	NIS was looking for websites with.edu or.org domains.
9	Does the NIS use the medical databases?	Medical databases	NIS was able to integrate databases where medical information is stored, such as CINAHL or PubMed.
10	Does the NIS question the website (organisation) reputation in term of health information?	Website reputation	When the NIS questioned if the source is able to be trusted, such as Wikipedia.
11	Does the NIS assess the author information?	Assess author information	When the NIS assessed the reliability of the author (publication information).
12	Does the NIS seek the published or posted date?	Up-to-date	NIS was looking for the current health information.
13	Does the NIS match the usefulness of the information found to the specific needs of the clinical question posed?	Usefulness	When the NIS examined the usefulness of health information in clinical practice. (clinical judgment)(using pictures, video)
14	Does the NIS use more than one source of information?	More than one resource	When the NIS used more than one resource to obtain the health information.
15	Does the NIS use strategies to compare and contrast the information from different sources?	Compare resources	When the NIS used strategies that help to choose a resource, such as split screen to compare resources or information.

Table 8.1 Yes/no questions derived from criteria emerging from the collected TA data

N	Question	Criteria	Focus
16	Does the NIS weight the value of different information sources based on the quality of the difference sources?	Valuation	When the NIS detect inconsistency or evidence relationships in health information websites.
17	Does the NIS satisfy with information obtained?	Satisfaction	When the NIS completed the search process and satisfied with the information obtained.

Table 8.2 Participant scores in the Think Aloud sessions

No.	Assessment criteria																	
	Interpretation	Using keywords	Search engine properly	Relevant	Authorised	Prior knowledge	Seek clarification	Check domain name	Medical databases	Website reputation	Assess author information	Up-to-date	Usefulness	Multiple resources	Compare resources	Valuation	Satisfaction	Total
1	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	12
2	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	N	Y	Y	Y	Y	Y	12
3	Y	Y	N	Y	Y	Y	N	Y	N	N	N	N	Y	Y	Y	N	Y	10
4.	N	Y	N	Y	Y	N	Y	Y	N	Y	N	N	Y	Y	N	Y	Y	10
5	Y	Y	N	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	Y	N	11
6	Y	Y	Y	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	N	10
7	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	N	N	N	9
8	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	13
Total	6	7	5	8	6	4	3	4	0	7	5	0	7	8	6	6	5	87*
No. Key (Clinical Statements)																		
1 Serum lactate is an important indicator of the septic patient’s prognosis, with mortality dropping significantly as the lactate level decreases																		
2 A nasogastric tube is considered as a contraindication in a patient with a basal skull fractures																		
3 Patients with GCS lower than 8 requires urgent airway and breathing management																		
4 ECMO is a support not a treatment to provide stability while underlying cause is treated																		
5 Prone positioning might improve overall survival in severe ARDS																		
6 No laboratory test can determine the presence or severity of pain																		
7 Heparin reduces pulmonary compromise and intravascular coagulation in fat embolism patients																		
8 A patient asked about the purpose of the pursed-lip method of breathing																		
* Total individual performance																		

8.3 Reliability of the tool

The reliability of a tool can be determined according to the consistency of its results. It can be considered reliable when it yields similar outcomes when used multiple times with the same or similar groups of students or by other researchers (Mohajan, 2017). There are different ways of considering reliability when developing a tool. For example, test-retest reliability focuses on the consistency of the results when the test is done at different times with the same group (Polit, 2014). Another test is inter-rater reliability, applied by another evaluator (McAlister et al., 2017). Also, it is important to consider other aspects such as using clear instructions for using the scoring system to address any potential ambiguity. The sample size needs to be considered when evaluating the reliability of the tool (Chaturvedi and Shweta, 2015). In this case, 8 clinical statements were evaluated out of 112 (the number of statements x the number of NISs), to provide a robust and valuable tool (McAlister et al., 2017)..

Inter-rater reliability (equivalence) relates to the degree to which separate observers are consistent in their judgements. This study used Cohen's Kappa to perform an inter-rater reliability analysis between two dependent categorical samples (Warrens, 2015). An independent reviewer rated one participant's recording, which included eight clinical statements based on the PT. Both raters judged the same criteria in 88% of the cases, while 12% of the cases were judged differently. Each individual clinical statement agreement is presented in Appendix 10. Cohen's Kappa is calculated as follows:

$$k = \frac{Po - Pe}{1 - Pe} = \frac{0.88 - 0.53}{1 - 0.53} = 0.74$$

where Po stands for observed probability, and Pe stands for expected probability (Table 8.3). Using the criteria of Landis and Koch (1977) (Table 8.4) for interpretation, to show how high the agreement was between two raters (Sun, 2011), the value of 0.74 was 'substantial' for this tool. The following section presents the performance results of the tool.

Table 8.3 Cohen's Kappa cross table

8 clinical statements	Rater 2		
Rater 1		Y	N
	Y	82	12
	N	4	38

Table 8.4 Cohen's Kappa interpretation

Kappa	Level of Agreement
> 0,8	Almost perfect
> 0,6	Substantial
> 0,4	Moderate
> 0,2	Fair
> 0	Slight
< 0	No agreement

8.4 Results

8.4.1 Assessment criteria scores

The data collected revealed that all criteria scored ranged from 0 to 8. Table 8.5 shows the assessment criteria score. A descriptive approach was used to analyse all assessment criteria data. The median score was relatively low (3), affected by some criteria with egregiously lower (outlying) scores, which influenced the overall results. Figure 8.2 presents the median from the highest to the lowest score of the assessment criteria.

Table 8.5 The total performance scores of each participant and criteria.

Q	NISs Assessment criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	**Total
		1	Interpretation	*6	8	6	8	7	8	8	7	6	5	7	7	8
2	Using keywords	7	8	7	8	7	4	7	8	7	7	8	6	8	6	98
3	Search engine properly	5	7	4	5	2	5	5	3	4	3	5	7	3	4	62
4	Relevant	8	6	8	8	7	8	7	8	8	8	8	7	7	8	106
5	Authorised	6	3	0	0	1	0	0	1	0	1	3	1	0	0	16
6	Prior knowledge	4	6	2	1	2	3	3	5	2	3	5	3	2	0	41
7	Seek clarification	3	4	3	2	1	1	1	3	3	2	0	4	1	1	29
8	Check domain name	4	2	6	6	1	5	0	3	2	6	1	0	4	3	43
9	Medical databases	0	0	1	0	3	3	0	3	0	0	1	2	0	2	15
10	Website reputation	7	3	6	8	7	5	3	8	7	6	8	7	8	6	90
11	Assess author information	5	2	0	7	1	2	4	3	2	5	5	4	5	2	47
12	Up-to-date	0	0	0	1	0	0	2	1	0	3	3	2	4	1	17
13	Usefulness	7	7	2	4	3	3	4	6	4	3	4	4	5	3	59
14	Multiple resources	8	5	1	7	0	1	4	4	1	3	3	6	1	1	45
15	Compare resources	6	3	0	6	0	1	4	4	0	3	3	5	0	1	36
16	Valuation	6	2	1	6	0	0	2	4	1	2	3	5	0	0	32
17	Satisfaction	5	8	5	6	8	8	8	8	8	7	8	8	6	5	98
***Total		87	74	52	83	50	57	62	79	55	67	75	78	62	45	
*P1 was able to understand 6 out of 8 clinical statements																
** Total each criteria scores performance																
*** Total each participants scores performance																

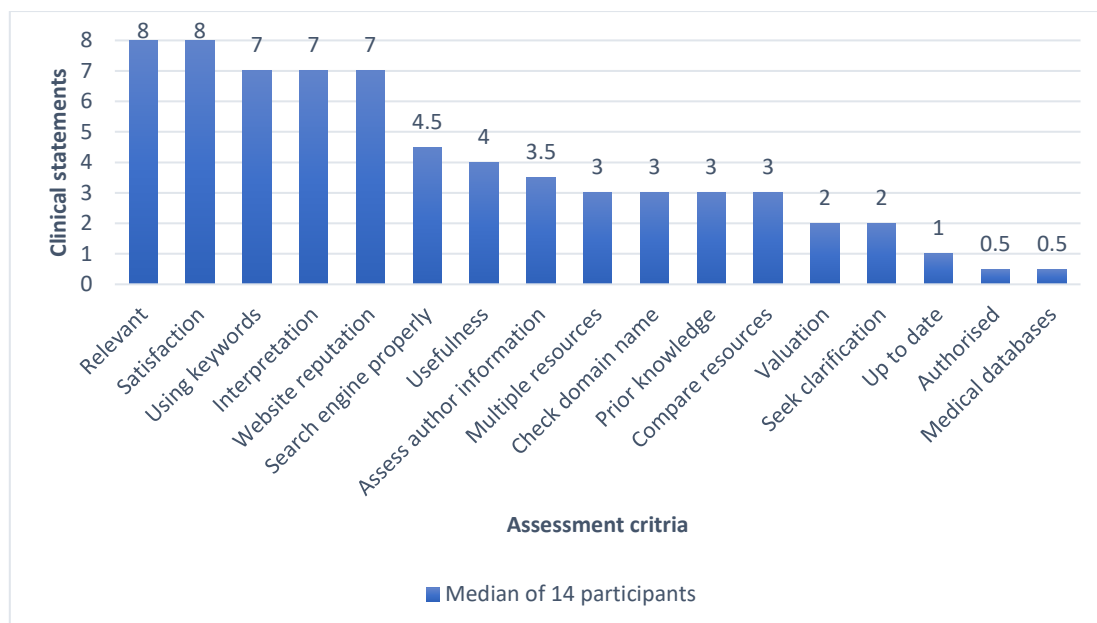


Figure 8.2 Assessment criteria score from the highest to the lowest.

The highest median in the tool was 8 for relevance (AC4) and satisfaction (AC17), meaning that the NISs were able to find health information to address their needs for almost all clinical statements and were satisfied. This was followed by using keywords (AC2), which scored 7, related to using different keywords to locate the health information. Similarly, interpretation scored 7, whereby NISs were able to understand the clinical statements without asking the researcher for clarification (AC1), which scored 7.

Search engines properly (AC3) scored 4.5, referring to the ability to transform a clinical statement or specific health information needs (HINs) into a searchable sentence. The lowest score was 0.5 for AC9, which shows that databases (e.g., PubMed and MEDLINE) are unlikely to be used for obtaining clinical answers among NISs. Also, using professional organisation websites (AC5) such as NICE, NHS, WHO, or MoH, scored 0.5. Furthermore, prior knowledge (AC6) and usefulness (AC13) scored 3 and 4, respectively. Figure 8.3 shows these statistics represented in a box plot to illustrate the variation for each assessment criteria in all clinical statements. The box plot shows how the distribution of assessment criteria scores for clinical statements. The line inside each box shows the median number, each box shows the interquartile range (IQR). The whiskers show the range that is the lowest to highest scores; the outliers are shown by single data points outside.

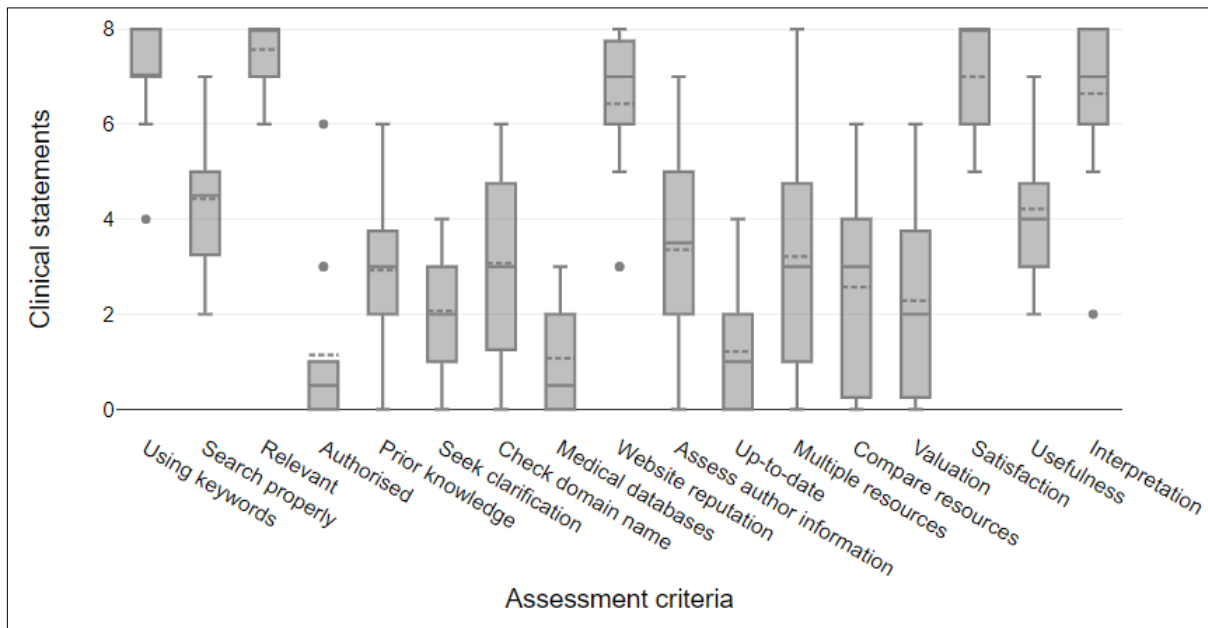


Figure 8.3 Assessment criteria scores for clinical statements

8.4.2 Clinical statements scores

The clinical statements (CSs) were about different subjects such as medical diagnosis, contraindications, nursing routine care, guidelines, pain management, nursing responsibility, and patient education. Each NIS was recorded and assessed in relation to eight clinical statements (thus, each clinical statement level might score from 0 to 17 for each participant). The data collected revealed that all clinical statements scored ranged from 4 to 13. Table 8.6 shows the clinical statement score to show the level of engagement. The statistical analysis of the clinical statement level was pulled from the assessment criteria tool. The median score was slightly lower at 8; clinical statements scores ranged between 7 and 9. Figure 8.4 displays the median level for the clinical statements from the highest to the lowest score of the assessment criteria.

Table 8.6 The total performance scores of each participant under each clinical statement.

CSs	NISs															**Total
	CSs	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	
1	Sepsis diagnosis	*12	10	6	10	7	7	6	9	6	7	8	9	8	5	110
2	NGT contraindication	12	10	6	7	8	8	7	9	8	9	11	12	8	7	122
3	GCS	10	7	6	10	5	8	6	12	7	12	8	12	9	6	116
4	ECMO	10	12	6	12	6	6	7	11	7	8	13	8	7	6	117
5	Patient position	11	11	7	10	7	6	10	10	7	7	11	11	8	4	122
6	Pain management	10	8	5	11	6	7	7	9	6	7	8	7	7	5	101
7	Medication indication	9	8	7	9	5	9	10	9	8	7	8	9	7	7	112
8	Patient education	13	8	9	12	6	6	9	10	6	10	8	10	8	5	117
***Total		87	74	52	83	50	57	62	79	55	67	75	78	62	45	

*P1 was able to score 12 out of 17 assessment criteria
 ** Total each clinical statement scores performance
 *** Total each participants scores performance

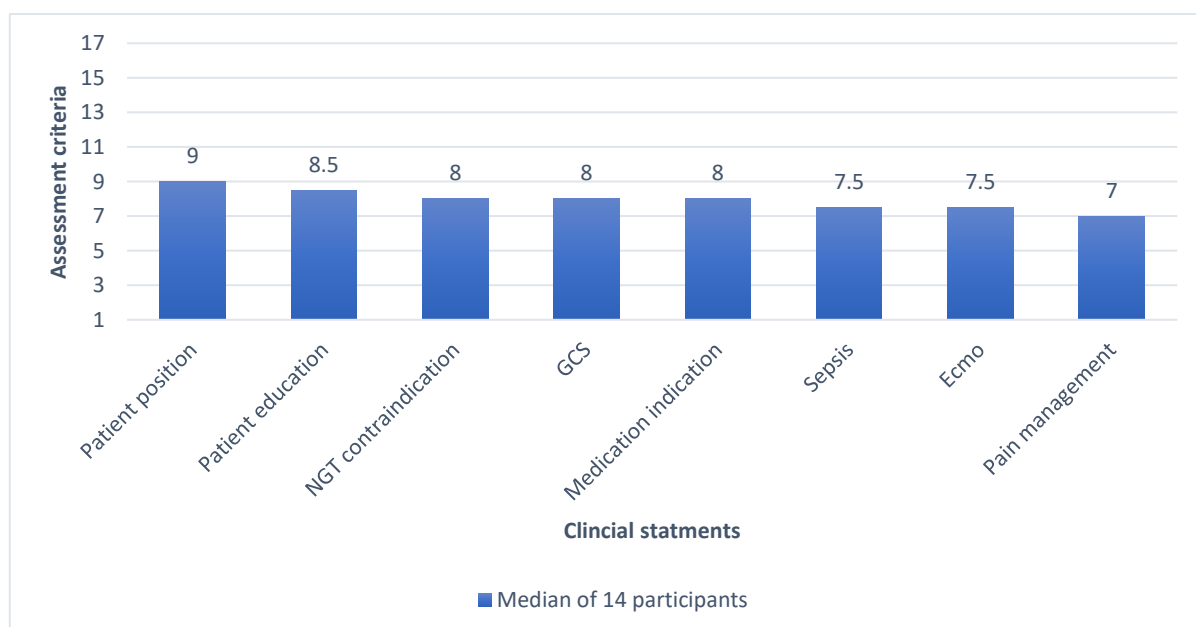


Figure 8.4 Clinical statements level score from the highest to the lowest

The highest clinical statement score was 9 for CS5, in which the NISs sought relevant information regarding patient position in ARDS. The second highest score was 8.5 for CS8, related to patient education about method of breathing, followed by scores of 8 for CS2, CS3, and CS7, pertaining to NISs paying attention to nasogastric tube contraindication, GCS, and medication indication (respectively). The lowest score was 7 for CS6, related to pain management. Figure 8.5 shows the clinical statements variation in scores based on the participants' scores. Across all the scenarios, the scores range from 4 to 13. The box plot shows how the distribution of clinical statements scores for assessment criteria. The line inside each box shows the median number, each box shows the interquartile range (IQR). The whiskers show the range that is the lowest to highest scores.

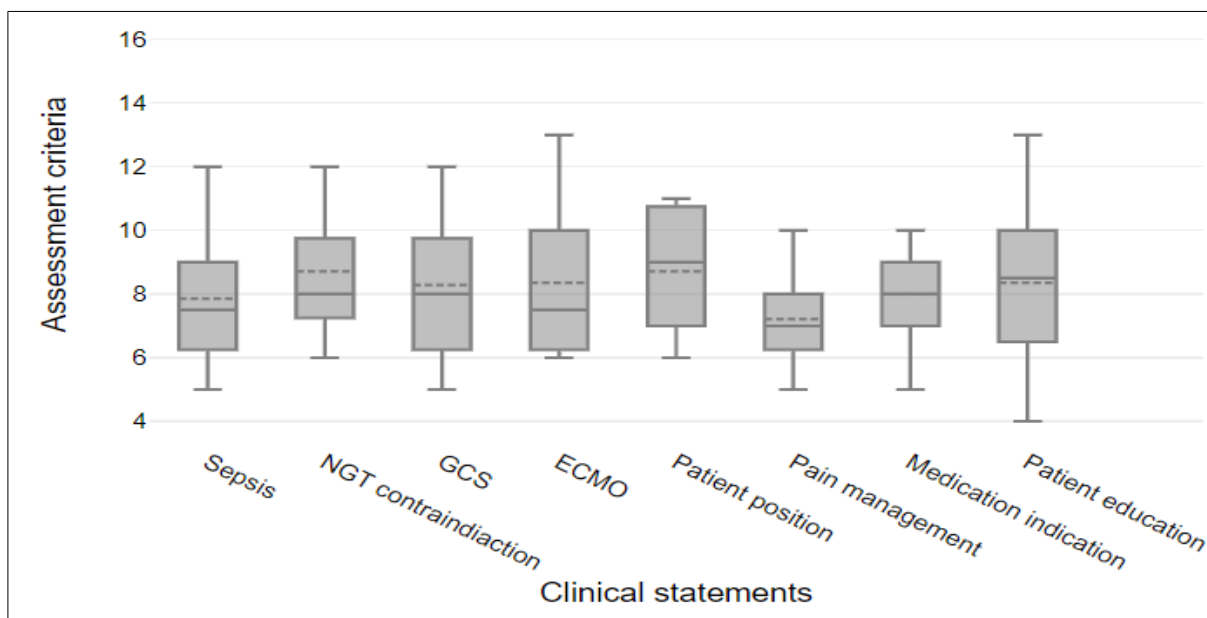


Figure 8.5 Clinical statements scores represented by box plots to show variation

8.5 Discussion

This section discusses the results obtained from the PT related to information quality assessment and TA activity. The development of the PT was an unintended secondary outcome of this study, and it provides both an analytical and performance rating tool that has the potential for practical application in assessing information-seeking skills. This tool will help to evaluate NISs' ISP in clinical practice to ensure that they are having the necessary skills to obtain EBHI in practice. This chapter demonstrates two main areas of focus concerning NISs' quality assessment, as applied to (1) the ISP; and (2) the clinical statements. For this thesis,

the PT provide to be important for showing how NISs approach and assess health information. It can be a valuable tool for researchers, educators, or clinical instructors to understand NISs' decision making process, and to better prepare for providing high-quality patient care.

8.5.1 Quality assessment applied by NISs

Interpretation of the clinical question or statements are an essential part of clinical practice, as they help NISs to develop critical thinking skills and provide evidence based practice (Rieh and Hilligoss, 2008). Several reports have shown that understanding the nature of the question being asked and knowing the key component of the question would help to understand the question and develop a focused search strategy (O'Mara et al., 2014, Bullington et al., 2019). Lahti et al. (2014) explored 114 nursing students' ability to identify the key component of 10 clinical questions and seek for EBHI resources. The results presented in this thesis showed that nursing students scored moderately in terms of their ability to understand and answer the clinical questions, with a mean of 5.5 out of 10; however, the median of 7 indicates that some egregiously low scores seriously reduced the mean value. Consequently, the results imply that most participants typically had the ability to understand 7 CSs out of 8, as the motivation for their initiate the process of seeking health information. It is apparent from this score that NISs were able to initiate the process of seeking health information relevant to the TA task, and that NISs were able to read and understand the clinical statements to initiate the process of seeking health information without asking for clarification.

Seeking for clarification can help NISs to improve their ISP (Parker et al., 2014). Researchers need to understand their students' willingness to find ways to seek clarification, such as using Google Translate or YouTube (Johnston et al., 2018, Li et al., 2021). A study mentioned that nursing students might not seek for clarification because they do not want to appear incompetent in front of their clinical instructors or patients (Jamshidi et al., 2016). In this study, the seeking for clarification criterion had a median of 2, indicating that participants were less likely to use a translator or to ask the researcher, and suggesting the possibility that they simply identified unknown words and ignored them. In accordance with the present results, a previous study has demonstrated that some healthcare professionals prefer to ignore unknown diseases, abbreviations, or medical terminology while seeking health information during practice (Lalazaryan and Zare-Farashbandi, 2014). By using the PT, clinical

instructors and educators can assess whether NISs have the required skills and plan further training needs such as using a translator.

Using keywords is an important strategy that NISs can use to obtain EBHI such as words that describe the information being searched (Wang et al., 2012, Chen et al., 2018). NISs can use keywords to narrow down their seeking process and obtain the most relevant health information more quickly (Horgan and Sweeney, 2012). For example, participants in this study they used 'heart failure,' 'asthma,' 'patient education' or 'WHO guidelines.' Using keywords had a median score of 7, indicating that participants typically had the ability to use keywords in 7 CSs out of 8 for locating online health information. A survey that included 111 healthcare providers found that 94% had recently searched with keywords, and mentioned that very low use of keywords is likely to result in not accessing the best quality evidence for EBP (Cullen, 2002). Therefore, using keywords can help NISs to find and locate health information efficiently.

Searchable sentences refer to a complete sentences that have the key elements for the clinical statements and used to seek health information for relevant information (Boltz et al., 2020). The ability to transform a clinical statement or a need for health information into a searchable sentence was one of the challenges for NISs in finding EBHI. Using searchable sentences had a median score of 4.5, which means that participants typically had some issues with the ability to type into the search engine properly. This suggests that 55% of sentences typed into the search engine were searchable. Based on this information, clinical instructors could consider teaching course to support NISs to write searchable sentences. It appeared difficult for all NISs to establish a causal relationship between the importance of writing searchable sentences and properly applying them to search engines.

However, 'finding relevant health information' had a median score of 8, indicating that participants typically had the ability to find health information that relevant to addressing their needs. A similar study by Sethi and Panda (2012) to assess the awareness of appropriate health resources among the medical students at the University of Aligarh discovered that 71.81% of the trustworthy resources they used were relevant to their subject field. When it comes to healthcare, where accurate information is of the utmost importance, the reliability of the resource is a key factor in figuring out how good a NISs' ISP is (Mikalef et al., 2017b).

NISs need access to accurate, reliable, and up-to-date health information to provide the best possible healthcare to their patients. Therefore, credibility in seeking health information refers to the reliability and authenticity of the source of the health information (Fode et al., 2020, Madathil et al., 2015). Based on the PT, there are several ways that NISs follow to assess the credibility of health information. One way is to consider of the authentication of the website. For example, health information from a well-respected medical organisations (e.g., NICE, NHS, WHO, MoH), or peer-reviewed websites, which are acknowledged to be more reliable than websites do not have similar authenticity.

Based on the PT, using professional organisation websites had a median score of 0.5, which indicates that participants had negligible regard for these websites, and did not regard them as being authoritative and accurate enough to be used in daily clinical practice. Moreover, checking the domain name (.edu or.org) had a median score of 3, thus participants considered the domain name while seeking for health information in only 3 CSs out of 8 as a strategy for checking the credibility of the resource. Such information can be used to inform future teaching to make students familiar with national and local health organisation resources. The PT can encourage nursing students to use professional organisation websites and avoid using unreliable or misleading resources.

Another way of assessing the quality of the information is to look for recent health resources, as more up-to-date peer-reviewed resources are considered to offer the most reliable evidence for EBP. However, the PT showed that NISs were less likely to check the date of the information they got when they were seeking health information. Only 1 out of 8 clinical statements was located through checking that the information obtained was up-to-date. Similarly, in a study by Raj et al. (2015) conducted among 100 health workers about seeking health information in their work, 20% agreed that outdated health information was considered a reason for not using health information in their work. Outdated health information can lead to inefficient clinical decisions, such as using an old guidelines, which in practical deployment can result in reduced QoC and even patient harm, such as delayed recovery or compromised patient safety (Jacobs et al., 2017). Therefore, the PT can play an important role to ensure that NISs engage in continuous learning and obtain the latest health information in the nursing field.

Another consideration is the website's reputation criteria, which had a median of 7, while 'assessed the reliability of the publication information; scored only 3.5 with regard to the participants' process of seeking health information. This finding is contrary to the outcomes of Komissarov and Murray (2016), who investigated factors that influenced 542 undergraduates' ISBs and opportunities for EBI practice. They found that 43% of students rated author reputation for sources as 'somewhat important', and 32% rated it as 'very important' for finding EBI; furthermore, only 1% rated the author and source reputation as 'not important'. Others have suggested that differences in access and resource types used may be influenced by a person's specific biases and background knowledge (Alving et al., 2018b, Wahoush and Banfield, 2014a).

Guidance is needed to help NISs understand what authentic health information is, and how to identify the existing supports and services for finding it. Similarly, Willemse et al. (2019) said that healthcare institutions need to evaluate the health information sources that will be used in clinical practice. In this regard, medical databases can provide a great benefit to access on a various health topics with considering latest research studies, guidelines, and EBP recommendations (O'Connell et al., 2018, Agarwal et al., 2016). According to Ryan (2016) nursing students who used medical databases to obtain health information mentioned increased ability to locate EBP recommendations and utilised them into practice. However, the PT indicated that the NISs' were rarely able to integrate medical databases to find health information.

The lowest score for the PT pertained to 'using medical databases,' with a median of 0.5. Thus, databases such as PubMed and MEDLINE are unlikely to be used for obtaining clinical answers among NISs. A large number of NISs fell below the average score, which could indicate that there are significant gaps in skill levels of using medical databases. It also showed that NISs did not think it was authoritative and accurate enough to be used in daily clinical practice. NISs still prefer searching for information on resources such as Google rather than searching medical databases. Zafar (2013), on a similar subject, found that 38% of students used online databases, while 70% were keen to have special training for the use of databases. Based on using medical databases results, NISs need to be encouraged to integrate medical databases searching into clinical practice and clinical instructors need to ensure that they have the skills to navigate health information.

Linking strategies refer to the methods to navigate relevant information among the enormous amount of online health information resources (Weaver III et al., 2010). One of the linking strategies utilised by NISs is using multiple resources, which had a median score of 3 (thus, five out of 8 clinical statements were answered through using the first resource that contained the needed information). Seeking different resources has some disadvantages, and might lead to irrelevant resources. These results are in accord with those of Tonsaker et al. (2014), which indicated that physicians are worried about patients often presenting with irrelevant information, due to the difficulty of addressing trustworthy resources.

Another unanticipated finding of the PT was that 'compare resources' had a median score of 2, indicating that participants are less likely to use strategies such as split-screen, find on page, or opening two windows. Furthermore, discovered inconsistencies in health information resources had a median of 2, which means that participants had the ability to find resources that provided conflicting health information in 2 CSs out of 8. This results can help to understand the actual NISs performance and address the needs of the majority of NISs. Nursing students need to use strategic thinking to compare and contrast the health information obtained and critically evaluate the sources of information, in order to find inconsistencies and critically evaluate the health information resources (Button et al., 2014).

All 14 NIS participants completed all 8 clinical statements. The completion of the search process effectively should make the NISs satisfied and able to make a decision; 'satisfaction' had a median score of 8, which means that participants were completely satisfied with their outcomes. A study reported by Cobb (2008) showed that 128 nursing students had a moderate level of satisfaction with seeking online health information in clinical practice, which was attributed to their concerns about the quality of information. Completion of the ISP does not always imply that NISs have successfully obtained EBHI.

NISs' decision-making when completing the search process depends on their quality assessment skills, clinical practices, individuals' knowledge, and the availability of information (Aitken et al., 2009, Bucknall et al., 2016). Surprisingly, 'usefulness of the information' got a median score of 4, which means that participants examined the usefulness of health information to apply in clinical practice in 4 CSs out of 8. Understanding the elements of assessment criteria might help NISs to improve their information-seeking skills and use health information that is applicable in clinical practice.

Overall, there is a need to consider a feedback mechanism in the PT, via a self-reflection based on self-assessment, evaluation by a faculty member, peer review, or a combination of these methods. The feedback of NISs' performance should be given in a timely and constructive manner, to help them to identify areas for improvement and track their progress in the internship year. By assessing NISs performance and providing feedback, clinical instructors can support NISs' professional development and maintain patient safety.

8.5.2 Clinical statements level

Researchers have acknowledged that problem-solving approaches with a clear TA task may encourage respondents to identify problems with the task and resulted in a more engagement approach (Pepper et al., 2018, Willis, 2004). In this thesis, NISs acknowledged that clinical statements were clear, and that this encouraged them to start the ISP. The findings indicate many positive aspects of the engagement with the clinical statements during the TA task: NISs successfully completed 112 statements out of a total of 112 statements (i.e., a 100% success rate). Also, NISs mentioned words to express their thoughts on clinical statements like 'interesting,' 'doubting,' or 'curious' as indicators of their impression. Moreover, as discussed in the interpretation of results, NISs were able to initiate the process of seeking health information without asking for clarification. These result provides some evidence that clinical statements captured the participants' attention and would give an accurate reflection of the ISP.

Research suggests that young nurses and nursing students with lack of experience find it difficult to use of various search skills, functions, and features when seeking information pertaining to different nursing topics in practice (Farokhzadian et al., 2015). Consistent with this, NISs' median performance score for seeking health information based on the clinical statements in this study ranged between 7 and 9. Participants had an average score of 8 out of 17 for applying quality assessment in seeking health information for each clinical statement. The highest clinical statement score was 9 for CS5, in which the NISs sought relevant information to address daily clinical practice in the critical care unit related to the recent pandemic, which is patient position in ARDS. This score could be influenced by the spread of Covid-19 topics and care in the field of clinical care.

The second highest clinical statement score was 8.5 for CS8, relating to NISs seeking relevant information to educate patients about methods of breathing, followed by a score of 8 for three clinical statements, CS2, CS3, and CS7, concerning attention to understand nasogastric tube contraindication, GCS, and medication indication (respectively). The two lowest scores were 7.5 and 7 for CS4 and CS6 (respectively), which show that NISs might not find it easy to understand the medical abbreviations of ECMO or obtain information related to pain management or difficult to apply a quality search due to indirect clinical statements. The clinical statement in this regard was *'No laboratory test can determine the presence or severity of pain.'* Overall, by using the PT, clinical instructors can identify nursing topics where further training is needed due to NISs difficulty of obtaining EBHI such as medication indications.

8.6 Summary

This chapter presented the evidence that reflects the overall extent of NISs' skills of seeking health information in TU, based on the PT. Some engagement aspects of this tool are discussed in the following chapter, which presents the Saudi NISs' experiences and strategies of seeking health information in their clinical practice during their internships.

Chapter 9

Discussion

This is the first study to explore and observe the process of obtaining evidence-based health information in clinical practice, specifically among nursing interns in Saudi Arabia. Using a new approach to TA methodology and semi-structured interviews, this thesis contributes to existing knowledge in the field of nursing interns' information-seeking knowledge, skills, and practice. A scoping review identified that nursing students might rely on online resources that could be unreliable or outdated for making clinical decisions. Therefore, this study explored their information-seeking behaviours (ISBs), identifying the key factors and strategies that contribute to obtaining evidence-based information concerning patient care among nursing intern students (NISs), to enhance the decision-making capabilities within clinical practice. Specifically, this study answered the following questions:

- How do NISs access evidence-based health information (EBHI) within patient care settings?
- How do NISs assess the quality of EBHI within patient care settings?
- What are the factors and strategies that contribute to the ability of NISs to access and utilise EBHI within healthcare?

These research questions were addressed via a set of commensurate objectives:

1. To explore NISs' strategies for seeking health information
2. To identify the type of health information needed and challenges of obtaining EBHI in a real clinical practice setting.
3. To identify how NISs assess the quality of health information resources.
4. To write recommendations for best practice in supporting NISs to search for and find high quality health information.

This chapter discusses the results obtained from the 14 TA sessions and 12 semi-structured interviews undertaken in this research. The first study addressed the first and third objectives, and provided deep insights into the process of ISBs among nursing interns triggered by clinical scenarios. The second study addressed the second objective using semi-structured interviews to explore how nursing interns sought health information in the clinical setting. The discussion

in this chapter elucidates how the aims and objectives of the study were met using Dervin's model (as presented in table 5.3) to frame the discussion and facilitate triangulation of the findings from the two studies.

9.1 Synthesising the benefits of using TA and SSI together

TA method can capture real-time action and thoughts during a task while semi-structured interviews explore participant perspectives. Combining these two methods can be a powerful approach for research (Lambert and Loisele, 2008), especially in the field of ISBs, to gain a more comprehensive understanding of NISs' cognitive process and perspectives (Hertzum, 2008). The TA method involves NISs' verbalising their thoughts and actions while performing clinical statements task. This technique provides real-time access to NISs' ISPs and insights into how they approach EBHI (Al-Moteri, 2023). By combining this with semi-structured interviews, this study gained a deeper understanding of NISs' experiences, strategies, factors, and decision-making after seeking health information in clinical practice. Combining multiple data collection methods will help to strengthen the validity of findings through data triangulation, offsetting the problems of individual methods while accentuating their strengths by combination with diverse approaches. By triangulating the two methods, this study identified NISs' ISP, providing a more comprehensive and reliable understanding of seeking health information in clinical practice (Molbæk and Kristensen, 2020).

The outcomes identified NISs' ISBs in relation to clinical experience and placements, affirming and extending beyond previous studies on HCPs' ISB in terms of underscoring common challenges faced by interns to identify and access quality information for EBP. The triangulated TA-interview approach explored NISs' cognitive rationales in depth concerning their ISBs, offering more holistic insights into their preferences. Dervin's Sense-Making Theory enabled this study to conclude that NISs undertake a dynamic 'gap-bridging' process, whereby they identify gaps in their own knowledge and then seek information from numerous sources, after which they seek to compile the new data in coherence with their previous clinical skills and knowledge. This research consequently offers new insights for the increasing studies of nurses' health information-seeking, with important outcomes for strategic development to improve information seeking, analysis, and deployment in EBP for nursing education and clinical practice.

9.2 Type of health information needed (context)

The identification of health information needs during clinical practice among nursing interns has provided valuable insight into the specific types of health information they require during their training. This study contributed to a deeper understanding of how NISs identify and address their health information needs (HINs) during patient care. The data revealed different types of information needed by NISs, with categories derived from thematic analysis of the semi-structured interviews, which were organised into three HINs accordance to the NISs: treatment, diagnosis, and information related to guidelines.

First, the treatment information was primarily biomedical, pertaining to medication indication, dosage, and side effects. Almost all NISs expressed that they experienced situations where they needed detailed information about a particular medication to find the correct way to administer it. Second, the medical or nursing diagnoses includes information related to plan, intervene, and evaluate nursing care for individuals. Third, the medical guidelines include HINs related to new standards of proficiency for nurses, referral information, and associated policies. A review by Clarke et al. (2013) critically analysed the findings of studies that focus on HINs and ISB of nurses in a primary care setting. It highlighted nurses' common HINs related to diagnoses and treatment regarding medication information, considering effective usage of resources is important for improving their clinical skills ability and performance.

However, this study provides new insights into exploring NISs' HINs based on the TA task or the clinical situation, but the pioneering nature of this research direction makes it correspondingly difficult to compare the NISs' HINs with the results of previous studies. Patient inquiries in primary care were explored by Cogdill (2003), Dee and Stanley (2005), and Tannery et al. (2007), and patients in these studies were concerned about their health condition and potential outcomes, while nurses needed a solid understanding of different health conditions to answer patients in a simple and clear way.

Treatment information was reported by Archambault et al. (2012a) and Scott et al. (2018), and patients in their studies often asked about the treatment options that were available to them. They were concerned about the risks and potential outcomes along with the benefits of various treatment options, such as surgeries. Continuous professional development was

recognised by Turner et al. (2008), Weng et al. (2013), Ebiye (2015), nurses believed that health information is continuously evolving and they needed to stay updated with the latest guidelines. Therefore, they engaged in professional development activities to enhance their knowledge such as attending conferences. Duncan and Holtslander (2012) identified that patients were concerned about their medications and potential side effects along with indications. Therefore, nurses mentioned that they needed to access comprehensive medication references and resources to answer these inquiries and ensure safety.

Within the context of the information concerns during TA tasks, NISs mentioned words like 'curious,' 'wondering,' 'not sure,' or 'confused' as indicators of knowledge gaps. For example, one participant said:

'I was very confused about the side effects of paracetamol, so I looked them up on the Google site. I looked up paracetamol side effects to learn about nursing duties.'

It has previously been observed that indicators of HINs in nursing students may be apparent in a number of ways, including uncertainty, inability to answer questions, seeking advice, and lack of confidence (Hatzenbuehler and Klein, 2019, Kim et al., 2016). According to Newman and Doran (2012) recognition of HINs is important because this cues the nurse to complete patient care tasks with consideration of evidence-informed resources. However, it should be noted that NISs may not perceive or recognise knowledge gaps and do not always seek health information when needed due to many factors, such as time, skills, and workload (Ricks and ten Ham, 2015b, Casafont et al., 2021).

In this study, NISs discovered that hospital guidelines and policies were unclear, and were classified as clinical information needs. Such classification may give insights into the different types of NISs' HINs. For example, a registered nurse might need information about specific patient care issues (Yang and Waters, 2019), while some NISs in this study had a need for information about non-clinical needs, particularly holistic patient-centred needs that form the advanced nursing practice contribution to modern healthcare services. This finding is consistent with that of Higgins et al. (2010), who identified that newly qualified nurses experienced uncertainty or ambiguity related to their first job descriptions. Whereas, those

who experienced clarity on hospital guidelines and policies found their transition process easier (Doody et al., 2012, Halpin et al., 2017).

Hospital guidelines and policies changed frequently, as the evidence was changing and resources were not always available. One participant declared: *'Unfortunately, I cannot find guidelines on patient safety regarding personal protective equipment for surgical operations.'* Casafont et al. (2021) said that hospitals should set up systematic rules for what healthcare students see as unclear rules before they start their clinical placement, to enable quick access to the best practice guidelines. This is corroborated by the current study, which showed that NISs preferred setting up systematic rules before starting their internship year. This can help to promote standardisation in clinical practice, and reduce uncertainty regarding best practice guidelines. It can provide valuable opportunities for NISs to address their HINs properly and become more competent in training, so they are primed to transition more coherently into clinical practice after they become registered nurses.

In relation to the content in nursing internship, they mentioned different types of difficulties that created HINs, such as lack of confidence and different policies used in hospitals to conduct procedures. Self-confidence also accords with Zohoorparvande et al. (2018), who reported that 105 nursing interns considered self-confidence and coaching support to have the highest effects on the gap between training and practice, with 88% and 85% agreement (respectively). Furthermore, many students are confused by the disparity between nursing education and practice as a result of the various policies used in hospitals to carry out procedures (Mackey and Bassendowski, 2017). Universities should collaborate more closely with hospitals, to provide a clear job description and provide qualified mentors to reduce the gap between education and practice that might decrease information needs in clinical practice.

It is important to keep in mind that NISs may not see or recognise gaps in their knowledge and may not always look for health information when they need it. According to Ricks and Ten Ham (2015a), recognition of HINs is important because it primes the nurse to complete patient care tasks with consideration of evidence-informed resources. This study identified many aspects that could affect NISs' HINs, including the work role, information-seeking skills, and the related clinical incidence, in addition to their experience in using the information

sources. Therefore, by having information sources that address these health HINs and are readily accessible, NISs may be able to increase efficiency in practice.

In summary, the diverse informational needs of NISs identified in this study reflect the diverse functions they perform in modern healthcare service delivery, and underscore the importance of their having the ability to access, analyse, and deploy the latest (and accurate) EBP. This entails that universities and healthcare organisations provide access to comprehensive educational and training resources and guidance on how to retrieve and assay information, in order to satisfy their informational requirements and deliver optimum clinical services and EBP, thereby improving the quality of education provided to nurses, and the quality of care ultimately provided to service users, improving healthcare system efficiency.

9.3 ISP (Bridges)

Studying NISs' ISBs identified barriers they experience in clinical contexts, and this research sought to comprehend how they undertake ISP, in terms of resources used and methods by which they seek to bridge vacancies in their pre-existing knowledge. TA and in-depth interviews provided deep and authentic insights into their cognition and process of making decisions in their ISPs. The outcomes indicate the flexible ISPs they use, and the active engagement NISs exhibit in identifying and filling information gaps. This is pertinent to the underlying need for more research on the implications of access to particular health information resources for the purpose of enhancing medical knowledge in general, which researchers have long argued affects the quality of healthcare services (Tabak et al., 2015, Jamal et al., 2015, Levin-Zamir and Bertschi, 2018).

Newly-graduated nurses are required to participate in EBP, which entails locating and evaluating current information and making nursing decisions when planning treatment for their patients (KHademian et al., 2020). This study shows that NISs follow a sequential process in order to fulfil their HINs, starting with locating information, followed by constructing its meaning, and finally evaluating the information. The following discusses NISs' online resources, using keywords, and other strategies to find and evaluate the information obtained. The ability to locate information to guide clinical practice is important for the NISs to develop in order to provide safe and good patient care (Al-Moteri, 2023).

Consequently, the ability to locate relevant health information is now included among the competencies required of nurses across a number of different jurisdictions and countries. The Canadian Association of Schools of Nursing includes two competencies related to ICT and evidence-based care within their document outlining RN entry-level practice competencies (Nagle et al., 2012): ‘access relevant information to support the delivery of evidence informed patient care’ (p. 10) and ‘access ICTs in accordance with professional and regulatory standards and workplace policies’ (p. 12).

There are several methods for NISs to locate health information in clinical settings. One common method mention in previous studies is using electronic health databases, such as PubMed, Medline, and CINAHL. These databases give access to a vast range of health-related information, such as research papers, clinical practice recommendations, and other relevant information (Yang and Waters, 2019). However, in TA sessions, NISs tended to focus on Google rather than medical databases or using professional organisation websites (NICE, NHS, WHO, MoH), as in the following response:

‘I think this website (PubMed) provides related information to pain assessment. One of the main issues is that I don’t know how to use it. I will focus on using Google’ (P13-TA).

Google was a place where many NISs liked to begin when looking for information. When asked why they would begin with Google, several students in this study said that Google is more accessible, simple, fast, quick, and handy than any other resource they might use. El Zein et al. (2018) stated that Google has become the preferred choice of search interface for many faculty and students to address their information needs. Google offers easy and effective access to a significant number of health information resources. P2 agreed with the same idea:

‘I am using a search engine, to be specific, “Google.” I just typed the information that I want to look for, and I will find a lot of websites’ (P2-TA).

These findings support that Google provides a various health information resources including research papers, medical databases, reputable health websites and medical institutions websites (Kung et al., 2023). Recently, researchers have begun to speculate that ChatGPT can help students to fulfil their health information needs (Kung et al., 2023, Huh, 2023). ChatGPT can answer questions, offer insights, or explain ideas based on its training data, rather than a

direct access to the internet or real time searching on medical databases (Biswas, 2023a). According to most NISs' preferences for seeking health information, they still relied on Google for their ISP due to its easy access, numerous resources available, their familiarity with ChatGPT, and access to reputable sources.

This study is based on the results when ChatGPT just released and were available for users in Saudi Arabia, and its functionality may have evolved since then. Despite these promising results, questions remain for further research to analysis of NISs preferences to determine if ChatGPT or Google as the preferred way to seek for health information (Biswas, 2023b). Nevertheless, despite the potential benefits of emerging search technologies, the problem remains that NISs were not aware of the many search engines available online that are perfectly amenable to healthcare students and practitioners, such as Google Scholar, ERIC, or PubMed, as reflected by P6:

'On my Google searching, I found access belongs to PubMed. But I am not sure if it is a reliable journal. I am going to search again... The clinical instructor also gave us access to slides at the start of each rotation, including an overview of all potential cases, and we got tested on them at the end of every month. However, it is not easy to access whenever you need to look at it due to the workplace computer being busy. So I looked at Wikipedia' (P6-SSI).

Health information may not be considered reliable when information obtained from sources such as Wikipedia, news, or blogs (Greysen et al., 2010, Santillan et al., 2014). In spite of easy access or familiar to NISs, the reliability of the health information obtained by them may not be sufficient to perform in clinical practice. Additionally, this study identified that due to some restricted accessibility or unfamiliarity with reliable information resources such as hospital websites, NISs tended to search for information on non-reliable resources. An NIS reported that *'I do not like this website. I know it is reliable, but for further information I have to sign up' (P11-TA)*. A cross-sectional survey study demonstrated that providing specific instruction for locating health information to nursing students can improve their confidence and awareness of materials available through online databases (Ford et al., 2016).

During the TA sessions, most NISs focused on free and accessible materials. However, NISs mentioned that it was difficult to access hospital materials. A cross-sectional study surveyed 350 nurses and found that 54% of respondents reported limited access to computers as a barrier to seeking health information in their workplace, which caused them to not utilise nursing informatics or seek health information in providing services (OLAJUBU et al., 2015). Limited access to computers in hospitals for seeking health information created significant challenges for NISs. Without this essential source of access, they may struggle to seek or retrieve health information. Overall, educational institutions and healthcare organisations need to work on making health information resources readily available to NISs in practice to promote their success of seeking health information along with access to a computer in the workplace as mentioned by (Ford et al., 2016).

The current study found that in the TA sessions, some NISs were able to convert clinical statements into searchable sentences in order to identify and use keywords, which was one of the vital search skills. P13 sought information using keywords:

‘Click to go back; [on the Google page, add the term “contraindication” and click search]. I am searching for information about the “relationship” between “serum lactate” and “mortality.” Search keywords were very important, as deciding on the proper keyword helped me reach the required information directly. This helps me get concise and precise information’ (P13-TA).

Several reports have shown that the participants’ use of keywords while seeking health information could lead to maximum improvement in the overall search performance (Daei et al., 2020, Hider et al., 2009). This finding was also reported by Sahapong et al. (2009), based on 198 questionnaires sent to clinicians working in public hospitals in Thailand. The results revealed that 95% of the clinicians used the keywords in clinical settings while seeking for health information.

NISs selected keywords from their textbooks, thoughts, experiences, or the same phrases used in the clinical statements to test the waters, or they altered their keywords based on their initial search attempts. Most students spent a lot of time trying different terms and struggled to determine which terms would retrieve the most relevant results: *‘It’s hard to say*

what it is exactly, what keywords fit. I do not know how to choose keywords for searching' (P3-TA). However, some NISs made their keywords in search strategies based on broad words without using controlled terms. An NIS stated that *'I am using the word "nurse" as a key word in the search engine to get information related to nursing efficiently.'* (P1-TA). Schuers et al. (2016) found that NISs might not be getting the best evidence because they do not have keyword search skills. Moreover, several studies have shown that nursing students have several difficulties when it comes to writing and formulating Google searches to locate health information such as limited writing skills, or difficulty in formulating search questions (Hussien et al., 2020, Alving et al., 2018a) . This result fits well with one of the results of the qualitative component of this study, which revealed that NISs had difficulty writing and formulating in Google searches. One participant reported that:

'The problem is with writing the sentence. I may have a thousand ideas in my head, but I cannot connect them in a sentence and write them in Google search to get the health information' (P10-TA).

NISs' verbal thoughts demonstrated that they conducted self-monitoring to direct their reading processes and manage the construction of meaning. They were taking an active role in constructing meanings from the websites accessed to decide on subsequent actions for exploring and managing relevant information to move toward useful context. Continuous seeking may lead NISs to unrelated health information and cause them to stop their search for health information (Al-Moteri, 2023). For example, after reading several links and texts related to ECMO, P10 noted that she was unable to construct the meaning and therefore decided to stop the process of seeking health information:

'I looked for different websites. I got frustrated with them because I had too many results and I could not interpret the results, so I will leave it' (P10-TA).

NISs can use their prior knowledge to understand meaning, and research has shown that it is a vital aspect in obtaining health information (Davis et al., 2020, Flott and Linden, 2016). An observation study found that nursing students in acute care units who were able to connect new information to their prior knowledge and patient's condition had a better understanding of the material and were more likely to apply it in clinical situations. The study also found that students who had a strong prior knowledge base in a particular subject area were more likely

to perform well in obtaining health information needed (Abelsson and Bisholt, 2017). This finding is similar to this study, some NISs in the TA sessions relied on using prior knowledge to reflect on the process of seeking health information and conduct clinical reasoning. P1 mentioned that:

'I have worked on a patient with ARDS. I remembered that I have seen patients related to COVID-19 on "Prone Positioning," so this can help me understand this statement' (P1-TA).

It is possible that exposing NISs to a resource of health information may face some of the challenges that have been reported at TA sessions, including difficulty understanding the relevance of the information retrieved, not knowing which sites to trust, and detecting unknown words. Detecting unknown words led NISs to seek meaning through Google Translate. This finding was also reported by Yanti and Meka (2019), who showed that, among 64 students, 96% of them used Google Translate as a fast dictionary. Almost all of the students realised that Google Translate could not be trusted unless it was double-checked. In one case, the participant thought that Google Translate was not good, so he used the Oxford Dictionary: *'What does pulmonary compromise mean? I am using "Oxford" translator, and I expect it to be better and more accurate than Google Translator in translating medical terms' (P13-TA).* NISs were comfortable using language translation apps such as Google Translate to overcome language barriers that can hinder the construction of meaning.

A study by Al Mutair and Redwan (2016) aimed to identify potential challenges among undergraduate Saudi nursing students towards nursing practice. Their participants comprised 141 students (a response rate of 56.4%), who complete the survey questionnaires. Almost half of the students (48.90%) agreed that their English language posed the greatest challenge within the nursing practice. This finding emphasises the significance of addressing language skills as a vital component of nursing education and training. Educators and clinical instructors should consider implementing strategies to support students in improving their English proficiency to ensure effective information retrieved in the healthcare setting.

This thesis contributes original findings on the ISP of NISs and the latter's capability to bridge the gaps they perceive in their knowledge pertaining to clinical practice. TA and in-depth interviews generated triangulated insights into the ways in which NISs identify and derive

knowledge from available health information resources. The outcomes indicate the vital need to empower NISs with improved learning and research strategies to determine relevant and authentic health information, with a particular need for improved evaluative and critique skills to operationalise information retrieved effectively, empowering NISs to execute EBP and thereby improve quality of care. The following section explains the ways in which NISs assess the quality of health information resources.

9.4 Information evaluation

NISs' ISP for clinical practice hinges on evaluation of source credibility and relevance, as explained previously, and is shaped by students' cognitive process of evaluating information they can access. This evaluation encompasses information's perceived validity, reliability, and clinical relevance. The way NISs critique information during their appraisals must be understood, as it directly affects the care they subsequently deliver to service users. Online resources provide NISs with a wide range of health information that can support their practice in the internship year, but not all information is reliable (Freund, 2015).

In this study, NISs used different strategies to evaluate, appraise, and critique the health information obtained. They judged the relevance of health information by checking the credibility of the content, the source of the information, the publication date, applying critical thinking, checking author information, using link strategies, or asking colleagues. This study presented the ways in which NISs seek to achieve equilibrium between the easier accessibility of relatively less credible information (e.g., using Google search features, as discussed previously), which highlights their need for more accurate and appropriate evaluative skills during their nursing education and training.

Credibility in health information refers to the accuracy and trustworthiness of the information obtained related to healthcare (Ghaddar et al., 2012). A finding that stands out from the results reported earlier is NISs relied on the strategy of checking the domain name, specifically looking for .org or .edu endings, to assess the credibility of the health information obtained. The findings of this study show that websites with .edu or .org domains were thought to be trustworthy due to the trust associated with these domains. This finding was also reported by Aakre et al. (2019), who found that newly qualified medical residents expressed a need for

reliable information in practice and placed importance on domain names to assess the quality of resources.

However, another important finding is that some NISs agreed on the limitations of relying solely on domain names. They recognised that not all .edu or .org resources could be considered trustworthy, as some are suspect as anyone can modify information, raising concerns that their credibility could be suspect (e.g., they mentioned such concerns concerning Wikipedia in particular). Therefore, Google Scholar, ERIC, or PubMed offer better EBHI due to peer-reviewed medical literature (Stellefson et al., 2011). However, NISs still found value in these resources, particularly for obtaining an overview of health information needed when reliable resources were not found. This finding highlights the impact of domain names in influencing NISs' strategies of seeking health information with considering that relying solely on domain names may have limitations in evaluating health information resources.

Studies have acknowledged that instructing NISs to use familiar resources for health information will alleviate or reduce many of the difficulties reported in searching for health information, such as difficulty evaluating the relevance of information retrieved and not knowing which sites to trust (Haruna et al., 2017, Kahouei et al., 2014, Wahoush and Banfield, 2014b). This finding was similar to this study's findings, in which some NIS refer to whether the resources are valid and accepted based on previous recommendations, such as *'most nurses recommended I use Nurses-Lab,' 'Nurse-Lab recommended by nursing school,'* or *'our clinical instructor frequently refers to Nurses-Lab.'* Moreover, this study clearly demonstrates how NIS evaluates the author's credibility and the website's reputation. An NIS said:

'[Pointer moves around the author's information] the author used a well-known medical website (UpToDate) to disseminate health information. Also, the author specialises in medicine. I think it is a reliable source to use' (P11-TA).

Directing NISs to a resource with useful health information may also improve their searching skills, from a 'trial-and-error' approach to a more systematic and, consequently, successful process (Ghaddar et al., 2012). However, they might have a lack of critical thinking; this might

range from inadequate skills to poor motivation to find and obtain EBHI that might conflict with credibility.

This study shows that NISs were concerned that resources may contain outdated materials, which may translate into trust issues with this information source. Five NISs said that clinical practice should follow the most recent guidelines and that some medical websites may have outdated information that is no longer recommended. As seen in the results of the Performance Tool (PT), NISs were not interested to check the date of the health information obtained (with a median score of 1 out of 8). This result suggested that they did not prioritise checking the date of the information published as a credibility assessment strategy. In TA sessions, an NIS said, *'This site is old in 2010; I will find other sites that provide the most recent medical information'* (P7-TA). She considered the resource unreliable based on the date of its dissemination. Similarly, in a study by Raj et al. (2015) conducted among 100 health workers about seeking health information in their work, 20% agreed that outdated health information was considered a reason for not using health information in their work.

A possible explanation for choosing outdated materials might be a lack of searching skills among NISs. Comments from an NIS highlight the challenges of locating the date of dissemination. He reported, *'I want to check if the information is up-to-date, but the problem is locating the date of dissemination.'* In an academic setting, NISs rely on their teachers for health resources rather than using their information-seeking skills to obtain EBHI. This result may be explained by Al-Dossary (2018), who mentioned that that nurse educators need to ensure a high-quality curriculum that accommodates problem-based learning in clinical practice to move them away from spoon-feeding teaching methods. Guidance is needed to help NISs understand how to find up-to-date information and may also be important for patient safety. This brings up some important questions for both NISs and clinical instructors in these fields because the amount of outdated information is growing faster than the amount of useful information, making it harder to find reliable information (Freund, 2015).

Clinical experience also seemed to have an effect on how NISs chose the information sources they liked best. Due to their lack of experience, O'leary and Mhaolrúnaigh (2012) concluded that nursing students were more reliant on more experienced nurses rather than initiating the ISP. This fits with what (Argyri et al., 2014) and (Stokes et al., 2021b) found, which is that newly qualified nurses depend on experienced nurses.

In the PT results, NISs had a median 3 out of 8 of their ability to use prior knowledge while searching for health information. This result might be due to a lack of working experience, as NISs had just started their first year of clinical placement. An NIS illustrated that *'I found this site, but the information is unreliable according to my experience. I need to seek more to get the right health information.'* They tended to be uncomfortable when they experienced conflicting knowledge or were uncertain about their health information. Therefore, they sought further health information to eliminate the uncertainty. Moreover, Langegård et al. (2021) reported that 70% of the nursing students who were interviewed experienced deterioration in obtaining EBHI due to a lack of clinical experience.

Therefore, NISs tended to compensate for their lack of experience by looking for more complete resources that gave a fuller explanation of how clinical information is applied in practice. Explaining the procedure was one of the attributes that motivated NISs to access information resources more than other information sources. During the TA session about ECMO statements, an NIS mentioned that *'ECMO is used to provide both the lungs and heart with oxygen until the "transplant" is implemented. Actually, it is a very effective and convenient website due to the explanation of the procedure!'* (P12-TA). NISs were more reliant on resources that had the characteristic of including all information about the different aspects of a topic. As a result of the lack of clinical experience, the ISP in TA sessions was more extensive, and the sources of health information were more diverse.

For instance, a source provides comprehensive clinical setting information about a disease and its causes, symptoms, methods of diagnosis, nursing responsibilities, and how to administer medications. Similarly, Al-Moteri (2023) aimed to improve the support provided to nursing students in their behaviours of seeking EBHI. By employing a concurrent TA method that include 12 nursing students in Saudi to gain insight into how they actually seek for and identify EBHI. The results revealed that during the quality assessment stage, participants primarily focused on determining the fitness of information to the topic of interest, and believed organising the information resources to be an important step in assessing its relevance. Studies mentioned different causes of inconsistencies in health information resources, such as some resources not having a clear process of reviewing or updating the content, which leads to inaccurate health information (Clarke et al., 2013), or providing biased health information or spreading false information (Althubaiti, 2016). In this study, NISs

considered using multiple resources to discover inconsistencies in health information resources.

Moreover, the PT shows that some NISs applied linking strategies through comparing and contrasting to identify interconnections of health information on different websites or evidence of relationships in health information. Previous studies found combining more resources to find information could improve reliability. Because participants could compare numerous sites and triangulate information to help them distinguish correct from incorrect health information (Adams, 2010, Moorhead et al., 2013). Some NISs used link strategies in some clinical statements to compare multiple resources:

'I am searching for information on more and more sites to ensure that I understand the meaning right' (P3-TA).

'We have a special website at the hospital, which we use as a reference. It is constantly updated and freely accessible at no charge at any time. I also used Medscape and nurses-lab websites to compare the information I got' (P1-SSI).

It can therefore be assumed that dedicated resources for NISs at clinical practice consider a valuable support for their information-seeking experience. It can provide access to EBHI to assist NISs in making patient care decisions, allowing them to access relevant resources. Universities need to collaborate with hospital departments concerning with clinical placements and ongoing training to ensure that resources regularly updating and maintaining the relevant content and resources to serve as a central hub to reduce inconsistency that exist in seeking health information freely (Pauer et al., 2016). Because of such inconsistencies, some NISs were confused by the inconsistency of the same information in different medical organisation resources: *'I'm comparing the websites. I found information that says a drop in "Lactate" means death rates are going down, which goes against what the other website says' (P1-TA).* These results are consistent with those of White and Roth (2009), who suggested that seeking widely available health information would evolve uncertainty as the seeker obtains additional information to bridge the knowledge gap.

It is important to note that most of the NISs said they were not able to determine information reliability when they located health information. This situation led them to seek assurance of

information reliability through human information (physicians, nurses, or colleagues), due to their higher accessibility and convenience. The NISs also felt that asking an expert is easier and more time-efficient than looking for information online. Still, it may be that NISs are not aware of the importance of the ISP (Koivunen et al., 2010), or they have limited information-seeking skills (Majid et al., 2017). The results from interviews found that NISs preferred consulting nurses and other healthcare providers, especially physicians, for evaluating the information obtained. An NIS said, *'The following day, I told a cardiology specialist about the information that I got from Google on ventricular tachycardia and asked him whether it was correct' (P3-SSI)*. Asking colleagues is one of the most common sources, which can be used more due to its quick and easy accessibility (Daei et al., 2020).

When Wahoush and Banfield (2014b), asked newly graduated and newly employed nurses about the information sources and resources they used to support evidence-based seeking of information, nearly all nurses (78%, n = 14) reported that they would ask nurse colleagues, while nursing students (44%, n = 27) in their clinical settings would ask nurses. In this study, registered nurses reported that because they had fewer resources, they were forced to ask nurses rather than search through various health resources. Similarly Aldousari and Al-Muomen (2022) aimed to investigate the health ISBs of Kuwait University undergraduates, by employing a semi-structured, web-based questionnaire. One of the categories measured why students asked physicians/medical specialists about the health information obtained. The results revealed that (34.9%, n=105) would discuss the health information obtained with a health professional, and believed to be an important step in searching health information.

Many NISs working in clinical practice had a heavy reliance on evaluating information obtained by asking nurses or physicians. What is concerning is the NISs' lack of skills in quality assessment. To improve clinical information evaluation even more, techniques that help NISs focus on judging the quality of information collected from colleagues should be given top priority. Guidance is needed to help NISs figure out what EBHI is and how to evaluate the current tools and services that can help them find it. As we explore the 'what' and 'how' of information usage and access, we may get insight into the importance put on information access.

The outcomes indicate that NISs' skills to evaluate the quality of health information to be addressed and enhanced during their education, and as part of ongoing professional training

when they transition to practice as registered nurses. Both the interviews and TA sessions yielded important data on NISs' cognitive evaluation and decision-making process in their engagement with health information, and signal the requirement to improve their skills of critical appraisal of information, particularly to differentiate reliable and credible information from dubious or outdated information (or misinformation).

More efficient evaluative critical skills would represent a lifelong beneficial outcome of nursing education and training programs, equipping nurses with the prerequisite academic and research skills to continually update and apply the best quality EBP throughout their careers, thereby optimising quality of care. The identified barriers to effective information evaluation can be addressed by tailored support and interventions to engender an EBP culture, whereby NISs can subsequently deliver the optimum services to clinical patients.

9.5 Types of hindrances

EBHI access in clinical practice for NISs entails complex processes of access, retrieval, and evaluation of information. This research has explored barriers faced by NISs in their endeavour to understand and deliver EBP. The outcomes indicate that they face problems in accessing and evaluating recent and reliable sources of information, which axiomatically hinders them from applying EBP effectively. On a more practical level, NISs faced constraints of time during their training, and complained of information overload, which reflects the inherent stress and difficulty faced during the transition to practice for nursing students and newly qualified professionals, as explained previously. Addressing new and unfamiliar clinical responsibilities in caring for real patients exacerbated the barriers they faced to identifying and deploying relevant EBHI. It is essential for nursing educators and hospital departments concerning with training to comprehend and address these challenges, with tailored support and interventions to enable NISs to retrieve, evaluate, and deploy information effectively in EBP.

The findings of this study found that NISs encountered a number of factors when it comes to engage with EBHI in clinical practice. These hindrances can be classified into personal, organisational, and technical factors. On a personal level, the most common barriers mentioned in the study were a lack of time and information-seeking skills. Regarding the lack of time, NISs noted that the time spent on searching during the TA sessions might not be

available in their clinical work place due to workload. One participant mentioned that, *'In practice, I don't have much time, it's hard to read the whole article, and it will take a long time'* (P2-TA). Similarly, one interviewee said that *'I have some troubleshooting, such as a lack of time to complete searches'* (P4-SSI). According to one participant, one possible explanation for these findings is a lack of adequate information-seeking skills, which hinders students' ability to access reliable and relevant information, and spend more time obtaining EBHI. P4, while seeking health information, said, *'I can't get the required information in a direct and convenient way.'* This study confirms that time problems are associated with a lack of information-seeking skills, supporting recent reviews which found that teaching seekers how to find information could cut down on the time it takes to look for and find health information (Alving et al., 2018b, Daei et al., 2020).

In addition, inadequate awareness of available resources presented a problem for some NISs who were unfamiliar with the variety of online journals, clinical guidelines, and medical databases resources available to them. P4 stated, while looking for health information, *'I am having some difficulty getting the required information from English resources.'* Moreover, Chiu et al. (2012) mentioned the majority of health resources use English as the search language and non-native nurses are frequently not proficient in seeking health information from them.

In this study, organisational factors also revealed significant obstacles for NISs such as healthcare professional collaboration, computers, and access to websites. NISs needed more organisational support to access health information resources. The absence of mentorship and guidance from clinical instructors or nurses hindered NISs' ability to effectively seek health information. A participant emphasised the significance of a nurse monitoring their method of seeking health information in practice in order to improve their ability to obtain reliable information in clinical settings. A participant said, *'I could not ask the nurses because they were too busy to answer my questions.'* Similarly, in Günay and Kılınc (2018) focus group study, nursing students in clinical practice stated that nurses are unable to cooperate with them to the desired extent due to a lack of resources and a heavy workload.

NISs commonly identified restricted access to health resources as a common challenge, with educational institutions or healthcare organisations imposing limitations on their ability to utilise medical databases, academic journals, and other vital information sources. The

restricted access to research publications has presented an important obstacle for nursing students attempting to gain access to essential health resources. This limitation has limited their ability to stay updated with current medical advancements and evidence-based practices. Consequently, this restricted access hindered the NISs' ability to retrieve reliable health information. P1 pointed out, *'I am not allowed to use a smartphone during clinical practice.'* It is common to prohibit NISs from the use of mobile phones, even if they might be using them for work purposes and for the benefit of their patients. A cross-sectional survey was conducted in the college of nursing that included 135 undergraduate nursing students to evaluate using smartphones in practice, which found that the most prevalent use of smartphones was to access health information on the website (93.3%) for educational purposes (Alsayed et al., 2020).

Technical factors also posed some significant obstacles for NISs. Complex information resource requirements presented a challenge for NISs to extract health information, as most NISs require registration to sign in (*'I need to register, I will switch to Google again'*) or engage in further training or refresher courses (*'I forgot how to use the databases'*). Therefore, NISs might not know about all the information resources that are out there, and they might only use certain ones, which might not be the best (Beyer and Wright, 2013, Bramer et al., 2017). Moreover, the plentiful abundance of general health information resources available online led to information overload for NISs, making it challenging for them to find and filter reliable and relevant health information. Information overload was noted as an obstacle by NISs due to too much information to scan and a low relationship between the sources found and the information needed.

These results reflect those of Dhanavandan et al. (2012), who also found that information overload was one of the foremost barriers to information-seeking among nursing students, as reported by 73% (110 out of 150) of participants. These results are in line with those of other reviews (Younger, 2010, Thomas and Revell, 2016, Zimmerman, 2021). Lastly, knowing preferred health resources and avoiding information overload may reduce the ability to access and critically appraise various health resources. Prior qualitative nursing studies have looked at how important it is to always use critical thinking to try to find health reasons, instead of focusing on specific resources, to be more independent, think critically, and make decisions autonomously (Smith, 2013).

In this study, screen sharing activities identified that visual health information and attributes of the search engines were more likely to point at and purposefully direct NISs' ISPs. Generally, visual information includes pictures, motion pictures, video or audio recordings, or visual presentation services to develop a perception of the content (Lee et al., 2017). An NIS thought visual information could help to get a first impression and enable him to navigate the text and read selectively. In this study, some NISs gathered helpful information from attributes of the search, such as Google's answer box, while others avoided them. However, the answers in the Google answer box should be investigated in terms of the dependability of health resources.

Overall, the hindrances associated with NISs' abilities to access health information in practice can be categorised as personal, organisational, and technical factors. Effectively addressing these challenges requires collaborative efforts among educational institutions and healthcare organisations. Strategies aimed at enhancing information seeking skills, enhancing communication channels, providing mentorship and guidance, upgrading technology infrastructure, implementing user-friendly information systems, and providing assistance in navigating information overload can empower NISs and improve their access to EBHI.

In general, NISs face numerous common problems in seeking to access, analyse, and deploy EBHI in clinical practice, in consistency with previous studies. It is essential for educators and nursing managers to address this, improving NISs' capacity to engage in EBP provision in practice. Targeted resources and support for academic skills of information searching, analysis, and deployment, as well as providing actual access to essential healthcare databases, are essential prerequisites for nurses to bridge gaps in their knowledge. This will improve quality of care, EBP, and patient satisfaction, and optimise resource efficiency in healthcare organisations.

9.6 NISs' needs to improve ISP in practice

As explained previously, targeted solutions are required to address NISs' ISP needs for EBP deployment in clinical practice. Specific ways in which they need ISP optimisation include resource and training allocation and provision, including guidance on effective ways to search for and critically appraise evidence, and to integrate and synthesise information for EBP deployment in clinical practice. Addressing these requirements is fundamentally important

for nursing education to deliver value on its own terms, and nursing education needs to be coordinated between universities and hospitals to enable the development and provision of targeted support and interventions for NISs and registered nurses.

NISs showed their understanding of the importance of improving information-seeking skills. By addressing NISs' needs, clinical instructors and educators can improve NISs ability to access and evaluate relevant health information resources during their internship year. In the study, NISs expressed their need to improve their ISP. NISs reported challenges in completing the search process such as, uncertainty, a lack of confidence, poor English language skills, or a lack of searching skills. Similarly, prior studies have highlighted several barriers to finding health information that might influence nursing student decision outcomes: lack of knowledge, lack of experience, limited guidance, and the patient situation (Lambert and Loiselle, 2007, Chen et al., 2013, Lam and Schubert, 2019).

Organisational support plays an important role in facilitating nurses' access to reliable information in practice and delivering important learning in practice in real time (Prybutok and Ryan, 2015). However, nurses are not always aware of available channels for access in clinical practice. P6 said, *'The difficulty lies in the fact that there is no website approved or created by the hospital where I trained.'* In this thesis, NISs mentioned the specific channels to obtain the desired health information resources, such as clinical instructors, hospital websites, librarians, or small libraries, with the avoidance of social media.

A cross-sectional survey conducted by (Van de Belt et al., 2013) among 635 healthcare respondents asked them to rate the perceived reliability of health information. That which participants obtained through social media was rated as the least reliable, with a mean score of 3.8 (on a scale of 1 to 10; 1 = very unreliable, 10 = very reliable), compared to Internet and physician scores of 6 and 7.3, respectively. This was confirmed by a systematic review by (Zhao and Zhang, 2017), which pointed out that trustworthiness was the main barrier preventing users from relying on social media as a reliable health information channel.

Numerous studies have acknowledged that nursing students may not have the necessary knowledge and skills to effectively seek out health information in practice, and highlighted the importance of nursing education programs to include health information literacy instruction in education (Bucknall et al., 2016, Lwehabura, 2018, Clarke et al., 2019). Training

courses were another need mentioned by NISs to help NISs improve their skills to seek health information efficiently. P1 said that, *'I definitely need courses that help me to seek and evaluate medical information and adopt an evidence-based approach to nursing clinical practice.'* Studies have shown that training courses play a key role in preparing nurses to find EBHI to inform their clinical practice (Kumaran and Chipanshi, 2015, Alving et al., 2018b). This finding was also reported by Kumaran and Chipanshi (2015), found that nurses often retrieve unreliable health information by Googling because of a lack of training in using clinical databases. These findings suggest that organisational training is the most important factor when the aim is to enhance NISs' skills in seeking health information in practice. Some of the issues emerging from this finding relate specifically to the hospital organisation's disagreements on the importance of implementing EBHI in nursing clinical practice (Alving et al., 2018a, Lee et al., 2019) and, as a derivation of this, a general negative attitude towards EBHI among the NISs.

NISs reported the use of smart phones and other handheld devices, which may represent an approach to accessing information that may be helpful in overcoming limited access. Comprehending the ISB of how NISs seek information and apply it in practice is a crucial first step in designing information delivery systems. The participants in this study generally demonstrated a need for further training in using devices in practice. Workshops or other kinds of training sessions provided by hospitals could develop the search skills and provide assistance to the hospital nurses in conducting systematic searches (Bartels, 2013). For example, the JBI training courses on Evidence-Based practice (EBP), at Nottingham University, equip participants to incorporate the best available evidence into care decision-making. These courses emphasise a cyclical EBP process that continuously refines practices based on evolving evidence and clinical insights, thereby improving the quality of patient care. NISs need to be better prepared to engage in medical decision-making. Providing access to online resources in clinical wards can also encourage NISs to learn about and use these resources (Bougioukas et al., 2020). It can therefore be argued that, rather than utilising resources to train them to look up and interpret research information, these resources should be directed at ensuring that there is more research information at hand in the workplace. These resources might be easier to use and give NISs access to better information to help them make decisions and improve their work.

NISs explored a sense of satisfaction when the search is completed with a new understanding. One interviewee said, *'I shared the information with the attending team. They found it truly helpful in re-diagnosing the case and re-thinking the medical procedures. I am delighted to benefit from my search process.'* (P1-SSI). To sum up, the findings revealed that correct process of seeking health information might increase knowledge, improve communication with colleagues as well as boost confidence, and help NISs fulfil their HINs (Aldousari and Al-Muomen, 2022).

The outcomes of the current investigation revealed particular NIS needs to improve ISP for clinical EBHI deployment, and highlight the necessity to provide improved training and resources to facilitate better access to and evaluation of prerequisite healthcare information. It is essential for nursing educators to increase nursing interns' abilities to decisions based on EBP, and thus provide optimum services. This entails addressing the various learner needs and barriers identified, including the development of specific interventions to improve NISs' critical thinking, searching, and appraisal skills. Improving NISs' ISP will improve patient satisfaction and outcomes and drive EBHI adoption in nursing clinical practice. The performance tool (PT) is addressed in the following chapter under a section on future implications.

9.7 Addressing challenges of TA task

It was important to understand how NISs perceived the clinical statements in order to initiate the process of seeking health information. Some parts related to the statements took NISs a while to understand, such as medical abbreviations, medication names, or statement meaning. The prolonged task completion in the P5, P8, and P9 might be attributed to different reasons as acknowledged in other TA studies.

First, the researcher's interference might disrupt the participants' ISPs and make them last longer (Peute et al., 2015). Nevertheless, during the TA session, the researcher did not interfere with their actions and thoughts to avoid researcher's interference and allow them to express their thoughts freely. Second, the active interaction between the researcher and the participants in the TA sessions might situate the participants in a more social environment (Koro-Ljungberg et al., 2013). The researcher was not a faculty member, which made it easier for the NISs to communicate during the sessions. Third, computer programs' pop-up

distractions or clinical statements may have been harder for NISs to deal with, along with family members interference. This might make them want to work harder on tasks and find more ways to do them so they can impress the researcher.

Overall, previous studies revealed that similarities outweighed differences between nursing students or nurses strategies of information seeking (Henderson et al., 2012, Farokhzadian et al., 2015, Bucknall et al., 2016). These studies found that nursing students may have similar behaviour patterns in terms of self-directed learning and learning strategies. Additionally, they emphasise the importance of significance of considering the level of education and clinical experience of the students when evaluating their behavioural patterns. It is important to know these studies are just examples and the results may vary depending on the population and nursing context.

9.8 Summary

This chapter presented the identified themes and discussion about the overall extent of NISs' strategies of seeking health information in Taibah University. The ISP among NISs were complex. However, using structured strategies along with developing critical thinking skills helped them to effectively find and obtain EBHI they need for clinical statements and real practice. The following chapter presents the conclusion of this thesis, and identifies its implications and limitations.

Chapter 10

Conclusion

The main aim of this study was to explore and observe the information-seeking behaviours (ISBs) of nursing intern students (NISs) at Taibah University who were in internship program in a clinical practice setting. Specifically, the thesis explored their health information needs (HINs) and how they obtained and evaluated health information resources, along with challenges that affected the overall process of seeking health information. Exploring evidence-based health information (EBHI) from NISs' perspectives contributes significantly to the overall understanding of satisfying HINs, and also sheds light on how NISs use online health resources to satisfying their decision making and EBP. In order to achieve the study aim and objectives, two methods (TA and semi-structured interviews) were chosen to guide the research process.

This study highlighted that online health information resources, such as websites, can be valuable tools for NISs in clinical practice. These resources can provide access to health information on various medical conditions, treatments, and guidelines, helping providers to make informed decisions and provide high-quality care to their patients. However, while online health information resources can be a valuable addition to a healthcare provider's usage, it is important to use them responsibly, and critically evaluate the information they provide. This study also highlighted the challenges in nursing internship program in Saudi Arabia, and the need to investigate and explore NISs' strategies of seeking health information in practice. The research conducted in this area is limited. Thus, further research exploring the ISBs among NISs was necessary.

A scoping review of the literature found out that online health resources are valuable to answer HINs in clinical practice. However, these types of health information need to be obtained with appropriate assessment of the quality of information. While this is a behaviour that NISs follow, there is no evidence as how they assess the information or what the strategies they applied. Consequently, there is a need to explore and observe the ISBs of NISs. The Dervin model was used to provide a unique perspective on health ISBs by highlighting the importance of the process along with the role of clinical practice in shaping ISBs. Also, it helped to understand the quality assessment of how information obtained evaluated.

Qualitative methods were used to collect and analyse data through TA followed by semi-structured interviews. This research, in total, included 26 participants: 14 for the TA approach of the study and 12 for the interviews. Data from the participants' experience with the TA informed the following development for the Performance Tool (PT). Common patterns identified from the TA were used to adapt and develop the new PT, which aimed to evaluate the NISs' performance in seeking health information in the context of Saudi Arabia.

The findings from the TA phase revealed that obtaining EBHI was essentially challenging, and showed NISs' thoughts towards seeking an evidence based resource in the Saudi clinical practice settings. The findings indicate many positive aspects of the engagement with the clinical statements which provide evidence that the TA task captured their attention. No NISs displayed any disengagement response with the clinical statements. NISs' strategies of seeking health information were captured at a more in-depth level using the PT presented in Chapter 8. Aspects related to the NISs' skills or resource characteristics prevented them from navigating the health information required smoothly. Sequentially, the findings from SSI revealed that ISBs result in particular information needs in clinical practice, which are, in turn, affected by factors such as source availability, assessment of the quality of the information obtained, individual skills of the user, and the environment around them. A discussion of the findings was presented in Chapter 9, including both TA activities and semi-structured interviews, informing our understanding of the complex use of seeking strategies required to evaluate the clinical sources NIS encounter in the Saudi context.

10.1 Implications of the study

Based on the study's findings, some implications highlight important areas for further work. This following points reveal how the findings that resulted from this study can have wider implications of the PT, along with implications of the findings from this study on education, clinical practice, and future research.

10.1.1 Implications for educational and clinical practice

A partnership between universities and nursing training centres can provide numerous benefits for nursing students with opportunities to gain hands-on NISs' experiences in clinical settings. This partnership can develop the internship programme based on NISs' needs and provide guidance and support. Personal preference differences may need to be considered

when designing the internship programme or allocating NISs (Alharbi and Alhosis, 2019). The results of this study indicate that a lack of training on critical appraisal, using databases, or finding reliable resources affected NISs' performance. NISs who had some experience seeking health information were more engaged during TA sessions. As a result, fitting the internship programme to the interests of the NISs would have important implications for future practice and increase their confidence and competence in the field.

Based on the study findings, NISs lack of skills to find and assess health resources led them to use unreliable resources, such as Wikipedia. Therefore, clinical instructors could recommend some reliable health websites for NISs (such as UpToDate), until they can seek health information and obtain a reliable recourse independently and efficiently (Boruff and Storie, 2014). The findings of this study suggest that these reliable resources may assist NIS to handle complex and different health HINs in practice. This is of broader importance for clinical practitioners (in addition to NISs), as nurses' workload and other competing clinical priorities commonly prevent them from responding to NISs' questions, or if they do engage in such explanations, this detracts from their customary time and energy expenditure in their customary clinical practice responsibilities. Although recommended websites may not answer all of nurses' HINs, they can contribute to improving NISs' strategies for seeking health information. This recommendation may need an arrangement with nursing faculty to facilitate consistent and up-to date health websites, with demonstrations by nurse educators or clinical instructors. There may also be a need to integrate such academic activities for clinical practitioners themselves, as registered nurses commonly experience difficulty in remaining up-to-date with the latest EBP.

Seeking health information is a significant part of a nurse's professional role and reliable information obtained depend on the quality assessment as well as an appropriate level of skills (Clarke et al., 2013). Therefore, this study suggests that nursing colleges could develop the curriculum to include the concept of HISB as a topic in one of the modules during the educational program, such as the fundamental nurse module. This development is align with the study findings which reflect on NISs' needs. This could provide the necessary knowledge and skills required to obtain EBHI in practice. NISs will be familiar with critically thinking while they look for health information. They may provide their feedback regarding this topic. The

PT revealed 17 criteria that might be utilised into wider aspect of integration of the HISBs curriculum.

As mentioned in the previous section, If the internship unit does not have guidelines for seeking health information in practice, they can use the PT to understand NISs' weaknesses and strengths regarding obtaining EBHI in practice. Adopting this tool that was developed in this study would be beneficial as a guideline for all NISs at the clinical placement who are interested in enhancing their ISP. This tool can be used directly by NISs to do self-assessment aimed at learning and continuous development in practice. It will benefit NISs during their clinical placement as it will increase their strategies about what to do in regards to clinical information needs and increase the overall quality of their nursing-retrieved information.

An implication of this is the possibility that leaflets can be an effective solution for NISs to learn about finding EBHI in practice. It can be either paper-based or electronic, to facilitate the broadest possible accessibility, and can be used as a self-directing guidance tool to lead to better health information outcomes (Whitehouse, 2017). The results of this research support the idea that providing NISs with a leaflet about the ISP in clinical practice during the induction week may increase NISs' awareness of the importance of obtaining EBHI. Also, they will feel more comfortable asking questions to their nurse educators or clinical instructors about the process and importance of EBHI. However, it is important to note that leaflets should be used in combination with other formal education such as training course or workshops, and cannot in themselves replace the need for more in-depth practical and evaluating experience.

10.1.2 Implications for further research

The findings of this study have a number of important implications for future research. This study has discussed the advantages as well as limitations of conducting TA online sessions. According to the findings of this study, the participants were often less worried about time because they were already at home and in a comfortable environment. Hence, they tended to interact more in the online session. Also, other advantages were reported, such as issues related to participants' safety, the ability to reach out to participants at a convenient time, and greater convenience for both participants and researchers during the TA sessions, which enhanced participant recruitment.

While online sessions cannot completely replace in-person sessions, especially for certain contexts that really require personal presence in the same time and space, the irrefutable and compelling advantages of online TA offer an unprecedented opportunity to gather more voluminous and comprehensive data pertinent to answer research questions. Further studies are need using the same online approach and instructions to assay the relative quality and utility of such strategies to drive academic inquiry in future. We conclude by highlighting the main study will be feasible based on the pilot study.

At first glance, the concept of HISBs seems to be well developed and used without apparent arguments or controversies about its meaning or applications on nursing practice. However, future studies should explain the concept of HISBs and lead to a more fully developed framework and more quality assessment for diverse settings and contexts. Therefore, there is a need for further research that aims to explore and observe the participants to address current challenges in evaluation health information resources and to explore the experience of obtaining HISBs more deeply. Moreover, this study could be extended and replicated in other settings, such as among pharmacy or medicine students or other health care professionals, which might produce different views in ISBs in practice. Therefore, additional research is required to gain further knowledge on students' and professionals' behaviours of seeking health information.

This study examined the NISs' strategies of assessing the information obtained. Evaluating participants' quality assessment when seeking health information provides a new insight into obtaining EBHI. Further studies might explore the quality assessment applied by HCPs, including pre- and post- or comparison design. Such studies might provide more important findings to enhance design of the PT. Also, quantitative designs may be conducted by using the PT with a larger sample. Moreover, the usage of ChatGPT to discover health information may increase information accessibility, but more research is needed to explore the use and implications of this emerging technological tool, and to determine the optimal approaches for building and using technology decision-making assistants, as these technological tools are themselves novel and evolving, and their application by HCPs is subsequently an emerging area of research.

10.2 Implementations of the Performance Tool (PT) in internship program

Integrating the PT to assess NISs regarding HISBs can be a valuable process for improving obtaining EBHI in practice. However, it is really important to approach this tool in a systematic process based on evidence-based model. The first step in integrating this tool was undertaken in this study, including developing the process, evaluating the tool's reliability, and its ability to measure the specific performance of interest. It was also important to consider the time and resources to implement it in an education system as a method of evaluation of student behaviours. This model shows effectiveness in measuring the targeted behaviours and identifying how to use it. It was appropriate for the population and context of Saudi NISs in this study.

The next step will be to educate and train the faculty members and clinical instructors who will utilise and interpret the PT. This educational process should include information on how to use the tool, how to score and interpret the results, and how to give feedback for NISs. Also, it might be important to involve NISs in this process. This can be conducted through giving them information about the tool, explaining its purpose and goals, and how it can be used to enhance their ISBs in practice. It can help NISs' willingness to participate and understanding of the process.

Once the tool has been fully implemented into nursing internship program, it is necessary to conduct regular evaluation for NISs before, during and after the internship year to determine the effectiveness of the tool. It can involve different clinical statements to examine their information-seeking performance. The results can be used to make any needed adjustment on the tool or to ensure that NISs meeting internship objective of finding the best relevant resources. Overall, this tool can enhance the experience of seeking health information in clinical practice through finding the strengths and weaknesses of NISs' performance.

10.3 Enhancing Dervin's model for evidence based health information: integrating and modifying findings

ISB models have been massively adopted to understand seeker behaviours in many fields, including health information and education (Kuhlthau, 2005, Pang et al., 2015, Kundu, 2017, Basnyat et al., 2018, Zimmerman and Shaw Jr, 2020). However, there have been few studies

in the field of EBHI with regard to clinical practice (Lopatovska and Arapakis, 2011, Akakpo, 2022). The pursuit of reliable health information has become increasingly important in the digital age, where information is abundant but not always accurate (Savolainen, 2016a).

In an effort to enhance the Dervin model for seeking health information (explained in depth in previous chapters), this study integrated the findings to incorporate a new category focused on assessing the credibility and quality of health information. This addition aims to equip individuals with the necessary skills to critically evaluate the information they encounter, enabling them to make informed decisions about health information obtained. By integrating this assessment category into the Dervin model, individuals can become more discerning consumers of health information, ensuring they obtain trustworthy and reliable resources, and enabling researchers to measure how participants assess and evaluate the health information.

Based on the PT findings, the inclusion of an assessment category within the Dervin model emphasises the significance of evaluating health information in order to enhance information reliability. This category encompasses various criteria such as source credibility, using medical databases, and the others. The adopted model identified key indicators and evaluation criteria that can aid nursing students in assessing the quality of health information. By providing individuals with a systematic framework to assess information, the enhanced Dervin model empowers them to filter out misleading or inaccurate content, thus promoting the acquisition of reliable health information and realising improvements in the quality of Dervin's model. Applying quality assessment on seeking health information within the bridge stage might lead to obtaining higher quality evidence-based information in healthcare (Figure 10.1).

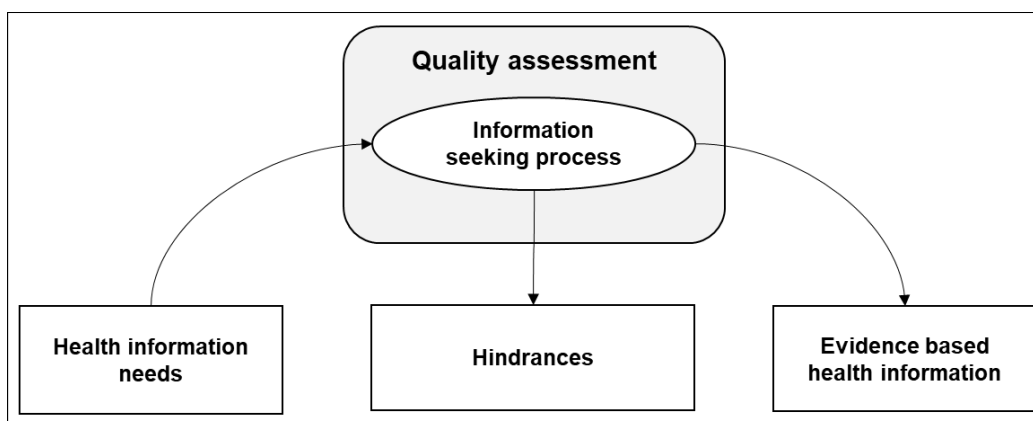


Figure 10.1 Modified Dervin's 'sense-making' model for EBHI

The integration of the assessment category into the Dervin model enables nursing students to evaluate the credibility of health information, and also encourages them to actively engage in critical thinking and information literacy. By incorporating this category, the model recognises that seeking reliable health information is not a passive process, but rather an active pursuit that requires a set of skills and strategies. Through education, training and awareness, individuals can develop the ability to distinguish between trustworthy and uncertain resources, fostering a more evidence-based approach to decision making regarding seeking health information. Ultimately, the enhanced Dervin model can serve as a valuable tool for individuals seeking to navigate the vast sea of health information available today, promoting access and appropriate use of reliable sources, and empowering individuals to take control of their own information needs in practice.

10.4 Limitation

Before the actual stage, the limitations of doing online TA were thoroughly explored, discussed, and resolved in Chapter 4. However, studies with a qualitative focus usually have some limitations, and one of the limitations of this study is related to the recruitment of participants. This thesis focused on NISs at Taibah University who started clinical placement in different units, such as intensive care, medical, or surgical. It is an attempt to address some of the ISBs associated with the acquisition of EBHI as a result of HINs in clinical practice. An ideal recruitment procedure might involve recruiting NISs from multiple universities in Saudi or a more rigorous and robust comparison study could have been made through measuring

long-term retention with progression during the course. However, as previously stated, the nursing internship programs throughout Saudi Arabia have similar project content, objectives, and time frames. Thus, due to limitations in time and access, this study focused on one institution. Nevertheless, the results gained from this thesis will be useful to many clinical instructors, stakeholders, and NISs interested in using health resources in clinical practice and developing ISP in healthcare settings.

Secondly, the participants were nursing students who started their internship year. Thus, the views of other intern students, such as those in medicine or pharmacy, were not explored. They may possibly have different strategies for seeking health information, which could add important perspectives that could enhance the understanding of ISBs in clinical practice. Therefore, it would be useful for future researchers to do this study with a different sample.

Third, sessions were conducted in English, which was used as a second language by all NISs, and which is the language of clinical practice. Using English in writing clinical statements may be a limitation due to the uncomfortable feeling that it may cause among NISs. However, they were asked to use their preferred language to fully express their thoughts.

Finally, there were a few limitations associated with incorporating TA and SSI. Some common challenges which were considered in this study that researchers commonly encounter when using TA and SSIs include some NISs altering their natural thinking process due to the contrived conditions, which might affect the validity of the SSI findings. Therefore, a separate group were recruited in the SSIs. Analysing TA and SSIs results required the researcher to interpret and make sense of NIS' thoughts and verbalisations, and the richness and complexity of the data made it challenging to extract meaningful insights consistently. However, different researchers may interpret the data in different way which might lead to inconsistencies in the analysis. Therefore, I tried to ensure and employ rigorous coding schemes to mitigate this challenge.

In this study, I was concerned that conducting TA and SSIs could be time-consuming and resource-intensive along with transcribing and analysing the data. It required a significant effort, and I carefully designed and integrated the TA and SSI sessions, and analysed data using established frameworks or coding schemes helped to address such challenges to a certain extent. Despite these concerns, TA and SSIs remain valuable research methods for

exploring and investigating ISP. Researchers can overcome these challenges by carefully designing their studies, and being aware of the challenges and potential biases associated that might occur.

10.5 Summary

This study is one of the first in the area of observing NISs' while seeking health information in clinical scenarios, particularly in the context of Saudi Arabia, and MENA more generally. The literature reviewed for this study identified many barriers and misconceptions about obtaining EBHI that impact clinical work negatively. It showed that NISs do not have sufficient skills to search for the best evidence in clinical practice. It also showed the inconsistent results around the world about NISs' strategies that contribute to getting EBHI within clinical establishments. Thus, this study set out to explore the ISBs, factors, and strategies that contribute to obtaining EBHI within clinical practice among NISs to enhance decision making.

This study has identified new solutions in order to conduct research, including TA sessions, as face-to-face sessions were no longer possible at the data collection stage due to social distancing measures that were applied. Based on the pilot study, the participants were often less worried about time because they were already at home and in a comfortable environment. TA online sessions cannot completely replace in-person sessions, especially for certain contexts that really require personal presence in the same time and space. However, the advantages of online TA offered an unprecedented opportunity to gather more voluminous and comprehensive data pertinent to answering research questions.

NISs face many challenges in order to ensure that the information sought in practice is considered adequately reliable for clinical practice and safe for patient care. Consequently, in light of the ongoing 'learning in practice' debate, a key challenge in nursing internships is to make students able to work independently, regardless of barriers such as lack of time or lack of assigned clinical instructors. This study on control and clinical environments deployed both TA activities and semi-structured interviews, informing our understanding of the complex use of seeking strategies required to evaluate the clinical sources NIS encounter on the Internet.

Overall, effective use of information evaluation strategies from the perspective of the PT is based on understanding quality criteria for health information through checking the validity

and reliability of the content, the source of the information, the publication date, applying critical thinking, or checking author information. Thus, quality criteria will guide NISs in obtaining and utilising EBHI.

Furthermore, the findings suggest several courses of action for both the target context and others. For Saudi nursing colleges, the training course related to obtaining EBHI could provide a sustainable approach to learning in practice. For clinical instructors, the findings suggested that they could benefit from the PT developed in this study to evaluate NISs' performance in seeking health information and make it a guideline for nursing staff as well. For the NISs, this study found that once they had a health information need, they started seeking health information randomly, without evaluating and reflecting upon the process itself.

Thus, this study suggests a need for NISs to implement a good health ISP in practice to improve opportunities for effective learner approaches. Increasing awareness about HINs is an essential prerequisite that can lead to seeking and evaluating health information more effectively. In addition, fully understanding the importance of obtaining EBHI is fundamental to driving more efficient and flexible learning in practice for nursing students, interns, and registered nurses throughout their continuous professional development, in order to deliver the best quality of EBP and improve healthcare services.

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Appendices

Appendix 1: Bachelor's Degree Programs in Nursing Faculty in KSA (Based on INTERNSHIP PROGRAM LOG Book)

At the beginning of the internship year, nursing intern students are placed in different clinical settings; therefore, some of them will start with a placement in the intensive care unit. In these clinical rotations, nursing intern students are assigned to a preceptor who is one of the staff nurses. Even with that assignment, nursing intern students may have several different preceptors due to different schedules. Nursing intern students will seek their preceptor's guidance in nursing practice throughout the day. Most preceptors will assign one of their patients to the nursing intern student who will be fully responsible for the patient's care, including administering medications and preparing the patient for special procedures. Nursing intern students are provided with a skills checklist from the Department of Nursing Education, which is associated with the nursing college. The checklist should help nursing intern students record certain procedures in each nursing unit supervised by their preceptors, such as intravenous cannulation, positioning, and vital sign monitoring. Also, the evaluation form contains a feedback space for preceptors to fill in information about their nursing intern student's performance. Later, that checklist and evaluation of the nursing intern student's performance from preceptors will be handed over to the department of nursing education in the hospital. If all feedback is acceptable, each nursing intern student will be given a certificate of internship completion. That certificate allows them to proceed with licensure procedures and an application for a nursing position. If the performance in a specific area is not acceptable, the nursing intern student will repeat that rotation to achieve acceptable performance in that area.

The Nursing Faculty offers Bachelor's degree programs in Adult Nursing, Community Nursing, and Midwifery; in addition to the Master's Programs in Nursing Leadership, Adult Nursing, and Midwifery. The Bachelor of Nursing program is a four academic year and one internship year program which aims to prepare competent nurses who can respond to changing healthcare needs in complex healthcare environments. This program recruits around 100 students in each academic year. In the first year, students are taught interdisciplinary basic science and health science courses. In the second year, they are introduced to nursing science and the fundamentals of nursing. During the third year,

students take specialty courses like adult, paediatric, maternal and child health, and mental health nursing. The fourth year includes a research project and critical care. Students are provided with clinical placements during the semesters. The fifth year is a clinical practice, during which students rotate on a monthly basis through several nursing specialty areas in university teaching hospitals, healthcare centres and communities.

Internship Program Goals

- To provide nursing students with an opportunity to strengthen nursing skills, apply their knowledge in various clinical practices and demonstrate competency in practical skill and procedure.
- To facilitate the transition to professional role.

Objectives

Upon completion of internship program, the professional nurse intern will:

1. Be acquainted with hospital policies and procedures.
2. Apply theoretical knowledge into various clinical setting.
3. Enhance effective communication skill
4. Develop professional relationships with patients and members of the multidisciplinary healthcare providers.
5. Improve the ability to act independently and implement appropriate nursing intervention.
6. Utilize appropriate available resources in patient care.
7. Ensure safe environment for patients, families and healthcare personnel.
8. Provide organized and quality patient care.

Internship Clinical Rotation Internship rotations include the following clinical areas

Surgical rotation	2 months	6 weeks male or female 2 weeks Operation room
Medical rotation	2 months	6 weeks male or female 2 weeks dialysis (optional)
Maternity rotation	2 months	3 weeks obstetric 3 weeks Gynecology 2 weeks Labor & delivery
Pediatric rotation	2 months	3 weeks medical 3 weeks surgical 2 weeks neonatal or pediatric intensive care unit (optional)
Critical Care rotation	2 months	4 weeks Emergency room 4 weeks intensive care unit (ICU)
Clinical elective area	7 weeks	

- Clinical elective shall be undertaken in any of the clinical rotation areas in the same hospital or any authorized government hospitals.
- The intern has define the elective area 2 months ahead to allow nursing department to communicate with the agencies.

Appendix 2: Applied Search Terms

#	Search terms	Results
S1	Nursing Staff/	21,130
S2	Nurse Clinicians/	8225
S3	Nurse Clinician.mp.	255
S4	Clinical nurse.mp.	3328
S5	Clinical nurses.mp.	1264
S6	Bedside nurse.mp.	269
S7	Bedside nurses.mp.	414
S8	"nurses' practic*"	545
S9	Hospital nurse.mp.	359
S10	Hospital nurses.mp.	1567
S11	Students, Nursing/	24,542
S12	Nursing intern*. m.p	32,760
S13	"nurses' skill*" or "performance"	4,171
S14	"Internship and Residency"/	49,693
S15	Nurse practitioner*. MH.	18541
S16	<i>1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15</i>	142,546
S17	Information need*.mp.	7311
S18	Information Behaviours.mp.	8
S19	Information Behaviour.mp.	44
S20	Information Behaviors.mp.	29
S21	Information Behavior.mp.	88
S22	Information Seeking Behavior/	2416
S23	Information search.mp.	496
S24	Staff Development/	9412
S25	Information seeking.mp.	4500
S26	Information usage.mp.	58
S27	Decision Making/	95,364
S28	Evidence-based information.mp.	1690
S29	Information Skill* MH.	157
S30	Information-Seeking Behavior. MH.	3461
S31	Information-Seeking Behaviour. MH.	313
S32	<i>17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31</i>	125,347
S33	Hospitals/	78,279
S34	Workplace/	22,938
S35	Hospital.mp.	1,247,540
S36	Nursing Staff, Hospital/	45,251
S37	Nurse* practice. m.p.	972

S38	Nurse* performance. m.p.	274
S39	Clinical performance. MH.	8720
S40	<i>33 or 34 or 35 or 36 or 37 or 38 or 39</i>	1,671,867
S41	<i>16 and 32 and 40</i>	780

Appendix 3: Qualitative Approaches

Most studies report the subjective views, perceptions, values or observations of inquiries, which require qualitative methods (Kahlke, 2014). Sometimes, the other more focused approaches (e.g., ethnography, case study, grounded theory, or phenomenology) are not appropriate. Therefore in those cases, researchers would take a more general approach to qualitative investigation (Percy et al., 2015). The principal researcher will be interested in exploring nursing intern students' attitudes, opinions, or experiences about obtaining evidence-based information within healthcare. Therefore, this research therefore calls for qualitative enquiry, but it would not be sufficient to use more traditional approaches, for the rationales shown in the following table.

Common qualitative approaches

Qualitative approach	Rational
<p>Ethnography focuses on the investigation of the network of social groupings, social customs, beliefs, behaviors, groupings, practices, etc., that define a "culture."</p>	<p>This study focus on identifying the factors and strategies of obtaining evidence based information for providing health care. Therefore, ethnography is inappropriate because the focus of the study, the content of the information desired, or the kind of data to be obtained do not focus on define a "culture."</p>
<p>Case studies are in-depth investigations of a "single case," using multiple methods and multiple sources of data. A single case is defined by having clearly recognizable boundaries that differentiate the case from any other collection of instances.</p>	<p>This study will not constitute a "case" in that sense. It will have multi cases based on participants' behaviours while seeking health information.</p>
<p>Grounded theory uses data from people to develop an explanation (theory) for the process in question developed over time.</p>	<p>This study would not lend to development of theory. This study is more descriptive, not explanatory. But, if the principal researcher would investigate senior nurses' reflections on experiences that have had significant impacts during their careers about accessing evidence based information of health care. Grounded theory will help to develop a theory of what experiences contribute to successful obtain evidence based health information.</p>
<p>Phenomenology investigates the "lived experience" of various phenomena. Many of the phenomena this approach tackles include attitudes, beliefs, opinions, feelings, and the like.</p>	<p>However, the phenomenologist's interest is in the inner dimensions, textures, qualities, and structures ("essences") of those cognitive processes, not in the external content or referents that may trigger the cognitive processes such as health information resources.</p>

Appendix 4 Comparison of Think-Aloud Tasks

The purpose of the Think-Aloud is to explore the type, pattern, and complexity of information seeking strategies used by nursing intern students. Therefore, the two tasks were designed to promote and encourage participants' use of diverse health resources during the Think-Aloud session. Then, the researcher compared them to choose the most suitable task to map clinical intern nurses' behaviours towards obtaining evidence-based nursing information. Participants were instructed to think aloud to ensure that all the activities that they engaged in during the seeking process were captured on the share screen and audio recorded.

Methods

Nursing care plan task

A clinical scenario task was designed to assess the level of nursing intern students searching for information and clinical reasoning to observe and evaluate their behaviours in seeking health information (Croft et al., 2018). The participants were given a clinical scenario and asked to talk through where they would seek information to understand and act on it. Before the task, the researcher informed the participants of the task goals and procedures with the following written description:

Your assignment is to read the clinical scenario and create a nursing care plan using multiple health resources. To this end, you will navigate freely to find different health resources deemed useful, learn from multiple sources carefully, and formulate a nursing care plan to a patient based on your searching.

Clinical statements task

A clinical statement task was designed to encourage the use of diverse health information resources and evaluative strategies when seeking health information and to utilise clinical reasoning. Therefore, the researcher used this task based on the Standard Saudi Care of Nursing Internship Program to encourage participants' navigation of clinical information. This task focused on exploring NISs' strategies for seeking clinical information from diverse health resources, with the following written description.

Your task is to read clinical statements that might happen in your daily nursing care to make a clinical decision within a patient care. Then, your task is to seek and obtain evidence-based information related to the clinical statement. To this end, you will navigate freely to find different health resources deemed useful and learn from multiple sources carefully.

The following table shows a comparison between the two think-aloud sessions.

Think-Aloud tasks	Nursing care plan task (T1)	Clinical statement task (T2)	Key note
Goal setting	To assess the acceptability of TA task to conduct Sessions over Internet Protocol (SolP) and ensure that the Microsoft team is suitable.		
Task characteristic	The participants were given a clinical scenario and asked to talk through where they would seek information to understand and act on this scenario.	The researcher used clinical scenario statements to encourage participants' navigation of controversial information and their use of information seeking strategies from diverse health resources.	Participants were asked to allow the researcher to observe them as they completed the task. Moreover, they were asked to explain and verbalise step by step what they were doing, which resulted in addressing and identifying ISPs.
Task goal	Simulate clinical practice situation.	Simulate clinical practice scenario.	Participants were asked to be unconstrained in moving to any spaces within resources.
Setting	Saud and Taibah Universities	Saud, Princess Noura and Taibah Universities	Multi-centre to maximise variation and explore different experiences.
Time	34 minutes 22 minutes	27 minutes 30 minutes 33 minutes	Search time was an important factor.
Tools	<ul style="list-style-type: none"> Teams Teams chat box 	<ul style="list-style-type: none"> Teams PowerPoint 	T2: PowerPoint helped for flow smoothly.
Microsoft teams	The participants needed a tutorial session for two minutes.		In actual stage the researcher needed to send a tutorial video before the session.
Preferred language	Arabic	Arabic	They felt more comfortable and confidence.
The researcher role	<p>Take part in the task which distract the fluent of the task without necessity.</p> <ul style="list-style-type: none"> - Clarifying the clinical scenario while they were doing the task. - Asking the participants to check the teams chat box. - Asking some questions to make the participants clarify their behaviours. - Inducing the participants to use different resources. 	The researcher role in the TA was limited to facilitating and guiding the participants. However, sometimes they needed initial encouragement to speak.	<p>The researcher needed to interfere and ask questions to make the participants talk more when seeking health information.</p> <p>Such as</p> <p>Do these sources represent the preferred sources for you to use?</p>
Chosen topic	One clinical scenario based on real practice.	The participants were asked to read the researcher-developed clinical statements based on real clinical practice (e.g., vital signs, nursing assessment, administer medications) to find supporting details and evidence.	T2: Clinical statement task seemed more encouragement in term of seeking health information.

Seeking health information	<p>Sometimes, because also the participants focused on the case study more than seeking health information.</p> <p>Sometimes and as directly as possible, because the task directs them to use one resource.</p>	<p>Almost and as indirect as possible, also their knowledge and experience that NISs had can influence their ISPs</p>	<p>The researcher offered minimum prompts whenever you become silent to motivate your vocalisation and to support your confidence level during the task.</p>
Resources selection	<ol style="list-style-type: none"> 1. Google 2. E-nursing book 3. General nursing websites 4. Medical dictionary 5. YouTube 	<ol style="list-style-type: none"> 1. Google 2. E-nursing book 3. General nursing websites 4. General medical websites 5. Professional Organisation Websites 6. Nursing book 7. Medical dictionary 8. YouTube 	
Participants' reaction to the tasks.	<p>Interesting which needed critical thinking effort more than seeking health information.</p>	<p>Challenging which needed searching and critical thinking effort.</p>	
Digital issues	<p>Noise Experience bad resolution.</p>	<p>Screen sharing was slow for a while.</p>	
Initiative coding Scheme		<ul style="list-style-type: none"> • Information location Locate goal-relevant and useful health information in multiple information sources. • Construct the meaning Strategic actions such as comparing and contrasting different information, translation, prior knowledge use. • Perception Goals for seeking health information, task-related factors. • Awareness Strategic actions include regulating and monitoring ISP, detecting problems. • Information evaluation Strategic actions in appraising, valuing, assessing any information such as linked references, critical thinking. 	

Appendix 5: All TA Clinical Statements

Focus	Clinical statements
Sepsis	Serum lactate is an important indicator of the septic patient's prognosis, with mortality dropping significantly as the lactate level decreases.
Medication indication	Digoxin must be checked at least 8 hours after dose. Because, side effect might be dangerous.
NGT contraindication	A nasogastric tube is considered as a contraindication in a patient with a basal skull fractures.
GCS	Patients with GCS lower than 8 requires urgent airway and breathing management.
Clinical reasoning	When a patient on Digoxin, heart rate must be assessed at least 6 hours after dose. (Why)
ECMO	ECMO is a support not a treatment to provide stability while underlying cause is treated.
Patient care	The primary goal of sedation in intensive care unit (ICU) practice is to make patients calm.
Medical condition	The most common arrhythmia post cardiac surgery is atrial fibrillation (AF). (why)
Patient position	Prone positioning might improve overall survival in severe ARDS.
Pain management	No laboratory test can determine the presence or severity of pain.
Medication indication	Heparin reduces pulmonary compromise and intravascular coagulation in fat embolism patients
Nursing assessment	Which assessment finding would most likely indicate perforation of the ulcer?
Medical condition	Compartment syndrome leads to vessel and tissue damage due to restricting the blood flow to the area. (How)
Medical condition	What is the different between Pneumonia and Ascites?
Patient education	A patient asked about the purpose of the pursed-lip method of breathing

Appendix 6: Ensuring the Quality of the Findings of Qualitative Research – Trustworthiness Criteria

Trustworthiness criteria	Strategy	Application
Credibility	<p>Triangulation: involves the use of multiple and different methods, investigators, sources and theories to obtain corroborating evidence</p>	<p>The data will use different sources of data or research instruments or research methods, such as observation through think-aloud method and semi-structured interviews. The study will review the think aloud task with different informants such as nursing faculty member and registered nurse on the suitable of the clinical scenario for nursing intern students.</p>
	<p>Negative case analysis: is when data emerging from the inquiry contradicts the researcher's expectations.</p>	<p>The negative cases will be reported to improve the credibility of the study because the principal researcher will make an account for the contradiction that emerged from the data, which could provide a plausible alternative explanation which improve the rigour rigour of the study.</p>
Transferability	<p>Provide thick description: thick description enables judgments about how well the research context fits other contexts, thick descriptive data, i.e. a rich and extensive set of details concerning methodology and context, should be included in the research report.</p>	<p>The study will involve all the research processes, from data collection, context of the study to production of the final report. Thus thick description will ensure transferability of qualitative inquiry which will allow comparison of this context to other possible contexts to produce a thick description of the context to ensure its transferability.</p>

Appendix 7: Approval from the Research Ethics Committee



**University of
Nottingham**
UK | CHINA | MALAYSIA

Faculty of Medicine & Health Sciences Research Ethics Committee

Faculty Hub
Room E41, E Floor, Medical School
Queen's Medical Centre Campus
Nottingham University Hospitals
Nottingham, NG7 2UH
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28 August 2020

Asim Alhejalili
PhD Student
c/o Professor Heather Wharrad
Professor of E-Learning and Health Informatics
Room B53, HELM
School of Health Sciences
QMC Campus
Nottingham University Hospitals
Nottingham, NG7 2UH

Dear Mr Alhejalili

Ethics Reference No: FMHS 50-0720– please always quote	
Study Title: How do nursing intern students obtain evidence based health information in Saudi Arabia? A qualitative study.	
Location of Study: online in Kingdom of Saudi Arabia	
Chief Investigator/Supervisor: Professor Heather Wharrad, Professor of E-Learning and Health Informatics, School of Health Sciences.	
Lead Investigators/student: Asim Alhejalili, PhD student, School of Health Sciences.	
Other Key Investigators/Collaborators: Dr Richard Windle, Associate Professor of E-Learning and Health Informatics, Dr Fern Todhunter, Associate Professor, School of Health Sciences	
Proposed Start Date: 01/09/2020	Proposed End Date: 31.03.2021

The Committee considered this application at its meeting on 10 July 2020 and the following documents were received:

- FMHS REC Application form and supporting documents version 1.0: 28.06.2020

These have been reviewed and are satisfactory and the study has been given a favourable opinion.

A favourable opinion has been given on the understanding that:

1. All appropriate ethical and regulatory permissions are respected and followed in accordance with all local laws of the country in which the study is being conducted and those required by the host organisation/s involved. Please submit copies of these permissions when these are available.
2. The protocol agreed is followed and the Committee is informed of any changes using a notice of amendment form (please request a form).
3. The Chair is informed of any serious or unexpected event.
4. An End of Project Progress Report is completed and returned when the study has finished (Please request a form).

Yours sincerely

Dr John Williams, Associate Professor
Chair, Faculty of Medicine & Health Sciences Research Ethics Committee



University of Nottingham
UK | CHINA | MALAYSIA

**Faculty of Medicine & Health Sciences
Research Ethics Committee**

Faculty Hub
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07 September 2022

Asim Alhejalili
PhD Student
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Nottingham, NG7 2UH

Dear Mr Alhejalili

Ethics Reference No: FMHS 50-0720– please always quote	
Study Title: How do nursing intern students obtain evidence based health information in Saudi Arabia? A qualitative study.	
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Other Key Investigators/Collaborators: Dr Richard Windle, Associate Professor of E-Learning and Health Informatics, Dr Fern Todhunter, Associate Professor, Nabil Alhassani, PhD student Health Informatics School of Health Sciences	
Proposed Start Date: 01/09/2020	Proposed End Date: 31.03.2021

Thank you for notifying the Committee of amendment no 1: 06.09.2022 in summary as follows:

- Addition of a second reviewer who speaks Arabic (Nabil Alhassani, PhD Student) to evaluate the tool developed for additional robustness.

And the following documents were received:

- FMHS REC Notice of Amendment form dated 06.09.2022

This has been reviewed and amendment no 1: 06.09.2022 is given a favourable ethics opinion.

A favourable ethics opinion is given on the understanding that:

1. All appropriate ethical and regulatory permissions are respected and followed in accordance with all local laws of the country in which the study is being conducted and those required by the host organisation/s involved. Please submit copies of these permissions when these are available.
2. The protocol agreed is followed and the Committee is informed of any changes using a notice of amendment form (please request a form).
3. The Chair is informed of any serious or unexpected event.
4. An End of Project Progress Report is completed and returned when the study has finished (Please request a form).

Yours sincerely

Dr John Williams, Associate Professor
Chair, Faculty of Medicine & Health Sciences Research Ethics Committee

Appendix 8: TA Quotations and Screen sharing activities from NISs’ Responses to Clinical Statements

Category: Information-Seeking Process

Theme	Quotes
Information location	<p>Accessibility</p> <p><i>“I am using Google Scholar now with the ability to focus on recent research” (P1-TA)</i></p> <p><i>“I need to register to carry on. I will leave this website and switch to Google again” (P2-TA)</i></p> <p><i>“I am using a search engine, to be specific, “Google.” I just typed the information that I want to look for, and I will find a lot of websites” (P2-TA)</i></p> <p><i>“ I am searching generally on Google to see what’s out there and what’s easy to access. Now, I found information regarding prone ventilation” (P1-TA-CS3)</i></p> <p><i>“ This is a good website, but unfortunately its disadvantage is that it is a paid website” (P8-TA)</i></p> <p><i>“It is the first time I have seen this website; I am searching generally to figure out the availability of the information and what I can find on Google before narrowing the research” (P9-TA)</i></p> <p><i>“Google provides a lot of health information resources that are easy to access” (P12-TA)</i></p> <p><i>“I think this website (PubMed) provides related information to pain assessment. But, one of the main issues is that difficult to access. I will focus on using Google” (P13-TA)</i></p> <p>Using keywords</p> <p><i>“I am using the word “nurse” as a key word in the search engine to get information related to nursing” (P1-TA-CS7)</i></p> <p><i>“It’s hard to say what it is exactly, what keywords fit. I do not know how to choose keywords in searching” (P3-TA)</i></p> <p><i>“I am using other keywords like “septic shock and nursing management” to get more results; now I have got results related to serum lactate implications” (P4-TA-CS1)</i></p> <p><i>“I wrote the whole clinical statement as the search keyword to get results about “Basal Skull Fractures” (P8-TA-CS2)</i></p> <p><i>“I looked for different words like “Machine Similar to Heart -Lung,” “Machine” “Support” “Patient” and “Treatment” I got frustrated with it because I had too many results and it will take me so long to read and extract the information, so I will leave it and try another way” (P10-TA-CS4)</i></p> <p><i>“I’ll try another search term, this time including the word “why” (P12-TA)</i></p> <p><i>“Return to the previous page; [On the Google page, enter the term “Contraindication” and click search] I am searching for information about the “relationship” between “Serum Lactate” and “Mortality.” Search keywords were very important as deciding on the proper keyword helps me reach the required information directly. This helps me with getting concise and precise information” (P13-TA-CS2)</i></p>
Construct the meaning	<p><i>“I have an idea: “Patient with ARDS.” I remembered that I have seen patients related to COVID-19 on “Prone Positioning,” so this can help me understand this statement” (P1-TA-CS5)</i></p> <p><i>“As you can see, I was having trouble with the pursed-lip method of breathing. Due to my unfamiliarity with the English language, I will use “Mayo Clinic” , because it helps me with making my search for information in an efficient and convenient way in terms of</i></p>

Theme	Quotes
	<p><i>constructing the meaning; (Points at the translation button); just one click to translate the webpage” (P1-TA-CS8)</i></p> <p><i>“This browser translates it into Arabic, and it was difficult for me to understand the medical content in Arabic because I studied it in English. I felt the meaning had changed” (P5-TA)</i></p> <p><i>“What does pulmonary compromise mean? I am using “Oxford” translator, I expect it to be better and more accurate than Google translator in translating medical terms” (P13-TA-CS4)</i></p> <p><i>“I am seeking information related to normal levels. I have an idea about similar situations that I have had before. The normal level is 1.3” (P13-TA-CS1)</i></p>
Information evaluation	<p>Credibility</p> <p><i>“I access the “Nurses-Lab” site because it is one of my favourite sites; it is conveniently accessible; its information is very reliable; most nurses recommend me to use it” (P1-TA)</i></p> <p><i>“RobHolland is a great resource for students. Our clinical instructor has sent us there many times” (P2-TA-CS7)</i></p> <p><i>“ Good source with an authorised author along with their email contact (Points at the web address of the National Library of Medicine) that’s probably pretty reliable..., but we should refer to the Saudi guidelines, and Saudi guidelines follow USA guidelines” (P2-TA)</i></p> <p><i>“ I am looking at the URL name of this website (points at the link org); I noticed words, such as “org.”; This site is related to a health organisation, so it is reliable” (P3-TA)</i></p> <p><i>““Nurse Lab” totally provides comprehensive nursing information which increases reliability... which is good!” (P3-TA)</i></p> <p><i>“ Wikipedia is an unreliable resource. This source is not accurate, because it can be edited, replaced, or omitted easily” (P3-TA)</i></p> <p><i>“ I am going to ignore Wikipedia and news websites because they are unreliable sources. It is allowed for anyone to add, edit, or omit the information. So, I may get improper information” (P4-TA)</i></p> <p><i>“I cannot find any references; actually, information may be improper as there are no references mentioned here” (P4-TA)</i></p> <p><i>“I count on the “Nurse Lab” site; this site is actually dedicated to nurses and recommended by nursing schools” (P5-TA)</i></p> <p><i>“ I don’t trust Wikipedia, even the Arabic information; because anyone can change the information on this site, you can change it, and then I change it; this keeps it up-to-date, but it also makes it untrustworthy” (P5-TA)</i></p> <p><i>“I am going to access the information in Wikipedia. I knew Wikipedia is editable, but I often count on it to get the information I need. Because, this site mentions all the required information I need, such as the “definitions,” “signs& symptoms,” and “treatment.” I found it difficult to find guidelines through the databases” (P7-TA-CS3)</i></p> <p><i>“It is my first time seeing this website (Cleveland Clinic) said a laboratory test can determine the presence or severity of pain. As for health information, I have to track some of those references randomly to find out the author’s information and background” (P8-TA-CS8)</i></p> <p><i>“I am going to utilise the information related to septic shock because it is a published in National Library of Medicine. I think that the information was approved by a medical authority before being published” (P9-TA-CS1)</i></p> <p><i>“I am accessing sites that end with the “education” domain. I find it reliable. I often use sites that are either “Org,” “Edu,” or “SA” (P10-TA-CS8)</i></p> <p><i>“I am checking this website about “ARDS”; it is a comprehensive website (Points at Mayo clinic); they gave all the details that I need about the disease” (P11-TA-CS5)</i></p> <p><i>“(Pointer moves around the author’s information) The author used a well-known medical website (UpToDate) to disseminate health information. The author specialises in medicine, and they mentioned the references used, so the information seems proper. I think it is a reliable source to use” (P11-TA)</i></p>

Theme	Quotes
	<p><i>"I expect that Wikipedia is an easy-to-access site that provides general information at least, so that I'll have an overview of the device, even if it's not a reliable site" (P13-TA-4)</i></p> <p>Up-To-Date</p> <p><i>"I am checking the date of publication to get the last updated septic care bundle" (P4-TA-CS1)</i></p> <p><i>"Let's look for information on the "Wikipedia" website; actually, I just use the most recent references from 2015 that are mentioned in the Wikipedia reference list in relation to the topics" (P4-TA)</i></p> <p><i>"The "references" were published in 2010, ten years ago, making them "outdated" So, I will change these resources to keep my resources up-to-date" (P7-TA)</i></p> <p><i>"This site has reliable information ("Healthline") as it is related to a medical institution; also, it up-to-date information (2020)" (P9-TA)</i></p> <p><i>"I want to check if the information up-to-date, but the problem is with locating the date of dissemination" (P10-TA)</i></p> <p><i>"This site is old in 2010; I will find other sites that provide the most recent medical information" (P12-TA)</i></p> <p><i>"I don't often care for the date of publication; however, I prefer to get the required information from the most recent references. This source is reliable as it clearly provides recent information, as the date of publication is 2020." (P12-TA)</i></p>
	<p>Clinical experiences</p> <p><i>" I am confused and am not getting the right answers. It was mentioned that the rise of lactate leads to higher hypo-perfusion, which is not true based on my prior knowledge" (P1-TA-CS1)</i></p> <p><i>"I found this site but the information is unreliable according to my experience. I need to seek more to get the right health information" (P7-TA)</i></p> <p><i>"I found this site mentions digoxin information (points at the nursing responsibilities), but I wanted to know about the patient's condition so I could think about possible side effects" (P10-TA)</i></p> <p><i>"I am not always sure of the information I get; I think it also depends on my clinical experience" (P11-TA)</i></p> <p><i>"Actually, it is a very convenient website due to procedure explanation similar to clinical practice!" (P12-TA)</i></p>
	<p>Link strategies</p> <p><i>" I am making a comparison between the websites; I found information that says that the decrease of "Lactate" indicates mortality dropping, which conflicts with the previous website" (P1-TA-CS1)</i></p> <p><i>"I am looking for another source to understand the clinical information, and I found this one. It is almost the same information as the previous one" (P2-TA)</i></p> <p><i>"I am verifying the correctness of my method of searching by looking at another resource. Here it is almost the same information in another resource that is prone position increase ventilation" (P2-TA-CS5)</i></p> <p><i>"I'm looking for information on more and more resources to make sure I've got it right." (P3-TA)</i></p>

Category: Gap

Theme	Quotes
Barriers	<p>Problem of access</p> <p><i>"An annoying thing requires me to register to be able to get the information I want" (P1-TA)</i></p> <p><i>"I am required to register with a valid email address. This is very annoying" (P6-TA)</i></p> <p><i>"I do not like this website. I know it is reliable, but for further information I have to sign up" (P11-TA)</i></p> <p><i>"I am not going to waste time on watching this video; also, there are many disturbing ads on this site!" (P2-TA)</i></p> <p><i>" This is a good site, but its main disadvantage is that it is a paid site" (P8-TA)</i></p>
	<p>Problem of time</p> <p><i>"I excluded e-books because it takes me a lot of time to find the required information" (P1-TA)</i></p> <p><i>"In practice, I don't have much time, it's hard to read the whole article, and it will take a long time" (P2-TA)</i></p> <p><i>"There is no time to access journals and read through them to find the information being sought. And honestly, the last thing I want to do when I get off work is spend personal time doing research" (P3-TA)</i></p> <p><i>"I get enough of the required information, so I stop searching for more to avoid wasting time" (P7-TA)</i></p> <p><i>" This article contain details or new words that might waste time reading them" (P10-TA)</i></p>
	<p>Poor of information skill</p> <p><i>"Through nursing education, I remembered that we had a course work on how to seek information through using healthcare databases. At that time, I accessed many of the healthcare databases many times. But, today I forgot how to use the databases" (P2-TA)</i></p> <p><i>"I am reading an e-book but I can't get the required information in a direct and convenient way. That is why I think that it is somehow difficult to get the required information from these books" (P3-TA)</i></p> <p><i>"It is so difficult to understand Medline, so I am required to ask for a help to learn the right way to use databases" (P3-TA)</i></p> <p><i>"I can't get the required information in a direct and convenient way. I am having somehow difficult to get the required information from English resources" (P4-TA)</i></p> <p><i>"This browser translates it into Arabic, and it was difficult for me to understand the medical content in Arabic because I studied it in English. I feel the meaning has changed" (P5-TA)</i></p> <p><i>"If I had better experience in using medical databases such as PubMed, I think I could find more appropriate nursing information" (P5-TA)</i></p> <p><i>"I am accessing PubMed. But, I am not sure if it is a reliable journal. I am going to search again" (P6-TA)</i></p> <p><i>"I have difficulty with wording the questions. I have difficulty with searching for information in English; I am not fluent in English; I have medical vocabulary but it is not sufficient for my search" (P7-TA)</i></p> <p><i>"I cannot recognise the difference between keywords and subject headings in the databases" (P8-TA)</i></p> <p><i>"I am having difficulties with finding the best keyword due to a lack of vocabulary I know. I am still struggling" (P9-TA)</i></p> <p><i>" It's an article, and often the articles are a little complicated, so I do not understand it very well because it includes many scientific details. The articles have a research aim, but their results are usually theoretical and not applicable in the nursing field" (P10-TA)</i></p>

Theme	Quotes
	<p><i>"I don't know how to write the sentence in proper form to get results related to the topic that I want to seek, which is ECMO" (P10-TA-CS4)</i></p> <p><i>"The problem is with writing the sentence. I may have a thousand ideas in my head, but I cannot connect them in a sentence and write it in Google search to get the health information" (P10-TA)</i></p> <p><i>"This article is too detailed, but I managed to scan the whole article to get the required information!" (P12-TA)</i></p> <p>Information overload</p> <p><i>"I don't prefer Medscape because it has a lot of information that I don't need, so I can't get the required information easily and quickly from this site" (P1-TA)</i></p> <p><i>"I found that the information of this resource is overload and does not have relevance to the nursing field" (P2-TA)</i></p> <p><i>"I don't prefer e-books. Because they have too much information, I can't easily get what I'm looking for!" (P4-NIS)</i></p> <p><i>"Actually, the site provides me with information about "trauma resuscitation emergency medicine"; this is what I am looking for; however, I still search for more information about the "causes."" (P12-TA-CS2)</i></p>
Facilitators	<p>Visual representation of health information</p> <p><i>"I am checking the images as they help me with assimilating the parts related to the nursing field. Usually, in the practical parts, these images help me to understand clinical practise" (P1-TA)</i></p> <p><i>"Nurses Lab is very well-organized and well-arranged based on nursing assessment; for example, "nursing diagnosis" comes before "nursing intervention"; I think that this site is conveniently designed to reach the information quickly" (P1-TA)</i></p> <p><i>"This site has many efficient features, such as "Indication," "Benefits," "Supply," and "Direct." I click on any feature to get the required information. The interface and colours of the site are attractive. Also, it is free" (P1-TA)</i></p> <p><i>"Let me return to the image. It is a device that oxidises blood. I expect it is also used in open-heart operations, and this image gave me a brief summary of it" (P2-TA-CS4)</i></p> <p><i>"As you can see, there is a very important illustration image to simplify the information for me or any specialist in the medical field before being imported to the patient" (P2-TA-CS8)</i></p> <p><i>"I noticed that the images clarify the shape of the lungs of the patients; it is very clear and helps me understand the situation" (P3-TA)</i></p> <p><i>"I am looking at pictures as they provide me with useful and clear details" (P4-TA)</i></p> <p><i>"This article is very long, so it is very difficult to pick out the required information" (P4-NIS)</i></p> <p><i>"I am reading about this procedure but do not understand it, so I am going to open a video to get this information and to understand it!" (P5-TA)</i></p> <p><i>"I am not going to count on these pictures. Some of them don't provide me with essential information such as their sources and published date" (P5-TA)</i></p> <p><i>"The reference list is useful, and the interface is user-friendly" (P9-TA)</i></p> <p><i>"This site is very convenient as it provides the "headlines" and titles to facilitate getting information in a very easy and convenient way. No need to read the whole text! There is a section here for the responsibilities of nurses. Let me search for more information" (P12-TA)</i></p> <p>Attributes of the search engines</p> <p><i>"Some texts are very attractive as the text is written in bold; also, I like highlighted text; and also, Google provides me with a "People who Ask" section, which gives me answers to my research questions" (P12-TA)</i></p>

Theme	Quotes
	<p><i>“People also ask “is useful sometimes to formulate the question that I want to know the answer to in a better way, because the used language is not our native language, so I’ll rely on this source” (P13-TA)</i></p> <p><i>“I chose it because the text was written in bold, because it attracted me to read it and locate my search for information faster” (P14-TA)</i></p>

Appendix 9: NISSs' Responses to Open-Ended Questions

Category: Information Needs

Theme	Quotes
Needs for medication information	<p>Indications</p> <p><i>"Since medication would be quite ineffective after eight hours from the occurrence of a stroke, as they told us in the lectures. I searched for the medications used in stroke cases, and their indications" (P4-SSI)</i></p> <p><i>"I is difficult to memorise all kinds of medications indications. The answer I got from Google was very simplified and far from comprehensive" (P7-SSI)</i></p> <p>Dosage</p> <p><i>"I needed to know whether to use the high, low, or medium sliding scale to determine the insulin dose to be given to diabetic patients" (P2-SSI)</i></p> <p><i>"A physician asked me to prepare a medication called Epanutin; it was the first time I heard about it. The physician did not mention the dosage. So, I sought the medication dosage on Google" (P10-SSI)</i></p> <p>Side effects</p> <p><i>"physicians used to give COVID-19 patients Paracetamol at the ER. I was very confused about the side effects of Paracetamol, so I looked it up on Google. Because I need to inform the patient about them" (P9-SSI)</i></p> <p><i>"In the emergency room, I experienced a case where we gave Voltaren by injection into a vein. I looked online to see if Voltaren was linked to any health issues when injected intravenously" (P11-SSI)</i></p>
Diagnosis	<p><i>"I went quickly over the various types of brain haemorrhages CT through Google and it turned out that the correct diagnosis might be subdural haemorrhage, not subarachnoid haemorrhage" (P1-SSI)</i></p> <p><i>"I sought information that helped to diagnose ventricular tachycardia to understand the treatment plan and management" (P3-SSI)</i></p> <p><i>"I seek medical information to help me address certain clinical situations, in order to identify things like nursing diagnosis of chest pain" (P8-SSI)</i></p>
Guidelines	<p><i>"Unfortunately, I cannot find guidelines on patient safety regarding personal protective equipment for surgical operations" (P5-SSI)</i></p> <p><i>"I trained at the renal dialysis department and I remember, for example, that there was that patient who was doing haemodialysis and was classified as a high potential fall risk. Of course, we have guidelines that are applied in such cases that I needed to review" (P6-SSI)</i></p> <p><i>"My first priority was only to seek how to manage my case, and then, after I was finished, a senior nurse also approved my clinical judgment. Yes, information obtained from various resources plays a very useful role, but I first have to check applicable policies at the hospital before I can go ahead and apply such information" (P7-SSI)</i></p>

Category: Information-Seeking Process

Theme	Quotes
Information location	<p>Accessibility</p> <p><i>"I used medical or nursing textbooks on cerebral trauma, which can always provide you with more comprehensive information, but they are not easy to access and books could contain information that may no longer be recommended" (P1-SSI)</i></p> <p><i>"I have on telegram certain channels that give you access to medical text books and constantly updated information. Occasionally, I did not have a connection to access this channel" (P2-SSI)</i></p> <p><i>"Workplace computers were not easy to access whenever you needed them. So I used my own phone to access Wikipedia" (P6-SSI)</i></p> <p><i>"I usually use the general medical websites, where you can find several websites that support nursing, such as Nurses Labs, which is very helpful and accessible" (P8-SSI)</i></p>
Information evaluation	<p>Ask colleagues</p> <p><i>"I usually check with physicians to make sure that such information is correct" (P2-SSI)</i></p> <p><i>"The following day, I told a cardiology specialist about the information that I got from Google about ventricular tachycardia and asked him whether it was correct" (P3-SSI)</i></p> <p><i>"I double checked by asking a physician or a nurse with enough experience" (P3-SSI)</i></p> <p><i>"I tried to get reliable information from Twitter, but the person posting the information may not be specialised in the nursing field. So, I had to check that the information was correct by asking a senior nurse" (P4-SSI)</i></p> <p><i>"I mean the websites I get the information from must be approved and medically-oriented. When I am unsure about the information obtained I would go and ask a nurse or physicians" (P5-SSI)</i></p> <p><i>"Even if the website is reliable, I have to ask the experienced staff members" (P5-SSI)</i></p> <p><i>"It is pretty typical. I got the information that I needed for my clinical practise from an experienced nurse" (P6-SSI)</i></p> <p><i>"Overall, it's good, but not good enough. That's why I asked a member of the senior nursing staff to check the information I got about hypovolemic shock" (P7-SSI)</i></p> <p><i>"I asked the specialist physicians for more information so I could be sure about what I had found" (P10-SSI)</i></p> <p><i>"I felt more comfortable and satisfied when I asked a nurse or physician with more experience about health information. I can't rely on online information alone, especially during my internship" (P11-SSI)</i></p> <p>Link strategies</p> <p><i>"I used Medscape and nurses-lab websites to compare the information I got. I can safely say that they are truly reliable and authentic" (P1-SSI)</i></p> <p><i>"When two websites have similar answers, I considered the information is correct" (P3-SSI)</i></p> <p><i>"Every time I look for information from e-resources in clinical practice. I linked this information to clinical practice to decide reliability" (P5-NIS)</i></p> <p><i>"The information that I got through Google, it may look good from a theoretical perspective, but is hard to apply in the clinical work environment and needs to be explained by a person with hands-on experience" (P6-NIS)</i></p> <p><i>"I usually search for health information on more than one site. Thus, I can better integrate evidence-based health information" (P9-SSI)</i></p> <p><i>"I suppose that the information that I get from Google is of poor quality because it is hard to apply in actual nursing practice" (P11-NIS)</i></p>

Category: Gap

Theme	Quotes
Organisational support	<p><i>"I can access the hospital's website along with a good many educational programs that are available at all times and are constantly updated to support the information needs" (P1-SSI)</i></p> <p><i>"The clinical environment was really helpful in terms of available search resources and close collaboration between physicians and nurses. So, I have the courage to discuss the diagnosis with the physician and say what I thought without fear" (P1-SSI)</i></p> <p><i>"The difficulty lies in the fact that no specific sites are recommended by the hospital from which you can get the information and apply it into practice" (P2-SSI)</i></p> <p><i>"I can use a digital library that provided from the hospital to learn the names of various medications and their side effects. In fact, it is much easier to use that system than to look it up on Google and have to read through thousands of side effects" (P4-SSI)</i></p> <p><i>"The main difficulty was insufficient clinical information on most of the nursing procedures and that you don't know a specific website where you can get reliable information about stroke medications" (P4-SSI)</i></p> <p><i>"In fact, the clinical instructor told me that I was an intern nurse and that I didn't have to know about seeking information-related clinical practice" (P4-SSI)</i></p> <p><i>"In fact, there were things that I asked about the dialysis machine during the rotation. A nurse had no problem taking the time to teach me, even if that meant that she might run behind on her work schedule" (P6-SSI)</i></p> <p><i>"The difficulty lies in the fact that there is no website approved or created by the hospital where I trained" (P6-SSI)</i></p> <p><i>"There are such hospital-related websites, which show you what medications to use for each particular diagnosis and what antidotes to use in case of toxicity or any other side effects. But, I cannot use it because the computers are always busy with lots of people using it for search rather than documentation and diagnosis-related purposes" (P8-SSI)</i></p> <p><i>"The staff members are very helpful; they provide me with all the information I need" (P10-SSI)</i></p>
Problem of access	<p><i>"I am not allowed to use a smartphone during clinical practice" (P1-SSI)</i></p> <p><i>"As often happens, I could not look up the insulin sliding scale on the internet at practice because the clinical instructor prohibited us from using our mobile phones during working hours" (P2-SSI)</i></p> <p><i>"I have to leave my mobile phone in my locker because we are not allowed to carry it around with us because the clinical instructor thinks that we will mostly use it for entertaining rather than learning purposes. I have difficulty recognizing uncertainties in clinical practice due to a lack of experience. As a result, the information-seeking process is not initiated" (P5-SSI)</i></p>
Problem of time	<p><i>"I mean, the information I seek may be totally new and I can't understand it within a short time. So, I have some troubleshooting, such as a lack of time to complete searches efficiently" (P1-SSI)</i></p> <p><i>"I could ask the clinical instructor and she would give me the answer right away or assist with integrating the appropriate resources. However, she was unavailable due to a heavy</i></p>

	<p><i>workload. Due to a lack of time and a heavy workload, I occasionally overlooked some clinical information needs” (P2-SSI)</i></p> <p><i>“The problem is that it took me a long time, probably because of my poor English and not knowing how to extract the information and apply it into practice” (P3-SSI)</i></p> <p><i>“I could not ask nurses because they were too busy to answer my questions. But sometimes when they aren’t so busy, I like to ask them because they have more experience and can get the information faster” (P4-SSI)</i></p> <p><i>“The preceptor I work under is quite cooperative, but sometimes I don’t get a chance to ask him because of the intensive workload” (P5-SSI)</i></p>
Information overload	<p><i>“Medscape never gives you the information you need straightaway and you have to read through a lot of things that you don’t need” (P1-SSI)</i></p> <p><i>“It was very difficult for me to find the information I needed. For example, when I searched for some medical information on the Google website, I found additional information with limited value many; which made it difficult” (P11-SSI)</i></p>
Recommended websites	<p><i>“I access to revision medical information through two specialised medical websites, usually Medscape, and nurses-lab. Because, they are recommended to utilise in practice by our clinical instructor” (P1-SSI)</i></p> <p><i>“The answer I got from Google was very simplified and far from comprehensive, but it gave me a simplified idea about the medication indications. I went to UpToDate, which was recommended for use in clinical practice in KSA” (P7-SSI)</i></p>

Category: Outcome

Theme	Quotes
NISs' needs	<p>Training course</p> <p><i>"I definitely need courses that help me to seek and evaluate medical information and adopt an evidence-based approach to nursing clinical practice" (P1-SSI)</i></p> <p><i>"I mean that if they administered classes to nursing interns even once a week focusing on obtaining evidence-based health information in the shortest possible time" (P2-SSI)</i></p> <p><i>"Apart from the orientation program, we should also have a specific training on the information seeking process" (P5-SSI)</i></p> <p><i>"I hope to get courses for information seeking strategies to find evidence-based clinical information, to be able to make the right decisions concerning nursing in an efficient way" (P10-SSI)</i></p> <p>Channels</p> <p><i>"The hospital is supposed to have specialised people available to answer students' questions" (P2-SSI)</i></p> <p><i>"I suppose that if there were a small library in the hospital, it would have been helpful to find accurate resources" (P3-SSI)</i></p> <p><i>"If we had a digital library at the hospital, I would not even think of using Google" (P4-SSI)</i></p> <p><i>"I would have liked to have a digital library that would really be helpful and will minimise medical mistakes resulting from getting the wrong information from unreliable sources" (P4-NIS)</i></p> <p><i>"The hospital did not facilitate or assign anyone to answer any questions that NISs may have at clinical practice" (P5-SSI)</i></p> <p><i>"I felt that it could be useful to use specific references and books, such as the hospital library if they have one" (P10-SSI)</i></p>

Appendix 10: NIS Score Regarding Performance Tool

P1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	12	
CS 2	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	N	Y	Y	Y	Y	Y	12	
CS 3	Y	Y	N	Y	Y	Y	N	Y	N	N	N	N	Y	Y	Y	N	Y	10	
CS 4	N	Y	N	Y	Y	N	Y	Y	N	Y	N	N	Y	Y	N	Y	Y	10	
CS 5	Y	Y	N	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	Y	N	11	
CS 6	Y	Y	Y	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	N	10	
CS 7	Y	N	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	N	N	N	9	
CS 8	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	13	
Total	6	7	5	8	6	4	3	4	0	7	5	0	7	8	6	6	5	87	136

P2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	N	N	Y	Y	N	Y	10	
CS 2	Y	Y	Y	N	N	Y	Y	N	N	Y	N	N	Y	Y	N	Y	Y	10	
CS 3	Y	Y	Y	Y	N	N	N	N	N	N	N	N	Y	Y	N	N	Y	7	
CS 4	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	12	
CS 5	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	Y	Y	Y	N	Y	11	
CS 6	Y	Y	Y	Y	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	8	
CS 7	Y	Y	N	Y	N	Y	N	N	N	Y	Y	N	Y	N	N	N	Y	8	
CS 8	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	N	N	N	Y	8	
Total	8	8	7	6	3	6	4	2	0	3	2	0	7	5	3	2	8	74	136

P3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	N	Y	Y	Y	N	N	N	Y	N	Y	N	N	N	N	N	N	Y	6	
CS 2	Y	Y	N	Y	N	Y	N	Y	N	Y	N	N	N	N	N	N	N	6	
CS 3	Y	N	N	Y	N	N	Y	Y	Y	N	N	N	N	N	N	N	Y	6	
CS 4	N	Y	N	Y	N	N	Y	Y	N	Y	N	N	N	N	N	N	Y	6	
CS 5	Y	Y	Y	Y	N	N	Y	N	N	N	N	N	Y	N	N	N	Y	7	
CS 6	Y	Y	N	Y	N	N	N	Y	N	Y	N	N	N	N	N	N	N	5	
CS 7	Y	Y	Y	Y	N	Y	N	N	N	Y	N	N	Y	N	N	N	N	7	
CS 8	Y	Y	Y	Y	N	N	N	Y	N	Y	N	N	N	Y	N	Y	Y	9	
Total	6	7	4	8	0	2	3	6	1	6	0	0	2	1	0	1	5	52	136

P4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	12	
CS 2	Y	Y	Y	Y	N	N	N	Y	N	Y	N	N	N	N	N	N	Y	7	
CS 3	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	N	Y	Y	Y	Y	10	
CS 4	Y	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	12	
CS 5	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	N	Y	Y	N	Y	N	10	
CS 6	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	N	Y	Y	Y	Y	N	11	
CS 7	Y	Y	N	Y	N	N	N	N	N	Y	Y	N	Y	Y	Y	N	Y	9	
CS 8	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	12	
Total	8	8	5	8	0	1	2	6	0	8	7	1	4	7	6	6	6	83	136

P5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	N	N	N	N	Y	7	
CS 2	Y	Y	Y	Y	N	N	N	N	Y	Y	N	N	Y	N	N	N	Y	8	
CS 3	Y	Y	N	Y	N	N	N	N	Y	N	N	N	N	N	N	N	Y	5	
CS 4	Y	Y	N	Y	N	N	Y	N	Y	N	N	N	N	N	N	N	Y	6	
CS 5	Y	N	N	Y	Y	Y	N	N	Y	Y	N	N	N	N	N	N	Y	7	
CS 6	Y	Y	N	N	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	6	
CS 7	N	Y	Y	Y	N	N	N	N	N	Y	N	N	N	N	N	N	Y	5	
CS 8	Y	Y	N	Y	N	N	N	N	N	Y	N	N	Y	N	N	N	Y	6	
Total	7	7	2	7	1	2	1	1	3	7	1	0	3	0	0	0	8	50	136

P6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	N	Y	Y	N	N	N	Y	N	Y	Y	N	N	N	N	N	Y	7	
CS 2	Y	Y	Y	Y	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	8	
CS 3	Y	Y	N	Y	N	Y	N	Y	Y	N	Y	N	N	N	N	N	Y	8	
CS 4	Y	N	Y	Y	N	N	Y	N	N	Y	N	N	N	N	N	N	Y	6	
CS 5	Y	N	Y	Y	N	Y	N	N	N	N	N	N	Y	N	N	N	Y	6	
CS 6	Y	Y	N	Y	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	7	
CS 7	Y	N	Y	Y	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	Y	9	
CS 8	Y	Y	N	Y	N	N	N	N	N	Y	N	N	Y	N	N	N	Y	6	
Total	8	4	5	8	0	3	1	5	3	5	2	0	3	1	1	0	8	57	136

P7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	Y	Y	N	N	N	N	N	N	Y	N	N	N	N	N	Y	6	
CS 2	Y	Y	N	Y	N	N	N	N	N	Y	Y	N	Y	N	N	N	Y	7	
CS 3	Y	Y	N	N	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	6	
CS 4	Y	Y	Y	Y	N	N	Y	N	N	N	N	N	Y	N	N	N	Y	7	
CS 5	Y	Y	Y	Y	N	Y	N	N	N	N	Y	N	N	Y	Y	Y	Y	10	
CS 6	Y	N	Y	Y	N	N	N	N	N	N	N	Y	N	Y	Y	N	Y	7	
CS 7	Y	Y	N	Y	N	Y	N	N	N	Y	N	Y	Y	Y	Y	N	Y	10	
CS 8	Y	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	Y	Y	Y	9	
Total	8	7	5	7	0	3	1	0	0	3	4	2	4	4	4	2	8	62	136

P8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	N	Y	Y	Y	N	N	Y	Y	N	N	Y	N	N	N	Y	9	
CS 2	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	N	Y	N	N	N	Y	9	
CS 3	Y	Y	Y	Y	N	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	12	
CS 4	Y	Y	N	Y	N	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	11	
CS 5	N	Y	N	Y	N	N	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	10	
CS 6	Y	Y	N	Y	N	N	N	Y	N	Y	N	N	N	Y	Y	Y	Y	9	
CS 7	Y	Y	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	N	N	Y	9	
CS 8	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	N	Y	N	N	N	Y	10	
Total	7	8	3	8	1	5	3	3	3	8	3	1	6	4	4	4	8	79	136

P9	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	total	Comment
CS 1	N	Y	Y	Y	N	N	N	Y	N	Y	N	N	N	N	N	N	Y	6	
CS 2	Y	Y	N	Y	N	N	Y	N	N	Y	N	N	N	Y	N	Y	Y	8	
CS 3	Y	Y	N	Y	N	N	Y	N	N	Y	N	N	Y	N	N	N	Y	7	
CS 4	Y	Y	N	Y	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	7	
CS 5	Y	Y	Y	Y	N	N	N	N	N	Y	N	N	Y	N	N	N	Y	7	
CS 6	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N	N	N	N	Y	6	
CS 7	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N	Y	8	
CS 8	N	Y	N	Y	N	N	N	N	N	Y	Y	N	Y	N	N	N	Y	6	
Total	6	7	4	8	0	2	3	2	0	7	2	0	4	1	0	1	8	55	136

P10	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	N	Y	N	N	N	N	N	Y	Y	Y	N	N	N	N	Y	7	
CS 2	N	Y	Y	Y	N	N	Y	N	N	Y	N	N	Y	Y	Y	Y	N	9	
CS 3	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	N	Y	Y	Y	Y	12	
CS 4	Y	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N	N	N	Y	8	
CS 5	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	N	N	N	N	Y	7	
CS 6	Y	Y	N	Y	N	Y	N	Y	N	Y	N	N	N	N	N	N	Y	7	
CS 7	N	N	N	Y	N	Y	N	Y	N	Y	Y	N	Y	N	N	N	Y	7	
CS 8	N	Y	Y	Y	N	N	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	10	
Total	5	7	3	8	1	3	2	6	0	6	5	3	3	3	3	2	7	67	136

P11	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	Y	Y	N	N	N	Y	N	Y	Y	N	N	N	N	N	Y	8	
CS 2	Y	Y	N	Y	Y	Y	N	N	N	Y	N	N	Y	Y	Y	Y	Y	11	
CS 3	Y	Y	N	Y	N	Y	N	N	N	Y	Y	Y	N	N	N	N	Y	8	
CS 4	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	13	
CS 5	Y	Y	Y	Y	N	N	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	11	
CS 6	Y	Y	N	Y	N	Y	N	N	Y	Y	Y	N	N	N	N	N	Y	8	
CS 7	N	Y	Y	Y	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	8	
CS 8	Y	Y	Y	Y	Y	N	N	N	N	Y	N	N	Y	N	N	N	Y	8	
Total	7	8	5	8	3	5	0	1	1	8	5	3	4	3	3	3	8	75	136
P12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	N	Y	Y	Y	N	N	N	N	Y	N	Y	N	N	Y	Y	Y	Y	9	
CS 2	Y	Y	Y	Y	N	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	12	
CS 3	Y	Y	Y	Y	N	Y	Y	N	N	Y	Y	N	N	Y	Y	Y	Y	12	
CS 4	Y	Y	N	Y	N	N	Y	N	N	Y	Y	N	Y	N	N	N	Y	8	
CS 5	Y	Y	Y	Y	N	Y	N	N	N	Y	N	N	Y	Y	Y	Y	Y	11	
CS 6	Y	N	Y	N	N	Y	Y	N	N	Y	N	N	Y	N	N	N	Y	7	
CS 7	Y	N	Y	Y	Y	N	N	N	N	Y	Y	N	N	Y	N	Y	Y	9	
CS 8	Y	Y	Y	Y	N	N	N	N	N	Y	N	Y	Y	Y	Y	N	Y	10	
Total	7	6	7	7	1	3	4	0	2	7	4	2	4	6	5	5	8	78	136

P13	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	Y	Y	N	Y	N	N	N	Y	N	Y	N	Y	Y	N	N	N	Y	8	
CS 2	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	Y	N	N	N	Y	8	
CS 3	Y	Y	Y	N	N	Y	N	N	N	Y	Y	Y	N	Y	N	N	Y	9	
CS 4	Y	Y	Y	Y	N	Y	N	N	N	Y	N	N	Y	N	N	N	N	7	
CS 5	Y	Y	N	Y	N	N	N	N	N	Y	Y	Y	Y	N	N	N	Y	8	
CS 6	Y	Y	Y	Y	N	N	Y	N	N	Y	N	N	N	N	N	N	Y	7	
CS 7	Y	Y	N	Y	N	N	N	Y	N	Y	Y	Y	N	N	N	N	N	7	
CS 8	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	Y	N	N	N	Y	8	
Total	8	8	3	7	0	2	1	4	0	8	5	4	5	1	0	0	6	62	136

P14	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	Comment
CS 1	N	Y	N	Y	N	N	N	Y	N	Y	Y	N	N	N	N	N	N	5	
CS 2	N	Y	Y	Y	N	N	N	N	N	Y	Y	N	Y	N	N	N	Y	7	
CS 3	N	Y	Y	Y	N	N	N	N	Y	N	N	Y	N	N	N	N	Y	6	
CS 4	Y	Y	N	Y	N	N	Y	Y	N	Y	N	N	N	N	N	N	N	6	
CS 5	N	N	N	Y	N	N	N	N	Y	Y	N	N	Y	N	N	N	N	4	
CS 6	Y	N	N	Y	N	N	N	N	N	Y	N	N	Y	N	N	N	Y	5	
CS 7	N	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	Y	N	Y	7	
CS 8	N	Y	Y	Y	N	N	N	Y	N	N	N	N	N	N	N	N	Y	5	
Total	2	6	4	8	0	0	1	3	2	6	2	1	3	1	1	0	5	45	136

Appendix 11: Individual Clinical Statement Agreement for Participant 1

Rater 1 and rater 2 agree that P1 was utilised 12 strategies and skills of obtaining evidence-based information and 4 strategies were not utilised regarding clinical statement number 1. In 94% of the criteria both raters judge the same where 6% of the criteria differently. $P = 16/17 = 94\%$

CS1	Rater 2		
Rater 1		Y	N
	Y	12	0
	N	1	4

Rater 1 and rater 2 agree that P1 was utilised 11 strategies and skills of obtaining evidence-based information and 4 strategies were not utilised regarding clinical statement number 2. In 88% of the criteria both raters judge the same where 12% of the criteria differently. $P = 15/17 = 88\%$

CS2	Rater 2		
Rater 1		Y	N
	Y	11	2
	N	0	4

Rater 1 and rater 2 agree that P1 was utilised 9 strategies and skills of obtaining evidence-based information and 4 strategies were not utilised regarding clinical statement number 3. In 76% of the criteria both raters judge the same where 24% of the criteria differently. $P = 13/17 = 76\%$

CS3	Rater 2		
Rater 1		Y	N
	Y	9	2
	N	2	4
<p>Rater 1 and rater 2 agree that P1 was utilised 10 strategies and skills of obtaining evidence-based information and 6 strategies were not utilised regarding clinical statement number 4. In 94% of the criteria both raters judge the same where 6% of the criteria differently. $P=16/17=94\%$</p>			
CS4	Rater 2		
Rater 1		Y	N
	Y	10	1
	N	0	6
<p>Rater 1 and rater 2 agree that P1 was utilised 11 strategies and skills of obtaining evidence-based information and 5 strategies were not utilised regarding clinical statement number 5. In 94% of the criteria both raters judge the same where 6% of the criteria differently. $P=16/17=94\%$</p>			
CS5	Rater 2		
Rater 1		Y	N
	Y	11	1
	N	0	5
<p>Rater 1 and rater 2 agree that P1 was utilised 10 strategies and skills of obtaining evidence-based information and 5 strategies were not utilised regarding clinical statement number 6. In 88% of the criteria both raters judge the same where 12% of the criteria differently. $P=15/17=88\%$</p>			

CS6	Rater 2		
Rater 1		Y	N
	Y	10	2
	N	0	5
<p>Rater 1 and rater 2 agree that P1 was utilised 9 strategies and skills of obtaining evidence-based information and 7 strategies were not utilised regarding clinical statement number 7. In 94% of the criteria both raters judge the same where 6% of the criteria differently. $P=16/17=94\%$</p>			
CS7	Rater 2		
Rater 1		Y	N
	Y	9	1
	N	0	7
<p>Rater 1 and rater 2 agree that P1 was utilised 10 strategies and skills of obtaining evidence-based information and 3 strategies were not utilised regarding clinical statement number 3. In 76% of the criteria both raters judge the same where 24% of the criteria differently. $P=13/17=76\%$</p>			
CS8	Rater 2		
Rater 1		Y	N
	Y	10	3
	N	1	3