UNIVERSITY OF KWAZULU NATAL

# EXPLORING NURSES KNOWLEDGE, PRACTICES AND PERCEPTIONS REGARDING COMPREHENSIVE ORAL CARE FOR CRITICALLY ILL PATIENTS AMONG INTENSIVE CARE UNIT (ICU) NURSES IN BOTSWANA.

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# EXPLORING NURSES KNOWLEDGE, PRACTICES AND PERCEPTIONS REGARDING COMPREHENSIVE ORAL CARE FOR CRITICALLY ILL PATIENTS AMONG INTENSIVE CARE UNIT (ICU) NURSES IN BOTSWANA

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By

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2011

## Declaration

I declare that this dissertation on nurses' knowledge, practices and perceptions on comprehensive oral care is my own work, that sources that I have used or quoted have been indicated and acknowledged by means of complete reference and that this work has not been submitted before for other degree at any other institution.

Student name: Annah Philo Sarefho

Signature: ----------. Date: ----------

Supervisors' name: ----------

Signature: ---------- Date: ----------

## Dedication

This dissertation is dedicated to my ailing mother Idah, and my children, Kagiso and Popo

**Acknowledgements**

I extend my thanks and appreciation to the following people, without whom the study and dissertation would not have been possible.

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- Nurses at the two study sites in Botswana
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Above all, I give thanks to almighty Jesus who gave me the power and strength to pull over throughout my studies and stay in South Africa

To you all, my sincere thanks and love

## Abstract

**Background:** Comprehensive oral care is an evidence-based, cost effective, essential routine nursing intervention that nurses ought to provide with good knowledge/understanding as it prevents and controls nosocomial infections especially Ventilator Associated Pneumonia (VAP) that is associated with increased morbidity and mortality in critically ill patients in Intensive Care Units (ICU).

**Aim of study:** To determine ICU nurses' knowledge, describe their practices and identify their perceptions regarding comprehensive oral health care to critically ill patients in order to refine or develop evidence based oral care protocol.

**Methods:** A quantitative approach with a descriptive, exploratory survey was used for this study. A non probability convenience sample of thirty-four (34) ICU nurses from two public referral hospitals participated in this study. A questionnaire with a combination of open and closed ended questions was used to collect data on comprehensive oral care to critically ill patients.

**Results**

Thirty-four nurses responded to the questionnaire (response rate 89%). Only 18% (n=6) were knowledgeable about important aspects of oral care, while the majority, 82% (n=28) lacked knowledge on important aspects of oral care. Fifty-nine percent (59%) n=20 had received training on comprehensive oral care at basic nursing training and 44% (n=15) had orientation at unit level. Ninety-seven percent (97%) n=33 of the participants requested further updates on comprehensive oral care. No significant relationships were found between nurses' demographic characteristics and knowledge of comprehensive oral care. All (100%) n=34 of nurses gave oral care a high priority and 91% ranked it very important for critically ill patients. Toothbrushes and toothpaste were used by 85% (n=29) of nurses and only 50% (n=17) used mouthwashes. The reason for non- use of mouthwashes was lack of supplies and not having been foreseen in unit protocol although neither of the units had an oral care protocol in place.

## Conclusion

Nurses lack knowledge on important aspects of comprehensive oral health care and there is no correlation between demographics and nurses' knowledge. Nurses rank mouth care as high priority, although they find it unpleasant to perform. Nurses are not formally educated on oral care and there are no mouth care protocols or mouth care assessment tools in units to guide them on oral care provision to critically ill patients, which lead to variations and inconsistency in oral care provision.

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ABBREVIATIONS

ICU – Intensive Care Unit

SICU – Surgical Intensive Care Unit

MICU – Medical Intensive Care Unit

CCU – Coronary Care Unit.

VAP – Ventilator Associated Pneumonia

NRH – Nyangabgwe Referral Hospital

PMH – Princess Marina Hospital

HAP – Hospital Acquired Pneumonia

CDC – Centres for Disease Control.

MEDLINE – Medical Literature on Line

CINAHL – Cumulative Index to Nursing and Allied Health Literature

# CHAPTER 1: BACKGROUND TO THE STUDY

## 1.1 Introduction and background to the study

Oral health care is a basic, routine fundamental aspect of nursing care that has an impact on the health, wellbeing and comfort of patients (Furr, Binkely, McCurren, and Carrico, 2004). It is an essential routine nursing procedure that is part of the nurses' practice domain. Nurses are expected to be knowledgeable about oral health care and ensure that the mouths of their patients remain comfortable, clean, moist, and infection free (Hijji, 2004).

Patients admitted to Intensive Care Units (ICUs) are critically ill and severely compromised. These patients are often intubated, have nasogastric tubes and are heavily sedated, febrile, unconscious, which leads to dehydration and breathing through their mouths, which in turn causes a change in growth of oral flora and a loss of salivary effectiveness. The administration of treatments such as oxygen therapy and sympathomimetics which also predisposes them to xerostomia, and the supine position in which they are often nursed, all contribute to pool of secretions, which favour the growth of virulent microbes that are easily introduced into the lower respiratory tract, thus increasing the risk of pneumonias such as aspiration, hospital acquired and ventilator associated pneumonia (Garcia, 2005). As such, these patients have complex oral care needs and often need assistance in maintaining a clean, moist and infection free mouth (Glynn, 2005).

According to Pear (2007), the composition of the oropharygeal flora of critically ill patients undergoes a change from the usual predominance of gram-positive streptococci and dental

pathogens to predominately gram-negative organisms, constituting more virulent flora, including pathogens, that cause hospital acquired pneumonia/ventilator associated pneumonia within hours or days of admission to ICU. It is, therefore, necessary to examine patients' oral status upon admission so as to guide and plan for the frequency and type of solutions for use in individual patients. Oropharyngeal colonization in critically ill patients is generally associated with several systemic diseases, and bacterial colonization of the oropharynx has been identified as an important risk factor for the development of nosocomial pneumonia/ventilator-associated pneumonia (VAP).

Several authors and investigators worldwide have identified VAP as a common, life-threatening nosocomial infection in intensive care units (ICUs) and maintain that nurses can play a major role in preventing it through several preventive strategies, the most simple and cost effective being the provision of oral health care. VAP is reported to be occurring in 9% - 68% of patients treated with mechanical ventilation and is associated with high morbidity and mortality rates which range from 33% -71% and higher in high risk patients. It increases duration of ventilator support, hospitalization and costs of patients' management (Augustine, 2007; Powers, Brower &Tolliver, 2007; Hsieh & Tuite, 2006; VanNieuwenhoven, Buskens, Bergmans, Tiel, Ramsay & Bonten, 2004; Schleder, Stott & Llyod, 2002).

Poor oral hygiene has been shown to have a negative impact on the overall health of patients in critical care units (Scannapieco, 2006). Vollman (2007), therefore, emphasized '*a return to basics'* for patient safety outcomes to curb the risk of this serious nosocomial infection. Several studies and reviews have recommended comprehensive oral care as a simple, cost saving and preventive nursing intervention to reduce the risk of this common serious

nosocomial infection, as it focuses on removal of plaque, stimulation of salivary flow and moisturising of the oropharynx thus reducing the risk of nosocomial pneumonia and the overall costs incurred for hospitalization and resource utilization (Berry & Davison, 2006; Scannapieco, 2006; Munro & Grap, 2004; VanNieuwenhoven et al, 2004; Tablan, 2003).

Critically ill patients have a high risk of developing VAP because of their compromised immunity, treatment complexities, co-morbid conditions and inability to perform this essential care aspect for themselves. The accumulation of organisms in the oral cavity and their products produce biofilm on teeth, gradually leading to formation of plaque, an immediate indicator for poor oral health care, which cannot be readily dislodged except through tooth brushing (Pear, 2007). Grap *et al* (2003) claim that tooth brushing is not routinely performed on critically ill patients, as confirmed by Cutler and Davis (2005) in their observational study on improving oral care for patients receiving mechanical ventilation.

Maintaining oral health in critically ill patients is of utmost importance in reducing the risk of nosocomial infections and improving patient comfort and discharge outcomes (Scannapieco, 2006; O'Reilly, 2003). Morton, Fountaine, Hudak and Gallo (2005:556) emphasize that oral care does not only increase comfort, decrease thirst, but also preserves the integrity of the oropharyngeal mucosa. These authors, therefore, recommend comprehensive oral care for critically ill patients.

Berry & Davison (2007), in their literature review of oral care in ICU, found that nurses admit relegating oral care to a lower priority in the high pressured, high technological

intensive care. This report is supported in review by Malkin (2009), who also identified that the risk of poor oral care is often underestimated in the intensive care units, resulting in it having a lower priority than other unspecified nursing care activities. Clarke (2009), commenting on current standards of effective oral care provision in ICUs suggested that patients are really at risk if this essential nursing procedure is not performed.

Comprehensive oral care includes a combination of nursing activities such as an assessment of the oral cavity, brushing the teeth and moisturising the lips, mouth, oropharynx as well as other related care practices such as repositioning and securing the endotracheal tube, tracheotomy care and endotracheal suctioning. Some of these activities are often placed very low on the priority list of critically ill patients when compared with other critical care practices (Munro & Grap, 2004). In addition, the life-saving nature, fast pace, high tech, and low touch environment of ICUs overshadows the hands on provision of this basic essential nursing care (Abidia, 2007; Human & Bell, 2007; Ross & Crumpler, 2007; Berry & Davison, 2006; Jones, Newton & Bower, 2004; Munro & Grap, 2004. Grap, Munro, Ashtiani & Bryant, 2003).

Clarke (2009) maintain that, although there is evidence suggesting that the importance of providing oral care is often not fully understood and consequently often neglected, effective provision of oral care is not a highly technical procedure, nor is it expensive in terms of resources. This author suggests, therefore, that it should be considered a priority and of equal importance as other highly technical interventions. This is echoed by the United Kingdom Department of Health's Essence of Care (2001), which highlighted oral care as a priority and an indicator of the standard of patient care. Human & Bell (2007) also commented that if

most people implement oral hygiene practices on a daily basis, why then does it appear that oral care for critically ill patients who are highly at risk, deserves less attention?

In spite of the above importance ascribed to oral hygiene, Munro and Grap (2004), in their review of oral care in ICU, found that oral care is often considered primarily an intervention simply for patients' comfort, a characteristic that further reduces its priority and its frequency. Berry and Davison (2006), in a review of oral hygiene as a critical nursing activity in ICUs, asserted that oral health and provision of comprehensive oral care is important not only for patients' comfort, but also for the prevention of infections and complications for the already immune compromised critically ill patient, as well as the improvements of patients' clinical outcomes.

Undertaking the practice of oral care in an ICU comes with a lot of challenges. Most patients admitted to an ICU are in need of respiratory support in the form of mechanical ventilation. The mouths of ventilated patients become overcrowded with devices such as endotracheal tubes, gastric oral tubes and tapes that secure the endotracheal tube, which limit access to the oral cavity and hence become a source for microbial growth. Nurses who are responsible for providing oral care may not only have the perception that oral care is not a priority in the overall health and wellbeing of their critically ill patients, but may also fear dislodging or displacing the tubes and may lack the necessary skills of carrying such procedures, thus affecting provision of this care (Furr et al, 2004; Schwartz & Powell, 2009). Furthermore in their studies these authors pointed out that the provision of quality oral care in ICUs is often influenced by oral care knowledge, ICU experience, adequate oral care supplies and time allocated for the procedure. Supporting this, Abidia (2007), in her review of oral care in an

ICU, maintains that oral care is a challenge for nurses because they have not been formally trained in assessing the oral status of critically ill patients in ICUs and that this lack of knowledge in the provision of comprehensive oral care is compounded by a lack of protocols to guide their practice. The consensus of several researchers is that inconsistent, impractical, difficult to follow, or actual lack of standardized protocols to direct best practice, results in nurses frequently performing oral care according to their individual rationales. This in turn results in a great variability from one nurse to the other (Cutler & Davis, 2005; Binkley,Furr, Carrico & McCurren, 2004; Sole et al, 2002). McAuliffe (2007), in her study on nursing students' practices in providing oral hygiene for patients, confirms that formal education has an influence on behaviours related to oral care to patients. Berry and Davison (2006) ascertain that the shortfall in prioritization of oral hygiene in the high pressured, highly technological environment of an ICU is possibly due to nurses having deficient knowledge or a lack of appreciation of the importance of oral health.

Malkin (2009) supports the notion that poor knowledge leads to uninformed choices of equipment and techniques. This is echoed by Hijji (2003) who maintains that poor knowledge has the potential to compromise the quality of patient care and result in unsafe practices. Clarke (2009) ascertains that knowledge and understanding of the underpinning theory is essential in order to perform a clinical skill competently, which is supported by Beaver (2009), who argues that not all nurses thoroughly understand the clinical connection between a patient's normal flora and the subsequent contamination with gram-negative pathogens, biofilm and plague formation, the development of xerostomia and mucosities, and the increased risk of hospital-acquired pneumonia. Many of the above authors suggested that, since nurses are ultimately accountable for their patients, they should be updated on the importance of effective oral care and the harm that can be caused by failing to provide it. It is

the duty of the nurses to be caring and compassionate and promote the wellbeing of their patients by minimizing risks and potential harm.

Most studies which have been done on oral health care have focused on oncological and elderly patients in the long term residents, with little research having been done on critically ill patients in ICUs as substantiated by Berry and Davison (2006) in their review. Some studies have been conducted focusing on nurses' practices and frequency in the provision of oral care in critically ill environments, but these were mostly surveys done in western countries such as the United States of America, the United Kingdom, Australia, Brazil and United Arab Emirates. The common feature in these studies, however, is the important aspect of oral healthcare in relation to a general lack of knowledge which results in inadequate practices(Cutler & Davis, 2005; Glynn, 2005; Hanneman & Gusick 2005; Binkley et al, 2004; Jones et al, 2004; Furr et al,2003; Grap & Munro,2003; Hijji,2003).

No documented studies on oral care to critically ill patients have been done in Botswana, where intensive care units are an emerging speciality. Generally, there is one ICU per hospital, but they are only fully functional in the referral hospitals. There are only seven local nurses who have been trained in intensive care working in these hospitals (Mmegi 2008) and expatriate nurses form most of the specialized workforce in the ICUs. The speciality of intensive care nursing is not offered in the nursing training institutes, but the student nurses do have the opportunity of being clinically placed in one of these units during their clinical practical internships. The referral hospitals also serve as orientation sites for intensive care and nurses in these hospitals work in ICUs on a rotational basis so as to gain the necessary skills and experience and to share the workload of these units. Because this study was

conducted in two of the referral hospitals which serve as teaching institutions and which have fully functional ICUs, it was possible to collect baseline data to identify problems and fill up gaps, in order to improve nurses' knowledge and clinical skills in the provision of comprehensive oral care to critically ill patients in ICUs.

### 1.2 Problem statement

Nationally and internationally, emphasis is placed on the prevention of infections and the provision of quality holistic nursing care based on evidence, available resources and patients' need. The Botswana Ministry of Health Clinical Service Department places emphasis on the prevention of infections and the importance of operational research for improved patient outcomes (Botswana Ministry of Health Profile). Thus, the provision of, oral care to critically ill patients in ICUs is worthy of research.

Nosocomial pneumonia is a common life-threatening infection in ICUs and comprehensive oral care has been identified as a key nursing intervention which assists in reducing this infection. Critically ill patients in ICU are often sedated or unconscious and, because of treatment complexities are at high risk for nosocomial infections. These patients are totally dependent on nursing staff for their personal and oral hygiene needs.

According to Augustyn (2007), nurses are the first line of defence in preventing bacterial colonization of the oropharynx through oral care, although they seem to rate this practice very low in priority (Berry & Davison, 2006). Nurses have been trained to prioritize and oral

care may be regarded as insignificant when life-saving interventions take top priority. The researcher aware of the importance ascribed to oral care for critically ill patients in ICUs observed some inconsistencies and variability in nurses' practices where oral care has sometimes been done by a quick swabbing of the oral cavity or, at times, not performed at all and has not been able to account for this due to a lack of published evidence. According to Ross & Crumpler (2007), poor oral hygiene has detrimental implications to critically ill patients which are supported by Clarke (2009), who maintains that in order to have quality care, oral care needs to change from rituals and intuitions to care which is based on evidence, research and practice guidelines/protocols. This necessitated the need to institute an enquiry to answer the question, what are the nurses' knowledge, practices and perceptions with regard to the importance of comprehensive oral care for critically ill patients as a preventative measure against nosocomial infections in ICUs?

### 1.3 Purpose of the study

The purpose of this study was to determine nurses' knowledge, practices and perceptions with regard to comprehensive oral care to critically ill patients as a preventative measure in order to develop, analyse or refine a context driven/specific protocol for the ICUs in Botswana.

## 1.4 Research Objectives

1.4.1 To assess nurses' knowledge regarding comprehensive oral health care to critically ill patients'.

1.4.2 To describe current oral care practices in the provision of comprehensive oral care to critically ill patients

1.4.3 To identify theoretical or clinical oral care training/instructions that ICU nurses underwent

1.4.4 To describe nurses' perceptions and their ranking of oral health care in critically ill patients

1.4.5 To establish association, if any, between nursing training, experience, demographic characteristics and country of origin with regard to knowledge and practice of oral health care to critically ill patients.

1.4.6 To establish the existence of an oral care protocol in the ICUs, and to analyse, refine or develop the protocol.

## 1.5 Research questions

1.5.1 What is the knowledge of ICU nurses regarding comprehensive oral care to critically ill patients?

1.5.2 What are the nurses' current practices in the provision of comprehensive oral care to critically ill patients?

1.5.3 What theoretical/clinical training/instruction have ICU nurses had with regard to oral care?

1.5.4 How do nurses perceive oral care and how do they rank the importance of oral care for critically ill patients?

1.5.5 Is there any association between nurses' demographic characteristics, training, experience and country of origin in the provision of comprehensive oral care to critically ill patients?

1.5.6 What assessment tools or protocols are available with regard to oral health care in ICUs and why are these tools important?

## 1.6 Significance of the study

Since there are no published studies on nurses' knowledge and practices regarding comprehensive oral care to critically ill patients in Botswana, the research findings may assist in the provision of quality oral health care to critically ill patients by focusing on current practices and identifying gaps in order to develop a protocol for oral care which will assist nurses by guiding them in the practice of providing comprehensive oral care to critically ill patients, thus improving their competencies and skills. The provision of evidence based comprehensive oral care may also reduce the potential risk of infections in critically ill patients, reduce their suffering and also reduce the costs incurred by long term care. The information obtained from the findings may be included in the nursing curriculum to be used as a guide to oral assessment tools and oral care skills for critically ill patients or in refresher courses, both of which may eventually lead to an improvement in the provision of comprehensive oral care to critically ill patients. The findings may also serve as a base and stimulate further research in oral health care practices and the best methods for the provision of comprehensive oral health care for critically ill patients in ICUs.

## 1.7 Operational term definitions

### 1.7.1 *Comprehensive oral health care*

In this study, comprehensive oral care refers to the practice of keeping the mouth clean and healthy by suctioning, brushing, rinsing and moistening to prevent a dry mouth and the build up of secretions and plaque that can lead to oral infections which increase the risk for pneumonias such as ventilator-associated pneumonia and hospital acquired pneumonia.

### *1.7.2 Knowledge*

Knowledge is the information, understanding and skills that you gain through education or experience (Oxford Dictionary 2006:821)

Knowledge, in this study, refers to familiarity or conversance with important aspects regarding oral care and the importance and benefits of comprehensive oral health care for critically ill patients

### *1.7.3 Practice*

Practice is a way of doing something that is usual or expected way in a particular situation (Oxford Dictionary 2006:1137)

In this study, practice refers to the routine performance, or carrying out, of comprehensive oral care to critically ill patients

### *1.7.4 Perception*

Perception is the way you notice things, especially with the senses. It's the ability to understand the true nature of something (Oxford Dictionary 2006:1079).

Perception, in this study, refers to individuals' own views regarding the importance of comprehensive oral care to critically ill patients and their conscious understanding on the ranking of oral care

### 1.7.5 *Critically ill patient*

In this study, a critically ill patient means any patient admitted to an ICU who has a life-threatening condition, is on supportive treatment, needs close monitoring and is totally dependent on nursing staff for her/his personal and oral health care needs

### *1.7.6 ICU Nurses*

In this study, ICU nurse refer to all registered nurses working in an ICU, irrespective of their age, gender, length of nursing experience and designation

## 1.8 Conclusion

This chapter has covered the background which motivated the study, the problem statement, the purpose of the study, research objectives and questions, the significance of the study and operational definitions.

Chapter two, which follows immediately, covers the literature related to the study, including the theoretical underpinning of the study. Chapter three covers the methodology of the study, chapter four is a presentation of the findings and chapter five presents discussion of the findings, the conclusions and the recommendations of the study.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

The aim of a literature review is to obtain information concerning the topic under study. According to Brink (2006; 67), a literature review is a process that involves findings, reading, understanding and forming conclusions about the published research and theory underlying the topic of concern. Furthermore, it allows the researcher to determine what is already known, helps to refine the topic, and forms a base for comparison and supports the current study.

The literature reviewed focused on oral health care in intensive care units and is a synthesis of data and information from an extensive range of sources, such as dental/oral health, microbiology and infection control from the point of view of intensive/critical care nursing. Sources include electronic articles and studies published between 2003 and 2010, indexed in the following databases: Medline, CINAHL, Pub med, Medscape, Science direct, Joanna Briggs Institute and the Cochrane library. A web search was also conducted using the Google search engine, using the key words oral care, mouth care, mouth hygiene, oral health care, intensive care and critical care. Editorials and comments on oral care were also included. Only literature from 2003 -2010 was used to get the latest and researched information on the studied topic though information before 2003 was also used as the basis for the study.

Previous studies on oral health care have focused mainly on oncological patients and the elderly in the long term residents. Most of studies on oral health care in an ICU context were carried out in western countries, and these focused mainly on frequency and practices of oral care. Their designs, purposes and study population samples differed, making it difficult to substantiate the findings in the African context where resources are scarce and limited.

Apart from a literature review by Human and Bell (2007), in South Africa, which identifies and describes the available evidence related to the beneficial effects of oral hygiene care and the way in which oral hygiene practices should be implemented for critically ill patients, no studies with the context of providing oral care to critically ill patients have been done in Africa or, particularly, in Botswana. The literature reviewed focused on:

- The importance of oral health care for critically ill patients in ICU
- Nurses' knowledge and role in the provision of oral health care to critically ill patients
- Evidence based practices in the delivery of oral care
- Barriers to oral care in ICUs
- Oral care management tools

### 2.2 The importance of oral care in critically ill patients

Oral health is influenced by dental plaque, the type of microbial flora present, salivary flow and oral immunity (Human & Bell 2007; Pear, 2007). Critically ill patients are severely compromised and often have multiple co-morbidities, which hinder nurses in performing oral care upon them. They are further burdened by a variety of treatment modalities that affect their ability and oral mucosa (Human & Bell, 2007; Berry & Davison, 2006; Garcia, 2005).

Oropharyngeal colonization is associated with several systemic diseases and bacterial colonization of the oropharynx is said to be an important risk factor for ventilator associated pneumonia (VAP). VAP is one of the most frequent complications among critically ill patients admitted to ICUs, with an incidence cited from 10% to 65%. Patients having VAP are 2.2 to 4.3 times higher at risk of death, as compared to other patients without pneumonia (Pear 2007). Comprehensive oral care reduces the risk for this common nosocomial infection (Garcia 2005). In a nonrandomized trial with historical controls, by Mori et al (2006), to examine whether oral care contributes to the prevention of VAP, it was found that oral care decreased the incidence of VAP in ICU patients.

Most oral bacteria are considered to be part of the patients' normal flora. These consist of different species which tend to colonize different surfaces in the mouth (Pear 2007; Berry & Davison, 2006). According to Pear, (2007), in critically ill patients the composition of the oropharyngeal flora undergoes a change from the usual predominant gram positive streptococci and dental pathogens to predominately gram negative organisms constituting more virulent flora, including pathogens that cause ventilator-associated pneumonia within hours or days of admission into an ICU. As such, an assessment of patients' oral cavities on admission is suggested as a priority, to guide the subsequent provision of oral care.

There is also a depletion of substances that act as host defence mechanisms, resulting in normal flora being replaced by virulent pathogens. These organisms are said to attach to teeth surfaces and produce biofilm, which gradually leads to the formation of dental plaque and is not easily dislodged except through tooth brushing (Grap *et al* 2003). The mouth of critically

ill patients then becomes a reservoir for pathogens (Schwartz & Powell 2009; Vollman 2007; Berry & Davison 2006; Munro et al 2004).

Saliva has antibacterial properties and is part of the body's defence against infection as it keeps the mouth clean and moist. It has a protective, antibacterial property that maintains a balance of resident bacteria, which includes staphylococcus and candida, and is also responsible for washing away debris and food particles (Pear 2007). In critically ill patients, there is a reduced production of saliva due to the absence of oral intake; drugs such as antibiotics, diuretics, analgesics (particularly opiate based), sympathomimetics like most inotropes which have adrenaline effects of drying the mouth and oxygen therapy (Pear 2007; Berry et al 2006). These all contributes to dryness of the oral cavity, which predisposes to increased oropharyngeal colonization by virulent respiratory pathogens, therefore an increased risk of respiratory infections (Malkin 2009). On this account, moistening of the oral cavity is of utmost importance.

Regular oral assessment and individualized oral care, along with the use of a standardized protocol for oral care, incorporating proven modalities, is said to be vital for optimal oral care in the critically ill patient (Malkin 2009; O'Reilly 2003). Therefore, the goal of oral care interventions in critically ill patients should be the removal of plaque, the stimulation of salivary flow and moistening of the oral mucosa (Grap et al 2003).

According to literature, nurses recognize and consider oral care as an important and integral component of intensive nursing care. Yet, there are discrepancies in carrying out this

procedure among nurses in different countries and on different categories of patients as demonstrated in surveys undertaken in different countries.

A study by Hijji (2003) in the United Arab Emirates on 46 nurses, focusing on knowledge and practice of oral care in an acute care unit, revealed knowledge deficits on some aspects of oral care. While 56% of the nurses were aware of adverse effects of drugs, 39% of them believed mouth assessment was not necessary. Most of the nurses were aware of healthy mouth indicators, but differed in their frequency of provision of mouth care to different categories of patients.

In the United Kingdom, a survey on oral care practices of 103 ICU nurses revealed that, on average, nurses gave oral care a similar priority as other aspects of personal care, with only 13.5%) giving it a lower priority. Ninety-eight percent (98%) of the nurses reported that they routinely performed an oral need assessment, 85.5% of them reported that they used toothbrushes every day and 50% administered chlorhexidine mouthwash.

In the United States of America, a survey was carried out on 170 nursing care providers to assess the frequency of their oral care interventions in a critical care unit. Seventy-five percent (75%) of the respondents reported providing oral care to non- intubated patients 2 or 3 times daily, while 72% reported providing oral care 5 times daily, or more, on intubated patients. in spite of these reports, however, oral care was documented on the unit's flow sheet with a mean of 1.2times per patient, for both intubated and non-intubated. Nurses were reported to report more frequent oral care than documented, as confirmed in an observational

study by Cutler & Davis (2005), whereby oral cleansing was observed to be done primarily via suction swabs and tooth brushing, while moisturising of oral tissues was not observed nor done at all.

These studies revealed that nurses considered oral care more as a comfort measure than a priority among critically ill patients (Gomes de Araujo, Gomes de Oliveira, Hanna, Correa, Carvalho & Alvares, 2009; Kearns, Brewer, and Booth, 2009; Jones et al 2004; Grap et al 2003).

A survey done by Glynn (2005) in Australia to assess how attitudes, behaviour, knowledge and current oral care practices influenced the provision of quality oral care among 30 ICU nurses revealed that although nurses regarded oral care as a component of their practice, there was no consistency in the frequency of its provision. While 90% of the nurses reported that they performed oral assessment on each shift, 56% did not routinely perform oral assessment of patients on admission. Two percent (2%) of the respondents reported that they provided oral care hourly, 50% two hourly, 40% four hourly and 8% eight hourly. With regard to knowledge of oral flora found in the oral cavity, only 18% proved to be knowledgeable, and results showed that 80% of the nurses used thymol, a mouth freshener which is not anti-microbial, for cleansing their patients' oral cavities.

In United Kingdom, a survey by Kearns, Brewer and Booth (2009) of the oral hygiene practices of 24 ICU nurses revealed that, 100% of the nurses thought that providing oral

hygiene care to the ventilated patients was a worthwhile use of nursing time, but only 54% recognised the importance of oral hygiene in the prevention of VAP

.

It was interesting to note that the important role of oral care in the prevention of respiratory tract infections such as VAP was not considered in almost all of these studies as the focus were more on the disparities in the provision of oral health care which had a negative influence on the overall delivery of comprehensive oral care. Results of these studies were attributed to either lack of knowledge or how important nurses perceived the administration of oral care to critically ill patients

Some investigators, however, did demonstrate the importance of oral care in reducing the risk of VAP in their studies and reviews. Ford (2008) highlighted the importance of the provision of oral care to surgical patients as a factor in reducing the incidence of VAP and, therefore, surgical outcomes.

A randomized clinical trial by VanNieuwenhoven et al (2004), in the Netherlands, demonstrated that preventing VAP in ICUs by means of oral decontamination is also cost saving. At baseline, the mean total costs for patients without VAP preventive measures ranged between $16.119 and $18.268, while post intervention costs dropped to $2.500.

Garcia et al (2009), in their study to determine the effect, the implementation of a comprehensive oral and dental care system and protocol had on the rate of VAP, found that

the rates decreased from 12.0 per 1000 ventilator days pre intervention to 8.0 per 1000 ventilator days post intervention. This shows a significant decrease in VAP rates which emphasizes the important role of oral care in the prevention of nosocomial infections such as VAP.

## 2.3 Nurses' knowledge and role in the provision of oral health care to critically ill patients

Intensive care units are highly specialized units that house critically ill patients who require close monitoring by staff who are competent and trained to deal with challenging situations. Critically ill patients are totally dependent on nurses for their basic personal and oral care needs and nurses are said to be the first line of defence in preventing bacterial colonization of the oropharynx through the provision of comprehensive oral care (Augustine, 2007). According to Beaver (2009), however, not all nurses understand the clinical connection between normal oral flora and the consequent contamination of the oral cavities of critically ill patients with gram negative pathogens, plaque formation, xerostomia and the negative effects of some drugs. This has been confirmed by other surveys conducted in different countries. In a study done in Australia, it became evident that only 18% of nurses had knowledge of the flora and pathogens found in the oral cavity (Glynn 2005). Another study conducted in Brazil revealed that 48% of the respondents lacked knowledge on oral care and 34.8% were not aware which drugs have an adverse effect on the oral cavity. Eighty-three percent (83%) of the nurses reported that they had not received basic training on oral health (Gomes de Araujo et al 2009; Hijji 2003). In a study done in the United Kingdom, the nurses themselves requested further training on oral health care. In this particular research, it became

evident that 23.5% of the participants had not received oral care training at their basic nursing training and 58% of them requested initial/further training in oral care. This is confirmed by nurses themselves requesting for further training on oral health care as evidenced by (23.5%) in United Kingdom reporting not to have received oral care training in their basic nursing training and 58% requesting initial/further training in oral care. In Brazil, 83% reported not receiving basic training on oral health.

Knowledgeable nurses have the power to reduce their patients' risk of acquiring VAP. Apisarnthanarak et al (2007) conducted a controlled prospective, quasi experimental study in Thailand in a Medical ICU (MICU), a Surgical ICU (SICU) and a Coronary Care Unit (CCU) to test the effectiveness of an educational programme in reducing VAP. The educational intervention resulted in a sustained reduction in the incidence of VAP. SICU and the CCU served as the controls, while the educational programme was implemented in MICU. Results showed a decrease from 20.6 cases per 1000 ventilator day's pre intervention to 8.5 cases per 1000 ventilator days post intervention in the MICU. In the SICU and CCU, however, statistics remained much the same. In SICU there were 5.4 cases per 1000 ventilator day's pre intervention and the VAP rate remained stable at 5.6 cases per 1000 ventilator days post intervention. In the CCU there were 4.4 cases per 1000 ventilator day's pre intervention and 4.8 cases per 1000 ventilator days post intervention.

With increased knowledge and awareness, nurses can intervene to reduce VAP rates and thus, consequently reduce ventilator days, VAP mortality and overall health care costs.

## 2.4 Evidence based practices

Windle (2003) encourages nurses to do away with traditional practices and practice evidence-based practices to maximise the quality of care for better patient outcomes. A report from the Nursing Research Committee at Methodist Hospitals in Indianapolis (2006) identified frequent oral care provision as an evidence-based prevention strategy for VAP.

Comprehensive oral care that includes tooth brushing, antimicrobial solutions and moistening agents has been shown to improve oral health as it removes dental plaque and respiratory pathogens from the oropharynx. It is reported that oral care stimulates salivary flow, which has antibacterial properties, and moistens the oral cavity, thus reducing the risk of respiratory infections and the subsequent costs in the care of critically ill patients (Malkin, 2009; Abidia, 2007; Human & Bell, 2007; Berry & Davison, 2006; O'Reilly, 2003). The same authors have identified the following modalities for delivering oral care which have proved to be beneficial to critically ill patients.

### ***2.4.1 Equipment***

**Tooth brush**: - A soft-bristled 'baby' tooth brush provides greater access to all regions of the mouth and mechanically removes dental plaque and debris from surfaces and crevices of teeth and in edentulous patients with minimal gingival trauma (Berry & Davison, 2006).

**Cotton swab/foam stick**: - These are effective in oral mucosal stimulation and moisture delivery, but ineffective in plaque and debris removal. They are recommended for use on patients who have bleeding tendencies and low platelet counts.

**Tooth paste**: - A pea-sized measure of fluoride toothpaste has both bactericidal and antiezymatic actions sufficient to reduce the formation of plaque acids.

### ***2.4.2 Mouth rinses/ mouth washes***

**Chlorhexidine mouthwash**: - This is a broad-spectrum, antibacterial and antifungal mouthwash that has an inhibitory effect against both gram-positive and gram-negative organisms as well as yeast, and has both preventive and therapeutic roles in preventing plaque formation. Chlorhexidine gluconate (0.12%) rinse is recommended during the pre-operative period for adult patients who undergo cardiac surgery. Routine use in other patients is not recommended. Pineda, Saliba and Solh (2006), in their meta-analysis of the effect of oral decontamination with chlorhexidine on the incidence of nosocomial pneumonia concluded that it did not significantly reduce the incidence of nosocomial pneumonia in patients receiving mechanical ventilation nor altered the mortality rate.

**Sodium bicarbonate mouthwash**: - This mouthwash reduces the viscosity of oral mucus and enhances the removal of oral debris. However, it must be used in its recommended concentration or it will cause mucosal irritation. It is also reported to have the possible effect of causing electrolyte changes in critically ill patients.

**Hydrogen peroxide**: - This is an oral cleansing and crust dissolving agent which has an antimicrobial effect. It is acidic and can cause mucosal irritation.

**Sodium chloride**: - Sodium chloride promotes healing of mucosal lesions, but has a tendency of causing dryness of oral tissues; therefore, its routine use as a mouth rinse in ICU is limited.

**Water:** - Water provides moisture and removes debris from the oral cavity which minimizes xerostomia. Hospital taps have been identified as a serious source of waterborne nosocomial infections, therefore, it is recommended that sterile water be used in an ICU.

**Lemon and glycerine**; -While lemon and glycerine provide and, induce moisture and softness in the mouth, the acid in lemon juice is thought to stimulate saliva production and thus results in reflex exhaustion overtime, resulting in xerostomia. It is, therefore, not recommended for use in an ICU.

**Glycothymoline**: - This is a mouth freshener with no anti-microbial effects. It is ineffective in the removal of plaque, and its use in an ICU is questionable.

### ***2.4.3 Lip moisturizer***

**Vaseline**: - Vaseline is a lip moisturiser that maintains the integrity of lips with its occlusive effect that reduces trans-epidermal water loss ensuring patient comfort, as well as preventing

cracking and drying of lips, which then serve as a harbour for microorganisms and increase the risk of infection (Malkin, 2009; Abidia, 2007; Human & Bell, 2007; Berry & Davison, 2006; O'Reilly, 2003).

### 2.5 Barriers to oral care in an ICU

Oral health in a healthy individual is achieved through eating and drinking, which stimulates the production of saliva, thus preventing bacteria from adhering to the mucosal membranes. It is also achieved by mechanical and chemical means such as toothbrushing and mouth washing (O'Reilly 2003).

Critically ill patients are often intubated, have orogastric or nasogastric tubes in place, are at times exposed to high flow oxygen and require frequent suctioning, which prevents the individuals from the normal functions of eating and drinking. Most of patients in an ICU are unable to perform their normal routine of oral hygiene to remove plaque, either mechanically or chemically, and are totally dependent on nursing staff to assist them with this essential function. This, however, is challenging to the nurses due to patients needs and treatment complexities (Augustyn 2007; Pear 2007; Hsieh & Tuite 2006). Several challenges which have been identified include lack of skills, fear of dislodging the endotracheal tube and, at times, lack of oral care supplies. Schwartz and Powell (2009), in a study, identified various barriers to proper oral care by nurses in critically ill patients as fear of aspiration, fear of adding to patient discomfort, nurse's time constraints, lack of knowledge of proper oral assessment and care and the perception that oral care has a low priority for critically ill patients. Pear (2007) affirms that nurses often prioritize their care according to patient acuity

and workload, and argues that if they lack knowledge on the relationship between oral care and the development of VAP, it is likely that oral care would be provided infrequently or not thoroughly done, thus compromising patient care.

In a survey by Furr et al (2004) focusing on factors affecting quality oral care in ICUs in the United States of America, findings showed that lack of oral care knowledge, shortage of nurses and attitudes of nurses towards oral care were barriers to the provision of quality oral health care.

Hijji (2003) conducted a survey in United Arab Emirates to establish qualified nurses' knowledge and practices of oral care on 46 nurses. A majority of the participants (78.3%) acknowledged that there were barriers to the provision of quality oral care and identified these as lack of materials, staff shortages, lack of time and uncooperative patients.

In spite of the barriers that had been identified, however, all these authors strongly advocated oral care as a vital preventative measure for VAP in critically ill patients.

### 2. 6 Oral care management tools

According to Urden, Stacy and Lough (2006:9), a care management system is an integrated process designed to enable, support and coordinate patient care throughout the continuum of health care services by different health care professionals. It is emphasized that care management should be patient-focused, continuum-driven and results-oriented and that a

process should be in place to support it. Various quality management tools are in place in most ICUs, the common ones being clinical pathways, algorithms, practice guidelines, protocols and order sets.

A protocol is a commonly used quality improvement tool in nursing care activities. DeLaune & Ladner (1998; 459) define a protocol as '*a standardized written intervention approved and signed by a physician'*. As such it defines what interventions are permissible and under what circumstances the nurse is allowed to implement the measures.

The use of protocols simplifies processes, standardizes care, facilitates patients' safety and reduces costs (Plost et al 2007).

According to Woolf et al (1999), clinical care management tools have their own strengths and weaknesses. The overall strength of clinical guidelines is that they make care more consistent and efficient as well as closing the gaps between what clinicians do and what scientific evidence supports. The authors emphasized that guidelines have benefits for patients, healthcare workers as well as the healthcare system itself.

### 2.6.1 Benefits of clinical guidelines for patients

- Improves the quality of care received by patients
- Improves health outcomes by reducing morbidity and mortality
- Improves consistency of care of patients by different clinicians at different settings

### 2.6.2 Benefits of clinical guidelines to health care professionals

- Improves the quality of clinical decisions
- Offers explicit recommendations for clinicians who are uncertain about how to proceed
- Improves consistency of care
- Acts as a common point of reference for prospective and retrospective audits of clinicians

### 2.6.3 Benefits of clinical guidelines to the health care system

- Improves efficiency by standardizing care
- Reinforces excellence and commitment to quality care

### 2.6.4 Limitations of clinical guidelines

Guidelines, however, also have limitations or weaknesses. The most common weakness is that they lack evidence, resulting in harmful practices. Furthermore, at times they are inflexible, resulting in clinicians not using their own discretions in the management of their patients. The consistent practice and reduced variation prescribed by guidelines may hinder clinicians offering special individualized care to patients. In some cases, guidelines may be based on inaccurate scientific information and, therefore, the clinical advice they offer may compromise the quality of care provided by clinicians. Guidelines may encourage ineffective or wasteful interventions and, at times, the clinicians may find them inconvenient and time consuming to use. Overall, however, if guidelines are evidence based, they are the only option for improving the quality of care in an ICU.

The use of quality improvement strategies to monitor processes and outcomes are recommended in prevention of nosocomial respiratory infections such as VAP (Sole, 2003). Glynn (2005) emphasizes that intensive care nurses need to be aware of the importance of regular quality oral care and actively practice effective techniques to maintain the health of oral mucosa through the use of protocols and oral assessment tools, as these enlighten attitudes and encourage practice changes that ultimately lead to improved oral care practices and better patient care outcomes. Cutler & Davis (2005) confirmed the importance of protocols in their observational study of improving the oral care of 253 patients receiving mechanical ventilation. Prior to the introduction of an oral care protocol, oral cleansing was primarily via suction swabs, with no evidence of tooth brushing or moisturising of oral mucosa, yet, after introduction of the protocol, almost all the important aspects of oral care were performed.

In Schleder et al., (2002), retrospective study on the effect of a comprehensive oral care protocol on patients at risk for VAP in a 10 bedded medical/surgical ICU, during the baseline period the VAP rate was 5.6 per 1000 ventilator days, while, after the introduction of the protocol the VAP rates dropped to 2.2 per 1000 ventilator days.

In a study by Orr & Mitchell (2008), on non-critical care and non-ventilated patients, to determine the efficacy of an oral hygiene protocol in reducing the incidence of Hospital Associated Pneumonia (HAP), at baseline the HAP rate was 1.83 cases per 1000 patient days and after the implementation of the oral care protocol, the HAP rate decreased to 1.0 per 1000 patient days, marking a 45% reduction in the number of HAP cases.

In an Infection Control and Prevention report (2004), the implementation of a new oral care routine almost eliminated VAP at Florida Hospital. At baseline they had 13 cases of VAP in a 16 bedded ICU, yet, after the implementation of an oral care protocol, they saw immediate results, with the VAP cases dropping to zero and remaining at zero for some months.

Simmons- Trau (2006) conducted a study at a 721 bedded medical centre with intensive care facilities catering for 55 adult and 47 children. Protocols were introduced whereby nurses used the tried and tested methods of performance improvement that included oral care to decrease the incidences of VAP. In the surgical ICU, prior to the implementation of the protocol, the VAP rate was 10.8 per 1000 ventilator days and post implementation, the VAP rate reduced to 3.6 per 1000 ventilator days, reflecting a 67% reduction. In the intermediate medical-surgical ICU, the pre-implementation VAP rate was 5.1 per 1000 ventilator days and reducing to 2.7 per 1000 ventilator days, marking a 48% reduction.

In a study by Glynn (2005) in Australia, the introduction of an oral care protocol, which included further education on oral care, was shown to improve oral care outcomes. The results showed that nurses had an increased awareness of the importance of oral care and a willingness to carry out the practice more regularly.

The main significance of these studies is that the use of protocols in oral health care has shown a tremendous reduction in VAP rates in ICUs. With the guidance of such protocols nurses are able to provide care which is standardized and efficient

## 2.7 Conceptual framework and theoretical underpinning of the study

The study utilized the nursing role effectiveness model developed by Irvine, Sidani and McGillis-Hall in 1998, which is based on the structure-process-outcome model of quality care. It describes nursing practice in relation to roles nurses assume in health care and links patient and systems outcomes to nurses role outcomes (Sidani &Irvine 1999). The structure consists of nurse, patient, and organizational variables that influence the processes and outcomes of care. The process represents the independent, interdependent and dependent roles that nurses assume for delivering care. Outcome includes nursing-sensitive patient outcomes. The nursing role effectiveness model proposes relationships among specific variables within the structure, process and outcome components. For this study, the variables are assigned to specific relationships among the structure, process and outcome components of the model as proposed (see figure 2.1).

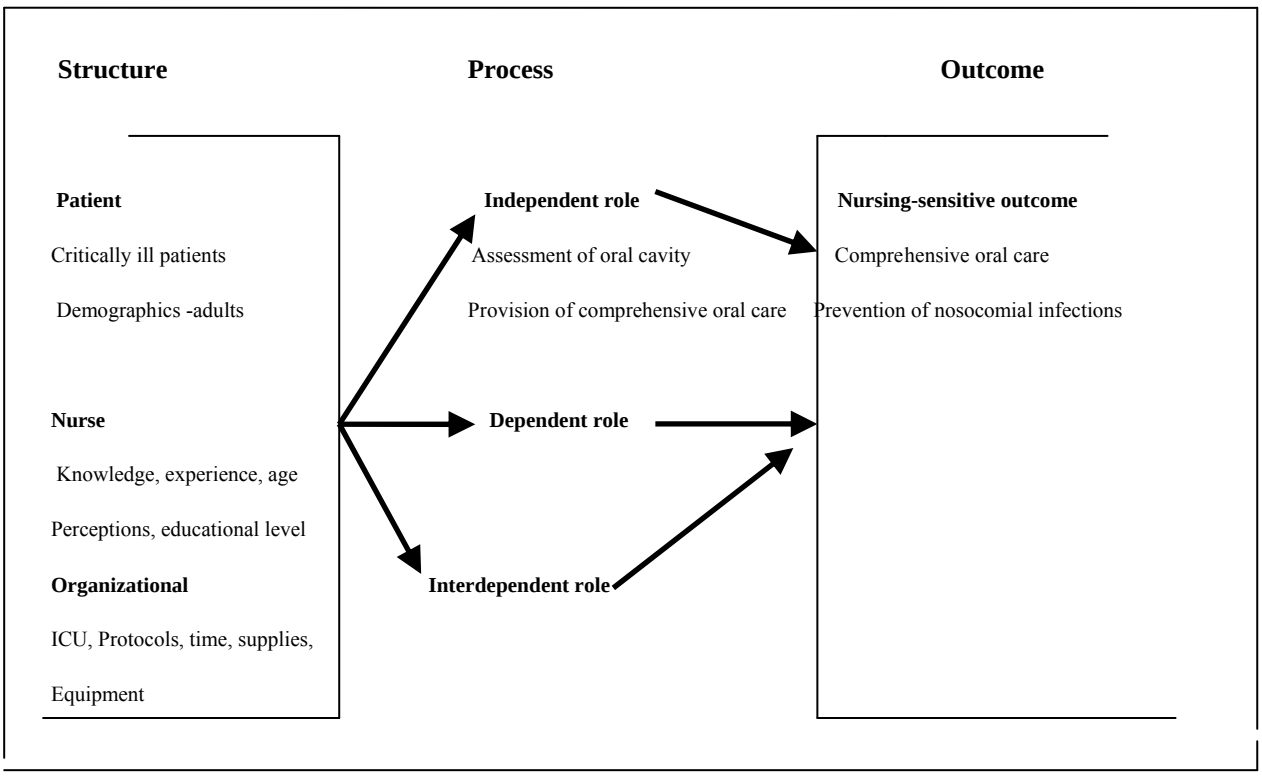


**Figure 2. 1-Nursing role effectiveness model (Irvine, Sidani & McGillis Hall 1998)**

The proposition is that the nurses' variables of knowledge, experience, age, educational level and perceptions would influence their independent role of assessing and providing oral care to the critically ill adult patients immediately upon admission and throughout the patients' stay in ICU. This would result in comprehensive oral care being provided to patients and, hence, reduce the patients' risks of complications, such as nosocomial infections in the form of ventilator associated pneumonia (VAP), increased ventilator days and increased utilization of resources. The other structural variable is that of organizational unit protocols that can influence the nurses' performance by guiding them on equipment, the frequency and best methods for oral care, thus, enabling them to provide quality oral care, rather than improvising which can be ineffective. It is hypothesized that if an organization offers enough supplies for the provision of oral care and nurses follow the appropriate guidelines, they will ultimately provide effective oral care and also reduces the risk of infections. A combination of structure variables affects the independent role implementation, which in turn has an impact on outcomes.

The dependent and interdependent roles were not applicable to this study.

## 2.8 Conclusion

The literature reviewed revealed that oral care is a complex, yet essential nursing procedure that needs to be effectively performed on all patients by knowledgeable nurses. In critically ill patients, it plays an important role in the prevention and control of infection by limiting the colonization of dental plaque and the development of respiratory tract infections. By reducing

adverse effects on patients, it thus promotes their physical and psychological comfort and discharge outcomes. Standardisation of oral care through the implementation of protocols is crucial in maintaining good oral care and quality patient care.

The research methodology of this study will be discussed in the next chapter

# CHAPTER 3: RESEARCH METHODOLOGY

## 3.1 Introduction

A description of the research methodology, study design, data collection process, data collection instrument, study population, study setting, ethical considerations, data analysis and management as well as dissemination of findings is given in this chapter.

## 3.2 Study design

The study was a quantitative descriptive exploratory survey approach with a positivist point of view that assessed intensive care nurses' knowledge, practices and perceptions on the importance of comprehensive oral health care to critically ill patients.

Quantitative research is a formal, objective, rigorous, systematic process for generating information about the world. It is the investigation of a phenomenon that can be precisely measured and quantified involving a vigorous and controlled design (Polit & Beck 2004; 729). A quantitative design was chosen for this study because of its systematic fashion as it allows the researcher to progress logically from step to step. It was also chosen because the data can be presented numerically, with use of percentages and frequency tables. Using a quantitative design enabled the researcher to describe what oral care practices already existed

and what is currently being practiced in order to refine or improve them for quality delivery of oral care.

Descriptive research seeks to describe a phenomenon in real life situations and also provides descriptions of variables in order to answer a research question, the purpose being to serve as starting point for hypothesis generation and to describe aspects of a situation as they naturally occur (Polit & Beck 2004; 192).

Exploratory research is conducted to explore existing dimensions of a phenomenon, or other dimensions which might develop or refine hypothesis about relationships between phenomena. In this study, the researcher intended to explore how nurses rank the importance of oral health care in critically ill patients, as this could have an influence on their provision of comprehensive oral care.

A survey is designed to obtain information about the prevalence, distribution, and interrelations of variables within a population. It obtains information from a sample of people by means of quantitative self-report (Polit & Beck, 2004:234). Surveys focus on what people do and are used to collect information regarding people's knowledge, opinions, attitudes and values. A survey was suitable for this study because it was a non-experimental study that looked at nurses' knowledge and practices. Surveys are flexible and broad in scope and used to get factual data on a large scale. Although, quantitative studies are intended to include many participants, this study, however, was on a small scale, because ICU nursing is an emerging speciality in Botswana, there are only two units that are fully functional and this

limited the number of participants. Surveys are relatively inexpensive, but are useful in making results statistically significant, even when analysing multiple variables.

### 3.3 Study setting

In Botswana, health care is delivered through a decentralized system in a network of hospitals, clinics, health posts and mobile stops (for hard – to - reach citizens). The system is organized into different levels, based on the complexity of services provided. The lower the level, the less the population it serves. The health and medical personnel are also distributed across these tiers of health care organization, with specialized professionals being mainly located at the referral hospitals, while general medical and other health professionals are located in the district and primary hospitals. The clinics, health posts and mobile stops are manned by experienced registered nurses, midwives and family welfare educators (Owolabi & Shaibu, 1999). At the lowest level are 810 mobile health stops, 340 health posts and 242 clinics, and at the midway level there are 17 primary hospitals and 13 district hospitals. At the highest level of the system there are 3 national government referral hospitals, which are located in the cities of Gaborone, Francistown and town of Lobatse (Health Statistics report, 2002). There are also two major private hospitals.

The study was conducted at high level of care in two of the three government referral hospitals of Botswana, Hospital A in Gaborone and Hospital B in Francistown. These sites were chosen because the referral hospitals not only serve as teaching institutions, but have ICU's that are fully functional and serve as orientation sites for ICU nurses working in these

hospitals and at country level. Nurses work in the ICUs on a rotational basis so as to gain the necessary skills and experience, while at the same time sharing the workload of these units.

Hospital A is situated in Gaborone, which has a population of 186,007 and is the capital city of Botswana (Central Statistics Office (CSO) 2008). It is situated in the southern part of the country and serves as a referral centre for all hospitals and clinics in the south. The hospital has a bed capacity of five- hundred and thirty (530) with eight (8) ICU beds.

Hospital B is situated in Francistown, a city in the northern part of the country with a population of 83,023(CSO 2008). Hospital B is the referral centre for the northern region and has the bed capacity of five hundred and twenty-two (522) with six (6) ICU beds. Although, there are a few trained expatriate nurses at these two hospitals, most of the nurses working there are not ICU trained. Refer to figure 3.1 and 3.2 for study setting and study sites.


**Figure 3.1 Map of Africa with an arrow pointing Botswana**

Source: copied from http://www.infoplease.com/atlas/Africa.html


**Figure 3.2 Map of Botswana showing two study sites indicated by arrows**

Source: copied from http://www.infoplease.com/atlas/country/botswana.html

### 3.4 Study population

All registered nurses working in intensive care units of Hospital A (20) and Hospital B (18) were targeted to participate in this study.

### 3.5 Sample

A total of thirty-eight (38) trained or experienced registered nurses currently working in the intensive care units of Hospital A (20) and Hospital B (18) were included in this study, since the sample was finite and small, the response rate determined the final sample size.

### 3.6 Sampling technique

The whole population (100%) of (38) ICU nurses working in these two hospitals were invited to participate in this study. Since the sample size was small for random sampling, all registered nurses currently working in these units during the time of data collection were included in the study.

### 3.7 Data collection and instrument

A forty-six (46) item self-administered, structured questionnaire was used to collect data on nurses' knowledge, practices and perceptions on the importance of comprehensive oral care.

The questionnaire, which was derived and formulated from an extensive literature review, also included a modification of Adams tool (1996) which is a questionnaire that she used to investigate nurse's knowledge of oral health care in medical wards and the questionnaire is on public domain. The researcher therefore modified and designed the questionnaire with the assistance of statistician and study supervisor to suite the researcher's topic.

The questionnaire consisted of four sections of open and closed ended, multiple-choice questions to offset the strength and weakness of each (refer to appendix1). Section A covered demographic data (8 points), Section B covered nurses' oral health care/hygiene knowledge and training (10 points), Section C consisted of a self report on oral care perceptions (7 points) and Section D covered oral care practices which included oral care tools, mouthwashes and moistening agents (21 points). The questionnaire was translated into Setswana by the researcher with the help of other Tswana speaking students (Appendix 2) to give the nurses the option of using their own language if they were not comfortable with English.

Self completion questionnaires are less costly and offer the possibility of complete anonymity (Polit & Beck 2004:350). Because respondents cannot be connected to their responses, they have more time to weigh the issues carefully before responding and less prone to acquiescence and, therefore, more honest responses may be provided (Gerrish & Lacey 2006:267). Standardized questions make measurement more precise by enforcing uniform definitions upon participants. High reliability is easy to obtain since all subjects are presented with a standardized stimulus.

### 3.8 Validity and reliability of the instrument

According to Polit & Beck (2004: 422), validity refers to the degree to which an instrument measures what it is supposed to measure. Reliability (2004; 416) refers to the consistency with which an instrument measures the target attribute. The researcher ensured reliability of the instrument by asking questions that were likely to be understood and relevant to the subjects being studied. The test, retest approach was also utilized to test the reliability of the tool among participants. The test retest yielded the same results with no further recommendations made. Content validity (2004; 423) is the degree to which an instrument has an appropriate sample of items for the construct being measured. Content validity was improved by including questions suggested by ICU nurses whom the tool was tested on and the statistician.

The constructs being measured were the knowledge, practices and perceptions of ICU nurses with regard to comprehensive oral care in critically ill patients. The researcher used a cross reference table to check the constructs against the objectives of the study and had shown how they would be covered in the data collection tool. Once the tool had been formulated, it was then checked by the supervisor and statistician for the appropriateness of the questionnaire in terms of content, relevance to the study, degree of coverage of concepts and feasibility related to level of subjects involved. A pilot study was carried out among fellow students who were practicing in different ICUs in and around Durban, specifically to test if the questionnaire was appropriate for the intended study and the questionnaire was then modified according to their recommendations. These recommendations suggested that participants' ages and years of ICU experience should be left open, rather than being in a

range form for ease of data analysis and that it would be a good idea to have some open ended questions on the tool to give participants an opportunity to respond in their own words. The pilot study was done in a different country because of time constraints, the researcher did not have enough time for piloting at the country of the actual study. The limitation to this is that results might have given a wrong impression because of different settings and workforce from the intended subjects. The main study was also going to use all the available population therefore; no nurses would be available in the country to do a pilot study on.

### 3.9 Data collection process

A self administered, coded questionnaire, a modification of Adams (1996) tool, was used to collect data and the questions were coded. After obtaining permission from the Ministry of Health in Botswana, the researcher further sought permission from managers and nursing superintendents of the hospitals; she explained the purpose of the study, requested for a venue and made arrangements for a suitable day and time for data collection. On the day of data collection, the investigator visited the hospital and addressed the nurses during their different shifts. After explaining the purpose of the study and obtaining their consent to participate, she personally handed out the questionnaires and waited for them to be completed by the respondents. The questionnaires were distributed to individual nurses by the researcher and the researcher made herself available to answer any questions the respondents might have if they needed some clarifications regarding the questionnaire. Questionnaires which have been personally handed out have an advantage of improved response rate (Gerrish & Lacey 2006:377).

### 3.10 Data analysis

The data was analysed using descriptive statistics and making use of frequency tables, percentages and cross- tabulations for demographic variables. Associations between variables were assessed using Pearson's chi square test for categorical variables and Pearson's correlation analysis for quantitative variables. The assistance of the statistician was sought and a p value<0.05 was considered statistically significant.

### 3.11 Ethical consideration

Ethical clearance was sought from the University of KwaZulu-Natal Ethics Committee (Appendix 3) and permission to conduct this study was secured from the Ministry of Health in Botswana (Appendix 4). In addition permission was sought from the Research Ethics Committees of the hospitals concerned (Appendices 6&8). Participants' human rights were protected by ensuring that any information they provided for this study was treated with the utmost privacy and was not shared, nor disclosed, to unauthorized people. See Appendix 9 for the Information Sheet which the participants kept. After the purpose of the study had been explained, written consent was sought from each participant (Appendix 10). The researcher explained to them that their participation was voluntary and that if they agreed to participate, there would be no reimbursements. She also explained that they could withdraw at any time without the risk of incurring any penalties. Their privacy and confidentiality was maintained throughout the study and anonymity was assured by coding the questionnaires and not seeking any identifying information.

### 3.12 Data management

A private computer, with an access code known only by the researcher, was used to store the data and hard copies of data will be kept under lock and key with the supervisor for a period of five years, after which they will be destroyed by fire.

### 3.13 Dissemination of findings

Copies of the findings will be submitted to the Ministry of Health in Botswana and also to the two participating hospitals. Once the report has been examined, it will be bound and submitted to the University library for public use. Findings will also be published in accredited nursing journals.

### 3.14 Conclusion

A quantitative descriptive exploratory survey was carried out in two public referral hospitals in Botswana on thirty-four (34) ICU nurses through the use of a questionnaire.

An analysis and presentation of the findings follows in the next chapter.

# CHAPTER 4: PRESENTATION OF RESULTS

## 4.1 Introduction

This chapter presents the findings of the study. Analysis of data into numeric values was facilitated by Statistical Package of Social Sciences (SPSS) version 15.0 to give meaning to the findings of the study. In order to test for statistical association between variables, Pearson's correlation coefficient measures were applied. The correlation coefficient represents the magnitude and direction of a relationship between two variables and the ranges are -1.00 for perfect negative relationship to +1.00 for perfect positive relationship (Brink, 2006). The statistical significance was further tested by manipulation of Pearson's correlation coefficient to an alpha level of 0.05, which depicts that any results of less than 0.05 are significant, while the results greater than 0.05 are insignificant. Microsoft Excel was also used to analyse data.

The findings are presented using frequency tables, percentages; cross tabulation tables for relationships between variables and graphs, to be reader friendly.

Section A of this chapter presents findings on the demographic data of the sample; Section B reflects findings on nurses' oral health care knowledge and training, Section C reflects findings on nurses' oral care perceptions and Section D reflects findings on nurses oral care practices.

## 4.2 Section A: – Demographic data

Demographic data is presented according to realised sample, age, gender, educational level, nursing experience, ICU experience, ICU training and citizenship.

### 4.2.1 Description of the population and sample

The target population was all 38 nurses currently working in the ICUs of the two referral hospitals, Hospital A and Hospital B (20 & 18 respectively). The numbers altered slightly as the number of nurses in the ICU of Hospital A unit had increased to 24, due to the fact that cardiac surgery had recently been introduced to the facility, while the number of nurses in the ICU of Hospital B had been reduced to 16, due to resignations. A response rate of 89%, (n=34) of ICU nurses working in these two national government referral hospitals was achieved. Two nurses from each site declined to participate on the basis that they were new in the unit, and the remaining two could not be reached because they were off duty during data collection.

#### 4.2.1.1 Age

Nurses' ages ranged from 24-53 years old with a mean age of 34.26. Fifty-six percent (56%, n=19) fell into the 24-33 year old age group, with the percentage decreasing with increasing age, as evidenced by 32% (n=11) falling into34-43 age group and only 12% (n=4) falling into

44-53 age group. This reflects a normal age trend for nurses in most ICUs and public hospitals of Botswana. Refer to table 4.1

#### 4.2.1.2 Gender

A large majority (77%, n=26) of the nurses were female and only 23% (n=8) were male. This is a normal pattern in the nursing profession supporting the traditional belief that nursing is primarily a female profession. (Refer to table 4.1).

#### 4.2.1.3 Educational level

Most of the nurses (73%, n=25) held a diploma in nursing education, 21 % (n=7) held a bachelor degree in nursing and only 6 % (n=2) held a post-graduate degree. This is inline with educational opportunities in Botswana, whereby basic nursing training is offered at diploma level in institutes of health sciences, while it is more difficult to obtain a bachelor degree from the university because of a limited intake. Refer table 4.1.

#### 4.2.1.4 Nursing experience

Table 4.1 indicates that 32 % (n=11) of the participants had 0-5years nursing experience, 27% (n=9) had 6-10 years nursing experience, 32% (n=11) had 11-20 years experience and

only 9% (n=3) had between 21-30years experience. With very little difference between the first three categories, this indicates a wide range of nursing experience from 0-20 years.

#### 4.2.1.5 ICU Experience

Findings revealed that the majority (85%, n=29) of the respondents had less than 5 years ICU experience, 6% (n=2) had 6-10 years ICU experience and 9% (n=3) had 11-20 years ICU experience. These statistics confirm that the workforce in the ICUs are mainly inexperienced which can be attributed to the policy of allocating nurses to these units on rotational basis for them to gain experience rather than having permanent ICU nurses in the units. Refer table 4.1

#### 4.2.1.6 ICU Training

The majority of the participants (79%, n=27) not trained in ICU nursing, with only 21% (n=7) having received such training. This confirms the lack of ICU speciality training in our institutes of health sciences and explains the lack of experience and expertise in these ICUs. Refer table 4.1

#### 4.2.1.7 Citizenship

Most of the respondents (85%, n=29) were locals and only 15% (n=5) were non locals. Of the 15%, most of these were ICU trained expatriate nurses who also formed the high percentage of the trained nurses in ICUs (12%). Refer to table 4.1

**Table 4.1 Percentage distribution of demographic characteristics of the sample (N=34)**

| **Background Characteristics** | n | % |
|---|---|---|
| **Age Category** | | |
| 24-33 Years | 19 | 56 |
| 43-43 Years | 11 | 32 |
| 44-53 Years | 4 | 12 |
| **Gender** | | |
| Male | 8 | 23 |
| Female | 26 | 77 |
| **Educational level** | | |
| Diploma | 25 | 73 |
| Bachelor degree | 7 | 21 |
| Post graduate degree | 2 | 6 |
| **Nursing experience** | | |
| 0-5 Years | 11 | 32 |
| 6-10 Years | 9 | 27 |
| 11-20 Years | 11 | 32 |
| 21-30 Years | 3 | 9 |
| **ICU experience** | | |
| 0-5 Years | 29 | 85 |
| 6-10 Years | 2 | 6 |
| 11-20 Years | 3 | 9 |
| **ICU trained** | | |
| Yes | 7 | 21 |
| No | 27 | 79 |
| **Citizenship** | | |
| Citizen | 29 | 85 |
| Noncitizen | 5 | 15 |
| **Facility** | | |
| ICU A | 20 | 59 |
| ICU B | 14 | 41 |
| **Total** | 34 | 100% |

### 4.3 Section B: - Oral health care/hygiene knowledge and training

To assess the nurses' knowledge on oral health care, they were asked to respond to various multiple choice, open and closed ended questions relating to oral health care and critically ill patients. The questions were allocated a point value (2 points or 1 point) and marks were given for each question answered correctly, with a possible total mark of 10points. Questions asked included naming: components of comprehensive oral care (2 points); common nosocomial infections related to poor oral care (2 points); prevalent oral flora related to critically ill patients (2 points); less important tissues when assessing oral status of critically ill patients(1 point); indicators of poor oral care in critically ill patients(1point); drugs with adverse effects on critically ill patients (1 point); and class of drugs that interfere with salivary production in critically ill patients (1 point). Then a knowledge score for each individual was derived by adding the marks for correctly answered questions.

It was considered that the questions covered basic routine nursing procedure and that nurses, by virtue of their professional practice domain, are responsible for this procedure and should have a certain amount of knowledge. Therefore, those who scored 7 and above were rated as having 'good scores' and, thus, a good knowledge of oral health care, while those who scored 6 and below were rated as having 'a poor score' and, thus, a poor knowledge of oral health care. Most nurses (82%, n=28) scored less than 6, indicating poor scores and consequently poor knowledge of oral health care for critically ill patients. Only 18% (n=6) scored 7 and above, indicating that they had adequate knowledge of oral care for critically ill patients. Table 4.2 displays the results on oral health care knowledge of the nurses.

**Table 4.2: Nurses knowledge score (N=34)**

| Knowledge score | n | % |
|---|---|---|
| 0 – 6 points | 28 | 82.4 |
| 7 – 10 points | 6 | 17.6 |
| **Total** | 34 | 100% |

The findings revealed that knowledge scores were not related to nurses' ages, as the 17.6% (n=6) who scored high marks were distributed among all age groups. Thirty three point three percent (33.3%) n=2 were in 24-33 yrs age group, 50.0% (n=3) were in 34-43yrs age group and 16.7% (n=1) were in 44-53yrs age group. The large majority 82.4% (n=28) of nurses, however, scored badly, with 60.7% (n=17) of them, falling into the 24-33 years age group, 28.6 %( n=8) into the 34-43 age group and 10.7 %( n=3) into the 44-53 age group. See Figure 4.1.

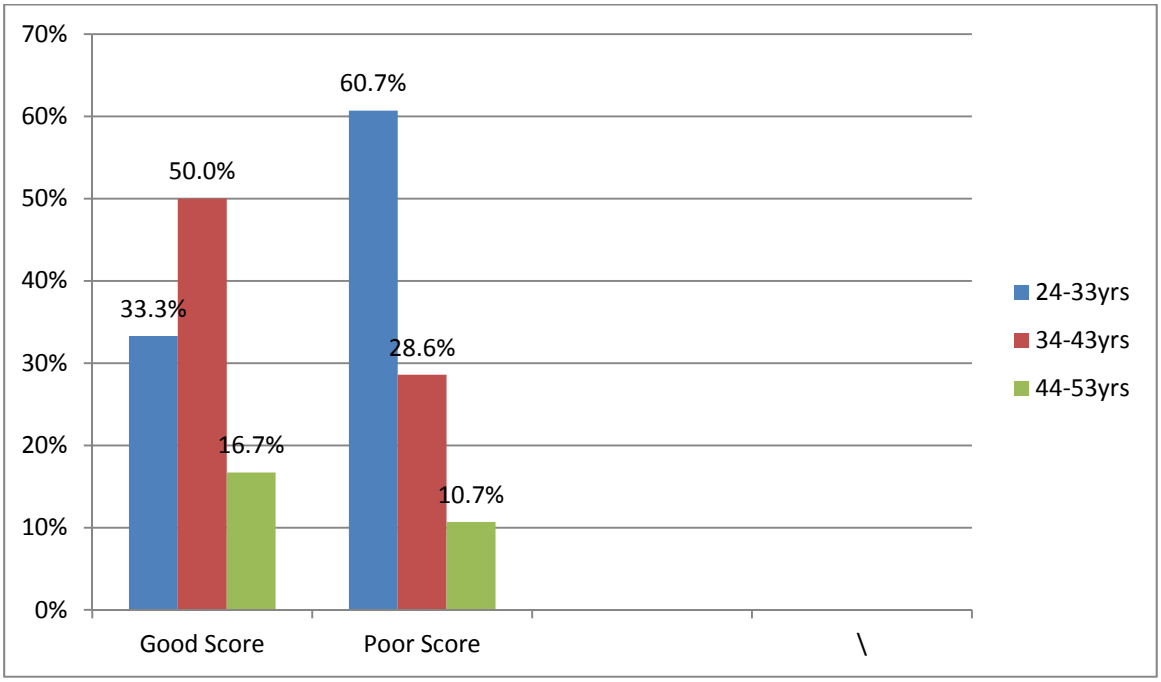


**Figure 4.1: Age and knowledge score distribution (N=34)**

It also became evident that the nurses' knowledge scores were not related to their educational level/qualification as the distribution of poor scores fell within all educational levels although a large percentage 78.5%(n=22) who did badly were diploma qualified nurses, who also formed 73% of the whole population studied. Eighteen percent (18%) n=5 had degrees and 3.5 %( n=1) were at post graduate degree level. The few nurses who achieved good scores (17.6 %( n=6) were also distributed throughout the educational levels. Fifty percent (50.0%) n=3 were diploma qualified, 33.3% (n=2) were degree qualified and 16.7% (n=1) had post graduate degrees. Figure 4.2 displays the results.

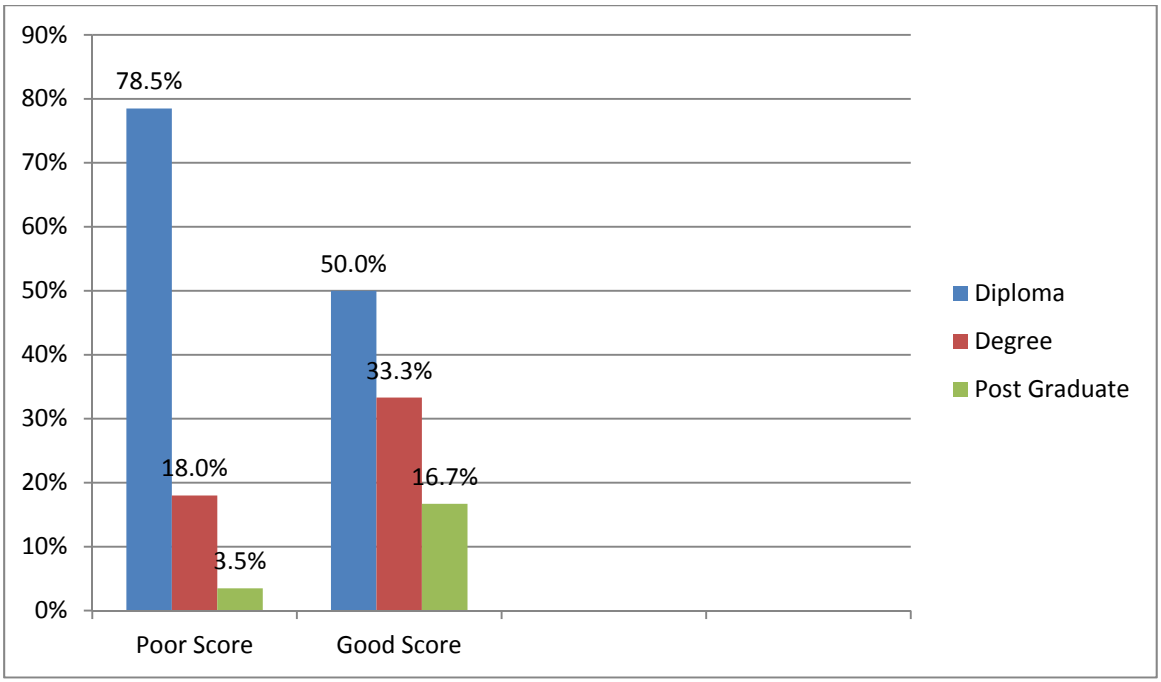


**Figure 4.2: Educational level and knowledge score distribution (N=34)**

Findings further revealed that nursing experience and ICU experience did not have an association with the knowledge of nurses' on oral health care. The original assumption was that because oral care is a basic nursing procedure, nurses with many years of nursing

experience should have a good knowledge of oral health care. The findings showed that this was not true, however, as nurses with many years of nursing experience scored poorly. The poor scores were distributed in all categories. Twenty eight point six percent (28.6%) n=8 were nurses with 0-5yrs nursing experience, 25.0% (n=7) had 6-10yrs of nursing experience, the most affected category being 11-20years nursing experience with 35.7% (n=10) and 10.7% (n=3) for nurses with 21-30yrs nursing experience. This may be attributed to the common perception that oral care is a comfort measure rather than a preventative measure and can be just provided routinely, as such, might be given a lower priority. Figure 4.3 displays the results.

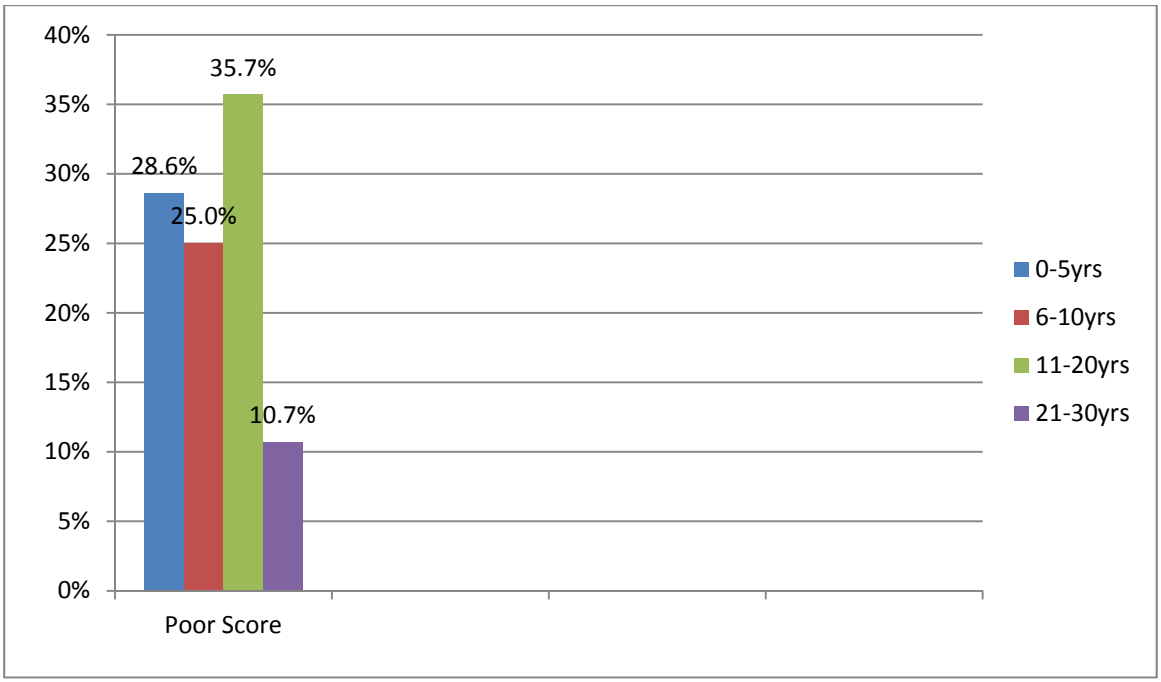


**Figure 4.3: Nursing experience and oral care knowledge score (N=34)**

There is also no association between ICU nursing experience and nurses' knowledge regarding oral health care for critically ill patients as those who had good scores were evenly distributed among all categories of ICU nursing experience.

The majority of nurses 93.0% (n=26) scored poorly, however, had less than 5years ICU nursing experience and although this statistic might be attributed to inexperience, it is a poor excuse because oral care is a basic routine nursing activity which every nurse is expected to know and practice effectively. Seven point zero percent (7.0%) n=2 had 11-20years of ICU nursing experience. Figure 4.4 displays the findings

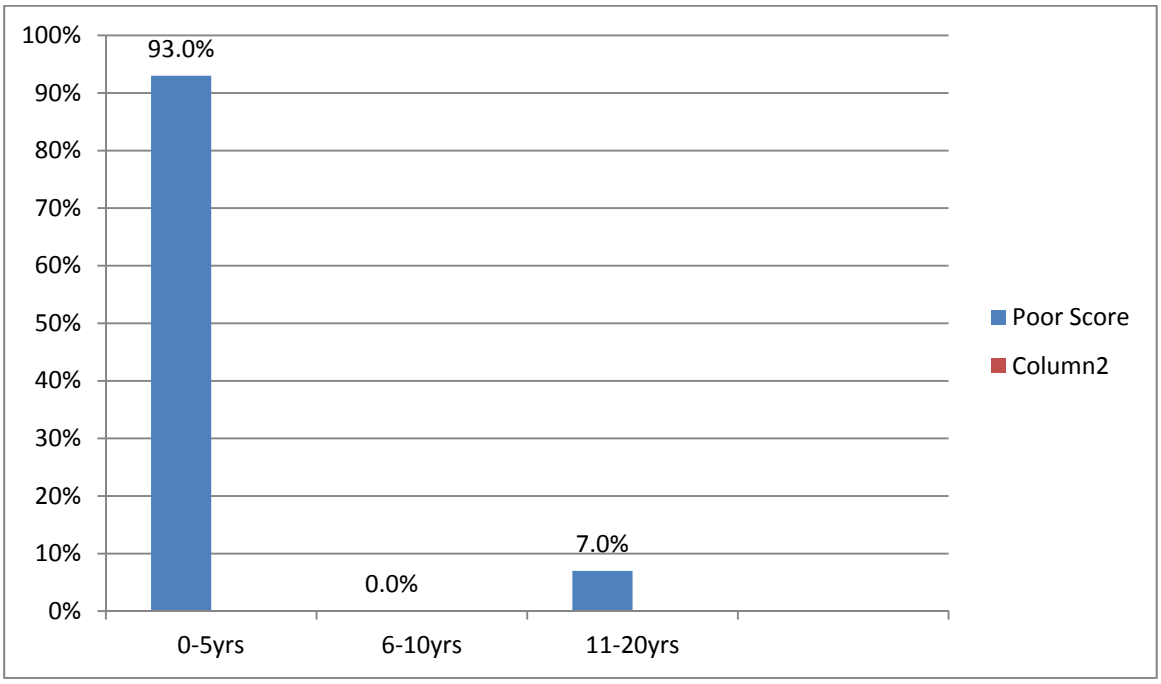


**Figure 4.4: ICU experience and oral care knowledge score (N=34**

The results indicated gaps in nurses' knowledge in some of the important aspects of oral health care for critically ill patients. Sixty-seven point six percent (67.6%) n=23 of the nurses who participated in this study were not able to name the most common nosocomial infection related to poor oral care, as evidenced by different answers given to that question. Some of the incorrect answers given to the question included TB/Bronchitis 17.6% (n=6), different strains of organisms 11.8% (n=4), sores/ulcers 14.7 %( n=5) and others indicating that they

did not know 23.5% (n=8). Only 32 %( n=11) of the respondents knew that pneumonia was the common nosocomial infection related to poor oral care. Table 4.3 displays the results

**Table 4.3 Most common respiratory nosocomial infection related to poor oral care (N=34)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | pneumonia | 11 | 32.4 | 32.4 | 32.4 |
| | TB/Bronchitis | 6 | 17.6 | 17.6 | 50.0 |
| | Sores/ulcers | 5 | 14.7 | 14.7 | 64.7 |
| | Organisms | 4 | 11.8 | 11.8 | 76.5 |
| | Don't know | 8 | 23.5 | 23.5 | 100.0 |
| | Total | 34 | 100.0 | 100.0 | |

Nurses also displayed lack of knowledge with regard to identifying the most prevalent oral flora in critically ill patients. Most of the nurses 97% (n=33) answered incorrectly, thus indicating that they were unaware of the association of micro-organisms and oral care as a preventive measure for nosocomial infections in critically ill patients. Only 2.9 %( n=1) of the respondents managed to identify gram negative streptococci and dental pathogens as the most predominant oral flora in critically ill patients. Refer table 4.4.

**Table 4.4: Oral flora/organisms that are predominant in critically ill patients (N=34)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Gram positive streptococci and dental pathogens | 10 | 29.4 | 29.4 | 29.4 |
| | Gram negative streptococci and dental pathogens | 1 | 2.9 | 2.9 | 32.4 |
| | Both | 15 | 44.1 | 44.1 | 76.5 |
| | Different strain of pathogen | 8 | 23.5 | 23.5 | 100.0 |
| | Total | 34 | 100.0 | 100.0 | |

Another question required respondents to mention signs of poor oral care. Only 32.4% (n=11) identified dental plaque as a sign that would make them suspicious of poor oral care, while 2.9% (n=1) identified moist lips and 64.7% (n=22) identified bleeding gums as signs of poor oral care. Table 4.5 displays the results.

**Table 4.5 Signs that would make you suspicious of a poor oral care (N=34)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | moist lips | 1 | 2.9 | 2.9 | 2.9 |
| | Bleeding gums | 22 | 64.7 | 64.7 | 67.6 |
| | Dental plaque | 11 | 32.4 | 32.4 | 100.0 |
| | Total | 34 | 100.0 | 100.0 | |

It was initially hypothesised that knowledge of oral health care for critically ill patients was influenced by nurses' demographic characteristics such as nursing experience or ICU experience. Therefore, correlations were done to confirm or nullify this hypothesis.

The Pearson correlation was utilized and it showed a perfect negative correlation between oral health care and nursing experience, r= -.011. The statistical significance was further tested by manipulating Pearson's coefficient alpha level to 0.05 which shows that 0.11 is greater than 0.05 and, therefore, results are insignificant, meaning that there is no relationship between nursing experience and oral health care knowledge. More years of nursing experience do not make a difference to the nurse' scores on oral health care. Refer to table 4.6 for correlations.

**Table 4.6 Correlation between oral health knowledge and nursing experience (N=34)**

| | | Oral health care knowledge scores | nursing experience of respondents |
|---|---|---|---|
| Oral health care knowledge scores | Pearson Correlation | 1 | -.011 |
| | Sig. (2-tailed) | - | .952 |
| | N | 34 | 34 |
| nursing experience of respondents | Pearson Correlation | -.011 | 1 |
| | Sig. (2-tailed) | .952 | - |
| | N | 34 | 34 |

The hypothesis of a connection between nurses ICU experience and oral health knowledge was nullified as the Pearson correlation showed a perfect positive correlation r= .327 (p value = <0.05) which suggested an insignificant relationship between the two variables. ICU experience had no influence on the nurses' knowledge of oral health care to the critically ill patients. See table 4.7 below.

**Table 4.7 Correlation between oral health care knowledge and ICU experience (N=34)**

| | | Oral health care knowledge scores | ICU experience of respondents |
|---|---|---|---|
| Oral health care knowledge scores | Pearson Correlation | 1 | .327 |
| | Sig. (2-tailed) | - | .059 |
| | N | 34 | 34 |
| ICU experience of respondents | Pearson Correlation | .327 | 1 |
| | Sig. (2-tailed) | .059 | - |
| | N | 34 | 34 |

Three items on the questionnaire addressed what amount of training the participants had received in oral assessment. The first queried whether the nurses had received any oral care training at basic nursing training, the second whether they had received any training when first allocated to the unit and the third asked whether they would like some further training. Fifty-nine percent (59%) n=20 of the participants reported that they had received training on oral health care during their basic nursing education while 41% (n=14) had received no such training. Forty-four percent (44%) n=15 were orientated on assessment and provision of comprehensive oral care during their initial allocation to ICU through inductions, while 56% (n=19) had had no orientation during their initial allocation to the ICU. Ninety- seven percent 97%(n=33) indicated that they wanted some updates on comprehensive oral health care for critically ill patients while only 3%(n=1) had no wish for any further updates. Refer to table 4.8 below

**Table 4.8: Nurses training on comprehensive oral care (N=34)**

| | Trained | Not trained | Total | % Trained | % Not trained |
|---|---|---|---|---|---|
| At Basic Nursing Education | 20 | 14 | 34 | 59 | 41 |
| Orientation at unit level | 15 | 19 | 34 | 44 | 56 |

### 4.4 Section C: – Oral care perceptions

A 5-point Likert scale of strongly agree, agree, uncertain, disagree, strongly disagree was used to assess the respondents perceptions with regard to comprehensive oral care for critically ill patients.

Nurses revealed their positive and negative perceptions towards comprehensive oral health care for critically ill patients. Overall, 64.7% (n=22) and 35.3% (n=12) of the nurses' perceived oral care to be a high priority in critically ill patients as they strongly agreed and agreed respectively to the statement, although, interestingly, some nurses 2.9% (n=1) and 17.6% (n=6) felt that oral care did not contribute much to patients' overall health and well being and 5.9% (n=2) were uncertain.

Nurses' perceptions of oral care were further divided when rating the item '*cleaning oral cavity is an unpleasant task'*. Eleven point eight percent (11.8%) n=4 of them strongly agreed with this statement, 26.5% (n=9) agreed to the statement and 8.8% (n=3) were uncertain. This was considered to be a negative perception of oral health care because if nurses perceive certain tasks as unpleasant, there is the possibility that they will not provide it. Forty four point one percent (44.1%) n=15 of the nurses agreed with the item '*The oral cavity of critically ill patients is difficult to clean'* 2.9% (n=1) also strongly agreed with the statement which might be associated with finding that some nurses (41%) n=14 had not received training on assessment and provision of comprehensive oral care at basic nursing education and some (56%) n=19 had not received any orientation during their initial allocation to an ICU. Table 4.9 displays the results on oral care perceptions. The item '*cleaning oral cavity of critically ill patients' causes patient discomfort'* had different responses from respondents as 14.7% (n=5) strongly agreed to the statement,26.5% (n=9) agreed, 5.9% (n=2) were uncertain, 17.6% (n=6) disagreed and 35.3% (n=12) strongly disagreed. The item '*the oral cavity of ventilated patients get worse no matter what I do',* eight point eight percent (8.8%) n=3 were uncertain, 41.25 (n=14) disagreed and 50.0% (n=17) strongly disagreed to the statement indicating that nurses recognise the importance of oral care to critically ill patients.

**Table 4.9 Oral care perceptions percentage distribution (N=34)**

| | Comprehensive oral care is a very high priority in critically ill patients | | Comprehensive oral care contributes less to critically ill patient's health and wellbeing | | Cleaning the oral cavity for critically ill patients is an unpleasant task | | Cleaning oral cavity of critically ill patients causes patient discomfort | | The oral cavity of critically ill patients is difficult to clean | | The oral cavity of ventilated patients get worse no matter what I do | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | n | % |
| Strongly agree | 22 | 64.7% | 1 | 2.9% | 4 | 11.8% | 5 | 14.7% | 1 | 2.9% | | |
| Agree | 12 | 35.3% | 6 | 17.6% | 9 | 26.5% | 9 | 26.5% | 15 | 44.1% | | |
| Uncertain | | | 2 | 5.9% | 3 | 8.8% | 2 | 5.9% | 1 | 2.9% | 3 | 8.8% |
| Disagree | | | 7 | 20.6% | 8 | 23.5% | 6 | 17.6% | 10 | 29.4% | 14 | 41.2% |
| Strongly disagree | | | 18 | 52.9% | 10 | 29.4% | 12 | 35.3% | 7 | 20.6% | 17 | 50.0% |

The nurses were further asked to rank oral care on a 10-point scale with 1 as least important and 10 as very important. Ninety one percent (91%) n=31 of the respondent's ranked oral care as very important, and 9% (n=3) left the spaces blank.

It was hypothesized that oral care perceptions were related to oral health knowledge and the provision of oral care by the nurses; the more knowledgeable the nurse was regarding oral health care, the positive his/her perception would be, and conversely, the less knowledgeable the nurse, the more negative his/her perception to oral care. The Pearson Correlation was used and it showed a perfect negative correlation between oral health knowledge and oral care perception, r=-0.081(p value = <0.05). A significant correlation exists, meaning that poor knowledge results in a negative perception for the provision of oral care. When a nurse lacks knowledge on important aspects of oral health care it leads to a negative perception to oral care, which in turn, influences the provision of this care. See table 4.10 below.

**Table 4.10 Correlations between oral health knowledge score and task of cleaning oral cavity**

**Correlations**

| | | oral health knowledge score | Cleaning the oral cavity for critically ill patients is an unpleasant task |
|---|---|---|---|
| oral health knowledge score | Pearson Correlation | 1 | -.081 |
| | Sig. (2-tailed) | | .649 |
| | N | 34 | 34 |
| Cleaning the oral cavity for critically ill patients is an unpleasant task | Pearson Correlation | -.081 | 1 |
| | Sig. (2-tailed) | .649 | |
| | N | 34 | 34 |

## 4.5 Section D – Oral care practices

Respondents were asked to state if they '*always', 'rarely', or 'never'* use the following mouth care supplies: tooth brush, toothpaste, swab, sterile water, tap water, normal saline, chlorhexidine, glycothymoline, lemon & glycerol, sodium bicarbonate, hydrogen perioxide and Vaseline. They were also asked to state the reasons for rarely or never using the supplies. The results indicated that toothbrushes and toothpaste were used by 85.3% (n=29) of the respondents, and swabs and Vaseline were used by 82.4% (n=28). On the other hand, the nurses indicated that they rarely, or never, used some of the other products. Eighty five point three percent (85.3%) n=29 of the participants never used Glycothymoline, while, 8.8% (n=3) rarely used it. Sixty four point seven percent (64.7%) n=22 never used Sodium bicarbonate, while 20.6% (n=7) rarely used it. Sixty one point eight percent (61.8%) n=21 never used Lemon & glycerol, while 26.5% (n=9) rarely used it. Fifty percent 50.0% (n=17) never used Chlorhexidine, while 38.2% (n=13) rarely used it. Forty seven point one percent (47.1%)

n=16 never used Hydrogen peroxide, while 26.5% (n=9) rarely used it. The reasons given for rarely or never using the supplies included: not foreseen in unit protocol which was surprising as neither of the units possessed a mouth care protocol; lack of supplies and equipment; lack of time; lack of skills and it causes patient discomfort. Table 4.11 displays use and non-use of mouth care supplies while Figure 4.5 displays the findings on use and non-use of mouth care solutions

**Table 4.11 oral care practices - Distribution of oral care supplies and use (N=34)**

| | Tooth brush | | Tooth paste | | Swab | | Sterile water | | Tap water | | Normal saline | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Count | % | Count | % | Count | % | Count | % | Count | % | Count | % |
| Always | n=29 | 85.3% | n=29 | 85.3% | n=28 | 82.4% | n=16 | 47.1% | n=13 | 38.2% | n=13 | 38.2% |
| Rarely | n=4 | 11.8% | n=4 | 11.8% | n=3 | 8.8% | n=7 | 20.6% | n=11 | 32.4% | n=11 | 32.4% |
| Never | n=1 | 2.9% | n=1 | 2.9% | n=3 | 8.8% | n=10 | 29.4% | n=10 | 29.4% | n=10 | 29.4% |
| Missing | | | | | | | n=1 | 2.9% | | | | |

| | Chlorhexidine | | Glycothymoline | | Lemon & glycerol | | Sodium bicarbonate | | Hydrogen peroxide | | Vaseline/lip balm | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Count | % | Count | % | Count | % | Count | % | Count | % | Count | % |
| Always | n=4 | 11.8% | n=1 | 2.9% | n=4 | 11.8% | n=5 | 14.7% | n=9 | 26.5% | n=28 | 82.4% |
| Rarely | n=13 | 38.2% | n=3 | 8.8% | n=9 | 26.5% | n=7 | 20.6% | n=9 | 26.5% | n=5 | 14.7% |
| Never | n=17 | 50.0% | n=29 | 85.3% | n=21 | 61.8% | n=22 | 64.7% | n=16 | 47.1% | n=1 | 2.9% |
| Missing | | | n=1 | 2.9% | | | | | | | | |

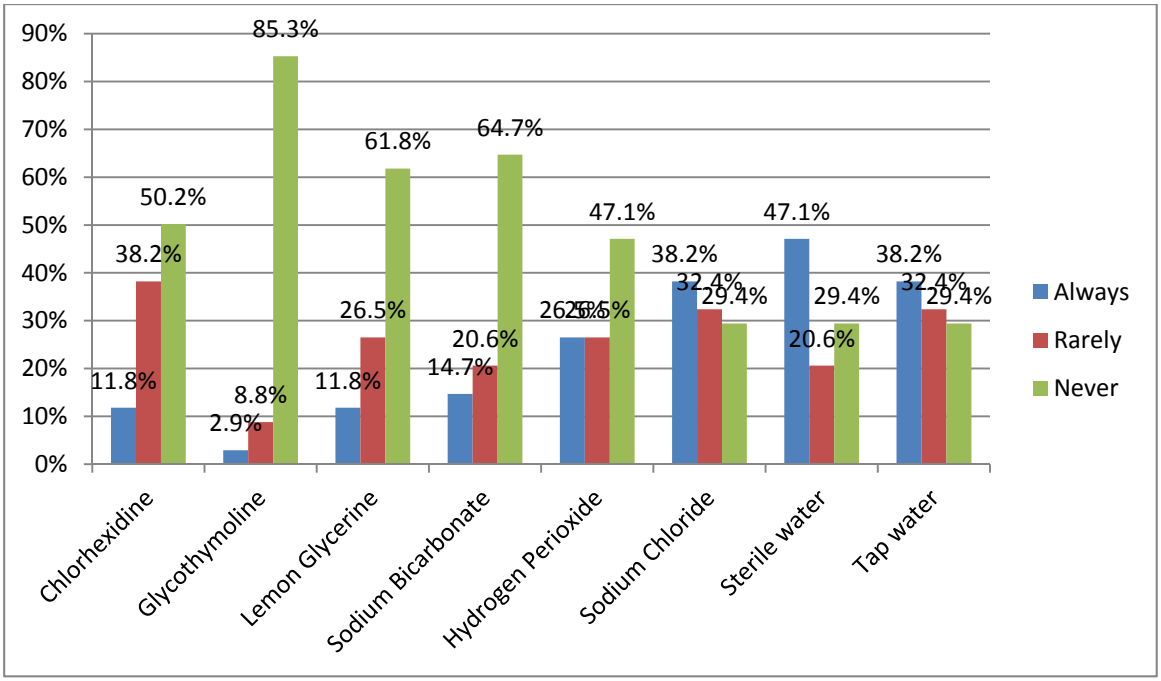


**Figure 4.5 Use and non use of mouth care solutions (N=34)**

The participants were further asked if they carry out an oral care assessment when patients are admitted to the unit. Fifty six percent (56%) n=19 of them reported that they did, while 44% (n=15) reported that they did not. Ninety seven percent (97%) n=33 reported that they don't have an oral care assessment tool to establish the oral status of patients, while 3% (n=1) reported that they did have an oral assessment tool that they used, but were unable to identify the tool. Respondents differed on the frequency of oral care, with the majority (71%) n=24 reporting that they provide oral care to their critically ill patients once a day, 26% (n=9) reported that they provided oral care as needed and 3% (n=1) reported that they provide oral care twice a day. All (100%) n=34 of the participants admitted that their units did not have an oral care protocol. Variations in practice and frequencies might be related to the absence of oral care assessment tools or protocols within the ICUs, as well as to lack of training on oral care, at basic training level and orientation in to the unit, as previously revealed.

## 4.6 Conclusions

Findings indicated that nurses lack knowledge on comprehensive oral care although they rank it high in importance and gives it a high priority. Furthermore there were no correlations between nurses' demographic data and knowledge of oral care. Lack of oral care protocols and assessment tools also contributed to variations in the provision of care.

A summary of the findings, recommendations, limitations and conclusion will be discussed in the next chapter.

# CHAPTER 5: DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

In this chapter the findings of the study are summarized, results discussed, recommendations are presented, limitations are discussed and the study is concluded. The purpose of the study was to determine nurses knowledge, practices and perceptions on comprehensive oral care to critically ill patients in order to develop, analyse or refine a context driven protocol for ICUs in Botswana.

The study was conducted in fully functional ICUs of two referral hospitals in Botswana. A self administered questionnaire was used to measure reported knowledge, perceptions and practices rather than using an observational measure. The researcher issued a questionnaire and waited for participants to complete it in her presence. This was done to minimize the possible gap between actual practice and what was reported and the Hawthorne effect, whereby participants might report what they think the researcher expects from them, rather than what they actual practice.

## 5.2 Discussion of findings

The discussion of findings is presented according to the major variables of the study, these being nurses' demographic characteristics, nurses' knowledge on comprehensive oral care for critically ill patients; nurses' perceptions on comprehensive oral care to critically ill patients; and nurses' practices in the provision of oral care to critically ill patients.

### 5.2.1 Nurses demographics

Nurses, by virtue of their practice domain, are key providers of oral care to critically ill patients. The study focused on determining whether there was an association between nurses' demographic characteristics and their knowledge, perceptions and practices in providing comprehensive oral care to critically ill patients. In this study, findings revealed that nurses' demographic characteristics were not associated with oral health care knowledge, practices and perceptions, as the small percentage of nurses who obtained high knowledge scores were evenly distributed in all age groups and among all educational levels. A large percentage of nurses obtained poor knowledge scores, irrespective of their age, gender, educational level, nursing experience, ICU experience, ICU training and citizenship. Sixty point seven (60.7%) n=17, who scored low were in 24-33year old age group, the largest group of the study. It was hypothesized that nurses who are experienced, or have ICU experience, might score better. However, findings revealed the contrary, as many experienced nurses scored badly showing that nursing experience and ICU experience had no association with knowledge scores on oral health care.

Out of the total population, 35.7 %( n=10) of the participants with 11-20 years of nursing experience scored badly, as did 93% (n=26) who had less than 5years of ICU experience. The large percentage of nurses scoring badly was across all educational levels as were the small percentage (17.5%) n=6 who scored well, which showed that level of education had little effect on the nurses' knowledge regarding the provision of oral care to critically ill patients. Most of the nurses (82%) n=28 scored badly. Seventy eight point five percent (78.5%) n=22 were diploma qualified, 18% (n=5) had degrees and 3.5% (n=1) had post graduate degrees. It was interesting to note that half of those with post graduate qualifications scored well, while the other half scored badly.

The findings of this study correlate with previous studies by Furr et al (2004), which found no association in nurses' demographic characteristics and oral health care knowledge, practices and perceptions and Ganz et al (2009), which also found no significant relationships between demographic and professional characteristics and the priority given to oral care. Soh et al (2007) found no association between nurses' demographic or workplace characteristics and nosocomial pneumonia knowledge. On the contrary, however, a recent study by Feider et al (2010), on oral care practices for orally intubated critically ill adults, found that nurses with over 7 years of critical care experience performed oral care more often than did less experienced nurses. Their findings also revealed that nurses with bachelor degrees in nursing used foam swabs, suctioned their patients' mouths before inserting endotracheal tubes and suctioned after oral care more often than other nurses. In yet another study by Carter et al (2009), on oral cancer awareness amongst hospital nursing staff, findings showed that nurses within 3 years of qualification were significantly better at recognising risk factors for oral cancer than their colleagues. Lin et al (2009) found that the age of ICU nurse was positively associated with oral care completeness.

In conclusion, some of recent studies, have found that experience, age and educational qualification can have an influence on the provision of oral health care, especially in western countries. This, however, might not be the case with the studied population because of limited resources and the lack of specialized training in Botswana.

### 5.2.2 Nurses knowledge and oral care

The study described the knowledge, practices and perceptions of nurses with regard to comprehensive oral care for critically ill patients in ICU. The majority of nurses in this study, (82%) n=28 scored badly; suggesting that overall, their knowledge of oral health care for critically ill patients is poor. The findings of this study revealed that nurses working in the ICUs lacked knowledge on important aspects of oral care such as naming the common nosocomial infection related to poor oral care, oral flora predominant in critically ill patients, indicators of poor oral care and drugs with adverse effects on oral health. This supports Beaver's (2009) argument that not all nurses understand the connection between oral flora, adverse effects of drugs and formation of plaque and an increased risk of VAP in critically ill patients. The findings of this study also concur with those of Biancofiore et al (2007) who, on evaluating nurses' knowledge on strategies for VAP prevention revealed that 54.8% of their sample of 84 nurses declared that they were poorly informed about strategies for VAP prevention.

In this study, only a small percentage of nurses (18%) n=6 were knowledgeable about the important aspects of oral care. These results support previous studies which have shown that

nurses lack knowledge on some of the most important aspects of oral care for critically ill patients (Glynn 2005, Hijji 2003). These deficits in knowledge have implications in the provision of quality oral care to critically ill patients as nurses lacking the necessary knowledge will not have the necessary skills relating to oral care and, therefore, use ineffective products, thus compromising patient care outcomes and resulting in unnecessary morbidities. Respondents did not understand the importance of providing oral care as a preventive measure; therefore, provide it infrequently with ineffective materials.

### 5.2.3 Nurses perceptions on comprehensive oral care

According to Glynn (2005), oral care protocols and assessment tools enlighten attitudes and encourage practice changes. All (100%) n=34 of the nurses in this study perceived oral care to be a priority for critically ill patients and they ranked it high. In spite of this, however, 20.6% (n=7) of them believed that oral care did not contribute much to the health and wellbeing of critically ill patients. In addition, some of the nurses (38.2%) n=13 displayed negative attitudes towards providing oral care to critically ill patients as they indicated that it was an unpleasant task. Such attitudes could hinder the provision of quality oral care

The findings of this study concur with those of Rello et al (2007) who, in their research, established that although 88% of their participants perceived oral care to be a priority in ventilated patients, 32% considered it to be unpleasant, as well as difficult. Other studies have had similar results. Binkley et al (2004) showed that 92% of the nurses they studied perceived oral care to be a priority and Ganz et al (2009) rated oral care of intubated patients with a

priority of 67 on a 0-100 scale. Only Jones et al (2004) have shown conflicting results. In this particular study, oral care was given similar priority as other aspects of personal care, with 13.5% of the participants rating it even lower.

Overall, however, findings of previous studies have revealed nurses rating oral care to be a priority in critically ill patients even though they failed to employ evidence-based oral care practices.

### 5.2.4 Nurses' oral care practices

In an ICU, oral health care is achieved by the use of mechanical and chemical means to remove plague, stimulate oral mucosa and moisturise the oral mucosa to reduce the risk of respiratory nosocomial infections. Nurses need to posses knowledge and skills to practice oral care with proven modalities, so as to reduce risk for nosocomial infections in critically ill patients.

The findings of this study revealed tooth-brushes and tooth-paste as the most common way of providing oral care to the critically ill patients, with 85% n=29 of nurses reporting that they use this method. Tooth-brushes and tooth-paste are effective in removing plaque, a film on teeth which increases proliferation of micro-organisms. The study question did not specify the type of tooth brush used although the 'soft paediatric tooth brush' is the proven and effective one. The results are comparable to previous studies that indicated tooth brushes and

tooth paste to be the most used methods (Jones et al, 2004, Kearns et al 2009). On the other hand, however, a study by Binkley et al (2004) in the United States of America showed that 80% of the respondents who were 556 in US ICUs used tooth brushes and tooth paste infrequently.

Foam swabs and Vaseline were the second most common methods of oral care reported to be used by 82.4% (n=28) of the nurses in this study. This confirms that nurses in the ICUs in Botswana lack knowledge on important aspects for VAP prevention as swabs are ineffective in plaque removal and should only be used in patients with bleeding tendencies and low platelet counts. Foam swabs stimulate the oral mucosa and are not effective in removing plaque, which harbours microbes in the oral cavity, thus increasing the risk of VAP. These findings are comparable to studies by (Kearns 2009, Ganz et al 2009, Binkley 2004, Lin et al 2009).

Mouth-washes were rarely, or never, used in this study. Nurses reported that they were not always supplied to the units and were not part of the unit protocol. Interestingly, neither of the units possessed an oral care protocol. Fifty percent (50%) n=17 of the studied nurses reported that they never used Chlorhexidine, an effective and research proven mouthwash. Various studies, however, have identified Chlorhexidine as the most commonly used mouth-wash (Ganz 2009, Kearns 2009, Binkley 2004, and Jones 2004). Furthermore, in a recent study by Munro et al (2009), these authors concluded that it was Chlorhexidine not tooth brushing that reduced early VAP in patients without pneumonia at baseline.

### 5.2.5 Conclusions

Evidence from literature has demonstrated that providing comprehensive oral care to critically ill patients in ICU not only provides a measure of comfort, but is also effective in the prevention of VAP. From the findings of this study, it became evident that although all nurses perceived oral care to be a priority in critically ill patients and ranked it high, many of them were in fact not very knowledgeable about oral health care, which has implications on their provision of such care. Nurses reported that they did not use certain evidence based oral care products, saying that these were not available in the ICUs or foreseen in unit protocol. Neither of the units in the research had an oral care protocol, however, or assessment tools to guide the nurses in the provision of care. Taking into account the above factors, the overall provision of oral care was compromised in the two ICUs as there were some inconsistencies and variations noted in the provision of care. Comprehensive oral health care is vital in critically ill patients as it reduces the risk of nosocomial respiratory infections.

## 5.3 Recommendations

Recommendations are presented in relation to practice, education, future research and management.

### 5.3.1. Recommendations for practice

As mentioned above, the results of this study indicated that some of the recommended mouth care supplies were rarely or never used, reasons being lack of supplies or not seen in the unit protocol, although neither of the units studied actually had an oral care protocol. ICU facilities need to ensure that an oral care protocol is put in place and that the necessary evidence based supplies for comprehensive oral cares are available for the nurses to use.

One of the objectives of the study was to establish whether an oral care protocol was in place in either of the ICUs studied. If such a protocol existed, it was the intention of the researcher to analyse and refine it, but if there was no oral care protocol in place, it was the intention of the researcher to develop one. The results of the study revealed non-existence of an oral care protocol in either of the ICUs, which therefore called for the development of a comprehensive oral care protocol.

#### 5.3.1.1 Development of an oral care protocol

*A Protocol* can be defined as standardized written intervention approved and signed by a physician. It defines what interventions are permissible and under what circumstances the nurse is allowed to implement the measures (DeLaune &Ladner 1998:459)

*Overview*

The oral cavity normally consists of different species of organisms that tend to colonize different surfaces in the mouth. The composition of the oropharyngeal flora of critically ill patients undergoes a change and constitutes more virulent flora, including the one which cause hospital-acquired pneumonia. The complexities of treatment for critically ill patient, such as ventilation and the effects of drugs, place them at risk of developing respiratory tract infections. Therefore, frequent, comprehensive and mechanical oral care has been identified as a preventive measure against these infections.

Comprehensive oral care maintains, improves and preserves the oral mucosal integrity and prevents accumulation of virulent microbes which predispose patients to respiratory nosocomial infections.

### 5.4.1.2 Purpose of a comprehensive oral care protocol

The following comprehensive oral care protocol has been developed to assist ICU nurses to maintain and improve the oral health status of critically ill patients, as well as to provide oral care as required to prevent the risk of respiratory nosocomial infections developing in these patients. It will ensure implementation, consistency and standardization in the provision of evidenced-based oral care practices and is developed on basis of recommendations found in the literature review (O'Reilly: 2003, Centres for Disease Control and Prevention: 2003,

Cutler & Davis: 2005, Morton et al: 2005, Berry & Davison: 2006, American Association of Critical Care Nurses: 2006, Abidia: 2007& Pear: 2007).

#### 5.4.1.3 Suggested protocol of oral health care in ICUs

**a. The nurse should conduct an oral assessment of every patient on admission and then subsequently daily prior to the provision of oral care**

*Rationale* - Oral assessment provides baseline data and helps in the identification of oral problems so that a proper individualized plan of care can be instituted.

**b. Use a small soft 'baby' toothbrush to brush teeth, tongue and gums at least twice daily to stimulate gums and remove dental plaque.**

*Rationale* - Dental plaque has been identified as a source of organisms that cause respiratory nosocomial infections. A small toothbrush provides greater access to most regions of the mouth and mechanically removes dental plaque and debris with minimal gingival trauma

**c. Use a pea-sized squeeze of fluoride toothpaste on tooth brush and brush teeth at least twice daily to reduce the formation of plaque acids**

*Rationale* - Fluoride has both bacteriostatic and antienzymatic action

**d. Use Chlorhexidine mouth rinse preoperatively for patients undergoing cardiac surgery, but not routinely for other patients**

*Rational* - Chlorhexidine has the ability to suppress the overgrowth of gram-positive and gram-negative bacteria as well as yeast.

**e. Use an alcohol-free, antiseptic mouth rinse to prevent bacterial colonization of the oropharyngeal tract**

*Rationale* - Mouthwashes containing alcohol cause excessive drying of oral tissues and thus predispose patient to bacterial proliferation.

**f. Apply a water soluble moisturizer at least once every two hours to assist in the maintenance of healthy lips and gums.**

*Rationale* - Cracked and dry oral tissues and lips provide regions for bacterial proliferation and a water soluble moisturizer allows tissue absorption and added hydration.

**g. Elevate the head of the bed at least 30 degrees and position the patient so that oral secretions pool into the buccal pocket**

*Rationale* - Elevation prevents reflux and aspiration of gastric contents which can be colonized with pathogenic organisms and lead to pneumonia

**h. Suction the patients' mouth and oropharynx as indicated by the patient's secretion production. Do not use same catheter to suction both the mouth and trachea**

*Rationale* - Suctioning minimizes aspiration of contaminated secretions into the lungs, thus reducing the risk of pneumonia. Using the same catheter for both mouth and trachea increases the risk of cross contamination.

**i. Avoid lemon glycerine swabs for moistening the oral mucosa**

*Rationale* - Lemon glycerine is acidic and can cause drying of oral tissues and hence increase the risk of bacterial proliferation.

**j. Only substitute toothbrush with cotton swabs/foam sticks for patients with bleeding tendencies and low platelet count, and clean the oral cavity at least every two hours and/or PRN.**

*Rationale* - Cotton swabs are ineffective in plaque removal and only effective in mucosal stimulation

### 5.3.2. Recommendations for education

The results indicated that 41% (n=14) of nurses have not been trained on oral assessment and the provision of comprehensive oral care during their basic nursing training and 56% (n=19) had not been orientated on comprehensive oral care provision when initially allocated to an ICU. Ninety-seven percent (97%) n=33 of the nurses, however, showed an interest in being updated on comprehensive oral health care.

It is recommended that comprehensive oral care to critically ill patients is incorporated into the basic nursing curriculum as it can benefit nurses and, hence, improve patient care outcomes. In addition, in-service lectures on comprehensive oral health care to critically ill patients with the involvement of a dentist can aid in updating nurses' knowledge and skills on evidenced based practice. Nurses should be encouraged to make use of the hospital libraries to access research-based information and to search the web for updates on evidenced based health care.

### 5.3.3. Recommendations for research

This study focused on critically ill patients in ICU in general. Most of the studies on oral health care were done in the western countries where critical care is more advanced. No studies have been done in Africa, especially in Botswana where resources are scarce and limited. Therefore, the results of this study can form the basis for further research regarding comprehensive oral health care to critically ill adult patients, especially ventilated/intubated patients so as to develop specific oral care protocols.

### 5.3.4. Recommendations for Management

The findings of the study have shown that because of lack of supplies, nurses rarely, or never, use some of the evidenced based oral care products and equipment to provide oral care to critically ill patients. It is recommended, therefore, that the stakeholders (Ministry of Health) increase the budget for critical care supplies so that nurses improve the provision of quality oral health care and, thus, quality patient care outcomes.

## 5.4 Limitations of the study

***Hospital Research Ethics Committees*** – The researcher was not aware of Hospital Research Ethics Committees within the hospitals and only learnt of their existence when she sought permission from the hospital managers to conduct the study, these committees wanted to review the proposal prior to granting the permission, which caused a lot of delays as communication was done through e-mails, with the researcher communicating to the secretaries of these committees. Network problems caused further delays at the beginning of the data collection process.

***Generalizability*** – This is the criterion used in quantitative studies to determine the extent to which findings can be applied to other settings or groups (Polit & Bert 2004:40). The study was conducted in two of the few fully functional ICUs of the referral hospitals in Botswana.

Only 34 nurses responded to the questionnaire and therefore, the results cannot be generalized to all nurses working in ICUs of Botswana.

***Hawthorne effect*** – Respondents were on duty when the researcher gave them the questionnaire to be filled in while she waited. Therefore, nurses might have completed the questionnaire in a hurry to get back to work and also provided answers which they thought might be favourable to the researcher.

## 5.5 Conclusion

Nurses lack knowledge about comprehensive oral health care to critically ill patients and there is no correlation between demographics and nurses' knowledge. Nurses rank mouth care as high priority, although they find it unpleasant to perform. They are not educated on oral care in formal education and in practice there are no mouth care protocols or mouth care assessment tools in the units to guide them on oral care provision to critically ill patients.

The study revealed that nurses' practices are sometimes inconsistent with current research-based practices and therefore highlights the need to update nurses on effective oral care modalities through in-service lectures. It is also important that organisations/facilities provide support by ensuring that there are always enough supplies and equipment for the provision of oral care.

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# APPENDIX 1

## Questionnaire – English Version

### Section A

#### 1. Demographic Data

Please tick your response in the box (√)

1.1 Age Years……..

1.2 Sex

1) Male ☐ 2) Female ☐

1.3 Highest nursing educational level

1) Diploma ☐ 2) Bachelors Degree ☐ 3) Graduate Degree ☐

1.4 Length of nursing experience/service

Months ……. Years……..

1.5 Length of Intensive care experience

Months…….. Years……..

1.6 ICU trained?

1) Yes ☐ 2) No ☐

1.7 Citizenship status

1) Citizen ☐ 2) Non – citizen ☐

1.8 Name of your facility

1) PMH ☐ 2) NRH ☐

**Section B**

**2. Oral health care/hygiene knowledge and training**

2.1 Comprehensive oral care includes:

1) Endotracheal suctioning and moisturizing of lips ☐

2) Oral assessment, brushing teeth, endotracheal suctioning and moisturizing oral cavity ☐

3) Endotracheal suctioning and brushing teeth ☐

4) Brushing teeth, suctioning and moistening the mouth cavity ☐

2.2 Which tissues are less important when assessing oral health status for critically ill patients?

1) Lips ☐

2) Gums ☐

3) Tongue ☐

4) Trachea ☐

2.3 What signs do you think would make you suspicious of a poor oral care?

1) Moist lips ☐

2) Bleeding gums ☐

3) Dental plague ☐

4) Pink tongue ☐

2.4 Which oral flora/organisms are predominant in critically ill patients?

1) Gram positive streptococci and dental pathogens ☐

2) Gram negative streptococci and dental pathogens ☐

3) Both 1 and 2 ☐

4) Different strains of pathogens ☐

2.5 Are there drugs which adversely affect oral health in critically ill patients?

1) Yes ☐ 2) No ☐

2.6) which class of drugs commonly used in ICU interfere with salivary production in critically ill patients?

1) Dormicum ☐

2) Amoxicillin ☐

3) Furosemide ☐

4)Sympathomimetics ☐

2.7 which is the most common respiratory nosocomial infection associated with poor oral care in critically ill patients? (Specify).....

2.8 Did you receive training/instruction in assessment and provision of comprehensive oral care for critically ill patients at basic nursing training?

1) Yes ☐ 2) No ☐

2.9 Did you receive training/instruction in assessment and provision of comprehensive oral health care to critically ill patients since allocated in your unit?

1) Yes ☐ 2) No ☐

If yes, what kind of training/instruction? (Specify).....

2.10 Would you like further training/updates on assessment and provision of comprehensive oral health care for critically ill patients?

1) Yes ☐ 2) No ☐

**Section C**

2 **Oral care perceptions**

Please indicate whether you: **1**- strongly agree, **2**- agree, **3**- uncertain, **4**- disagree or **5**- strongly disagree to the following statements by ticking(√) under the number that best describe your point of view.

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 3.1 Comprehensive oral care is a very high priority in critically ill patients | | | | | |
| 3.2 Comprehensive oral care contributes less to critically ill patient's health and wellbeing | | | | | |
| 3.3 Cleaning the oral cavity for critically ill patients is an unpleasant task | | | | | |
| 3.4 Cleaning oral cavity of critically ill patients causes patient discomfort | | | | | |
| 3.5 The oral cavity of critically ill patients is difficult to clean | | | | | |
| 3.6 The oral cavity of ventilated patients get worse no matter what I do | | | | | |

3.7 Rank importance of examination of a patient's mouth on admission on a ten-point scale with **1** as least important and **10** as very important (just tick (√) your response below the number)

| Rank | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|

**Section D**

3 **Oral care Practices**

Some of the internationally used and evidence-based oral care mouthwashes, cleansing tools and moistening agents for critically ill patients are listed below, indicate whether you: **1** - always, **2** - rarely or **3** -never use them by ticking (√) against each agent and indicating on the reasons column by putting a number that corresponds with the reason for **rarely** or **never** using the agent.

Lists of reasons and their numbers

Not foreseen in the unit protocol - **1**

Lack of time - **2**

Lack of supplies and equipment - **3**

Lack of skills - **4**

It causes patient discomfort - **5**

Any Other reason (specify)..... **6**

| Mouthwashes, cleansing tools and moistening agents | 1 | 2 | 3 | Reasons |
|---|---|---|---|---|
| 4.1 Tooth brush | | | | |
| 4.2 Tooth paste | | | | |
| 4.3 Swab | | | | |
| 4.4 Sterile water | | | | |
| 4.5 Tap water | | | | |
| 4.6 Normal saline | | | | |
| 4.7 Chlorhexidine | | | | |
| 4.8 Glycothymoline | | | | |

| | | | | |
|---|---|---|---|---|
| 4.9 Lemon & glycerol | | | | |
| 4.10 Sodium bicarbonate | | | | |
| 4.11 Hydrogen peroxide | | | | |
| 4.12 Vaseline/lip balm | | | | |
| 4.13 Other(specify) | | | | |

4.14 Do you carry out oral health assessment on a patient on admission?

1) Yes ☐ 2) No ☐

4.15 What percentage of patients in your unit requires assistance with oral care? (Please specify).....

4.16 Who caries out mouth care in your unit? (Please specify).....

4.17 Is there an assessment tool/guide that you use to establish your patient oral care status?

1) Yes ☐ 2) No ☐ (if yes, name the tool).....

4.18 Do you have any practical difficulties in carrying out regular oral health care for patients in your unit?

1) Yes ☐ 2) No ☐

(If yes explain).....

……..

4.19 Does your unit have a mouth care protocol?

1) Yes ☐ 2) No ☐

4.20 How frequently is a patient's oral care provided each day in your unit?

1) Not at all

2) Once per day

3) Twice per day

4) Three times per day

5) More than three times per day

6) As needed

4.21 Do you feel your hospital provides adequate resources/supplies for the provision of oral care?

1) Yes ☐ 2) no ☐ 3) not sure ☐

Thank you very much for your time!

# APPENDIX 2

## Questionnaire – Setswana – Version

**Setswana version**

**Karolo ya ntlha**

1. Pusulotso ka ga gago

Tshwaya karabo ya gago jaana mo lebokosong (√)

1.1 Dingwaga tsa gago……

1.2 Boleng

1) Rre ☐ 2) Mme ☐

1.3 O dirile dithuto dife tsa booki

1) Dipoloma ☐ 2) digarata ☐ 3) go feta digarata ☐

1.4 O na le nako/sebaka e/se kafe mo tirong ya booki

1) Dikgwedi……. 2) Dingwaga…….

1.5 Sebaka mo lephateng la balwetsi baba gateletsweng/ pitlaganyeng

1) Dikgwedi……. 2) Dingwaga……..

1.6 Ao rutetswe tlhokomelo/botsogo jwa balwetsi baba pitlaganyeng/ gateletsweng

1) Ee ☐ 2) Nnyaa ☐

1.7 Boagedi

1) ke moagedi ☐ 2) ga ke moagedi ☐

1.8 Leina la kokelo eo direlang mo go yone

1) PMH ☐ 2) NRH ☐

**Karolo ya bobedi**

2. Kitso le ithuntontsho ka bophepha le tlhokomelo ya legano mo balwetsing ba ba gateletsweng/pitlaganyeng

2.1 Tlhokomelo legano ee tletsing e akaretsa:

1) Go goga leswe mo kgokgotshong le go kolobetsa dipoonama ☐

2) Go sekaseka legano, go tlhapa meno, go goga leswe mo kgokgotshong le go kolobetsa legano ☐

3) Go goga leswe mo kgokgotshong le go tlhapa meno ☐

4) Go tlhapa meno, go goga leswe mo kgokgotsong le go kolobetsa legano ☐

2.2 Ke efe karolo ya legano ee seng botlhokwa thata mo tlhatlhobong ya molwetsi oo gateletsweng/pitlaganyeng

1) Dipounama ☐ 2) Marinini ☐ 3) loleme ☐ 4) Kgokgotsho ☐

2.3 Ke dife dikae tse di ka go tsibosang fa tlhokomelo ya legano ese e e nametsang

1) Dipounama tsedi metsi ☐ 2) marinini aa tswang madi ☐ 3) meno aa apesitsweng ke lobebe ☐ 4) loleme lo lohibidu ☐

2.4 Ke efe megare ee sa bakeng bolwetsi ee bonalang thata mo leganong la molwetsi yo o gateletsweng/pitlaganyeng

1) Mofuta wa gram positive le e mengwe ya meno ☐

2) Mofuta wa gram negative le e mengwe ya meno ☐

3) Mefuta yotlhe ya ntlha le ya bobedi ☐

4) Mefuta ya megare e e farologanyeng ☐

2.5 A go na le melemo mengwe ee ka amang botsogo ja legano mo molwetsing yo o gateletsweng/pitlaganyeng

1) Ee ☐ 2) Nnyaa ☐

2.6 Ke mofuta ofe wa melemo ee dirisiwang gantsi mo balwetsing ba ba gateletsweng/pitlaganyeng ee kgadisang mathe mo leganong

1) Dormicum ☐

2) Amoxicillin ☐

3) Furosemide ☐

4) Sympathomimetics ☐

2.7 Ke bolwetsi bofe jwa mahatla jo bo tlwaelesigileng jo bo amangwang le tlhaelo bophepa jwa legano mo molwetsing yo o gateletsweng/pitlaganyeng (Tlhalosa)……..

2.8 A o rutilwe kgotsa o filwe ithutuntsho ka go sekaseka le go tlhokomela legano la molwetsi yo o gateletswengpitlaganyeng ko dithutong tsa gago tsa booki

1) Ee ☐ 2) Nnyaa ☐

2.9 Fa o sale o simolola go berekela mo o leng teng gompieno a o kile wa tsenelela ithutontsho/kgakololo mabapi le go tlhatlhoba/tlhokomela botsogo jwa legano jwa molwetsi yo o gateletsweng/pitlaganyeng

1) Ee ☐ 2) Nnyaa ☐

Fa karabo e le ee, tlhalosa mofuta wa ithutuntsho…….

2.10 A o eletsa go rutintshiwa kgotsa go fiwa dikgakololo ka go tlhatlhoba/tlhokomela botsogo ja legano la molwetse yo o gateletsweng/pitlaganyeng?

1) Ee ☐ 2) Nnyaa ☐

**Karolo ya boraro**

3. Maikutlo  a gago ka tlhokomelo legano la molwetsi yo o pitlaganyeng/gatrletsweng

Ke kopa o supe fa **1**-o dumela thata, **2**- o dumela, **3**- o le fagare, **4**- o sa dumele, **5**- o sa dumele gotlhelele  mabapi le tlhokomelo legano la molwetsi yoo gateletsweng/pitlaganyeng ka go tshwaya ka nomoro maikutlo a gago

| Maikutlo | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 3.1 Tlhokomelo legano ke ntlha ya botlhokwa mo molwetseng yo o gateletsweng/pitlaganyeng | | | | | |
| 3.2 Tlhokomelo legano e seabe senye mo botsogong jwa molwetsi yo o gateletsweng?pitlaganyeng | | | | | |
| 3.3 Go tlhapisa legano la molwetse yo o gateletsweng/pitlaganyeng gase tiro e ntle | | | | | |
| 3.4 Go tlhapisa legano la molwetse yo o gateletsweng/pitlaganyeng go kgoreletsa molwetse go itheetsa | | | | | |
| 3.5 Legano la molwetse yo o gateletweng/pitlaganyeng ga le motlhofo  go tlhapisiwa | | | | | |
| 3.6 Legano la molwetse yoo thusiwang go hema a gateletswe ga le nne botoka lefa o ka le tlhapisa | | | | | |

3.7 Supa seemo ka botlhokwa jwa go tlhatlhoba legano la molwetse yo o gateletsweng/pitlaganyeng fa a robadiwa ka dintlha go tswa mo bongweng fa go sebotlhokwa go yako lesomeng go supa fa go le botlhokwa thata

| Seemo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|

**Karolo ya bone**

4. Di dirisiwa le mefuta ya go tlhokomela legano

Dingwe tsa di dirisiwa le metswako ee tsokunyang legano ee kanokilweng ebile e dirisiwa lefatshe ka bophara ea latela. Supa fa; **1**- o e dirisa ka metlha, **2**- o e dirisa fa gongwe, **3** -o sa e dirise gotlhelele. Mme o bo o fa mabaka a go e dirisa fa gongwe kgotsa go sa e dirisa gotlhelele ka go tshwaya nomoro ya lebaka

Mabaka le dinomoro tsa teng

Ga go yo ka fa tlase ga melawana ya madirelo a rona **-1**

Ga kena nako **-2**

Ga gona didirisiwa le metswako ya teng **-3**

Ga kena boitsaanape/bokgone **-4**

Go kgoreletsa molwetse **-5**

Mabaka a mangwe (Tlhalosa)……**-6**

| Di dirisiwa le metswako | 1 | 2 | 3 | Mabaka |
|---|---|---|---|---|
| 4.1 Tooth brush | | | | |
| 4.2 Tooth paste | | | | |
| 4.3 Swab (lewise) | | | | |
| 4.4 Sterile water | | | | |
| 4.5 Tap water (metsi a pompo) | | | | |
| 4.6 Normal saline ( metsi a a tsentsweng letswai) | | | | |
| 4.7 Chlorhexidine | | | | |
| 4.8 Glycothymoline | | | | |
| 4.9 Lemon & glycerol | | | | |

| | | | | |
|---|---|---|---|---|
| 4.10 Sodium bicarbonate | | | | |
| 4.11 Hydrogen perioxide | | | | |
| 4.12 Vaseline | | | | |
| 4.13 Tse dingwe ( tlhalosa) | | | | |

4.14. A o tlhatlhoba legano la molwetse fa a robadiwa?

1. Ee ☐ 2. Nnyaa ☐

4.15 Ke selekanyo se se kafe mo lekgolong la balwetsi ba ba kafa tlase ga tlhokomelo ya lona ba ba tlhokanang le go thusiwa ka tlhokomelo legano? (Tlhalosa)……

4.16 Ke mang yo o lebaganyeng le go tlhapisa legano la molwetse yo o gateletsweng/pitlaganyeng mo madirelong a lona? (Tlhalosa)……..

4.17 A gona le mokwalo wa melawana e le e salang morago fa le tlhatlhoba bophepa jwa legano la molwetsi yo o gateletsweng/pitlaganyeng?

1) Ee ☐ 2) Nnyaa ☐

Fa karabo ele ee, tlhalosa leina la mokwalo oo……..

4.18 A o na le bothata mabapi le tlhokomelo legano la molwetsi yo o gateletsweng/pitlaganyeng?

1) Ee ☐ 2) Nnyaa ☐

Fa karabo e le ee, bothata ke eng……..

4.19 A madirelo a lona a na le mokwalo oo kayang ka fa o tshwanetseng wa tlhokomela legano la molwetse yo o gateletsweng /pitlagannyeng ka teng?

1) Ee ☐ 2) Nnyaa ☐

4.20 Balwetsi ba tlhapisiwa legano ga kafe mo madirelong a lona?

1) Ga banke ba tlhapisiwa legano ☐

2) Gangwe fela mo letsatsing ☐

3) Ga bedi mo letsatsing ☐

4) Gararo mo letsatsing ☐

5) Go feta boraro mo letsatsing ☐

6) Fa go tlhokega ☐

4.21 A o na le tumelo ya gore kokelo ya lona e na le di dirisiwa tse di lekanyeng tsa go tlhokomela bophepa ja legano la balwetsi ba ba gateletsweng/pitlaganyeng?

1) Ee ☐ 2) Nnyaa ☐ 3) Ga kena bosupi ☐

Ke lebogetse tirisano mmogo le nako ya gago!

# APPENDIX 3

RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL : ximbap@ukzn.ac.za

UNIVERSITY OF
KWAZULU-NATAL

22 SEPTEMBER 2009

Mrs. Annah Philo Sarefho (208509211)
Nursing
Faculty of Health Sciences
Howard College Campus

Dear Mrs. Sarefho

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0554/09M

I wish to inform you that your application for ethical clearance has received full approval for the following project:

**"Exploring nurses' knowledge, practices and perceptions on comprehensive oral health care among Intensive Care Unit (ICU) nurses in Botswana".**

**PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years**

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

PROFESSOR STEVEN COLLINGS (CHAIR)
HUMANITIES & SOCIAL SCIENCES ETHICS COMMITTEE

cc. Supervisor (Busisiwe Bhengu) ,
cc. Sugen Reddy

# APPENDIX 4

Telephone: (267) 363200
FAX (267) 353100
TELEGRAMS: RABONGAKA
TELEX: 2818 CARE BD


MINISTRY OF HEALTH
PRIVATE BAG 0038
GABORONE

**REPUBLIC OF BOTSWANA**

REFERENCE NO: PPME 13/18/1 PS IV (74) 08 December 2009

Health Research and Development Division

Notification of IRB Review: New application

Annah Sarefho
P o Box 115
Gumare

| | |
|---|---|
| Protocol Title: | **Exploring nurses knowledge, practices and perceptions on comprehensive oral health care in critically ill patients among Intensive Care Unit nurses in Botswana** |
| HRU Protocol Number: | HRU 00569 |
| Sponsor: | N/A |
| HRU Review Date: | December 08, 2009 |
| HRU Expiration Date: | December 08, 2010 |
| HRU Review Type: | HRU reviewed |
| HRU Review Determination: | Approved |
| Risk Determination: | Minimal risk |

Dear Sarefho

Thank you for submitting a new Application for the above referenced Protocol.
This approval includes the following:

1. Application form
2. Proposal
3. Consent form

This permit does not however give you authority to collect data from the selected site without prior approval from the management. Consent from the identified individuals should be obtained at all times.

1

The research should be conducted as outlined in the approved proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.

If you have any questions please do not hesitate to contact Mr. P. Khulumani at pkhulumani@gov.bw, Tel +267-3914467 or Mary Kasule at mkasule@gov.bw or marykasule@gmail.com Tel: +267-3632466

**Continuing Review**
In order to continue work on this study (including data analysis) beyond the expiry date, submit a Continuing Review Form for Approval at least three (3) months prior to the protocol's expiration date. The Continuing Review Form can be obtained from the Health Research Division Office (HRDD), Office No. 9A 11 or Ministry of Health website: www.moh.gov.bw or can be requested via e-mail from Mr. Kgomotso Motlhanka, e-mail address: kgmmotlhanka@gov.bw As a courtesy, the HRDD will send you a reminder email about eight (8) weeks before the lapse date, but failure to receive it does not affect your responsibility to submit a timely Continuing Report form

**Amendments**
During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek HRDC approval before implementing it. Please summarize the proposed change and the rationale for it in the amendment form available from the Health Research Division Office (HRDD), Office No. 9A 11 or Ministry of Health website: www.moh.gov.bw or can be requested via e- mail from Mr. Kgomotso Motlhanka, e-mail address: kmotlhanka@gov.bw . In addition submit three copies of an updated version of your original protocol application showing all proposed changes in bold or "track changes".

**Reporting**
Other events which must be reported promptly in writing to the HRDC include:
- Suspension or termination of the protocol by you or the grantor
- Unexpected problems involving risk to subjects or others
- Adverse events, including unanticipated or anticipated but severe physical harm to subjects.

Do not hesitate to contact us if you have any questions. Thank you for your cooperation and your commitment to the protection of human subjects in research.

Yours sincerely

P. Khulumani
**For Permanent Secretary**

PERMANENT SECRETARY
MINISTRY OF HEALTH
RESEARCH UNIT

0 8 DEC 2009

P/BAG 0038
GABORONE
REPUBLIC OF BOTSWANA

# APPENDIX 5

University of KwaZulu Natal

Howard College School of Nursing

Desmond Clearance Building Floor 5

Durban 4041

South Africa

**To**: Hospital Manager

Nyangabgwe Refferal Hospital

Private Bag 127

Francistown

14th December 2009

Dear sir/madam

**Request for permission to conduct a research study**

I am a 2nd year master of nursing(Trauma & Critical Care) student with the above mentioned university and requesting for permission to conduct a study among ICU nurses on importance of comprehensive oral health care to critically ill patients as part of the requirement for my masters degree. The purpose of the study is to explore nurse's knowledge, practices and perceptions regarding importance of comprehensive oral care to critically ill patients as a preventative measure for nosocomial pneumonia in order to develop or refine a context driven/specific oral care protocol for ICUs in Botswana. The study would be conducted during the month of December 2009/January 2010 and will not have any negative effects to the participants. The researcher promises to respect and protect the rights of the participants.

Attached is a copy of the Ministry of Health approval permit to conduct the study.

Thanking you in advance

Yours faithfully

_____

Annah Philo Sarefho

Cc- Nursing superintendent

# APPENDIX 6

13/18

**TELEPHONE: 2411000**
**FAX: 2416706/2419387**
**REFERENCE:** NH 3/54 VI (10)

Republic of Botswana

**NYANGABGWE HOSPITAL**
**PRIVATE BAG 127**
**FRANCISTOWN**
**BOTSWANA**

19 January 2010

Annah Philo Sarefho
University of KwaZulu Natal
Howard College of Nursing
Desmond Clearance Building Floor 5
Durban 4041
South Africa

Dear Madam

**RE: PERMISSION TO CONDUCT A RESEARCH STUDY**

Approval has been given for your research proposal entitled "Exploring Nurses Knowledge, Practices and Perceptions on Comprehensive oral health care in critically ill patients among Intensive Care Unit Nurses in Botswana."

I have attached a copy of the approval letter from Research and Ethics Committee of Nyangabwe hospital.

Yours faithfully

Dr LN Chansa
**DEPUTY HOSPITAL SUPERINTENDENT**

**LNC/gjm**

MINISTRY OF HEALTH
DEPARTMENT OF CLINICAL SERVICES
DEPARTMENTAL
2010 -01- 21
PRIVATE BAG 00305
TELEFAX: 3176695
GABORONE, BOTSWANA

**Ethical review of proposed study: "Exploring nurses knowledge, practices & perceptions regarding comprehensive oral care to critically ill patients among intensive care unit (ICU) nurses in Botswana"**

Name of applicant: Annah Philo Sarefho (being a University of Kwazulu-Natal student)
Name of site: Nyangabgwe Referral Hospital (hereafter NRH)
Reviewer(s): Dr Selemogo
Review determination: Approved
Date & place of decision: 13/01/2010, Nyangabgwe Referral Hospital

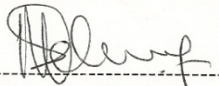
**The above named study protocol fulfills all the necessary ethical requirements to give it a go ahead to be carried out at NRH.**

- According to the Ministry of Health's *Guidelines for good practice in the conduct of clinical trials in human subjects in Botswana* (2008), the study protocol may be classified "No more than minimal risk research". It is a descriptive study which poses no physical risks to the potential participants nor does it involve the use of procedures or devices about which there is limited knowledge.
- The protocol is also found to display the desired sensitivity to the main ethical issue of confidentiality which it evokes.
- Further strengthening its ethical validity is the social value of the information it seeks to generate; information which will be of particular importance in enhancing the care of the critically ill patients in our ICUs, with potential to also reducing the number of nosocomial infections.

Follow-up requirements

The following standard requirements as pertain to the responsibilities of the researcher during the conduct of the study should noted:

1. The need to notify the committee in cases of protocol amendments (other than amendments involving only logistical or administrative aspects of the study).
2. The need to notify the committee in the case of amendments to the recruitment material, the potential research participant information, or the informed consent form.
3. The need to report to the HS any serious and unexpected adverse events related to the conduct of the study.
4. In case of a premature suspension/termination of the study, the applicant should notify the committee of the reasons for such suspension/termination.
5. NRH should receive notification from the applicant at the time of the completion of a study.
6. NRH should receive a copy of the final report of the study. A presentation of the findings at the hospital's Friday morning clinical meeting would be highly desirable.



Dr Selemogo (Chair Research & Ethics Committee)

# APPENDIX 7

University of KwaZulu Natal

Howard College School of Nursing

Desmond Clearance Building Floor 5

Durban 4041

South Africa

**To**: Hospital Manager

Princess Marina Hospital

P.O. BOX 258

Gaborone

14th December 2009

Dear sir/madam

**Request for permission to conduct a research study**

I am a 2nd year master of nursing(Trauma & Critical Care) student with the above mentioned university and requesting for permission to conduct a study among ICU nurses on importance of comprehensive oral health care to critically ill patients as part of the requirement for my masters degree. The purpose of the study is to explore nurse's knowledge, practices and perceptions regarding importance of comprehensive oral care to critically ill patients as a preventative measure for nosocomial pneumonia in order to develop or refine a context driven/specific oral care protocol for ICUs in Botswana. The study would be conducted during the month of December 2009/January 2010 and will not have any negative effects to the participants. The researcher promises to respect and protect the rights of the participants.

Attached is a copy of the Ministry of Health approval permit to conduct the study.

Thanking you in advance

Yours faithfully

_____

Annah Philo Sarefho

Cc- Nursing superintendent

# APPENDIX 8

Princess Marina Hospital
P.O. Box 258
Gaborone Botswana

REPUBLIC OF BOTSWANA

Tel: 3621400
Fax: 3973776
Email: ygureja@gov.bw (chairman)
boisa2002@yahoo.com. (Secretary)

**PRINCESS MARINA HOSPITAL INSTITUTIONAL REVIEW BOARD**

Our Ref: PMH2/09-071 Date: 03 March 2010

Ms Annah Selefho
University of Kwazulu Natal

Dear Ms Selefho

**RE: Exploring nurses knowledge, practices and perceptions regarding comprehensive oral care to critically ill patients among Intensive Care Unit (ICU) nurses in Botswana**

Reference is made to the above titled study submitted to the Research and Ethics Committee of Princess Marina Hospital. Following a review, the study has been approved on condition that the researcher:

- Seeks permission from the head of the institution/department in which the study will be conducted.
- Resubmit for approval should any changes be made to the protocol.
- Provide both a hard and an electronic copy of the report when the study is finished.

The study permit is still valid for a period of one year, from the date of this letter.

The Committee would like to communicate its support in this very important endeavour. Your continued communication and update is greatly appreciated.

**Yours sincerely,**

**Boitumelo Mokgatla-Moipolai**
**Secretary**
**Contacts: 362 1778 (Office) or 71543980**
**Email: Boisa2002@yahoo.com**

# APPENDIX 9

Dear participant

I am Annah Philo Sarefho, a master of nursing student studying trauma and critical care with the University of KwaZulu Natal, Durban, South Africa. As part of the requirement for master's degree, I am embarking on a study on "Comprehensive oral care in critically ill patients in the intensive care units" (ICU). As you are all aware, nationally and internationally, provision of holistic quality nursing care, based on evidence, available resources and patient's needs is being emphasized and prevention of nosocomial infections in ICU is of utmost importance. The purpose of this study is to determine level of knowledge you, ICU nurses, have on oral care of critically ill patients and describe your current oral care practices and perceptions on importance of comprehensive oral care to critically ill patients as a preventative measure in order to provide evidence based care, increase our clinical knowledge and skills in provision of oral care to critically ill patients and develop or refine a context driven/ specific oral care protocol for ICU's in Botswana. You are chosen to take part in this study because of your ICU exposure and might be familiar with care of critically ill patients. It is hoped that this study might yield information that can assist us to improve our clinical practice in provision of quality oral care to our critically ill patients and hence prevent nosocomial pneumonia.

The questionnaire is coded; no identifying information is required from you. Therefore, your anonymity, privacy and confidentiality are assured. No information given in this questionnaire will be shared or disclosed to unauthorized person. Your participation in this study is voluntary and you have a right of deciding to withdraw from it if you so wish without incurring any penalties and there are no remunerations for participating in this study. The questionnaire might take 7-10 minutes of your time to complete.

Returning a fully completed questionnaire to me implies your agreement to participate in the study. I will really appreciate your participation.

If you need more clarification or having comments or questions you can forward them to me or my supervisor at the following numbers and addresses:


Annah P. Sarefho - +27769750984

Email: sarefhoa@yahoo.com

208509211@ukzn.ac.za

Professor BR Bhengu - +27836615563

Email: bhengu2@ukzn.ac.za

Tel: 031 260 1134/2499

Fax: 031 260 1543

# APPENDIX 10

Consent Document

Study title**: Exploring nurses knowledge, practices and perceptions on comprehensive oral health care among intensive care unit (ICU) nurses in Botswana.**

Ethical clearance number: HSS/0554/09

Dear participant

You are kindly invited to participate in a research study as titled above. Provision of holistic quality nursing care, based on evidence, available resources and patient's needs is emphasized globally and prevention of nosocomial infections in ICU is of utmost importance. The researcher is interested in knowing your knowledge, practices and perceptions regarding comprehensive oral care to critically ill patients as a preventative strategy for nosocomial pneumonia in critically ill patients. There are no individual benefits/remunerations for participating in this study but the researcher hopes that the study may yield information that might be useful for improvement in provision of quality comprehensive oral care to our critically ill patients. Your participation is voluntary. If you agree to participate, you will append your signature as evidence of your acceptance and be given a copy of the document.

**Declaration of consent**

I……(full names of participant) give consent to participate in a study titled: **Exploring nurses knowledge, practices and perceptions on comprehensive oral health care among intensive care unit nurses in Botswana.**

I have read the information document and understood the contents, the nature of the research project was explained clearly to me and I was made aware that participation is voluntary and anonymity and confidentiality would be maintained.

Signature of Participant…… Date…….

Signature of Researcher…… Date……

Witness Signature..... Date.....

# APPENDIX 11

Editing Declaration

P O Box 531
Hillcrest
3650
KwaZulu-Natal

2011-01-27

TO WHOM IT MAY CONCERN

Thesis Title: EXPLORING NURSES' KNOWLEDGE, PRACTICES AND PERCEPTIONS REGARDING ORAL HEALTH CARE FOR CRITICALLY ILL PATIENTS AMONG INTENSIVE CARE UNIT (ICU) NURSES IN BOTSWANA

Author: Annah Philo Sarefho

This is to certify that I have edited the above thesis from an English language perspective only, and have made recommendations to the author regarding spelling, grammar, punctuation, structure and general presentation.

A marked-up version of the thesis has been sent to the author and is available as proof of editing.

I have had no input with regard to the technical content of the document and have no control over the final version of the thesis as it is the prerogative of the student to either accept or reject any recommendations I have made.

Therefore, I accept no responsibility for the final assessment of the document.

Yours faithfully

Margaret Addis