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Introduction

Oral Health in the 21st Century

Over the last decade the issue of children’s oral health has re-emerged as a priority on the political health agenda. Although oral health has dramatically improved over the last 100 years, improvements have slowed, with the average rate of 5 year olds with decayed, missing or filled teeth (dmft) having hardly altered since 1985 (Hall & Elliman, 2003, DH, 2004a, DH, 2005a) (Appendix 1). In an attempt to rectify this national problem government set a target of on average no more than 1.0 dmft per child (Hall & Elliman, 2003). The trend of poor oral health in children has been associated with areas of high social deprivation (ONS, 2004a, WHO, 2003a, DH, 2005a, FDI, 2009)

Locally, Nottingham City, an area of high social deprivation, has demonstrated dmft rates (Nottingham City dmft = 3.10) twice the National average (dmft = 1.47) and three times higher than affluent areas (Kent dmft = 0.84) (BASCD, 2007) (Appendix 1). Globally, 60-90% of children from industrialised countries alone experience dental decay, costing US$ 3513 per child in treatment (WHO, 2003a). This epidemic of poor oral health has been associated with the segregation of oral health from general health within society, resulting in health policy neglecting to include oral health leading to disjointed services
(WHO 2003a, WHO, 2003b, FDI, 2009). To assist developed and developing countries in tackling widening oral health disparities, the World Health Organisation (WHO) developed 7 global goals (Appendix 1) (WHO, 2003b). Set to be achieved by 2020, the goals are broad in nature, allowing governments and local service providers to tailor the goals to local need (WHO, 2003b).

**Importance of Good Oral Health**

The oral cavity is made up of the teeth, gums, tongue, hard and soft palate, connective tissues, salivary glands, bone, ligaments and muscles, nurses and veins; resulting in an elaborate, highly specialised entrance to the human body (NIDCR, 2000, FDI, 2009). A person’s mouth is an essential part of everyday life. Used continuously, it allows people to eat, drink, speak, kiss, smile, taste and communicate (NIDCR, 2000, FDI, 2009). Therefore oral hygiene is essential, not only for a person’s comfort but to allow development of greater self-esteem and self-image; leading to an improved interaction with their environment and society (WHO, 2003a, DH, 2005a, DH, 2007a, FDI, 2009). There are many disorders, conditions and congenital abnormalities which can affect a person’s oral health and wellbeing (Appendix 1) (NIDCR, 2000, WHO, 2003a, FDI, 2009). The most common of these oral health issues in children is dental decay (Table 1), which affects 30.9% of child under 5 years in the UK (BASCD, 2009).
Table 1: Definition of Dental Decay

Dental decay is the result of build up of plaque, a layer of bacteria which grows within the mouth. The bacteria breaks down sugar left around the teeth and gums for energy, producing an acidic waste product. The acid erodes tooth enamel which protects the tooth’s dentine layer and nerve. The resulting symptoms are pain, halitosis, discolouring and distortion of the tooth and eventual tooth death and abscess formation. In severe untreated cases, the dead and decaying teeth can lead to systemic sepsis and even death. Dental decay is a disease process which will affect the teeth throughout the mouth but is a preventable disease through good oral hygiene and diet.

Guzman-Armstrong, 2005, FDI, 2009

Poor oral health has shown to seriously effect a child’s quality of life and general health status due to an increased chance of experiencing;

"pain, discomfort, disfigurement, acute and chronic infections, and eating and sleep disruption as well as higher risk of hospitalization, high treatment costs and loss of school days with the consequently diminished ability to learn"

(Sheiham, 2005)

Moreover children with poor oral health are more likely to be underweight and shorter in stature to their healthier peers, due to
eating difficulties and sleep disturbances (Acs et al, 1992, Ayhan et al, 1996). Consequently a child’s oral health status is regarded as a reliable measure of quality of life (Locker, 1996), whether the health status is report by the child or the parent (Barbosa & Gaviao, 2008a, Barbosa & Gaviao, 2008b). Making reported oral health an essential tool when assessing the quality of life and health of children who have difficulties communicating. Many of the studies conducted into the relationship between growth and oral health status were conducted in other countries, making it difficult to generalise the results to this country due to cross-cultural differences. However the correlation between oral health status and growth has been demonstrated in both developing and developed countries, validating a link between the two variables.

These symptoms affect the child’s long term wellbeing, as the child’s ability to achieve academically and eventually economically are diminished. Furthermore childhood socio-economic status has found to be indicative of adulthood health, including oral health (Mheen et al, 1998, Poulton et al, 2002). Poor oral health in adulthood has been linked to an increased chance of heart and lung disease, stroke, diabetes, premature birth and low birth weight, irrespective of smoking habits or deprivation (WHO, 2003a, Humphrey et al, 2008, FDI, 2009). Therefore by reducing the impact of social deprivation on childhood health should directly impact adult health experience.
Children living in socially deprived areas are more likely to experience decay than children from affluent areas and have more teeth affected (ONS, 2004a, BASCD, 2007, BASCD, 2009). This difference could be the result of poor understanding by parents of children’s oral health needs. When children from low social status groups access dental services, they are more likely to have their permanent teeth extracted instead of conservatively treated (ONS, 2004a). Demonstrating a reactive rather than proactive approach to oral health care, due to the tooth being so damaged by decay it cannot be saved. Currently only two thirds of children are registered with a dentist, children who do not attend the dentist regularly are more likely to develop problems with their oral health and are more likely to experience dental pain (Hall & Elliman, 2003, ONS, 2004b). Previously these children would have been identified whilst at school through in-school dental screenings. However the majority of these screenings have now been phased out, due to government guidance advising that the screenings were not cost-effective (DH, 2007c). Therefore there is now a proportion of the child population who are not receiving any regular dental screening service.

As well as an indicator of quality of life and social status, oral health has been linked to neglect, physical and sexual abuse (Appendix 1) (Kellogg, 2005, Harris et al, 2009). Awareness of this indicator is essential for nursing, as paediatric nurses have been identified as key
workers in child protection (DH, 2003, DH, 2004a, DH 2004b). Therefore knowledge of oral assessment and oral health indicators would allow nursing staff to identify and report abuse. Furthermore within cases of neglect it is essential to distinguish between deliberated and accidental abuse, perhaps due to ignorance of oral hygiene or a lack of service provision (Kellogg, 2005, Harris et al, 2009). Here the use of intensive oral health promotion programmes could allow nurses to identify the child’s and family’s needs and make appropriate referrals.

Consequently it is clear that there are multiple factors influencing a child’s oral health status and the relationship this has with a child’s wellbeing. Therefore for oral health promotion interventions to be successful, the interactions of these factors will need to be taken into account.

**Definitions of Oral Health**

Oral health in its simplest of terms refers to the physical health of the mouth. The WHO (2010) defines oral health as;

"...integral to general health and essential for well-being. It implies being free of chronic oro-facial pain, oral and pharyngeal (throat) cancer, oral tissue lesions, birth defects such as cleft lip and palate, and other diseases and disorders that affect the oral, dental and craniofacial tissues,"
collectively known as the craniofacial complex.”

WHO (2010)

This definition focuses on the physical element of oral health, restricted to disease processes and to the cells, tissues and organs involved. However the influence of oral health is not limited to the mouth. Instead it has a complex relationship with the body and mind of each individual. Affecting how we function from day to day and how we interact with our environment.

Offering a more comprehensive approach would be to apply definitions of general health to oral health. The WHO (1948, cited by WHO, 1998) suggests one of the earliest definitions as ‘a state of complete physical, mental and social wellbeing, not merely the absence of disease and infirmity’. Although ground-breaking for its time, this definition creates unrealistic and idealistic expectations of health (Seedhouse, 1998, Ewles & Simnett, 2005). Instead health is now recognised as a subjective and abstract concept (Naidoo & Wills, 2000, Ewles & Simnett, 2005). As such a comprehensive and compact definition has been difficult to develop (Seedhouse, 1998, Ewles & Simnett, 2005).

Hall & Elliman (2008) described health as being a ‘positive holistic state in which mental and social well-being are as important as
physical well-being’. This definition is rather vague in nature, purposefully to allowing people to adjust it to their own needs and values. It focuses on the present state of the individual, and as such fails to take into account the way a person’s health is ever changing. Especially in children, where a definition would need to take into account their needs for optimum growth and development. The WHO attempted this with an up-dated definition which defines health as;

‘...the extent to which an individual or group is able, on the one hand, to realize aspirations and satisfy needs; and on the other hand, to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living; it is a positive concept emphasizing social and personal resources, as well as physical capacities.’

WHO (1986 cited by Ewles & Simnett, 2005)

Although more encompassing, this definition is still heavily criticised (Seedhouse, 1998). In relation to oral health, this definition would mean to not everyone is able, or needs to achieve optimum oral health. This produces questions to the aim of health promotion, as the general trend, following medical ideologies, is to aim for optimum health.
Definitions of Oral Health Promotion

Currently there is no singular theoretical definition of health promotion (Naidoo & Wills, 2000, Ewles & Simnett, 2005); however the most widely accepted definition comes from the WHO, which states that;

"Health Promotion is the process of enabling people to increase control over, and to improve, their health”

WHO 1986 cited by WHO 1998

This definition is designed to be used alongside the WHO’s definition for health (WHO, 1998, Ewles & Simnett, 2005). However, the term health is not easily defined and this complexity follows through to the term health promotion (Seedhouse, 1998, Naidoo & Wills, 2000, McQueen & Kickbusch, 2007). Currently this definition is vague, failing to divulge how health promotion will achieve its aims whilst assuming that the term health has significant meaning to the reader, (Seedhouse, 1998).

Hall & Elliman (2008) defined health promotion as;

‘...any planned and informed intervention which is designed to improve physical or mental health or prevent disease, disability and premature death’
This definition provides a better insight into the aims of health promotion, although it fails to take into account the needs of children for growth and development. Overall this lack of clarity amongst definitions is partly due to health promotion’s comprehensive nature and broad base, making it difficult to define health promotion in a short and simple way (Naidoo & Wills, 2000, McQueen & Kickbusch, 2007). This uncertainty could lead to the introduction of unsuitable policies and interventions, with the potential of doing more harm than good to clients’ health (Seedhouse, 1998, McQueen & Kickbusch, 2007). This is of particular concerns within oral health promotion, where interventions like fluoridated water would reach entire populations for the benefit of the minority.

Health promotion can be further defined to the approaches taken to improve health (Appendix 1). Each of the approaches has limitations, however depending on the aim of the health promotion each approach can be used to its vantage (Naidoo & Wills, 2000, Ewles & Simnett, 2005). Often health promotion interventions will use several approaches to maximise effectiveness (Naidoo & Wills, 2000, Ewles & Simnett, 2005). Within oral health promotion, several techniques are currently being utilised depending on local need and resources. These are; fluoridation of water supplies, school nurse and health visitor
lead education programmes and policies guidance to support health promotion activities.

**Reasoning for Research**

Children’s oral health is a current and important issue facing children’s services. Locally, Nottingham City has demonstrated this by piloting City Smiles, an oral health promotion programmes which uses school nurses and health visitors to help reduce the high rates of dmft and health inequalities (Appendix 2). The use of public health nurses in oral health promotion highlights the potential of nurses to access children who are currently not accessing dental services. This approach is supported by WHO’s (2003b) 2020 oral health goals, which lists the integration of oral health into general health as a key goal. Therefore this study plans to investigate how student nurses are prepared for oral health promotion and the integration of oral health into general health.
Literature Review

Oral Health Promotion through Policy

Following the government target of no more than 1 dmft per child, Hall and Elliman’s (2003) ‘Health for all Children’ and the government’s Every Child Matters: Green Paper (ECM) (DH, 2003) were published. These revolutionary documents marked the start of dramatic change within children’s services. In the following year the National Service Framework for Children, Young People and Maternity Services (NSF) (DH, 2004a) was released, this mirrored many of the recommendations made in ‘Health for all Children’ including the need for services to be tailored to children’s and family’s needs. The NSF highlighted that services needed to become proactive, using early identification and intervention to ensure that the most vulnerable children are helped to achieve their true potential. Oral health was also as a key element of general health promotion, which helped to raise the profile of oral health promotion (OHP).

In the same year, the Chief Nursing Officer’s Review (DH, 2004b) was published. This review named nursing as the key profession to take the lead in developing holistic services, continuity of care and child health promotion. The document described nurses’ three key roles being; first contact and acute care, long term and continuing care,
and public health and health promotion, identifying nursing as essential for improving the health and wellbeing of children, including their oral health. All of the above documents presented the opportunity of creating a better future for all children. However they lacked the specific detail required to implement the broad plans needed to improve children’s health. Furthermore the picture painted by these documents is rather unrealistic and idealist, assuming what ideal health and wellbeing is and what people want to achieve. Nevertheless these documents set the standards for change and from these more specific documentation and guidance was developed.

‘Choosing Better Oral Health’ (DH, 2005a) provided a comprehensive guide to dental practices and Primary Care Trust’s (PCTs) about the development of oral health promotion services, not only for children but for adults too, helping to develop family health behaviours. The document identified that current approaches for oral health promotion were narrow and isolated, focusing on individual behaviours and lifestyle choices whilst failing to address the underlying influences; consequently having a limited long term effect. As a result the duplications of services were leading to conflicting advice, confusing families. Choosing Better Oral Health (DH, 2005a) therefore recommended that the government, education services, National Health Service, local communities and society work together to develop evidence based interventions to inspire and empower
communities allowing them to take control of their health. However one in three children currently lives in poverty (HM Treasury, 2004, End Child Poverty, 2010), therefore it is likely that providing more education and support alongside public health strategies like fluoridating water are unlikely to solve health inequalities if the overarching problem is poverty. For example if a parent has to make the choice between buying a toothbrush or feeding their child, the latter is likely to prevail. Even if the parent is aware that such an action will increase the child’s likelihood of developing dental decay, as their survival will come first.

Choosing Better Oral Health (DH, 2005a) also identifies how oral health promotion should be carried out by a variety of health care professionals, including health visitors and specialist nurses. Although it states that, "Other health professionals can help promote good oral health and should also be able to recognise when it is appropriate to refer to patients to a dentist"; it fails to identify school nurses as a key element of this proposal, missing out on a health care professional who has access and the skills required to provide oral health promotion. The guidelines also identify a need for an ‘oral health promoter’ to provide health promotion to children and families. However this would undoubtedly require extra funding for training and development, instead nurses could provide this promotion as a part of their service. This recommendation is particularly short
sighted as just a year previously nurses were identified as key professionals in health promotion, particularly for vulnerable children (DH, 2004b). Moreover by focusing on a target audience of dental practices and PCTs, the document immediately separates oral health from general health as the health care professionals who could implement these actions, like health visitors, are unlikely to see its contents. This is contradictory to the content of the guideline, which highlights oral health as integral to general health, something which dental practices would already be aware of. Lastly, Choosing Better Oral Health neglects to set a timeline or any targets for inclusion of the advice into local practice, perhaps reducing its importance and therefore impact on PCTs.

To provide guidance to health professionals on the needs of children and adults with specific health needs Valuing People’s Oral Health (DH, 2007a) was produced. This policy guideline reiterated and built upon the recommendations made by Choosing Better Oral Health. Valuing People’s Oral Health added that oral health is an intrinsic element of holistic care. Identifying that children with specific health needs often suffer from poor oral health, due to a dependence on carers, poor communication and the side effects of health interventions like sugary medicine (DH, 2007a). Valuing People’s Oral Health (DH, 2007a) highlighted that appropriate oral health promotion is essential, but cannot be provided by the dental
profession alone. As such dental practices must work with other health care professionals, including school nurses to ensure appropriate and comprehensive care is provided. However Valuing People’s Oral Health (DH, 2007a) failed to identify nursing’s potentially key role in ensuring oral health is integrated into care plans. This lack of insight may be due to the policy’s focus on community care rather than hospital care, but this exclusion of health areas may only compound efforts to increase oral health awareness. However PCTs are named as responsible for the education of health and social care professional in oral health promotion and assessment; hopefully improving the awareness of oral health’s importance and the need for its inclusion in care plans.

To assist promoters of dental health ‘Delivering Better Oral Health’ (DH, 2007b) was developed. This evidence based tool-kit provides a detailed breakdown of the oral health promotion advice and interventions available for different age groups and at-risk groups. Alongside the advice, a key is provided to inform readers of the strength of the evidence behind the advice or intervention, encouraging readers to develop their own evidence based practice. However Delivering Better Oral Health (DH, 2007b) does not advise when or how the health promotion advice or intervention should be given, which could lead to confusion and contradiction if advice is given too early or repeated by different health professionals.
Furthermore the advice has been simplified, not allowing for individual circumstances or requirements which is contradictory to previous Government aims to provide individualised holistic care. There is also concern that in the two years between Choosing Better Oral Health and Delivering Better Oral Health, there may have been confusion over what health promotion should be provided, throwing into question the progress services could have made within improving oral health and reducing health inequalities.

Following these oral health specific policies, statistical evidence has shown that the mean dmft for the whole population has decreased (BASCD, 2007, BASCD, 2009). Locally, this includes Nottingham City, which had some of the highest rates of dmft in the country (Appendix 2). However although the overall dmft rate of children has decreased, the amount teeth affected in those children with dmft has not decreased as much. This shows that although there are fewer children with dmfts, those with dmfts still suffer with large amounts of decay (Appendix 2). These variances could mean that the initial decrease was the result of accessing families who were ignorant to oral health promotion but with the economical advantage. On-the-other-hand, the number of children assessed for the survey has decreased, as positive consent is now required to take part (BASCD, 2009). Therefore it is possible that those with the worst oral health statuses were missed out of the survey, making it difficult to compare
the statistics to previous years, reducing the results validity and reliability (BASCD, 2009). Therefore it will be interesting to see how the statistics develop of the next few years as the advice from the guidelines is employed.

More recently Healthier Lives, Brighter Futures (DH & DCFS, 2009) was published, commenting on the progress made to children’s services five years after the release of the NSF (DH, 2004a). Within the report oral health was disappointingly only mentioned briefly, with the policies and action plans initially devised and progress made since, narrowed down to two small paragraphs. Moreover the report used out-dated statistics and reiterated plans made by Health for All Children (Hall & Elliman, 2003) and Choosing Better Oral Health (DH, 2005a) some years previously. As a result it was felt the progress made in oral health promotion had not been fully evaluated, missing out on an opportunity to make further improvement and suggestions to service development. Perhaps this signals the end of oral health promotion as a political hot topic.

**Oral Health Promotion Interventions**

The literature reviewed for this study involved government and organisational reports, empirical work and systematic reviews from academic journals. These were identified through internet databases CINAHL, British Nursing Index, Medline and Google Scholar. Search
terms used were ‘oral’, ‘oral health’, ‘child’, and ‘nurse’, ‘student nurse’ and ‘health promotion’ alongside a combination of these. Articles from the year 2000 were included for up-to-date evidence; however some older articles were accessed to demonstrate the development of oral health care. Within oral health promotion interventions studies mainly using children were selected. However in oral health promotion and nursing, studies in which adults or children were receiving oral health assessment and/or promotion were included due to a lack of literature. Some studies using paediatricians were also included to allow for comparison.

‘Brushing for Life’ is a national oral health promotion programme, provided via sure start centres (DH, 2005b). Originally mentioned in 2001 as a pilot programme for improving oral health amongst deprived communities, the programme provided advice through the health visitor about oral health (DH, 2005b). Packs containing toothpaste, a toothbrush and leaflet were handed out to the families to help encourage behavioural change (DH, 2005b). The intervention was provided to families when their infant was 8, 18 and 36 months (DH, 2005b). However by these developmental stages the infants would have had the majority of their deciduous teeth come through and have start weaning (DH, 2007b, FDI, 2009). This puts into question how effective the advice would have been, as tooth brushing is meant to commence as soon as the first tooth starts to appear
(DH, 2007b). An appraisal of the programme in 2005 came to the conclusion that although there are signs of potential benefit, without a randomised control trial, it was difficult to establish cause and effect due to multiple influencing factors (DH, 2005b, WHO, 2005, Watt et al, 2006). This in turn makes it hard to compare Brushing for Life’s progress to other oral health programmes and judge its long-term chances of success (DH, 2005b, Watt et al, 2006).

Frustratingly the programme’s evaluation was the only detailed information on ‘Brushing for Life’ that could be found. The programme was mentioned in 2009 within the report ‘Healthier Lives, Brighter Futures’, which listed it as a key element for improving oral health (DH, 2009). However no reference was provided for ‘Brushing for Life’ within the policy, and from literature searches online, each PCT seems to have its own approach to oral health promotion. As such it is difficult to establish the potential this service could have nationally.

Improving on ‘Brushing for Life’, ‘City Smiles’ is a Nottingham based oral health promotion programme (Appendix 2). This local intervention improved the programme by providing health promotion before key developmental stages. For example initial packs were handed out at 3 instead of 8 months. This step attempts to ensure weaning had not been started early, that the transition would be
made from bottle to beaker by 12 months, and that teeth were brushed as they came through the gums. ‘City Smiles’ also continued providing health promotion into childhood ensuring that health promotion for permanent teeth, such as flossing was provided. Currently City Smiles is still a pilot programme so there is little evaluation of its progress and effectiveness (*pers comm.*). However it will be interesting to see what conclusions can be drawn as the pilot programme is only expected to run for two years. This time limitation could make it difficult to establish the long term effects of the programme as the children receiving the intervention will not have reached adulthood (Watt et al, 2006, WHO, 2005). City Smiles have so far observed that more training sessions were provided than expected, due to poor knowledge and confidence levels in providing oral health promotion expressed by the health visitors and school nurses (*pers comm.*). However due to the potential observer bias more empirical evidence is required before conclusions can be made.

Currently being developed in Nottingham, alongside ‘City Smiles’, is a school nurse led oral health assessment programme of school children’s teeth (Appendix 2). This intervention is to be implemented as a pilot programme, in which school nurses assess oral health, give advice and/or make referrals as appropriate. This has been developed following government guidance to stop in-school dental assessments by dentists unless the PCT could prove the screenings to be cost
effective and have a positive impact on oral health (DH, 2007b). This new school nurse role aims to improve the amount of children getting help for the oral health problems which otherwise may have gone untreated. However with only children with severe oral health problems being referred to the community dentist, this is a reactive service, providing help once the damage is already done. This is contradictory to the aims of the NSF and Choosing Better Oral Health which advocates proactive services tailored to individual need (DH, 2004a, DH, 2005a).

Oral health promotion interventions like the school nurse assessment programme, City Smiles and Brushing for Life use a combination of medical, education and social change approaches to health promotion (Naidoo & Wills, 2000, Ewles & Simnet, 2005). For example they provide preventative treatments such as painting teeth with fluoride (medical) alongside information packs and one-to-one learning sessions (educational and social). These programmes often focus on the poorest families, who suffer the largest health inequalities. However these one-to-one techniques are often expensive to set up and maintain resulting in mainly areas with the highest rates of poor oral health inequalities investing in such initiatives to meet targets. This is compounded by research from Friel et al (2002) showing that the use of mass media could achieve the same results as one-on-one interventions. However Friel et al (2002) focused on short term gains
and relied on the self-reported behaviours of primary school children; putting into question its reliability and validity. Nevertheless there is still the argument for the public health approach of fluoridating the population’s water supply. Although cheaper than one-to-one interventions, not all research into the effectiveness and possible side-effects of water fluoridation are conclusive (WHO, 2004, NCB, 2007). As such the introduction of fluoridised water has been left up to local authorities to assess local need. Water fluoridation has also been criticised for targeting the masses for the benefit of the minority, putting the general population at risk from side-effects (NCB, 2007). Furthermore this intervention does not change individual health behaviours, perhaps limiting its long-term effectiveness. However how the effectiveness of interventions is measured depends on the subjective concept of health gain (Ewles & Simnet, 2005, NCB, 2007, McQueen & Kickbusch, 2007). Within oral health promotion like City Smiles and Brushing for Life, the aim is educational, giving the clients the choice to employ this knowledge into their health behaviour. This free-will will mean that individuals can choose to, or may not be able to, implement the new knowledge; especially amongst children where the ultimate choice will come down to the parent’s perception of need alongside economic resources (Sisson, 2007).
Whether health is the responsibility of the state or the independent individual has always been a key ethical debate surrounding health promotion (Seedhouse, 1998, Sidell et al, 2003, McQueen & Kickbusch, 2007, NCB, 2007). Currently the British Government takes a liberal approach to health, only intervening to reduce the risks citizens pose to each other’s health and to promote the health of those who cannot take full responsibility for themselves (Mill’s Harm Principle) (NCB, 2007). Children fall into this category, as even with the Fraser Guidelines/Gillick Competency (Sidell et al, 2003, NCB, 2007); there will always be a proportion of the child population who are unable to care for themselves independently. In which case, the debate changes from being between the individual and the state to between the parent/guardian of the child and the state (Sidell et al, 2003, McQueen & Kickbusch, 2007, NCB, 2007).

The extent to which a state should go to promote children’s health is unclear. The stewardship model of health promotion advises that the state should not infringe on the liberties of parents whilst promoting the health of children (NCB, 2007). In comparison, the Mill’s Harm Principle states that children “must be protected against their own actions as well as against external injury” due to their lack of maturity and reliance on society (NCB, 2007). However these theories fail to classify the balance between the protection of child and the interference of the state. To resolve this conflict, the
likelihood of benefits of state interference verses the potential risks are usual considered (Sidell et al, 2003, McQueen & Kickbusch, 2007, NCB, 2007). To support the action of the state, the considerations need to either show that intervention will benefit the population or that inaction would cause more harm (Sidell et al, 2003, McQueen & Kickbusch, 2007, NCB, 2007).

Therefore a universal service, which can adjust to people requirements, would help to maintain people’s liberties whilst protecting the health of children (NCB, 2007). However if this liberal approach were to fail, then at a low risk of intruding on people’s individual freedoms, to provide children with invaluable access to benefits, a more intrusive approach would prevail (NCB, 2007). As such more invasive public policy may then be required to significantly reduce health inequalities (NCB, 2007). Within oral health promotion, the greatest benefits are theorised to be obtained by combining high-risk approaches (targeting at risk children and families with one-to-one services) and population approaches (water fluoridation) (WHO, 2003, NCB, 2007, Sisson, 2007, Felton et al, 2009).

**Oral Health Promotion and Nursing**

Nurses have been previously identified as key health care professionals in health promotion due to their unique access to children, especially those from deprived areas (DH, 2004a, DH,
2004b, DiMarco et al, 2009). In tackling oral health inequalities, nurses could provide one-to-one oral health promotion services to high-risk children and families. Some oral health promotion services are already using nursing skills, for example City Smiles (Appendix 2). In Nottingham, school nurses and health visitors, many of whom originally trained as nurses, are used to provide oral health education. However there is currently little research into the suitability of nurses to this new role. Anecdotal evidence from City Smiles found that school nurses and health visitors often requested more training sessions due to poor knowledge and confidence levels in providing oral health promotion (pers. Comm.). Although many of the school nurses and health visitors originally trained as nurses, this does not necessarily mean their original training was poor or that the nursing training available now is either.

During the literature searches for this review few articles investigating children’s nursing and oral health promotion were found. Of the literature available, many focused on specialist mouth care and service provision, for example PICU and Oncology. Within these areas, research suggests that oral health is generally overlooked by nursing and medical staff in terms of diagnosis, treatment and documentation (Franklin et al, 2000, Glenny et al, 2004, Dickinson et al, 2009).
Dickinson et al (2009) provided some insight into the relationship between paediatric nurses and oral health promotion. Their study looked at the implications of implementing a general oral health assessment tool on nursing knowledge and practice within a paediatric hospital. This study identified that was there not only a lack of knowledge but also a lack of priority among nurses, as the majority of participating nurses did not perceive oral health as a nursing role unless the child was at risk. However this ‘at risk’ group focused on acute medical need, identifying children who were, for example nil by mouth or intubated. As a result children from low social economic groups or unaccompanied children were often not identified. This was attributed to the hospital’s culture encouraging reactive approaches to acute care needs rather than preventative approaches for long term wellbeing. When the introduction of the assessment tool and educational programme for staff had little effect of nursing practice, culture was thought to be responsible. This poor change was also attributed to a lack of support from all staffing levels for the introduction of the tool. Nursing culture and educational experiences were found by McAuliffe (2007) to be an influencing factor on students implementing oral care practices whilst on placement, perpetuating poor care and the limiting the up-take of evidence based practice.
Although Dickinson et al’s (2009) work provides a key insight into the needs of paediatric nurses when implementing assessment tools, this research was carried out in New Zealand. As such it could be difficult to generalise the results to the UK due to cross cultural differences. However issues of children’s poor oral health are worldwide, and currently there is a lack of research surrounding paediatric nurses and oral health promotion, along with a lack of development in evidence based oral health assessment tools. Therefore this research provides a good basis to build upon further research. Moreover it makes the important acknowledgement that integrating oral health promotion into general health care is likely to be unsuccessful unless it is viewed as a multidisciplinary responsibility.

Research into adult nursing has long shown issues surrounding qualified and student nurses in terms of inadequate knowledge and competence to provide high quality, evidence based mouth care (Costello & Coyne, 2008, McAuliffe, 2007, Fitzpatrick, 2000, Adams, 1996). This short-fall is often attributed to a lack of education, pre and post-registration (Adams, 1996, Fitzpatrick, 2000, McAuliffe, 2007, Costello & Coyne, 2008). Further, due to a lack of time, resources and evidence-based assessment tools, oral health is not always viewed as a nursing priority (Costello & Coyne, 2008). However the nurses involved in these studies always demonstrate an enthusiasm to improve their knowledge base and practice (Adams,
1996, Fitzpatrick, 2000, Costello & Coyne, 2008). The implications of these adult based studies, although important, may be difficult to generalise to child nursing. Moreover McAuliffe (2007) and Costello & Coyne (2008) conducted their studies in Ireland, putting the validity into question due to cross cultural differences, as the education in the UK may be different to the education received by nurses in Ireland. However these studies do provide insight into nursing and oral health care. Fitzpatrick (2000) identified a need for increased education into the short and long term outcomes for oral health, to provide nurses with a better understanding on how oral health effects general health and welfare. This increased insight would then allow nurses to make informed, critically balanced decisions about the oral health needs of their patients. Although this study was conducted on an elderly care ward; these patients were dependent on the nursing staff for their oral health care, similar to children who are also dependent on carers.

In the United States of America (USA) the involvement of paediatricians in oral health promotion is a key issue, showing similar problems to nursing. Lewis (2000) found that only 50% of paediatricians had received oral health education prior to qualifying and that only 9% of respondents could answer all oral health knowledge questions correctly. Lewis (2000) made recommendations for oral health to be included into training and for policy and guidance
to be developed to support training and paediatricians post-qualifying. Krol (2004) reiterated Lewis’s (2000) findings, adding that a lack of inclusion of oral health into policy and guidance was slowing oral health’s inclusion into paediatricians’ curriculum. However it was Caspary et al (2008) who made the crucial link between education, knowledge and confidence. Showing that confidence in particular was the key factor to paediatricians’ supporting the inclusion of oral health promotion into the well-child health checks. Although these studies were performed in the USA on paediatricians, presenting problems with generalising findings to paediatric nurses in the UK, these studies still raise key points. For example the importance of governing bodies supports the inclusion of oral health promotion into curriculums, and the influence of confidence on people’s support of role development. Therefore if student nurses are not confident in their abilities to provide oral health promotion then perhaps they are unlikely to transfer their skills to practice particularly if it is not a perceived nursing role. This perception could be reinforced if the university education and placement experiences do not encourage to introduction of evidence based oral health promotion into practice.

**Nursing Education**

Currently student nursing programmes are monitored and in part designed by the Nursing and Midwifery Council (NMC) through standards of proficiency (NMC, 2004). These are then taken on by the
individual Universities to develop curriculums which fulfil each of the NMC’s requirements (NMC, 2004). The most recent edition of standards does not mention oral health skills specifically, however it does state that in order to register, nurses should be able to;

- Create and utilise opportunities to promote the health and well-being of patients, clients and groups
- Undertake and document a comprehensive, systematic and accurate nursing assessment of the physical, psychological, social and spiritual needs of the patients, clients and communities.
- Formulate and document a plan of nursing care, where possible in partnership with patients, clients, their carers and family and friends, within a framework of informed consent.
- Based on the best available evidence, apply knowledge and an appropriate repertoire of skill indicative of safe nursing practice.
- Evaluate and document the outcomes of nursing and other interventions
- Demonstrate sound clinical judgement across a range of professional and care delivery contexts.
- Demonstrate knowledge of effective inter-professional working practices which respect and utilise the contributions of members of the health and social care team.
- Delegate duties to others, as appropriate, ensuring that they are supervised and monitored
- Demonstrate key skills

NMC (2004)

All of which can easily be applied to oral health promotion, which would require the nurse to assess the child’s oral health, provide them and their family with appropriate health promotion. These
actions should then be documented and followed up to assess whether any further intervention is required. Alongside this, referrals may need to be made to dental services as appropriate. This process should be carried out whether in a hospital setting or community setting, depending on which services the child accesses. However Universities have to make that association between the standards and oral health promotion for oral health to be included into nursing curriculum. Consequently there have been calls for nursing care to go back to basics. As such the NMC (2007) developed ‘Essential Skills Clusters’ (ESC), which will help universities and student nurses achieve entry to practice by clarifying what the profession and the public expect from newly qualified nurses. These do mention oral health care specifically, but as a form of physical care not health promotion. Furthermore the completion of ESC is only compulsory for nursing students from the entry of September 2008. Meaning that any effect the ESC’s will have on practice may not been witnessed until the majority of the work force has qualified under them. Whilst there is a need to teach students the basics of mouth care, there is also a need to expand and develop mouth care into oral health assessment and promotion. Allowing nurses to assess the client’s needs thoroughly and holistically, taking appropriate evidence based action.
However any change to practice is likely to face opposition. This is mainly due to a perception that nursing care should be a natural process, based on common sense (Hooper, 2004, Goodman, 2006, Clarke & Davies, 2009, Tayray, 2009). Therefore a change towards an evidence based, scientific approach can be perceived as the profession moving into medicine and losing its focus on nursing care (Hooper, 2004, Goodman, 2006, Clarke & Davies, 2009, Tayray, 2009). Furthermore nursing staff may not perceive oral health promotion as an element of their duty of care; this perception would only be compounded by a lack of support and encouragement from government, the NMC, management and senior staff. There by slowing the process of change towards evidence based oral health promotion by nurses.

However as nurses have been identified as the key professionals in health promotion (DH, 2004a, DH, 2004b, DiMarco et al, 2009), changes to education and practice are likely to be required. As such nursing is developing and moving towards evidence-based critical practice and by 2013 all graduating nurses will be educated to degree level (PMC, 2010a). This new generation of nurses will be expected to be at the forefront of NHS development, contributing to service development, policy making, education, research and leadership (PMC, 2010b). This element of growth and development for nursing relates to the current debate lead by the Prime Minister’s Commission
(PMC) who sees future nurses as “a source of leadership, inspiration and support” (PMC, 2010b). An important aspect of this development will be nursing research. This will allow the development of evidence-based practice, specifically focusing on the opinions, perceptions, expectations and experiences of children, families and nurses (Parahoo, 2006). Allowing effective service development and providing a greater understanding into how the attitudes, knowledge levels and beliefs of health professionals can influence their practice (Parahoo, 2006).

**Summary of Literature Review, Aims and Objectives**

It is apparent from the literature that poor oral health is a modern health problem especially amongst the socially deprived, within the UK and around the world. As such, policy and guidance has been implemented to develop oral health promotion programmes and services to improve the oral health of children and adults. However recent statistics and research has shown that this is having little effect. This is partly due to a lack of empirical research surrounding oral health promotion interventions and their effectiveness. However there is a general consensus that in order for health promotion to be successful it needs to; involve the community and aim for social change, be universal but target individual needs, be cost effective and lastly provide a comprehensive service that is easy to coordinate.
The literature has suggested and this study proposes that nurses are in a key position to provide oral health assessment and promotion due to their unique access to children from deprived areas. However, there is currently a lack of current research into paediatric nurses and student paediatric nurses making it difficult to assess the viability of implementing oral health promotion and assessment as a nursing role. The research that is available suggests that paediatric student nurses’ knowledge, confidence and understanding of oral health promotion and assessment may be insufficient. Therefore the aim of this research is to investigate student paediatric nurse’s perceptions of their oral health education and their opinions towards oral health promotion and assessment by nurses.

Furthermore Caspary et al (2008) found that paediatricians, with a greater experience of oral health promotion and assessment, were more likely to support the proposal that paediatricians should take a more active role in children’s oral health. Consequently this study hypothesises that student paediatric nurses with a greater education and experience of oral health promotion will lend greater support to nurse led oral health promotion and assessment.
The aim and hypothesis of this study will be achieved through the following objectives:

1. To identify the experiences student nurses have of oral health education, promotion and assessment.
2. To investigate whether student nurses feel they have the ability to perform oral health promotion and assessment.
3. To examine whether student nurses feel it is part of a nurse’s role to perform oral health promotion and assessment.
3. Method and Methodology

3.1 Quantitative Descriptive Approach

The literature review demonstrated that there is a requirement for further research into student nurses’ perceptions of oral health education and attitudes towards oral health promotion and assessment. The aims and objectives identified in the literature review focussed upon a need for a broad overview of current paediatric nursing students experiences and opinions, investigated in a structured and objective manner. This indicates the best approach for research as being a descriptive quantitative approach.

A descriptive quantitative approach is considered most suitable as it will allow this study to classify variables into different areas (Parahoo, 2006, Davis, 2007, Creswell, 2009). The areas identified are psychological, social and behavioural, which will be statistically compared to identify correlations and relationships between the variables (Parahoo, 2006, Davis, 2007, Creswell, 2009). This research method will allow this study to be exploratory, facilitating current understand and contributing to future hypotheses and research (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Specifically it could provide an overview of current students’ awareness and opinions to oral health promotion and assessment;
giving commissioners and service providers an insight into how health services and nursing education could be developed.

It could be argued that the quantitative approach is reductionist, whereas a qualitative method would provide a more holistic viewpoint (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). However the aim of this study is to provide insight into a broad topic area which the descriptive quantitative approach allows for. Furthermore the use of a structured approach allows the study to be easily replicated, adding to the knowledge base and providing validity to the results (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). If more depth is required then through this study, specific areas could be identified for future qualitative research.

### 3.2 Sample Characteristics

For this research project the target population was made up of child branch student nurses studying under the University of Nottingham, from all centres. Students from all years on all courses, Diploma, Degree or Master of Nursing Science (MNursSci) were included (Table 2). This group was seen as particularly appropriate as the child branch student’s undertake training at different centres across the East Midlands, providing a more varied experience of hospital and community care. Originally first year cohorts were considered for exclusion from the study as they were unlikely to have experienced
much child branch teaching or placements. However due to the small population of child branch student nurses within the University of Nottingham; the first year cohorts were included to improve the statistical significance of the data. It is also hoped that the data from the first year cohorts will add some depth for comparison to the other cohorts, as these students have yet to have specialised to child branch.

### Table 2: Details of Sample Population

<table>
<thead>
<tr>
<th>Nursing Course</th>
<th>Year of Study</th>
<th>Cohort</th>
<th>Cohort Size (Est = Estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma/Degree</td>
<td>1</td>
<td>0909 &amp; 0901</td>
<td>Est 55</td>
</tr>
<tr>
<td>Diploma/Degree</td>
<td>2</td>
<td>0809 &amp; 0801</td>
<td>Est 55</td>
</tr>
<tr>
<td>Diploma/Degree</td>
<td>3</td>
<td>0710 &amp; 0705</td>
<td>Est 55</td>
</tr>
<tr>
<td>MNursSci</td>
<td>1</td>
<td>0913</td>
<td>20</td>
</tr>
<tr>
<td>MNursSci</td>
<td>2</td>
<td>0812</td>
<td>15</td>
</tr>
<tr>
<td>MNursSci</td>
<td>3</td>
<td>0711</td>
<td>13</td>
</tr>
<tr>
<td>MNursSci</td>
<td>4</td>
<td>0610</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>Est 231</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.3 Cross Sectional, Retrospective Design

To develop an understanding of how opinions of oral health education, promotion and assessment evolve for students throughout the nursing courses, a cross-sectional retrospective design was deemed as most suitable. As this will allow each year group to be sampled, providing a detailed overview of the sample’s previous experiences of oral health education (Parahoo, 2006, Davis, 2007,
Denscombe, 2007, Crewell, 2009). In particular, the MNursSci course, where all years are currently following the same programme, therefore providing research with an insight into how the course progresses over the four years. By using the cross-sectional retrospective approach, the data collected from the different courses and years can be compared for similarities and differences; therefore limiting the effects of poor recall of student’s responses (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). This detailed analysis on the results aims to provide a detailed overview of students’ current experiences and opinions, and perhaps revealing relationships between the different variables. Furthermore these approaches allows for the data to be gathered over a short period of time which is most suitable for the resource requirements of a Masters dissertation (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009).

3.4 Survey Design and Questionnaires
A survey design was selected as it allows for the collection and analysis of a large amount opinions and experiences which suits the aims of this research project (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Furthermore survey designs tend to be economical and produce easy to analyse data, perfect for an initial exploratory piece of research (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009).
From the survey design, self administered questionnaires were selected as they ensure the anonymity of the sample. This is important within this study as the sample may have concerns over confidentiality, as the researcher is a peer of theirs and as a result the sample may be concerned that their responses will be seen and perhaps judged by the researcher or their lecturers (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Within other techniques like interviews these concerns could result in social desirability bias, with the students stating answers which match social expectations or requirements of the researcher (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Therefore by providing anonymity within the questionnaires it is hope more honest and reliable data will be gathered; increasing the study’s validity (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009).

Questionnaires provide a relatively quick and easy way of describing the opinions of a whole population, providing the self-administered questionnaire is short, well structured and easy to complete (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Furthermore the standardised structure and wording of questions increases reliability and allows the study to be easily replicated by other researchers (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). A critique of questionnaires is that standardisation and resulting
detachment of the researcher from the sample can result in superficial data, as the researcher is unable to elaborate on responses (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). However the aim of this study is to provide a broad overview of the current situation within oral health and student education, which will allow for future detailed research.

### 3.5 Questionnaire Design

The questionnaire was developed with permission from Caspary et al.’s (2008) questionnaire into the perceptions of oral health training and attitudes toward performing oral health screening among graduating paediatric residents (Appendix 3). This use of this previously validated questionnaire provided a good base for the development of this study’s questionnaire. It ensured a balance of close-ended and open-ended questions, facilitating quick and easy completion whilst providing students with freedom in their responses (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). This provides greater depth to the responses whilst avoiding common limitations of lengthy questions, ambiguous and biased questions or superficial results (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Any of which could have affected the questionnaire’s validity and reliability (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009).
From Caspary et al (2008) the questionnaire was adapted to 3 sections and designed to take around 10 minutes to complete (Appendix 3). Section A was made up of demographical questions which are useful for constructing population profiles and exploring correlations (Boyton & Greenhalgh, 2004, Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). For example the correlation between the support expressed by students towards nurse-led assessment, and the students’ level of qualification. Next sections B and C go on to explore perceptions of oral health, basic oral health knowledge and attitudes towards oral health promotion and assessment. A detailed comparison of the study’s questionnaire to Caspary et al (2008) can be found in appendix three.

As the questionnaire was adapted, a pilot study was carried out to ensure that the changes made to Caspary et al (2008) had not altered the reliability and validity of the questionnaire. The pilot study was carried out on a selection of dental nurses, hygienists, dentists and a recently graduated MNursSci student nurse. From the pilot study a few grammatical errors were identified and rectified. Apart from this the participants felt that the questionnaire was realistic, easy to understand and complete, and would achieve its aims. The pilot study helped to confirm that the adapted questionnaire was valid.

3.6 Method of Data Collection

In this study the students were accessed at the end of their lectures with the permission of the lecturer. All students who attended the lecture were included in the study and asked to volunteer. Any students who did not attend the lecture were excluded and not followed up for participation. The student nurses’ timetables were accessed via the internet and nursing lecturers, who assisted in the development of a data collection timetable (Appendix 3) ensuring each cohort was accessed. However completing research within this environment could have an effect on the data collected due to social and cultural factors (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). As this piece of research is only taking place within one nursing school there could be cross cultural differences making it difficult to attribute the findings to other nursing schools (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). However as there is little research currently within this area, the results could serve as a base for comparison; enhancing understanding within student nurses’ education.

As the questionnaires were distributed to the total population a sample size calculation was deemed as unnecessary. Instead several
sample size calculations were completed to demonstrate the response rate required for varying confidence levels. Once the data has been collected the appropriate confidence level will be accepted.

Table 3: Confidence Level Calculation (SurveySystem, 2009, MaCorr Inc, 2009)

<table>
<thead>
<tr>
<th>Confidence Level</th>
<th>95%</th>
<th>90%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence Interval</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Population</td>
<td>231</td>
<td>231</td>
<td>231</td>
</tr>
<tr>
<td>Response Rate</td>
<td>144</td>
<td>125</td>
<td>110</td>
</tr>
<tr>
<td>Required Percentage</td>
<td>62%</td>
<td>54%</td>
<td>48%</td>
</tr>
</tbody>
</table>

3.7 Ethical Considerations and Approval

Due to a questionnaire’s perceived non-intrusive nature there is often a misconception that they can cause no harm (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). However probing personal or professional questions can affect students more than expected; for example knowledge questions can be perceived as threatening, creating concerns over how the students’ performance is perceived by themselves, researchers or lecturers (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). A further factor to consider is the effect the researcher’s presence could have on the data collection and the results (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). The students may feel coerced into taking part in the study due to the researcher’s presence there (Parahoo, 2006, Davis, 2007,
Therefore when designing any research project it is important to observe four key rights, these are; the right to not be harmed, the right to full disclosure, the right to self determination and the right to privacy, anonymity and confidentiality (Parahoo, 2006, Davis, 2007, Denscombe, 2007, Crewell, 2009). Each of these rights was considered in detail for this study in terms of questionnaire content, informed consent, anonymity and confidentiality (Appendix 3).

For this study ethical approval was sort in August 2009 from the University of Nottingham, Division of Nursing Committee (Appendix 3). Where the study protocol, draft questionnaire and draft information sheet were approved for research with some minor corrections (Appendix 3). Following this the course leaders for the diploma/degree programme and masters of nursing science programme were contacted for permission to access the students whilst they were at lectures. The individual lectures themselves were then approached for permission to attend the end of their sessions to collect data. Following this consent to take part in this study was assumed following the return of a completed questionnaire. In accordance to university data retention policy, it has been organised that the completed questionnaires will be stored within the University of Nottingham for 7 years.
3.8 Analysis of Data

To ensure the data collected is protected and kept confidential, the questionnaires will be given an identification (ID) code. This ID code will then be used when the raw data is entered into SPSS version 17. Descriptive statistics will be used to give an overview of the raw data. The frequencies, median, mean and standard deviations of the data will be presented, as these measures allow the variance of the data to be described whilst taking into account the influence of extreme values (Hinton, 2008, Hinton et al, 2008). The relevant variable will be present in tables and bar graphs to present the data in a concise manner (Hinton, 2008, Hinton et al, 2008).

Certain variables will be compared and correlated using inferential statistics to establish any significant differences and relationships. Caspary et al (2008) used one-way analysis of variance (ANOVA) and post hoc Scheffe tests to examine specific relationships between continuous variables (Hinton, 2008, Hinton et al, 2008). However as population is a lot smaller for this study than Caspary et al (2008) the data is likely to not be homogenous but be non-parametric. Therefore non-parametric tests will be used, including; Mann-Whitney U for the direct comparison of one independent variable with a maximum of two conditions, e.g. nursing courses (Hinton, 2008, Hinton et al, 2008). Kruskal-Wallis will be used for the direct comparison of one independent variable with more than two conditions, for example
academic year (Hinton, 2008, Hinton et al, 2008). For correlation analysis between two variables, Spearman’s rho will be used to identify relationships (Hinton, 2008, Hinton et al, 2008). There is the possibility that the knowledge scores from section C will produce homogenous, parametric data. If this is the case then independent t-tests will be used to identify differences in one variable with less than two conditions (Hinton, 2008, Hinton et al, 2008). ANOVA will be used for comparison of one variable with more than two conditions, whilst Pearson will be used to identify any correlations between variables (Hinton, 2008, Hinton et al, 2008).

To establish whether the results are due to chance or not a p value will be used to measure the significance, the smaller the p value (p < 0.05) the stronger the evidence against the null hypothesis (Sterne & Smith, 2001, Hinton, 2008, Hinton et al, 2008). The p value was not designed to be used to show whether the results are significant or not, rather how significantly the results can be applied to situations (Sterne & Smith, 2001, Hinton, 2008, Hinton et al, 2008). Therefore if a p value greater than 0.05 is found, the results will not be labelled as insignificant, instead they will be discussed against current literature to establish their clinical significance.
3.9 Conclusion

This chapter has introduced what this study aims to achieve and how this shall be done. Within the results chapter the data collected will be analysed as detailed above. The implications of the method and methodology used on the data collected will be considered within the analysis and discussion of the results.