Knowledge, attitudes and practices of student nurses regarding oral health at a university in the Western Cape

A mini thesis submitted in partial fulfilment of the requirements for the degree of Masters in Nursing (Nursing Education) in the School of Nursing, Faculty of Community and Health Sciences, University of the Western Cape.

By

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KEYWORDS

Attitude

Knowledge

Oral care

Oral health

Practice

Student nurse

LIST OF ABBREVIATIONS

ECP 1: Extended Curriculum Programme year one

ECP 2: Extended Curriculum Programme year two

HSSREC: Humanities and Social Sciences Research Ethics Committee

R174: (SANC) Regulation 174

R425: (SANC) Regulation 425

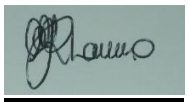
SANC: South African Nursing Council

SPSS: Statistical Package for the Social Sciences

WHO: World Health Organization

DECLARATION

I declare that “Knowledge, attitudes, and practices of student nurses regarding oral health at a university in the Western Cape” is my own work, that has not been previously submitted for any degree or examination in any institution and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Pelisa Khonco signature: 

DEDICATION

To the Devine Power, the creator of all life Indeed, it's through you Almighty that its possible, thank you for giving me strength and for all that I am and have. and to Omaduna, Omsuthu, Othiba, Onokhala, Onkhabinde Camagu bantu abadala.

I dedicate this work to my mother Nomathamsanqa Grace Kongela. You have been celebrating me in everything I have achieved. I know it excites you that I am the first generation in our family to hold a master's degree. You are so passionate about education that you have went so far as to pay registration fees for other children in the community with the little that you have. Thank you for all your efforts and struggles as a single parent, you are indeed a phenomenal woman.

To my father Mandla Khonco I know you are looking down on me, continue Resting in peace and being my guardian, Angel.

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To my entire family especially those who are still students I hope this motivates you to never give up on your studies.

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ABSTRACT

Oral health is one of the most important factors in the general well-being of individuals and their quality of life. Nurses are important role players in health promotion and student nurses have a significant role in oral care promotion. Student nurses should be equipped with knowledge and skills to take care of their own oral health and promote oral health in the communities. The aim of this study was to determine student nurses' knowledge, attitude towards their own oral care and patient's oral care, and student nurses' practices regarding oral health.

A descriptive quantitative approach with a descriptive survey and a self-administered questionnaire was used in this study. The quota sample consisted of 287 student nurses enrolled in the Bachelor of Nursing Programme at a university in the Western Cape.

The questionnaires were completed by 281 respondents. Data were captured in SPSS version 28, and descriptive statistics, univariate and bivariate analysis were used. Respondents had positive attitudes towards their oral health care, with 92.9% agreeing that if they knew facts about dental health, that could help prevent tooth loss. They had fair oral health status and practices, with 98.6% reporting using a toothbrush to clean their teeth. However, their oral health knowledge was poor with an average of 47.8%, but they showed positive attitudes towards patient oral health care with 82.5% agreeing that providing oral care may prevent complication of their patients. The study highlighted areas for further education with recommendations for the inclusion of oral health in the nursing curriculum.

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

Nurses play an important role in society by promoting, preventing, maintaining and improving the health of the community and educating the community about general wellbeing and oral care (Deogade & Suresan, 2017; Yavagal, Dalvi, Benson, Lakshmi,Yann, & Gowda, 2020). However, nurses' role in dentistry appears to be unimportant as student nurses' theoretical knowledge about dental care is limited and the clinical skills laboratory used to develop their clinical skills lacks dental equipment and instruments (Deogade & Suresan, 2017). Student nurses should have theoretical and clinical learning opportunities regarding oral health. In this regard, Deogade and Suresan (2017) argued that oral health needs to receive greater importance in the nursing curriculum which could include clinical courses on identifying and diagnosing oral diseases. Similarly, Bhagat, Hoang, Crocombe and Goldberg (2020) argued that an oral care module should be included in nursing curricula (Bhagat et al., 2020) to empower student nurses' knowledge and skills regarding the practice of oral care. Hence, student nurses should be equipped with knowledge and skills to be self-reliant in respect of their own oral health and to promote oral health in their communities. Student nurses need to be provided with education and competences related to oral care before they can teach community members (Bhagat et al., 2020; Cabov et al., 2021). There is a need to acquire oral care knowledge to promote oral health which is of great importance for individuals' general health (Cabov et al., 2021; Singh, Pradhan, Sharma, & Srivastava, 2022).

According to the nursing curricula, student nurses integrate the knowledge into practice. It is crucial for student nurses to develop professional knowledge and skills (Rudberg, Westerbotn, Sormunen, Scheja, & Lachma, 2022). They contribute to nursing care in the facilities although they practice under supervision of professional nurses. Studies have found that student nurses have a significant role in oral care promotion (Yadav, Khan, Khan, Gupta, Gupta, & Gupta, 2019). The fact that nursing curricula still have to focus on oral health care in their modules impacts negatively on student nurses' oral care knowledge and practices (Al-hatlani & Ali, 2019). Therefore, the lack of oral care knowledge and practices among nursing students is a challenge in terms of executing mouth care; hence, the thorough healthcare needs of patients are compromised. Because of this, it i*-+s crucial that nursing students understand oral health and have the necessary knowledge, attitudes, and practices so they can educate and promote it to their patients. Once student nurses are equipped with oral care knowledge and practices, they will be able to assume responsibility for their patients' oral health (Grønkjær, Nielsen, Nielsen, & Smedegaard, 2017) as student nurses are trained to become professional nurses (Rudberg et al., 2022) who promote health at primary healthcare facilities (Austin-evelyn, Rabkin, Macheka, Mutiti,Mwansa- Kambafwile, Dlamini, & El-Sadr, 2017) and in hospitals (Ross, Wehrlen, Perez, Farmer, & Bevans, 2019).

Nurses are the first point of contact at primary healthcare facilities (Aljomaie, Hollingdrake, Cruz, & Currie, 2022), they are expected to be knowledgeable in oral health so that they can respond to the community members' oral health needs. Nurses need to educate community members with confidence, give demonstrations on oral care techniques to the community members that rely on them for health education. Nurses are viewed as role models in health promotion within the community (Darch,

Baillie, & Gillison, 2017; Wills, Kelly, & Frings, 2019). As a result, the community members' knowledge and practices surrounding oral health may be influenced by nurses' knowledge, attitudes, and practices (Gowdar, 2017). Oral health knowledge and behaviour affect oral health (Singh et al., 2022) Good oral health practices depend on good oral health knowledge (Gowdar, 2017). This means that oral health knowledge can lead to a good practice of oral health. A lack of good oral health attitude and knowledge may result in poor oral health (Gowdar, 2017).

1.2 Background of the study

Student nurses' attitudes towards their oral self-care practices could be an indication of their understanding of the importance of oral health promotion and procedures thus helping improve the oral care of the population (Singh & Pottapinjara, 2017). Oral health is one of the most important factors in the general well-being of the individuals and their quality of life (Fellows, Atchison, Chaffin, Chávez, & Tinanoff, 2022). The digestive system begins in the oral cavity since the mouth is the first organ of digestion. (Khan & Odisho, 2017). According to the World Health Organization (2020), two billion people across the world are estimated to suffer from dental caries of permanent teeth. Tooth decay usually causes dental carries to develop as a chronic oral disease (World Health Organization, 2020). Since the majority of diseases' indications and symptoms can be discovered in the mouth, it's essential that nursing students comprehend and possess the necessary oral health knowledge (Khan & Odisho, 2017).

Patients' oral care consists of routinely washing their lips, tongues, gums, and dentures to maintain a healthy mouth. (Tadesse & Worku, 2019). There has been concern that student nurses' knowledge of oral health seemed inadequate, especially as to what is required from future professional nurses (Yavagal et al., 2020). Nursing

schools include health promotion and health assessment as part of their curriculum but there is a poor integration and focus on oral health (Spurr, Bally, Hayes, Ogenchuk, & Trinder, 2017). Moreover, the School of Nursing at a university in the Western Cape, has not yet included an oral care module in the curriculum across the four-year nursing programme.

The school at a university in the Western Cape offers a four-year Bachelor of Nursing degree. Regarding the theory and practices to nursing care, the nursing curriculum includes different modules at each year level. For the students registered with the South African Nursing Council (SANC) for the regulation 425 (R425), the school offers a Fundamentals of Nursing module in the extended curriculum programme and first-year level of the mainstream nursing programme and offers general nursing science modules at the second-year level. The Fundamentals of Nursing module has expected learning outcomes and one of them is hygiene (School of Nursing, 2018). Therefore, student nurses have the opportunity to learn about the basics of mouthwash as one of the expected learning outcomes, but dental care is not covered (School of Nursing, 2018). Moreover, the general nursing modules focus on diseases and injuries, but the student nurses need to learn about the oral cavity when they are doing skills like mouth suctioning and about oral diseases (School of Nursing, 2019). The third year offers a new experience namely midwifery, community modules and a unit management module. At this level, student nurses can recall information of oral hygiene when they are suctioning a baby. At the fourth-year level, the curriculum focuses on psychiatric nursing modules, professional practice modules, gender-based violence modules and research modules. Besides the above-mentioned modules, the nursing curriculum includes service modules such as: a chemistry and physics module at first-year level,

human biology modules at first and second-year levels, and pharmacology and psychology modules at second-year level.

In the new curriculum regulation 174 (R174) first year including ECP one and two, Fundamentals of Nursing module is offered, and oral healthcare is only covered in adult basic hygiene needs and even in this content oral health is not emphasised and, in skills laboratory, oral health is only covered as part of the basic hygiene needs of an adult (School of Nursing, 2021). In the second-year, oral health is only covered in communicable and non-communicable diseases module when the students learn about suctioning as part of nursing care for patients with a tracheotomy. In these general nursing modules, oral health is inadequately covered in both theory and in the skills laboratory (School of Nursing, 2021). In the third year of the new curriculum, the focus is on midwifery and the introduction to mental health while the fourth year focuses on research and mental health modules; however, an oral health module is excluded (School of Nursing, 2021). Therefore, oral care is not adequately included in the curriculum and there is a gap in teaching, learning and assessment related to oral care knowledge and practices. In this regard, there is a need to determine student nurses' knowledge and attitudes towards their own oral care, that of their patients, and their practices regarding oral health.

1.3 Problem statement

Dental caries is the most prevalent infectious disease worldwide and is currently the largest oral health problem in the world (Yadav et al.,2019; Gianos et al., 2021). Oral health discrepancies in South Africa varies, especially in deprived groups where most people experience the burden of oral diseases due to the inadequate distribution of dental amenities in the region, which results in a lack of oral health resources like

dentists and facilities (Ramphoma, 2017; Mbele-Kokela & Moodley, 2021). Two billion people across the world are estimated to suffer from dental caries (World Health Organization, 2020).

Concerns have been raised concerning the degree of oral health education provided in nursing schools, and studies have revealed that student nurses' practises, attitudes, and knowledge of oral health are insufficient (Yavagal et al., 2020), especially as to what is required from future professional nurses (Grønkjær et al., 2017). The nursing programme at a university in the Western Cape offers nursing courses that cover the fundamentals of mouth washing without emphasising dental care theory or clinical teaching (School of Nursing, 2018; School of Nursing 2019; School of Nursing, 2021). The perceptions of the significance of oral health promotion and oral health procedures can be related to the knowledge, attitudes, and practices of student nurses with regard to oral health (Tadesse & Worku, 2019). Within South Africa, studies conducted on student nurses' knowledge, attitudes and practices regarding oral health remains unknown to the researcher. Therefore, an investigation is needed to fill the gap in nursing research.

1.4 The Study

1.4.1 Aim of study

The aim of the study was to determine the attitudes and knowledge of student nurses, at a university in the Western Cape, towards their own oral care and their attitudes towards their patient's oral care as well as their practices regarding oral health.

1.4.2 Objectives

1 To describe the self-reported oral health status of the student nurses

2 To describe the self-reported oral health practices of the student nurses

3 To determine student nurses' knowledge of oral health

4 To determine student nurses' attitude towards oral health

5 To determine student nurses' oral health attitude towards oral care of their patients.

1.5 Significance of study

Student nurses at a university in the Western Cape are future professional nurses who will care for patients from primary healthcare (PHC) level to tertiary level, it is vital for these nurses to have a thorough knowledge of oral health to provide their patients with oral health promotion and education. The findings of this study may be used by nurses to better the management of their patient oral care and to assist in nursing education curriculum development. Moreover, the study results will give the nursing school information about the level of knowledge and attitudes among students regarding oral health and patient oral care practices. In this regard, the findings can influence the nursing curriculum development towards the integration of oral health into general health nursing more effectively.

1.6 Research methodology

A descriptive quantitative questionnaire design was employed in this study to accomplish the aim of the study. To investigate the knowledge, attitudes, and practices of student nurses on oral health, a quantitative approach was utilised in this study. This approach was useful for the researcher to collect numeric data using a self-administered questionnaire and analyse them using Statistical Package for Social Sciences (SPSS) (Brink, Van der Walt, & Van Rensburg, 2018). A cross-sectional

descriptive design was applied, and the researcher collected the data at one point in time. A detailed methodology description is provided on chapter three.

1.7 Definition of Terms

Table 1: Operational definitions of terms

Terms	Definition
Knowledge	In this study knowledge refers to the understanding of what oral health is in terms of practice and attitude of the student nurse towards oral health.
Oral health attitude	Refers to student nurses' views, thoughts and how they behave towards their own oral care.
Oral health practices	In this study oral health practices refer to the student nurse's practices of oral care and evaluation of their own oral health.
Oral health status	In this study oral health refers only to the absence of pain in the mouth, sores, or lesions and all the disorders that affect the gums and the teeth.
Patient oral care	Patient oral care, in this study, refers to the ability of student nurses to keep the patient's mouth cavity clean and their comprehension of their role in providing oral care to patients.
Student nurse	In this study, a student nurse is defined as a nursing student who is registered under course R425 of the South African Nursing Council regulations related to the approval of and the minimum requirements for the education and training of a learner leading to registration as a general nurse, psychiatric nurse, community nurse, and a midwife (south african Nursing Council act, 2013) and R174 these are South African Nursing Council regulations related to the approval of and the minimum requirements for the education and training of a learner leading to registration as professional nurse and a midwife (South African Nurse Council, 2013) at a university in the Western Cape, Cape town

1.8 Outline of the study

1.8.1 Chapter 1

In Chapter 1 the introduction and the study background are included. It also contains the problem statement, aims and objectives, significance of the study, the methodology is briefly provided, and the definition of terms used in this study.

1.8.2 Chapter 2

Chapter 2 includes the literature review related to oral health, oral health related diseases, student nurse's knowledge of oral health, oral health practices, student nurses' attitudes towards oral health, oral health barriers, and a summary of the chapter.

1.8.3 Chapter 3

Chapter 3 includes a detailed description and outline of the research design and the methodology that was used in the study is explained.

1.8.4 Chapter 4

Chapter 4 includes the study results attained from the data analysis, these results are presented in the form of tables and graphs.

1.8.5 Chapter 5

In Chapter 5 the results are discussed and interpreted within the body of empirical literature on knowledge, attitudes, and practices of nursing students regarding oral health.

1.8.6 Chapter 6

Chapter 6 provides a brief reflection on the aims and objectives of the study, while considering the findings in Chapter 4, this chapter also discusses this study's limitations, presents its recommendations and draws a conclusion.

The Appendices are attached at the end of this study.

1.9 Summary

This chapter covered, in detail, the study's background and significance, the problem statement, research question, aims and objectives, and definitions of key.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature review is reading with understanding and formulating conclusions about published research theory and presenting it in an ordered manner. The used database including searched words will be evidence of how the researcher searched literature (Brink et al., 2018). In this study, there are six sections that make up the literature review. Section one explores oral health and examines the link between oral health and the general wellbeing of an individual. The second section is associated with the oral health related diseases. The third section explores student nurse's knowledge of oral health; the evidence suggests that there is a lack of knowledge on oral health. The fourth section outlines the practices of student nurses in oral care. The fifth section examines student nurses' attitudes towards oral health and includes evidence which suggests that oral care is a difficult experience for student nurses. The sixth section examines the different types of oral health barriers.

2.2 Oral health

Oral Health is the ability of an individual to communicate, smell, touch, speak, taste, chew, swallow and to present different emotions through facial expressions without discomfort, pain, or diseases of the mouth and face (Glick, Williams, Kleinman, Vujicic, Watt, & Wyant, 2016; Mbele-Kokela & Moodley, 2021). The craniofacial complex consists of the head, face, and oral cavity. The craniofacial complex is the most distinguishing structure of all the human body structures (Hinton & Svoboda, 2010). The craniofacial complex allows physicians to understand organs and systems. Through the craniofacial complex the head and face can be uniquely defined (Fellows

et al., 2022). The craniofacial complex allows an individual to smile, smell, speak, touch, chew, swallow and express emotions and communicate feelings through facial expressions (Fellows et al., 2022).

Oral health is also defined as the absence of orofacial pain, periodontal /gum diseases, oral infection, and other oral diseases that affect the overall physical and mental well-being of a person (Bhagat et al., 2020). The oral cavity is the key to general health, in order for people to have good general health they need good oral health, this is because the oral cavity is an important part for the body that interacts with the outside environment (Kane, 2017). The importance of having a healthy mouth, in the general wellbeing of an individual, should be emphasised. Oral health allows a person to laugh, eat, smile, speak, and chew without any discomfort or humiliation as it is also an important part of socialising (October & Ramphoma, 2016).

When an individual has oral health issues this can have a negative influence on their quality of life. Mouth pain and missing teeth can badly influence an individual's speech, and it will influence their diet and their social life (Roy, Casier, & Dupuis, 2018). Studies show a significant link between good oral health and general health. Oral health related diseases are: cardiovascular diseases, poor nutrition, cancer, diabetes mellitus, and respiratory infections (Kane, 2017; Kotronia, Brown, Papacosta, Lennon, Wayant, Whinup, Wannamethee, & Ramsay, 2021; Roy et al., 2018).

2.3 Oral health related diseases

Oral diseases such as periodontal diseases have an impact on other systemic conditions such as; cardiovascular diseases, respiratory diseases, malnutrition, diabetes mellitus and oral cancer (Sabbah, Folayan, & El Tantawi, 2019).

2.3.1 Cardiovascular diseases

Atherothrombotic cardiovascular disease (ACVD) is mainly caused by Atherosclerosis. ACVD, is a multiform inflammatory-based disease that is caused by accumulated fats and fibrous tissue in walls of arteries. Studies suggest that periodontal disease can cause atherosclerosis. This is possible due to bacteria from periodontal pockets caused by, brushing, flossing teeth and from chewing (González, Pintó, & Jané, 2017; Lazureanu, Popescu, Stef, Focsa, Vaida, & Mihaila. 2022). Cardiovascular disease is, globally, a leading cause of sickness and death and accounts for 30% of mortalities (Joshy, Arora, Korda, Chalmers, & Banks, 2016). Chronic infectious diseases like periodontal disease and gingival inflammation are involved in the development of most cardiovascular diseases and are linked to stroke development (Söder, Meurman, & Söder, 2015; Joshy et al.,2016). Periodontitis and gingivitis are the most common human chronic infections with an estimated 15% to 35% of the population in industrialised countries suffering from these chronic inflammation conditions (Söder et al., 2015; Lazureanu et al., 2022). Periodontitis and gingivitis may last for years and burden the body by slowly spreading bacteria in the bloodstream and thus around the entire body followed by increased inflammation mediators (Lazureanu et al., 2022). These inflammation markers are themselves indications of stroke risk (Söder et al., 2015). The development of atherosclerosis and death from myocardial infarction are both caused by long-term oral infections, which are indicated by an increased dental calculus index score. (Söder, Meurman, & Söder, 2014).

2.3.2 Malnutrition

Research proves nutrition to be crucial for both physical health and for developing and maintaining a healthy mouth and, most importantly, the gums and teeth (Clifford,

Bellows, & Moore, 2017). Nutrition and oral health have a close connection because good nutrition has a role in the prevention of teeth and gum diseases (Clifford et al., 2017). Oral health diseases lead to malnutrition (Bhagat et al., 2020). The health of our teeth and gums help us to determine the type of food we can eat, when there is a deficiency in one or more nutrients in our diet the first deficiency symptoms often show in our mouth, common deficiencies are vitamin B-complex, vitamin C, fluoride and a deficiency of protein (Clifford et al., 2017). A deficiency in these nutrients affects nearly all the oral cavity structures which are the cause of cleft palate, scurvy, enamel hypoplasia, dental caries and poor mineralisation; for example individuals with unhealthy habits such as high sugar intake will promote dental caries and demineralisation (Pflipsen & Zenchenko, 2017). The use of tobacco products and alcohol abuse damage the dentition and leads to a variety of oral diseases (Pflipsen & Zenchenko, 2017). Nutrition is vital for oral health from the day of gestation through to the end of an individual life (Pflipsen & Zenchenko, 2017). There is a continuous collaboration between nutrition and the integrity of the oral cavity in diseases and in health (Ghosh, Nagpal, Archana, Hegde, & Nagpal, 2015). Good nutrition aids good oral health and good oral aids good nutrition (Ghosh et al., 2015). Quality oral health practices should be encourage early in life and should be sustained throughout life (Pflipsen & Zenchenko, 2017).

2.3.3 Diabetes mellitus

Worldwide diabetes mellitus is one of the common chronic diseases and presents with signs and symptoms of oral diseases thus impacting dental care (Baratakke, Rekha, Kadanakuppe, Ravindranth, Gubbihal, & Kausalya, 2016). In South Africa, the prevalence of diabetes mellitus increased rapidly from 4.5% to 12.7% between the years 2010 to 2019 (Grundlingh, Zewotir, Roberts, & Manda, 2022). In 2019, 52.4%

of people between the ages 20–79 years were undiagnosed with diabetes mellitus (Grundlingh et al., 2022). Diabetes mellitus presents with elevated blood glucose levels and abnormal carbohydrate, fats, and protein metabolism. A significant number of oral related diseases are associated with diabetes mellitus (Baratakke et al., 2016). Periodontitis is thought to be exacerbated by uncontrolled diabetes mellitus. Periodontitis is the most prevalent oral disease, has potential to be fatal and is closely associated to diabetes mellitus in an equally unfavourable manner (Borgnakke, Genco, Eke, & Taylor, 2018). According to Borgnakke et al., (2018) in 1993 Harald Löe declared periodontitis the sixth most likely complication of diabetes mellitus. Latter evidence, from the 1990s, proved that periodontal infection is a risk factor for elevated blood glucose levels, uncontrolled glycaemic, and some diabetes mellitus, complications (Borgnakke et al., 2018), hence unfavourable affecting diabetes mellitus outcomes. Thus the effects are mutual and result in a two-way affiliation between periodontitis and diabetes mellitus (Borgnakke et al., 2018). The effects of periodontitis on diabetes mellitus results from the inflammatory response nature in periodontal tissues (Olofin, Ngwu, Ohadoma, & Okoro, 2013). Through periodontal microcirculation, mediators that influence tissues and organs include tumour necrosis factor and pro-inflammatory cytokines generated in inflamed periodontal tissues (Olofin et al., 2013).

2.3.4 Respiratory infection

The primary physical purpose of the oral cavity is respiration, swallowing, speech, mastication and suckling (Singh, Awasthi, & Gupta, 2020). The functions of the oral cavity are balanced, any disturbance of these oral cavity functions results in abnormal growth and the abnormal development of the bony and soft tissue structure of the craniofacial complex (Singh et al., 2020). Mouth breathing refers to the breathing state

of inhaling and exhaling through the oral cavity (Garcia-Triana, Ali, & Grau- Leon, 2016). Reduction in nasal respiration may cause altered tongue posture and this will result in the inferior positioning of the mandible which will induce facial muscular and neck changes and cause the formation of dental and facial characteristics (Singh et al., 2020).

Breathing through the oral cavity has serious effect on the growth of the facial skeletal and occlusion of the teeth (Singh et al., 2020). Gum infections, like gingivitis, are caused by bacteria that can travel to the lungs and may harm them (Coffee, Sockrider, & Bruzzese, 2019). Dental plaque is a breeding ground for bacteria, some of which can, through tiny droplets of saliva, be inhaled through the lungs (Coffee et al., 2019). Healthy lungs will fight these bacteria but lungs that are damaged by disease are unable to defend themselves thus increasing the risk of worsening lung problems such as asthma and chronic obstructive pulmonary disease (COPD) (Coffee et al., 2019). When gums are inflamed, a distress signal is sent to the rest of the body causing it to be on alert and leading to more lung inflammation (Coffee et al., 2019). Tooth decay increases the risk of lower respiratory tract infections, pneumonia in particular, is associated with oral health (Matsumoto, Kadowaki, Tsukahara, & Yorifuji, 2021). Infections with bacteria, viruses, fungi, or parasites can result in pneumonia, which is an inflammation of the lungs. (Shah, Shah, Goje, & Shah, 2017). The presence of dental decay and cariogenic bacteria, including periodontal pathogens, are risk factors for aspiration pneumonia (Shah et al., 2017). Poor oral hygiene and periodontal diseases may cause oropharyngeal colonisation by respiration pathogens thus increasing the possibility of aspiration pneumonia (Zhou, Jiang, Li, Lo, & Gao, 2018).

2.3.5 Oral Cancer

Cancer is an uncontrolled growth and spread of abnormal cells, tobacco and Periodontitis are just a few of the outside causes that might cause cancer (Mathur, Nain & Sharma, 2015). Oral cancer is one of the top ten most prevalent cancers worldwide, oral cancer has a dismal prognosis, a delayed clinical diagnosis, no known biomarkers for the disease, and expensive treatment options (Rivera, 2015).

Research states that those who have periodontal disease are more likely to get oral cancer and oral squamous cell carcinoma first appears in patients with severe periodontitis (Komlós, Csurgay, Horváth, Pelyhe, & Németh, 2021). The International Agency for Research on Cancer's (IARC) most recent reports, oral cancer, which affects the lips, tongue, gingiva, mouth floor, parotid, and salivary glands, has a higher annual incidence worldwide, with over 300.000 diagnosed cases and a mortality rate of about 145,000 per year (Rivera, 2015). Therefore, clinicians should focus on the oral mucosa in addition to the teeth, particularly in areas with a high prevalence of oral cancer, as an early detection of precancerous lesions or cancers in the early stages increases the likelihood that the patient will be cured and significantly lowers mortality and morbidity (Dhanuthai et al., 2018). Since each patient provides the treating clinicians with a different set of challenges, the management of these challenges has an impact on both survival and quality of life. Hence, the therapy of oral cancer is a multidisciplinary endeavour (Wong & Wiesenfeld, 2018).

2.4 Student nurse's knowledge of oral health

Student nurses are important role players in health promotion and prevention, by raising awareness through spreading information to their families, patients and the

community in general (Kerr & Singh, 2018). It is important that student nurses' knowledge of oral health is determined as they have contact with, and influence on, patients (Kerr & Singh, 2018). Student nurses are trained in disease, prevention and health promotion; hence it is crucial that their oral health knowledge is assessed to see if it matches professional recommendations (Deogade & Suresan, 2017). Brushing one's teeth and gums is the most effective and powerful self-care strategies in preventing oral disease, it also reduces and prevents dental plaque and teeth decay. (Nazarianpirdosti, Janatolmakan, & Andayeshgar, 2021) Therefore its essential for nurses to have an understanding or knowledge about correct brushing techniques and the maintenance of a toothbrush, as a lack in the proper cleaning and replacement can cause oral infection that may later cause oral diseases (Nazarianpirdosti et al., 2021). Student nurses at different hospitals are exposed to different guidelines on the oral healthcare of hospitalised patients, this varies according to their illness and length of hospitalisation (Ashour, 2020). Student nurses have limited oral health information and knowledge and this is a challenge in terms of executing oral care; hence the complete healthcare requirements of patients are compromised (Khan & Odisho, 2017).

Currently, student nurses' oral health knowledge is not well documented, nursing students' oral health knowledge is limited, and this is especially problematic as nursing students are future professional nurses who will educate patients about oral diseases and methods of prevention (Owibingire, Salehe, & Sohal, 2017). In a study carried out in Iran, student nurses results on knowledge about the maintenance and use of toothbrushes was 59.2 ± and 16.4 out of 100 (Nazarianpirdosti et al., 2021). In a study conducted in Denmark, results on student nurses' knowledge was good regarding tooth decay and plaque; however, they had inadequate (65% were aware) knowledge

regarding periodontal diseases such as gingivitis (Grønkjær et al., 2017). These two studies show that the student nurses have basic oral health knowledge; however, they struggle to link oral diseases with general wellbeing. Hence, oral health should be emphasised in the nursing curriculum to enhance student nurse's oral health knowledge.

2.5 Oral Health practices

Knowledge, attitudes, and practices depend on each other. Oral health self-care is an essential component of general wellbeing practices (Kerr & Singh, 2018). Good oral health practices in an individual includes brushing teeth with a toothbrush and a fluoride toothpaste twice a day (Mbele-Kokela & Moodley, 2021). Oral health practices is important, and the correct practices of oral care should be carried out habitually, as the oral cavity can accumulate bacteria when not cleaned properly and these bacteria can spread to other organs through blood flow and cause diseases (Khan et al., 2017). People with adequate knowledge of oral health and who have control over their oral health are expected to excel in oral self-care practices (Omale, 2014). Nurses are mostly unaware of, and neglect, oral health and dental care, and this is shown in the differences of self-reported oral health behaviour results (Kerr & Singh, 2018). Student nurses' education on oral health is a very important component of health related practices (Spurr et al., 2017). When the correct education on good oral health practices is given, changes to practices can be facilitated by giving enough motivation, information and practices on oral health (Omale, 2014). In order for student nurses to give effective and adequate education, it is important that their knowledge, attitudes and practices on oral health is measured and that nursing curricula include oral care (Kerr & Singh, 2018). Nursing students' oral health practices plays an essential role in providing oral health for their patients and the population (Kerr & Singh, 2018).

Patients that are hospitalised long-term, and patients that are physically limited due to their medical disorders require full oral care. If students don't provide oral healthcare to these patients it can affect the patient's medical condition (Ashour, 2020). The different hospitals students are exposed to have different terms and they prioritise oral care differently for their hospitalised patients, a lack of oral care for these patients may lead to other health conditions such as oral abscess, periodontal inflammation, dental caries, and mouth lesions (Ashour, 2020). In India, a study was carried out by Yavagal et al., (2020) on student nurses' oral health practices. The results showed that 161 (44.1%) of 365 respondents visited dentists when they had a dental problem and 244 (67.4%) followed the routine of rinsing their mouths after brushing. Another study, conducted in India by Deogade and Suresan (2017), on student nurses' oral health practices, found that 74 (43.1%) of 172 respondents were using non-fluoridated toothpaste. In this regard, the above results of both studies show that student nurses' practices need improvement as most of student nurses visited dentists due to dental problems. This reveals that student nurses might perceive regular dental visits/check-ups as less vital. The fact that most of the respondents used non-fluoride toothpaste, reflects student nurses' inadequate knowledge on the benefits of fluoride toothpaste. These results, thus serve as evidence to show that student nurses' oral health practices can be improved.

2.6 Student nurses' attitude towards oral health

Student nurses' communication on good oral health attitudes is a beneficial influence on patients to change their oral health behaviour and attitudes (Kerr & Singh, 2018). Including nurses' understanding and appropriate oral care attitudes in everyday patient care is crucial (Tadesse & Worku, 2019). Informing, and positive reinforcement of, patients regarding oral healthcare routines can help improve compliance (Bhagat et

al., 2020). Student nurses lack confidence in oral care because they lack knowledge on oral healthcare (Haresaku, Miyoshi, Kubota, Aoki, Kajiwara, Monji, & Naito, 2020). Therefore, to improve attitudes on oral care, training and education is important as this helps improve the oral health of patients (Bhagat et al., 2020).

Poor oral health practices increase the morbidity and mortality rate of most hospitalised patients (Tadesse & Worku, 2019). With poor oral health practices leading to serious health consequences, oral care is a crucial aspect of nursing care as oral care is needed by all patients dependent and not dependent on nurses (Tadesse & Worku, 2019). Most student nurses know that it is important to visit the dentist and they know the crucial role dentists play in oral health (Yavagal et al., 2020), they demonstrate a positive attitude towards dentists and are aware of the link between oral health and systemic health. Most student nurses know the importance of brushing teeth in prevention of dental caries (Yavagal et al., 2020). The majority of student nurses were interested in learning more about oral health from the nursing curriculum (Smadi & Nassar, 2016). In a study done in South Africa results on student nurses' attitudes were as follows: 59% (n=100) of respondents perceived the health of their teeth as good/excellent which did not have any significant difference by year of study, but 17% (n=29) reported gum bleeding during dental flossing with 8% (n=14) reported having halitosis. (Kerr & Singh, 2018). The nursing students' attitudes based on the above studies proves that nursing students are interested in acquiring more knowledge on oral health. Including oral health, in an in-depth manner in the nursing curriculum can improve their oral health attitudes of nursing students.

2.7 Oral health barriers

Overall health and oral health are directly related; oral diseases have socioeconomic factors, these factors include income, employment, education, access to healthcare

services and the type of community (Roy et al., 2018). It is vital that overall wellbeing and oral health are not separated as oral health is an important factor of general wellbeing and oral problems (Roy et al., 2018). This can be seen in many chronic diseases like diabetes mellitus and heart diseases which share mutual risk factors like poor diet, misuse of alcohol, and smoking which are also some risk factors for poor oral health (Roy et al., 2018). According to Kerr & Singh (2018) the price of dental care and dental patients' dread of going to the dentist are some barriers to receiving dental care. All nations should offer accessible, inexpensive dental treatment, according to the World Health Organization's Regional Oral Health Strategy for Africa (World Health Organization, 2016). The majority of student nurses are unable to afford oral healthcare, this causes more doubt on the South African healthcare system ability to deliver inexpensive dental healthcare services (Kerr & Singh, 2018). Oral wellbeing inequality affects mostly the poor and disadvantaged members of society.

There is a strong association between the prevalence of oral disease and socioeconomic status (World Health Organization, 2020). The association between the prevalence of oral diseases and socioeconomic status can be seen from early age to older age across all population groups in low, middle- and high-income countries (WHO, 2020). The majority of oral diseases are related to socioeconomic status which is linked to the income of the family, education achievement, status of employment, housing, and mental and physical health (Tellez, Zini, & Estupiñan-day, 2014). Access to primary oral healthcare is frequently very limited due to the lack of adequate oral health facilities and unequal access to oral health experts in the majority of nations (WHO, 2020). Monitoring oral health social inequality is essential for collecting data on population variations in need of oral healthcare, preventative measures, and oral

health system priorities. (Mejia, Elani, Harper, Thomson, Ju, Kawachi, Kaufman, & Jamieson, 2018).

2.8 Summary

In Chapter 2 the focus of the literature review was on literature on knowledge, attitudes, and practices of student nurses. Based on the literature, student nurses need more knowledge on oral health, their attitudes and practices can be improved with knowledge and with the importance of oral health being emphasised in their curriculum. This is imperative as it will improve their attitude towards patient oral care and patient education on the importance of oral health.

In the third chapter the researcher will discuss the research design and the methods used to achieve the study aims.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The methodology for this study is described in detail in this chapter. Research methods are the steps researchers take to design a study, gather data, and analyse it in order to answer a specific research topic (Brink et al., 2018). This chapter discusses the population sample, research setting, data collecting method, validity and reliability of the data collection tool, data collection procedure, data analysis, and ethical considerations.

3.2 Research approach

A descriptive quantitative approach was used in this study. A quantitative approach aims to collect and analyse data numerically from a sample representing a population (Brink et al., 2018). This method was relevant for this study as the researcher sought to look into nursing students' knowledge, attitudes, and practises about oral health at a university in the Western Cape.

3.3 Setting

The location where the researcher plans to gather data for the study is known as the "research setting," and it is determined by the research question and the data required to answer it (Brink et al., 2018).

The setting of the study was at a university in the Western Cape which offers a Bachelor of Nursing programme in the Cape Town metropole. The Bachelor of Nursing programme consists of four years for the mainstream programme and five years for the extended curriculum programme (ECP). The student nurses at this university were

exposed to patients with oral care needs from first year to final year. A total of 1098 of undergraduate student nurses was registered at the School of Nursing in 2021.

3.4 Design

To collect and explain quantitative information related to the knowledge, attitudes, and practises of student nurses on oral health, the study employed a descriptive survey design with a self-administered questionnaire (Brink et al., 2018)

3.5 Population and Sampling

3.5.1 Population

A population is the entire set of items or individuals that the researcher is interested in during a research study and that fit their requirements. (Brink et al., 2018). The population of the study consisted of 1098 student nurses registered at university in the Western Cape in 2021, including student nurses registered for R174 programme, and the student nurses registered for R425 namely ECP one and two, first, second, third and fourth-year student nurses (Table 2).

3.5.2 Sample

Sample size: A sample size calculator was used to calculate the sample size (Adam, 2020) using the following formula: population size = 1098, distribution = 50%, margin of error = 5% and confidence level score = 95%) = 287 students, distributed proportionally across year levels (Table 2).

Sample strategy: quota sampling was used which involved proportional sampling a subpopulation referred to quota in a stratum, to ensure that each key subgroup was represented within the sample (Polit & Beck, 2017).

Table 2: Population and Sample table

POPULATION TABLE		
YEAR	N (= 1098)	n (287)
ECP 1	53	23 (43.3%)
ECP 2	46	25 (54.3%)
First-year	118	34 (28.8%)
Second-year R425	100	27(27%)
Second-year R174	176	48 (27.2%)
Third-year	335	45 (13.4%)
Fourth-year	270	79 (29.2%)
Total	1098	287 (97.9%)

Source: School of Nursing (2021)

3.6 Instrument

The researcher used a self-administered questionnaire which was based on three validated scales to address the objectives. These scales included: the “Oral Health Questionnaire for Adults” (World Health Organization, 2013), the “'Rustvold Oral Health Knowledge Inventory” (Rustvold, 2012) and the questionnaire on nurses’ attitude towards patient oral health (Tadesse & Worku, 2019), (Appendix G). The researcher contacted the authors and obtained permission to use questionnaires (Appendix F).

3.6.1 Questionnaire structure

The questionnaire consisted of five sections and 84 questions.

- Section A: four questions on demographic information, including gender, age, marital status, and the year level of the student nurses.
- Section B: 42 closed-ended scale type questions and dichotomous questions associated with the oral health status and student’ nurses oral health practice (Oral Health Questionnaire for Adults (World Health Organization, 2013).

- Section C: ten closed-ended scale type questions using MCQs to test student nurse's knowledge on oral health (Rustvold Oral Health Knowledge Inventory, (Rustvold, 2012).
- Section D: ten questions measuring student nurse's attitude towards oral health (Oral Health Attitudes Questionnaire, (Rustvold, 2012).
- Section E: 14 questions related to student nurses' attitude towards patients' oral care (Tadesse & Worku, 2019).

3.6.2 Validity and reliability of the study questionnaire:

The accuracy of an instrument in measuring what it is intended to measure is referred to as the tool's validity. (Brink et al., 2018). The final questionnaire was tested for face validity and content validity.

Face validity: The ability of a tool to measure what it is intended to assess, or how the tool is viewed by the participant, how relevant and clear the tool is to the participant, (Brink et al., 2018). The questionnaires included in c*ontent validity:* Content validity is the assessment of a tool and how it represent all the components of the variables to be measured (Brink et al., 2018). Table 3 demonstrated the content validity in terms of the objectives and questionnaire.

Table 3: Content validity of study instrument

Objectives	**Questionnaire**	**Questions**
To describe the self-reported oral health status of the student nurses.	WHO oral health (2013) questionnaire	Questions 23–34
To describe the self-reported oral health practice of the student nurses.	Rustvold (2012) questionnaire	Question 35–48
To determine student nurse's knowledge on oral health.	Rustvold (2012) questionnaire	Questions 49–58
To determine student nurse's attitude towards oral health.	Rustvold (2012) instrument	Question 60–73
To determine student nurse's oral health attitude towards oral care of their patients.	Tadesse and Worku (2019) instrument	Question 74–87

Reliability: the ability of a research tool to measure a set of variables consistently and dependably (Brink et al., 2018). The instruments used in this study had established reliability (Table 4). The Cronbach's Alpha test was used to measure the study's internal consistency (Table 4) to make sure the questions were understandable, clear, and unambiguous, a pretest was conducted. In this study a pre-test consisted of 12 nursing students, to test the reliability of the questionnaire, three nursing students from each year level were used. No adjustments to the questionnaire were necessary and pre-test respondents were included in the study. The oral health knowledge scale had poor internal consistency. This was confirmed due to inconsistencies in respondents' knowledge (Chapter 4).

Table 4: Validity and reliability of existing questionnaires

Questionnaire	**Content validity**	**Reported reliability**	**Study Reliability**
To describe the self-reported oral health status of the student nurses.	Oral health status (Questions 23–34)	.90 (World Health Organization, 2013)	.755
To describe the self-reported oral health practice of the student nurses.	Oral health practice (Questions 35–48)	.85 (Rustvold, 2012)	.639
To determine student nurse's knowledge on oral health.	Oral Health Knowledge (Question 49–58)	.74 (Rustvold, 2012)	.270
To determine student nurse's Oral Health Attitudes	Oral Health Attitudes (Question 60–73)	.76 (Rustvold, 2012)	.495
To determine student nurse's oral health attitude towards oral care of their patients.	Oral health attitude towards oral care of their patients. (Question 74–87)	.78 (Tadesse & Worku, 2019)	.548

3.7 Data collection

Data collection is aimed at addressing the research question and is a description of the researcher's approach at answering the research question (Brink et al., 2018). After receiving the ethics approval (Appendix A) and the various levels of permission

(Appendix B and C), the researcher invited all students per year level (by email) to explain the study. Participation was voluntary and participant information sheets were only handed to students who were willing to participate (Appendix D). Students were informed about the date, time, and venue for data collection for the different year levels. The researcher gave the study's details to the participants who were able to ask questions on the day of data collection. The rights of the participants were described. Participants were given consent forms by the researcher to sign (Appendix E). The researcher distributed the questionnaires to the students who agree to participate in the study. The data collection across all year levels lasted approximately four weeks and each participant required about 30 minutes to complete the self-report questionnaire. The researcher collected the self-report questionnaires and consent forms which were kept separately in a safe, locked place in order to protect participants' information and identity. The researcher was available to answer any questions from participants via email and to explain to the participants anything they did not understand. The researcher did maintain confidentiality of these documents by not allowing anyone who was not part of the research team to access the documents. The collected data was stored on a password protected Google drive with access limited access to the supervisor, co-supervisor and the statistician.

3.8 Data analysis

According to Brink et al (2018) data collection is the method of collecting data from research participants. The data was cleaned, analysed, and presented in simple percentages and frequencies for all the variables. The researcher captured the data into the IBM Statistical Package for the Social Sciences computer program version 28. Descriptive statistical analysis (frequencies) was used to describe and summarize quantitative data related to the participants' demographic information, Section 1: Oral

health status and habits (Student nurses' oral health status by Rustvold (2012), Section 2: Knowledge, attitudes, beliefs and barriers on oral health (Student nurse's oral health knowledge by Rustvold (2012). Section 3: Impact on nursing care measured with Attitudes towards patient oral health questions by Tadesse and Worku (2019) questionnaire.

The questions on self-reported oral health status of the student nurses (Questions 23–34) contains 12 statements which contains five rating scales namely: very often, fairly often, sometimes, no and don't know. The scale was divided into two: often and seldom. The following: very often, fairly often and sometimes were recoded to be often while no and don't know was recoded as seldom.

The questions on self-reported oral health status of the student nurses (Questions 35–48) contains 14 statements which contains seven rating scales namely: several times a day, every day, several times a week, once a week, several times a month, never and no response. The scale was divided into two: often and seldom. The following: several times a day, every day, several times a week were recoded to be often while once a week and several times a month were recoded as seldom.

The questions on personal oral health attitudes (Questions 60–73) contains 14 statements which contains five rating scales namely: I agree completely, I agree partly, I disagree partly, I disagree and no response. The scale was divided into two; agreed and disagreed. The 'I agree completely, and I agree partly' were recoded as agreed while 'I disagree partly, and I disagree' recoded as disagreed.

The questions on personal oral health attitudes (Questions 74–87) contains 14 statements which contains five rating scales namely: I agree completely, I agree partly, I disagree partly, I disagree and no response. The scale was divided into two; agreed

and disagreed. The ‘I agree completely, and I agree partly’ were recoded as agreed while ‘I disagree partly, and I disagree’ recoded as disagreed.

3.9 Ethical considerations

In this study, the researcher respected all ethical principles. The researcher obtained the ethical approval from the Humanities and Social Sciences Research Ethics Committee (HSSREC) of the university: ethics number: HS20/08/6 (Appendix A). The researcher contacted the Director of the School of Nursing at the university to obtain permission to conduct the study using the student nurses as participants across the year levels included in this study (Appendix B and C). The researcher then obtained permission from the coordinators and lecturers across the year levels to inquire about the availability of students and an appropriate venue was booked where the data was collected.

3.9.1 Beneficence

Regarding the right to be protected from any harm and emotional distress the principle of beneficence was applied. This study did not expect to cause any harm. Every participant was made aware of his or her right to accept or decline participation. Furthermore, the participants were informed that they were free to leave the study anytime, without being penalised. There was a free participation, and the participants freely signed the consent form.

3.9.2 Justice

Regarding the principle of justice, there was no unfair discrimination associated with inclusion and exclusion criteria. Therefore, there was a fair selection of student nurses included in the study. No guarantees about specific incentives or remuneration were made by the researcher.

3.9.3 Privacy and Dignity

The researcher applied the principles of privacy and dignity and made it clear to each participant that they had the right to choose how much of their private information they wanted to disclose.

3.9.4 Confidentiality

To maintain the confidentiality, the researcher kept the self-report questionnaires and consent forms apart in a secure, lockable cabinet. The confidentiality was ensured by collecting data anonymously and excluding any personal details, Participants were advised not to include their names or student identification numbers on the questionnaire. Privacy was applied by only allowing involved personnel to access the data. The researcher, supervisors, and statistician were the only individuals that accessed data. The data collected was not used for any other purpose than was explained to the participants. During data analysis each participant was identified using a number. The collected data will be destroyed after five years based on the HSSREC requirement.

3.9.5 Anonymity

During data collection however, Since the participants could see each other at the venue, anonymity could not be guaranteed. The names of the participants were overlooked on the survey and in SPSS. Additionally, the findings did not include their names or the name of their university. They were informed that the results of this study would not have a negative impact on their studies.

3.10 Summary

In Chapter 3 the research methodology used to achieve the aim of the study was described. The setting, research design, the population sample, data collection tool

and validity, the reliability of the data collection tool, the data collection process, data analysis as well as the ethics of the study were discussed.

CHAPTER FOUR

RESULTS

4.1 Introduction

In Chapter 4 the result of the study is presented in three sections based on the study objectives.

1. To describe the self-reported oral health status of the student nurses
2. To describe the self-reported oral health practices of the student nurses
3. To determine student nurse's knowledge of oral health
4. To determine student nurse's attitudes towards oral health
5. To determine student nurses' oral health attitudes towards oral care of their patients.

This chapter describes the sample realization and the demographics of the participants. The results are then presented in three sections. Section 1: Respondents oral health status and practice (Objectives 1 & 2); Section 2: Respondents oral health knowledge and personal oral health attitudes (Objectives 3 & 4); and Section 3: Impact on Nursing Care with respondents' attitudes towards patient oral health (Objective 5).

4.2 Sample Realisation

The population of the study was 1098 student nurses registered at a university in the Western Cape in 2021. These students included students registered for the South African Nursing Council (SANC) R.174 programme, and the SANC R.425, i.e., Extended Curriculum Programme (ECP) year one and two, BN year one, BN year two, BN year three and BN year four students. A proportional sampling method (Table 1) per year level was used, to select a sample size of 287 students. A total of 300

questionnaires were distributed to allow for non-completion of some respondents. Ten questionnaires were not returned, and nine (9) questionnaires were incomplete, and were excluded from the final data analysis. A total of 281 questionnaires were included in the final analysis (281/287, 97.9% response rate) (Table 5). Data is reported out of total responses received and may not always add up to 281.

Table 5: Population and Sample

YEAR	N (=1098)	Proposed sample n (287)	Actual Sample (n=281)
ECP1	53	23	23 (100%)
ECP 2	46	25	25 (100 %)
First-year	118	35	34 (97.1%)
Second-years (R.174+R425)	276	75	28 + 47 (100%)
Third-year	335	50	45 (90%)
Fourth-year	270	79	79 (100%)
TOTAL	1098	287	281 (97.9%)

Source: School of Nursing (2021)

4.3 Demographic characteristics

Of the 281 respondents in the study, most were female (235, 83.6%), with 46 (16.4%) being male respondents. The youngest respondent was 18 years, and the oldest respondent was 38 years (average age 21.9 ±3.5 years, median age 21 years). Most of the respondents were single (245, 87.2%), 35 (12.5%) reported having a partner (22 partnered and 13 married) (Table 6).

Over a quarter of the respondents were in Year 4 (79 (28.1%) followed by Year 2 (75, 26.7%) respondents, Year 3 (46, 16.4%), Year 1 (33,11.7%) with 25 (8.9%) ECP1 respondents and 23 (8.2%) ECP2 respondents (Table 6).

Table 6: Demographics

Gender	**F (%)**
Male	46 (16.4%)
Female	235 (83.6%)
Age (m, sd)	21.9 (3.5)
Marital status	
Partnered	35 (12.5%)
Single	245 (87.2%)
Year level	
Year 4	79 (28.1)
Year 2	75 (26.7%)
Year 3	45 (16.0%)
Year 1	34 (12.0%)
ECP1	25 (8.9%)
ECP2	23 (8.2%)

SECTION 1: RESPONDENTS' ORAL HEALTH STATUS AND PRACTICES

Section 1 focuses on the respondents' oral health status and practices.

4.4 Respondents' oral health status

Student nurses' oral health status was assessed through self-report on the state of their teeth and mouth and problems experienced in the last 12 months due to their teeth (Table 7).

4.4.1 Status of teeth and mouth

In terms of natural teeth and dentures, most of the respondents had 20 or more of their natural teeth and only 25 (8.9%) reported having a denture (Table 7). Though nearly two-thirds of the respondents (176, 62.6%) reported that they had no pain and discomfort in the last 12 months, nearly half of the respondents reported the state of their teeth to be poor (122, 43.4%) and similarly, about half of the respondents (131, 46.6%) reported the poor state of their gums (Table 7).

Table 7: Oral health status (n=281)

Items	F (%)
20 or more natural teeth	264 (94.0%)
0–19 natural teeth	17 (6.0%)
No pain and discomfort in last 12 months (n=279)	176 (62.6%)
Pain and discomfort in last 12 months	99 (35.2%)
Not sure	4 (1.4%)
A partial denture	17 (6%)
A full denture	3 (1.1%)
A full lower denture	5 (1.8%)
Good state of teeth	86 (30.6%)
Average state of teeth	73 (26.0%)
Poor state of teeth	122 (43.4%)
Good state of gums	82 (29.2%)
Average state of gums	68 (24.2%)
Poor state of gums	131 (46.6%)

4.4.2 Problems experienced due to teeth

In assessing the types of problems experienced due to teeth, the following problems were identified 95 (33.8%) of the respondents reported that they often felt embarrassed due to how their teeth appeared, more than a quarter of the respondents felt tense because of problems with teeth/mouth (75, 26.7%), similarly 75 (26.7%) of the respondents often avoided smiling because of their teeth and 75 reported a dry mouth (26.7%) (Table 8).

Table 8: Problems experienced due to teeth (n=281)

Problem with teeth	Often n (%)	Seldom n (%)
Felt embarrassed due to appearance of teeth	95 (33.8%)	186 (66.2%)
Felt tense because of problems with teeth/mouth	75 (26.7%)	206 (73.3%)
Avoided smiling because of teeth	75 (26.7%)	206 (73.3%)
Dry mouth	73 (26.0%)	208 (74.0%)
Difficulty in biting	71 (25.3%)	210 (74.7%)
Difficulty with speech/trouble pronouncing words	67 (23.8%)	214 (76.1%)
Difficulty in chewing food	49 (17.4%)	232 (82.6%)
Had sleep that is often interrupted due to teeth	52 (18.5%)	229 (81.5%)
Reduced participation in social activities	49 (17.4%)	232 (82.6%)
Felt less tolerant of spouse or people close	41 (14.6%)	240 (85.4%)
Have taken days off work due to teeth	25 (8.9%)	256 (91.1%)
Difficulty doing usual activities due to teeth	22 (7.8%)	259 (92.2%)

In assessing the impact of challenges with their teeth, 52 (18.5%) reported that their sleep was interrupted, followed by 49 (17.4%) reporting that they had reduced participation in social activities due to their teeth (Table 8).

4.5 Respondents reported oral practices

Oral habits were examined through questions on mouth hygiene, visits to the dentist and general food habits which may impact on their oral health.

4.5.1 Mouth hygiene

About three-quarters of the respondents (171, 60.9%) reported that they cleaned their mouth twice a day, followed by 89 (31.7%) of the respondents reporting cleaning their mouth once a day (Table 9). Most of the respondents (27, 98.6%) reported using a toothbrush to clean their teeth and the majority (201, 97.9%) reported using toothpaste with fluoride (Table 10). Nearly half of the respondents reporting flossing their teeth using thread (135, 48.0%) (Table 9).

4.5.2 Visits to dentist

In assessing visits to the dentist, about one-quarter of the respondents (66, 23.5%) reported that they never saw a dentist (Table 9). Fifty-three respondents (53, 18.9%) reported that they had visited the dentist in the last six months with less than 20% of respondents visiting the dentist in the last 6–12 months to more than 5 years ago (Table 9). Reasons for visiting the dentist ranged from pain (78, 27.8%), routine check-up (73, 26.0%), 22 (7.8%) for treatment follow up and 22 (7.8%) for consultation (Table 9).

Table 9: Teeth cleaning and dentist visitation (n=281)

Item	n (%)
Clean 2 times a day	171 (60.9%)
Clean once a day	89 (31.7%)
Clean 2–6 times a week	6 (2.1%)
Never clean mouth	8 (2.8%)

Item	n (%)
Once a month	7 (2.5%)
Used toothbrush to clean	277 (98.6%)
Does not use toothbrush to clean	4 (1,4%)
Used toothpicks (wood)	137 (48.8%)
Does not use toothpicks (wood)	114 (51.2%)
Used toothpicks (plastic)	51 (18.1%)
Does not use toothpicks (plastic)	230 (81.9%)
Used thread (floss)	135 (48.0%)
Does not use thread (floss)	146 (52%)
Do you use toothpaste with fluoride?	201 (71.5%)
Don't know	61 (21.7%)
No	19 (6.8%)
Visited dentist >5 years	34 (12.1%)
Visited dentist 2–5 years	35 (12.4%)
Visited dentist 1–2 years	54 (19.2%)
Visited dentist 6–12 months	39 (13.9%)
Visited dentist in the last 6 months	53 (18.9%)
Never visited the dentist	66 (23.5%)
Visited dentist due to pain	78 (27.8%)
Visited for routine check-up	73 (26.0%)
Visited for consultation	24 (8.5%)
Visited for treatment follow up	22 (7.8%)
Don't know/remember	84 (29.9%)

4.5.3 Food habits

Foods that may impact the health of teeth and gums were assessed by asking about how often these foods were consumed. Less than three-quarters of the respondents (195, 69.4%) reported eating fresh fruit often, with 82 (29.2%) reporting that they seldom eat fresh fruit. Over half of the respondents (155, 55.2%) often drink tea with sugar, just under half 139 (49.5%) often consumed coffee with sugar, and 44.1% (124) often consumed lemonade, Coca-Cola or other sugar soft drinks (Table 10). Less than 20% of the respondents consumed jam or honey (37, 13.2%) and 28 (10.0%) of the respondents reported that they often eat sweet pies or buns (Table 10).

Table 10: Food often consumed in small quantities (n=281)

Food consumed	Often n (%)	Seldom n (%)	Never n (%)
Eat fresh fruit	195 (69.4%)	82 (29.2%)	4 (1.4%)
Tea with sugar	155 (55.2%)	81 (28.8%)	45 (16.0%)
Coffee with sugar	139 (49.5%)	77 (27.4%)	65 (23.1%)

Food consumed	Often n (%)	Seldom n (%)	Never n (%)
Lemonade, Coca-Cola or other sugar soft drinks	124 (44.1%)	124 (44.1%)	33 (11.7%)
Eat sweets/candy	108 (38.4%)	142 (50.5%)	31 (11.0%)
Eat biscuits, cakes, or cream cakes	105 (37.4%)	161 (57.3%)	0 (0%)
Chew gum with sugar	76 (27.0%)	123 (43.8%)	80 (28.5%)
Jam or honey	37 (13.2%)	157 (55.9%)	84 (29.9%)
Eat sweet pies/buns	28 (10.0%)	157 (55.9%)	94 (33.5%)

4.5.4 Substance habits

Though only nine respondents have never smoked, 244 (86.8%) reported seldom smoking and 28 (10%) that they often smoke (Table 11). The rest of the substances were mostly never used (Table 11).

Table 11: Substances used (n=281)

Substances used	Often	Seldom	Never
Used cigarettes	28 (10.0%)	244 (86.8%)	9 (3.2%)
Used cigars	0 (0%)	0 (0%)	278 (98.9%)
Chewed tobacco	0 (0%)	0 (0%)	278 (98.9%)
Never used snuff	0 (0%)	0 (0%)	280 (99.6%)
Other tobacco substance	10 (3.6%)	10 (3.6%)	262 (93.2%)
Alcohol drank per day, during the past 30 days.	Had 1 drink	Had <1 drink	Had none
	22 (7.8%)	22 (7.8%)	226 (80.4%)

SECTION 2: KNOWLEDGE, ATTITUDES, BELIEFS AND BARRIERS ON ORAL HEALTH

The section presents the findings on the knowledge, attitudes, and perceived barriers to optimum oral health.

4.6 Respondents' oral health knowledge

Respondents' oral health knowledge was assessed through questions containing both correct and incorrect statements to assess their knowledge of oral health.

4.6.1 Overall knowledge score

Knowledge was classified as high or low based on how many of the multiple-choice questions (MCQ) the respondent answered correctly. The average score of respondents is 4.8/10 (47.8%) with half of the respondents scoring above 5 (50%) and half below 5 out of 10 (Table 12).

Table 12: Knowledge score (n=281)

	N	**Minimum**	**Maximum**	**mean**	**median**	**Std. deviation**
Knowledge out of 10	281	.00	9	4.8	5	1.9
Knowledge percentage	218	.00	90	47.8	50	18.5

4.6.2 Knowledge of specific oral heath items

Most of the respondents (238, 84.7%) answered the MCQ on *inflammation of the gums that involves swelling and bleeding* correctly. Following this, 208 (74.0%) correctly answering *A germ containing substance that collects on the surface of teeth.* Over two-thirds of the respondents (181, 64.4%) correctly answered the MCQ that fluoride *in toothpaste has hugely improved oral health by decreasing cavities.*

However, all the rest of the answers had less than 50% of the respondents answering correctly (Table 13) only 113 (40.2%) of the respondents were knowledgeable of the item *sugar is changed by bacteria into acid that harms tooth surfaces* and 113 (40.2%) had knowledge of the item *sugar is changed by bacteria into acid that harms tooth surfaces.* (Table 13). On the question regarding flossing only 105 (37.4%) knew that regular *flossing is an important part of your dental health routine, and you shouldn't worry if your gums bleed a bit at first.* On the question regarding oral health habits only 98 (34.9%) knew the answer that it *is important brushing twice daily and flossing once.* This was followed by the MCQ question regarding the goal of brushing; 97 (34.5%)

respondents knew *the goal of brushing teeth to remove germs, to remove food.* The second last worst response was for 81 (28.2%) on the link *between periodontal disease and oral health can relate to general health e.g., low birth, diabetes, heart disease/ stroke*. The worst response was for 68 (24.1%) on *the best tooth friendly time to eat sugary treats is along with meal* (Table 13).

Table 13: Students nurses' oral health knowledge (n=281)

Correct items	**No**	**%**
Inflammation of the gums that involves swelling and bleeding	238	84.6%
Plaque – a germ containing substance that collects on the surface of teeth	208	74.0%
Fluoride in toothpaste has hugely improved oral health by decreasing cavities.	181	64.4%
Smoking cigarette causes periodontal disease cases; and of all cancers of the mouth	153	54.4%
Sugar is changed by bacteria into acid that harms tooth surfaces	113	40.2%
Regular flossing is an important part of your dental health routine, and you shouldn't worry if your gums bleed a bit at first	105	37.4%
It is important brushing twice daily and flossing once	98	34.9%
The goal of brushing teeth to remove germs, to remove food	97	34.5%
Link between periodontal disease and oral health can relate to general health e.g., low birth, diabetes, heart disease/ stroke	81	28.2%
he best tooth friendly time to eat sugary treats is along with meal	68	24.1%

4.7 Personal beliefs impacting on optimum oral health

Beliefs and attitudes that may enhance optimum oral health was examined using a questionnaire that assesses personal positive oral health beliefs and perceived barriers to oral health

4.7.1 Personal oral health attitudes

Overall, the respondents demonstrated positive oral health attitudes with >80% of respondents agreeing with all five statements. The highest rated statement was *If they knew the facts about dental health, they could help prevent the loss of their teeth* the with 261 (92.9%) agreeing with this statement. Similarly, most the respondents (257, 91.5%) agreed with the statement: *I know how to brush my teeth correctly* and 239 (85.1%) of the respondents agreed with *by flossing their teeth they can prevent gingivitis.* Lastly, 234 (83.3%) agreed with the statement: *I believe that I am responsible for preventing the loss of my teeth* and 230 (81.9%) with the statement: *I believe that by brushing and flossing my teeth I am less susceptible to tooth decay* (Table 14).

Table 14: Agreement on beliefs enhancing optimum oral health (n=281)

Optimum oral health belief	Agreement
If I knew the facts about dental health, I could help prevent the loss of my teeth	261 (92.9%)
I believe I know how to brush my teeth correctly	257 (91.5%)
I believe that by flossing my teeth I can prevent gingivitis.	239 (85.1%)
I believe that I am responsible for preventing the loss of my teeth.	234 (83.3%)
I believe that by brushing and flossing my teeth I am less susceptible to tooth decay.	230 (81.9%)

4.7.2 Barriers to optimum oral health

Barriers to optimum oral health was examined using a questionnaire that assesses personal oral health attitudes towards statements that may potentially be viewed as barriers. Over two-thirds (199, 70.8%) of the respondents agreed with the barrier to optimum oral health that: *If their gums bleed when they floss that usually means that they are hurting their gums and they should stop flossing their teet*h; 178 (63.3%) with

the statement that: *Tooth loss is a normal part of growing old* and 120 (42.7%) with the statement: *If my gums bleed when I brush this usually means that I am brushing too hard and I should stop brushing my teeth* (Table 15). High-levels of disagreement were reported for the statement: *I believe that if my parents have bad teeth, brushing and flossing will not help my teeth (*251, 89.3%); 232 (82.6%) with the statement: *I am likely to have gingivitis or gum disease in the next year or two*; 221 (78.6%) with the statement: *I am likely to have tooth decay in the next year or to; 203 (72.2%)* with the statement: *I believe dentures are less trouble than taking care of my natural teeth;* and 203 (72.2%) respondents disagreed with the statement; *I believe visiting the dentist is only necessary when I am experiencing pain.* (Table 15*).*

Table 15: Barrier to optimum oral health (n=281)

Barrier to optimum oral health	***Agreement***	***Disagreement***
If my gums bleed when I floss this usually means that I am hurting my gums and I should stop flossing my teeth.	199 (70.8%)	82 (29.2%)
I believe that tooth loss is a normal part of growing old.	178 (63.3%)	103 (36.7%)
If my gums bleed when I brush this usually means that I am brushing too hard and I should stop brushing my teeth.	120 (42.7%)	161 (57.3%)
I believe that only the dentist can prevent cavities.	87 (31.0%)	194 (69.0%)
I believe dentures are less trouble than taking care of my natural teeth.	78 (27.8%)	203 (72.2%)
I believe visiting the dentist is only necessary when I am experiencing pain.	78 (27.8%)	203 (72.2%)
I am likely to have tooth decay in the next year or two.	58 (20.6%)	221 (78.6%)
I am likely to have gingivitis or gum disease in the next year or two.	48 (17.1%)	232 (82.6%)
I believe that if my parents have bad teeth, brushing and flossing will not help my teeth.	30 (10.7%)	251 (89.3%)

SECTION 3: IMPACT ON NURSING CARE

4.8 Student nurses' attitudes towards patient oral health.

The last section of the study addresses student nurses' attitudes towards patient oral health and the possible impact this may have on nursing care.

Most of the respondents (264, 94.0%) agreed that: *Proper oral care is needed for the general health of the patient*, and that: *Adequate oral care may prevent complications* (260, 92.5%). Similarly, 249 (88.6%) of the respondents agreed that: *All patients should have an oral check-up during admission;* and 249 (88.6%) that there is a: *Need to involve oral hygienist to give better oral care* 2 (Table 16).

Table 16: Attitudes towards patient oral health (n=281)

Attitudes towards patients' oral health	Agreement	Disagreement
Proper oral care is needed for the general health of the patient	264 (94.0%)	15 (5.3%)
Providing adequate oral care may prevent complication	260 (92.5%)	21 (7.5%)
All patients should have an oral check-up during admission	249 (88.6%)	32 (11.4%)
Need to involve dental hygienists to give better oral care	249 (88.6%)	32 (11.4%)
Oral care is high priority especially in critically ill patients?	242 (86.1%)	38 (13.5%)
Willing to accompany a patient for their oral care treatment	239 (85.1%)	42 (14.9%)
Patient oral care is one daily task of nursing	205 (73.0%)	69 (24.6%)
Do you think a nurse's responsibility is to check the oral cavity of the patient?	196 (69.8%)	85 (30.2%)
Doctors should preferably do oral care by themselves	152 (54.1%)	129 (45.9%)
Nursing staff follow oral care practices properly only if doctors insist	152 (54.1%)	129 (45.9%)
The oral cavity is difficult to clean	133 (47.3%)	143 (50.9%)
Cleaning the oral cavity is unpleasant task	111 (39.5%)	170 (60.5%)
Oral problems and their treatments can be delayed as they are not life threatening	98 (34.9%)	183 (65.1%)
Oral care is not my job to do	48 (17.1%)	231 (82.2%)

Of concern was that more than 50% of respondents had negative attitudes towards patients' oral health with 143 (50.9%) agreeing that: *The oral cavity is difficult to clean;*

170 (60.5%) that: C*leaning the oral cavity is unpleasant task;* 183 (65.1%) that: *Oral problems and their treatments can be delayed as they are not life threatening*. Most of the respondents 231 (82.2%) agreed that: *Oral care is not my job to do* (Table 16).

4.9 Summary

The findings of the study were described in Chapter 4. The findings address the study objectives to investigate as per objectives to determine the knowledge, attitudes, and practices of student nurses regarding oral health at a university in the Western Cape are. The results in this study found that nursing students' oral health knowledge was low, they had positive attitudes towards their oral health and positive attitudes towards patient oral health and their oral health practice was fair. In Chapter 5 the researcher will discuss the finding of Chapter 4 in detail, and in context of other similar studies.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

In this chapter the researcher will discuss the study findings of the previous chapter which presented the knowledge, attitudes, and practices of student nurses regarding oral health of student nurses at a university in the Western Cape. The discussion will address the study objectives set out below:

1. To describe the self-reported oral health status of the student nurses
2. To describe the self-reported oral health practice of the student nurses
3. To determine student nurses' knowledge of oral health
4. To determine student nurses' attitude towards oral health
5. To determine student nurses' oral health attitude towards oral care of their patients.

5.2 Oral health status and practices

Oral health refers to the absence of pain in the mouth, sores, or lesions and all the disorders that affect the gums and the teeth (Fellows et al., 2022). This was examined in this study by reporting on the respondents' self-reported oral health status and practices.

5.2.1 Student nurses' self-reported oral health status

Half of the respondents reported their teeth to be in poor state (43.4%) and about a quarter reported that the status of their gums was poor (24.2%). However, most respondents had their natural teeth (94.0%), and had not presented with pain and discomfort in the past 12 months (98.9%). Of concern was that only 29.2% stated their gums were in a good state. The results were in contrast with the results of a study conducted in KwaZulu-Natal, South Africa where half of the student nurses reported

their dental health to be good (59%) (Kerr & Singh, 2018). Contrary to our study, in a study conducted in Aarhus, Denmark on student nurses, 23% of the respondents described their teeth and gums as extremely good and just over half (57%) described them as very good (Grønkjær et al., 2017).

5.2.3 Oral health practices

Most of the respondents used a toothbrush to clean their teeth (98.6%) and the majority used toothpaste with fluoride to clean their teeth (97.9%). The use of toothpaste with fluoride may be because most toothpaste available in South Africa has fluoride (Vorster, 2019). About half of the respondents (48.8%) reported that they made use of wood toothpicks to clean their teeth interdentally and about half (48.0%) make use of thread floss to clean their teeth interdentally. The results are aligned with the results of a study conducted in KwaZulu-Natal on nursing students where nearly all of the respondents (99.0%) reported that they use toothpaste and a toothbrush to clean their teeth and (28%) of the respondents use a toothpick to clean their teeth interdentally (Kerr & Singh, 2018).

In assessing oral health visit practices, in this study, just over a quarter of the respondents (27.8%) reported that they visit the dentist when they experience pain while a further quarter (26.0%) reported that they visit the dentist for check-ups. Just under a quarter (23.5%) of the respondents also reported that they never visited the dentist. In contrast with our study, a study conducted in Aarhus, Denmark on student nurses reported that about (76%) of the respondents went for regular dental checks and more than half of the respondents (55%) visited the dentist yearly and only (1%) had not visited the dentist in the last five years (Grønkjær et al., 2017). The study done in KwaZulu-Natal also reported that (65%) of male student nurses visited the dentist when experiencing pain, which they indicated may possibly be because of the

believe that a visit to the dentists is to extract teeth (Kerr & Singh, 2018). Similarly, in a study conducted in Turkey on nursing students the respondents presented at the dentist with at least one tooth being affected by dental caries (Bal, Bengi, Açikel, & Saygun, 2015). In contrast to this study, in a study done in Aarhus, Denmark on nursing students (76%) of the respondents went for regular dental check-up and only (17%) visited the dentists due to pain (Grønkjær et al., 2017).

In assessing food consumption in this study, less than three-quarters of the respondents (195, 69.4%) reported eating fresh fruit often. Over half of the respondents (155, 55.2%) often drank tea with sugar, just under half 139 (49.5%) often consumed coffee with sugar, and 124 (44.1%) often consumed lemonade, Coca-Cola or other sugar soft drinks. Contrary to this study, in a study conducted in Nigeria on clinical medical students and dental students, the clinical medical students reported 105 (98.1%) eating fresh fruit (Janada & Idon, 2019), similar to our study regarding drinking tea with sugar only 101 (94.4%) reported to drink tea in their study, Lastly, 100 (93.5%) of the clinical medical student reported consuming carbonated beverages(Janada & Idon, 2019).

In assessing substance intake in this study, the majority of the respondents reported

seldom smoking cigarette 244 (86.8%) and only 28 (10%) reported smoking cigarette often. Regarding alcohol consumption only 22 (7.8%) reported to have consumed alcoholic drinks per day during the past 30 days. Contrary to our study, in a study conducted in Croatia on nursing students and technical students, only 12.9% of the nursing students reported to have consumed alcoholic drinks per day during the past 30 days, regarding tobacco product use only ($p = 0.170$) was the reported significant difference between the two groups (Cabov et al., 2021). Contrary to our study, in a

study conducted in Nigeria on clinical medical students and dental students the clinical medical students reported 106 (99.1%) seldom smoking cigarette (Janada & Idon, 2019). With the above discussed results and supporting literature this study participants had fair oral health practises.

5.3 Knowledge, attitudes, beliefs, and barrier on oral health

5.3.1 Student nurses' oral knowledge

In this study the respondents were asked questions to assess their knowledge of oral healthcare. The respondents were required to choose an appropriate answer from the multiple-choice questions.

Gingivitis and plaque: gingivitis and plaque are common dental health problems (Murakami, Mealey, Mariotti, & Chapple, 2018; Erchick et al., 2019). The average score for knowledge of respondents was 47.8% with a median of 50%. The respondents appeared to be knowledgeable on gingivitis and plaque, with 84.7% having correctly responded to the statement that: *inflammation of the gums involves swelling and bleeding* and 74.0% that plaque is a *germ containing substance that collects on the surface if teeth*. This is similar to a study, with student nurses in Aarhus, Denmark, where 65% of the respondents correctly answered the question on plaque and in 90% the question on gingivitis (Grønkjær et al., 2017). Similarly, in another study on student nurses in Amman, Jordan nearly three-quarters of the respondents had knowledge of gingivitis (Smadi & Nassar, 2016).

Fluoride: fluoride plays an important role in oral health by effectively preventing dental carries (Vorster, 2019). In South Africa fluoride was added to the water in 2003 due to the high prevalence of oral diseases (Muller, Heath, & Villet, 1998; Mulder, 2018). Knowledge about fluoride was adequate with over two-thirds of respondents (64.4%)

correctly responding to this question. In a study conducted in Kathmandu, Nepal of student nurses, this was lower with only 40.2% being knowledgeable about fluoride (Bhattarai, Khanal, Rao, & Shrestha, 2016).

Impact of smoking on oral health: There is strong evidence of the impact of smoking on oral health, especially in periodontal disease and oral cancer*s* (Fellows et al., 2022). Over half of the respondents (54.4%) answered correctly on the relationship between smoking, periodontal disease and oral cancer*s.* Similar findings were reported about nursing students in the Kathmandu district of Nepal regarding oral cancer causes with just under half (47.8%) of the respondents correctly identifying this relationship (Bhattarai et al., 2016). In this study, however nearly all (98.8%) agreed that excess tobacco consumption and tobacco chewing was a bad habit (Bhattarai et al., 2016). A study conducted in the city of Davanagere, Karnataka, India on student nurses found a slightly higher numbers correctly identifying that tobacco is a cause of cancers (60.8%) (Yavagal et al., 2020).

Knowledge on dental health practices: It is recommended that teeth should be brushed twice daily and flossed at least once a day (Fellows et al., 2022). In this study only two -thirds (34.9%) appear to be knowledgeable on the most important dental habits, namely brushing twice a day and flossing once a day. This figure was higher for nursing students in Turkey (88.9%) of the nursing students were knowledgeable about brushing twice a day and flossing once (Bal et al., 2015), possibly due to cultural differences and access to resources as Turkey is a first world country with a high median income (Bal et al., 2015). In our study only (34,5%) respondents were knowledgeable about *the primary goal of brushing teeth; to remove germs and food from the surface of the teeth*. This was similar to a study conducted in Zanzibar on nursing students where only (35,5%) were knowledgeable on this subject (Owibingire

et al., 2017) and in Amman, Jordan, where (38%) of the nursing student respondents had no knowledge of dental plaque (Smadi & Nassar, 2016).

Link between oral health and general health. There has been increasing evidence published on the link between oral health and general health, specifically related to periodontal disease and systemic diseases such as cardiovascular disease, diabetes mellitus and malnutrition to name a few (Kane, 2017). In responding to the question research studies have shown a link between low-birth-weight babies, diabetes, heart disease and stroke, only (28.2%) of the respondents were knowledgeable on these issues. This was low compared to a study conducted in Jordan on nursing students, where half of the respondents (54%) knew that periodontal diseases in pregnant women can cause low birth weight and also knew of the correlation between periodontal disease and cardiovascular disease or diabetic control (Smadi & Nassar, 2016).

5.4 Personal beliefs and barriers impacting on optimum oral health

5.4.1 Student nurses' oral health attitude towards their own oral health and Barriers

The respondents were asked questions about their beliefs about enhancing their oral health and their attitudes towards possible attitudinal barriers to enhancing optimum oral health. In this study the respondents had positive oral health attitude as most of the respondents (92.9%) agreed that knowing the facts about dental health could help prevent the loss of their teeth. This is similar to the study conducted in Davanagere, Karnataka, India of student nurses, (81.9%) of the respondents agreed that proper brushing of teeth can prevent dental loss (Yavagal et al., 2020). Contrary to this study, in Tumkur, India, in a study of nursing students, the score was 7.2 (average) on attitudes towards brushing teeth correctly (Bennadi, 2019).

Of concern was the high-level of negative attitudes which may result in barriers to optimum oral health. In this study, nearly three-quarters (70.8%) of the respondents agreed with the negative statement that if their gums bleed when they flossed that usually means that they are hurting their gums and they should stop flossing their teeth, and (63.3%) of the respondents agreed that tooth loss is a normal part of growing old. This was similar to negative attitudes in a study conducted in Istanbul, Turkey on nursing students where (33%) of the respondents indicated that when getting old they could not help having false teeth (Doğan, 2013). In this study, about half (42.7%) of the respondents supported the negative statement that gums bleed when they brush and that this usually means that they were brushing too hard and should stop brushing the teeth as compared to (21%) in a study in Istanbul, Turkey of nursing students that agreed their gums bleed when they brushed their teeth (Doğan, 2013) .

In terms of seeing a dentist when in pain, in our study, nearly three-quarters of the respondents (72.2%) disagreed that they should only see a dentist when they are in pain, similar to the study in Jordan, Amman on student nurses where (86%) of the respondents considered regular visits to the dentist to be necessary (Smadi & Nassar, 2016).

5.4.2 Student nurses' attitudes towards patient oral health

An important aspect of oral health is understanding the relationship between oral health and general health and how attitudes towards the oral health of patients can impact on nursing and patients' health.

In this study, respondents overall had good attitude towards patients' oral health as most of the respondents (94.0%) agreed that proper oral care is needed for the general

health of the patient and that providing adequate oral care may prevent complications (92.5%), especially through the involvement of dental hygienists to give better oral care (88.6%). This was similar to a study conducted in Davanagere, Karnataka, India, where (78.1%) of the respondents felt the need to collaborate with dentists to provide oral healthcare for their patients (Yavagal et al., 2020). Most of the respondents (88.6%) agreed that all patients should have an oral check-up during admission, these results are similar to result of a study conducted in Taif, Saudi Arabia where (92.9%) of the respondents agreed with this statement (Ashour, 2020). Similarly, (86.1%) of the respondents agreed that oral care should be high priority in critically ill patients, which was similar to the same study conducted in Taif, where (95.6%) of the respondents agreed that all patients admitted in hospital should receive oral care (Ashour, 2020). However, in this study, oral health did not appear to be a priority for the respondents. Though 231 (82.2%) of respondents felt that oral care was their job, respondents felt that cleaning the oral cavity was a difficult (50.9%) and an unpleasant task (60.5%). This was similar to a study conducted in Calabar, Cross River State, Nigeria where nearly half (41.1%) of the respondents agreed that oral care was an unpleasant task (Nsemo, Nwakhe, & Obo, 2018). Of concern was that (34.9%) of respondents felt that oral problems and their treatments can be delayed as they are not life threatening (Nwakhe & Obo, 2018). These results are worrisome as oral diseases have an impact on chronic systemic conditions such as periodontal diseases being linked to diabetes mellitus, respiratory and cardiovascular diseases (González et al., 2017; Midwood & Hodge, 2018; Zhou et al., 2018; Sabbah, Folayan, & El Tantawi, 2019).

5.5 Summary

This chapter discusses the results in the context of similar research findings. In the discussion it was shown that the student nurses had poor oral health knowledge. They had fair oral health practices and oral health status. The discussion also showed that the student nurses showed positive attitude towards their oral healthcare and positive attitudes towards patient oral healthcare. In Chapter 6 the conclusion, limitation and recommendations will be discussed.

CHAPTER 6

FINDINGS, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

6.1 Introduction

This chapter will summarise the key findings, conclude the research study by identifying the study's limitations and provide recommendations based on the findings.

In this study the focus was on investigating the on the knowledge, attitudes, and practices of student nurses regarding oral health at a university in the Western Cape. The researcher has done this by fulfilling the objectives, namely:

1. To describe the self-reported oral health status of the student nurses,
2. To describe the self-reported oral health practice of the student nurses,
3. To determine student nurses' knowledge of oral health.
4. To determine student nurses' attitude towards oral health
5. To determine student nurses' oral health attitude towards oral care of their patients.

6.2 Summary of key findings

The aim of this study was to determine, student nurses at a university in the Western Cape's, knowledge and attitude regarding their oral care and attitude towards their patient's oral care and student nurses' practices regarding oral health.

6.3 Overall findings

Firstly, in terms of the respondent's general oral health status and practices the oral health status of the student nurses and their oral health practice was fair.

Secondly, in assessing the respondents' knowledge and attitudes, overall, the knowledge was poor, attitudes towards their oral health were positive and their attitudes towards potential barriers to optimal health was positive.

Lastly, considering the impact of attitudes on nursing, the respondents had positive attitudes towards patients' oral health as expected from future professional nurses.

6.4 The key findings addressing the five objectives of this study are summarised below:

6.4.1 Objective 1: To describe the self-reported oral health status of the student nurses.

In this study the oral health status of nursing students was poor with about half of the students reporting their gums and teeth being in a poor state, even though most of the student reported having more natural teeth and no pain in the past 12 months.

6.4.2 Objective 2: To describe the self-reported oral health practices of the student nurses.

The oral health practices of the student nurses were fair, with most of them having the correct daily oral hygiene practices. However, this was not sufficient as most of the student nurses misunderstood the importance of visiting dentists and were misinformed as to the importance of dental visits.

6.4.3 Objective 3: To determine student nurses' knowledge oral health.

The student nurse's oral health knowledge was low with an average score of less than 50%. The student nurses lacked knowledge on oral health linked diseases and lacked knowledge of the goal of brushing one's teeth and lacked knowledge on how sugar contributes to tooth decay. They lacked important knowledge that is expected from a

nursing student; knowledge of oral health is vital and influences the nursing care provided to patients.

6.4.4 Objective 4: To determine student nurses' attitudes towards oral health.

The respondents in this study had positive oral health attitudes with the majority having positive attitudes beliefs enhancing optimum oral health, but they had mixed or negative attitudes towards oral health practices, like bleeding gums while flossing and believed that tooth loss was a normal part of growing up.

6.4.5 Objective 5: To determine student nurses oral health attitudes towards oral care of their patients.

In this study the respondents had an overall positive attitude towards oral care of the patients and agreed that proper oral care was needed for the general health of patients. Most of the respondents recognised that oral care of patients is their job and, though some of the respondents agreed that providing adequate oral care may prevent complications, there seems to be a disconnect as most of the respondent did not appear to recognise the importance of the link between oral health and general health.

6.5 Limitations of study

The selection of the sample was limited to one school of nursing in a specific province in South African and thus the data may not be generalisable to other provinces or countries. Other limitations include that the testing of knowledge and the link and understanding between oral health and general health should have been further explored. It was not possible to do random stratified sampling as class lists could not be accessed for information due to the POPIA requirements (Adams, Adeleke, Anderson, Bawa, Branson, Christoffels et al., 2021). In addition, the

knowledge section was only assessed with ten questions and these questions had poor internal consistency.

6.6 Recommendations

6.6.1 Nursing Education

Recommendation 1: Include oral health content in the curriculum could benefit both the student nurses and quality of patient general health.

The knowledge of student nurses was low, and it lacked the vital elements that a future professional nurse should possess. The curriculum developers should include oral health in all year levels:

- Bachelor of Nursing year-one and ECP one and two; oral health can be included in Fundamentals of Nursing under hygiene needs. A detailed lesson can be added on oral health in this session by giving greater emphasis to personal and patient oral health needs.
- Bachelor of Nursing year-two; the new curriculum offers non-communicable diseases, in this module when they cover theoretical trachea care, oral health should be included. In the module that covers children's health, oral care of children can be integrated by examining teeth and differentiating what is dentally normal and abnormal.
- Bachelor of Nursing year-three; oral health can be added in the curriculum in pre-natal and post-natal care. This could be done by emphasising oral health in the education of the pregnant mother and, after birth, by educating mothers on continuing good oral care habits and how to clean their child's first teeth. At primary healthcare level outreach campaigns/projects can be used to educate the community about oral health.

- Bachelor of Nursing year-four; oral health can be included in the curriculum under mental health disorders such as dementia, as poor oral health and dementia have a link (Manchery, Subbiah, Nagappan, & Premnath, 2020). The curriculum developers can have outreach campaigns and can develop an assessment tool/ screening tool for student nurses to screen patients with mental illness.

Recommendation 2: Include oral health as risk factors in key nursing areas

The student nurses seem to be struggling to link oral health with overall general wellbeing, this proves that the curriculum does not provide adequate knowledge and information on oral health. Including oral health in the curriculum and emphasising it through workshops, training, and clinical practice could convey the link between oral health and general health. Oral health and general health can be linked through modules like Fundamentals of Nursing and Communicable and Non-communicable Diseases, Midwifery, and Psychiatric Nursing.

6.6.2 Nursing Practice

Recommendation 3: Improving skills in oral health cleaning

The clinical facilitators need to work with hospital clinical facilitator in ensuring that proper oral care is provided to the patients and that the nursing students are competent in providing oral care. In addition, student nurses should understand the relationship between oral health and general health.

In the skills lab, mouth care can be brought back, and proper mouth/dental mannequins can be used to demonstrate how it should be performed for both personal and patient's needs. The school can provide mannequins with oral diseases and mannequins with good oral health thus assisting in differentiating between the two. The clinical facilitator can teach students how to assess oral health in both paediatrics

and adults. A focus on oral health skills during lab skills sessions will also assist in emphasising oral health importance for patients.

6.6.3 Health promotion for students

Recommendation 4: Prepare health education material for student nurses as part of general wellness of students.

Health education for student nurses can be done through oral health campaigns and by having regular workshops for student nurses. By increasing oral health information in the curriculum, students could benefit by improving their own oral and general health practices, and thus in turn, improving the oral and general health of their patients.

6.6.4 Research

Recommendation 5: Conduct a specific survey on oral health and general health knowledge.

This section was only assessed with ten questions, and these had poor internal consistency. However, as students did poorly in some of the key questions, a detailed survey will assist curriculum developers to know how much knowledge nursing students have regarding links between oral health and general health, and thus allow them to effectively fill any gaps. Most importantly, it will assist in moving away from a curative view of oral health disease and towards a preventative.

6.7 Conclusion

The findings in this study show that knowledge, attitudes, and practices of student nurses regarding oral health is important and relevant to the nursing profession. However, there is a gap in nursing training about oral health and the nursing curriculum may not adequately prepare nursing students for practice. This study can help to provide more emphasis on oral healthcare in nursing practice. The results can be used

to ensure that future curricula include detailed oral health education and focus on the link between oral health and general health.

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APPENDICES

Appendix A: Ethical clearance

UNIVERSITY of the WESTERN CAPE

60 YEARS of hope, action & knowledge

15 October 2020

Ms P Khonco
School of Nursing
Faculty of Community and Health Sciences

Ethics Reference Number:	HS20/8/6
Project Title:	Knowledge, attitudes and practices of student nurses regarding oral health at a university in the Western Cape.
Approval Period:	30 September 2020 – 30 September 2023

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report by 30 November each year for the duration of the project.

The permission to conduct the study must be submitted to HSSREC for record keeping purposes.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

NHREC Registration Number: HSSREC-130416-049

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

Appendix B: Permission to conduct study

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT THE UNIVERSITY OF THE WESTERN CAPE

This serves as acknowledgement that you have obtained and presented the necessary ethical clearance and your institutional permission required to proceed with the project referenced below:

Name of Researcher
PELISA KHONCO

Research topic
Knowledge, Attitudes and Practices of student nurses regarding oral health at a university in the Western Cape

Period permission is valid for
20 October 2020 – 30 September 2023
(or as determined by the validity of your ethics approval)

Reference code
UWCRP201020PK

You are required to engage this office in advance if there is a need to continue with research outside of the stipulated period. The manner in which you conduct your research must be guided by the conditions set out in the annexed agreement: *Conditions to guide research conducted at the University of the Western Cape*.

Please be at liberty to contact this office should you require any assistance to conduct your research or require access to either staff or student contact information.

Yours sincerely

DR AHMED SHAIKJEE
DEPUTY REGISTRAR
UNIVERSITY OF THE WESTERN

UNIVERSITY OF THE WESTERN CAPE
ACADEMIC ADMINISTRATION
20 OCTOBER 2020
This document contains a qualified electronic signature and date stamp. To verify this document contact the University of the Western Cape at researchperm@uwc.ac.za.

Appendix C: Permission to conduct study at the SCHOOL OF NURSING

18 May 2021

Dear Ms Khonco

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT THE SCHOOL OF NURSING, UNIVERSITY *of the* WESTERN CAPE

Name of Researcher: Ms Pelisa Khonco
Research Topic: *Knowledge, attitudes, and practices of student nurses regarding oral health at a university in the Western Cape*
Ethics Clearance Reference No.: HS20/8/6
UWC Permission Reference Code: UWCRP201020PK
Target population: 1st to 4th year B Nursing students
Validity Period: 20 October 2020 – 30 September 2023

As per your request and evidence provided, we acknowledge that you have obtained the necessary permission and ethics clearance. Permission is therefore granted for you to conduct your research as outlined in your proposal.

Please note that while permission is granted to conduct your research (i.e. interviews and surveys) staff and students at the School of Nursing are not compelled to participate and may decline to participate or withdraw should they wish to.

Should you wish to make use of or reference the School's name, spaces, identity, etc. in any publication/s, you must first furnish the School with a copy of the proposed publication/s so that the School can verify and grant permission for such publication/s to be made publicly available.

As per your letter of permission to conduct research at the UWC from Dr Ahmed Shaikjee, Deputy Registrar, assistance to access student contact information, must be done through the office of the Deputy Registrar or be facilitated by your supervisor.

We wish you success with your research.

Yours sincerely

Prof Jennifer Chipps
Director: School of Nursing
Faculty of Community and Health Sciences
UNIVERSITY *of the* WESTERN CAPE
T: +27 21 959 3024 E: jchipps@uwc.ac.za

Appendix D: Information sheet

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 9345 Fax: 27 21-959 2679

E-mail: 3157273@myuwc.ac.za

INFORMATION SHEET

Project Title: ***knowledge, attitude and practices of student nurses' regarding oral at a university in the Western Cape.***

What is this study about?

This is a research project being conducted by Pelisa Khonco, a Master of Nursing student, specialising in Nursing Education, at the University of the Western Cape. I am inviting you to participate in this research project because you are a student nurse enrolled in the Bachelor of Nursing degree at the university of the Western Cape. The purpose of this research project is to determine the knowledge attitude and practice of student nurses toward oral health. This information will contribute to the understanding of the level of oral health literacy amongst nursing students in South Africa, and it may facilitate the development of effective interventions to enhance the oral health literacy of student nurses.

What will I be asked to do if I agree to participate?

You will be asked to complete a 84-question survey. The study will be conducted in your lecture room on the date decided with the relevant programme coordinators. The questionnaire may require 30-35 minutes to complete. The questionnaire consists of questions related to your knowledge of oral health and practices, as well as your attitudes toward oral health of yourself and patients.

Would my participation in this study be kept confidential?

The researchers undertake to protect your identity and the nature of your contribution. To ensure your anonymity, the surveys are anonymous and will not contain information that may personally identify you. To ensure your confidentiality, the research questionnaires will not be exposed or given to anyone other than the immediate involved personnel. The research questionnaires will be locked in a lockable cabinet that is only open by involved personnel. The information you provide will be locked in filing cabinet and stored for up to five years, where after it will be shredded. If we write a report or article about this research project, your identity will be protected.

What are the risks of this research?

There may be some risks from participating in this research study. This study might contain the psychological and emotional defects on the respondents as the research questions could provoke some unintended emotions. The respondents might feel embarrassed or fear in answering some of the questions, if you experience any discomfort, psychological or otherwise, during the process of your participation in this study where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the researcher learn more about student nurse's knowledge, attitude and practice regarding oral health. The researcher hopes that, in the future, other people might benefit from this research project through findings of this research, on student nurses knowledge, attitude and practice of oral health and interventions to enhance oral health education of nursing students and adequately prepare them for patient care.

Do I have to be in this research, and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time.

If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Pelisa Khonco, Master of Nursing Student at the University of the Western Cape. If you have any questions about the research study itself, please contact Pelisa at: 3157273@myuwc.ac.za.

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please

contact:

Prof Jennifer Chipps

Head of School of Nursing

University of the Western Cape

Private Bag X17

Bellville 7535

jchipps@uwc.ac.za

Prof Anthea Rhoda

Dean of the Faculty of Community and Health Sciences

University of the Western Cape

Private Bag X17

Bellville 7535

chs-deansoffice@uwc.ac.za

This research has been approved by the University of the Western Cape's Humanities and Social Sciences Research Ethics Committee.

Humanities and Social Sciences Research Ethics Committee Office

University of the Western Cape

Private Bag X17

Bellville 7535

Tel: 021 959 2948/49/88 or 021 959 2709

Email: research-ethics@uwc.ac.za

Appendix E: Consent form

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 9345 Fax: 27 21-959 2679

E-mail: 3157273@myuwc.ac.za

Project Title: knowledge, attitude and practices of student nurses' regarding oral at a university in the Western Cape.

CONSENT FORM

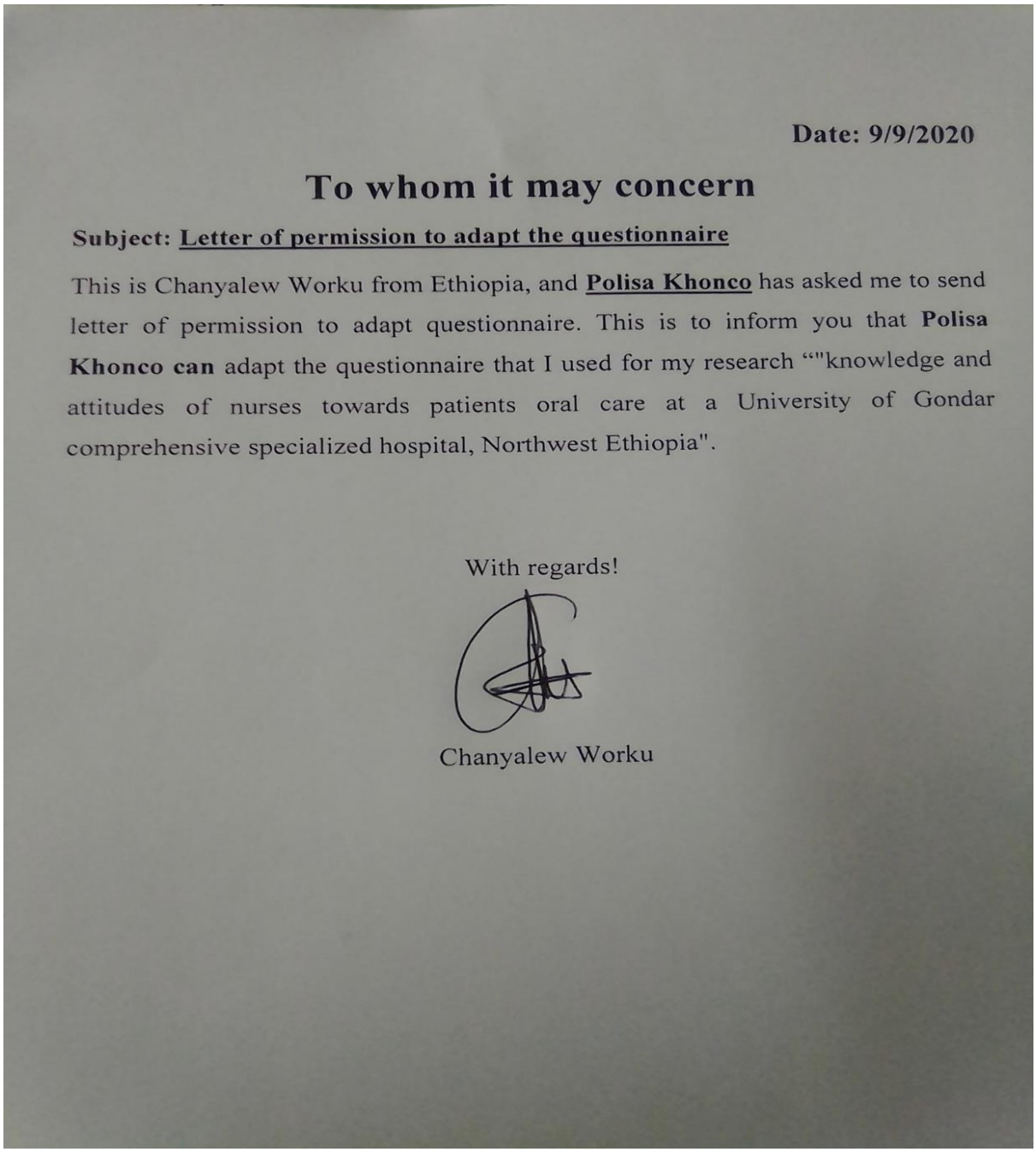
The study has been described to me in a language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that participation in the research is not a course requirement. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Participant's name……..

Participant's signature…….

Date……

Appendix F: Permission to use questionnaires



Date: 9/9/2020

To whom it may concern

Subject: Letter of permission to adapt the questionnaire

This is Chanyalew Worku from Ethiopia, and **Polisa Khonco** has asked me to send letter of permission to adapt questionnaire. This is to inform you that **Polisa Khonco can** adapt the questionnaire that I used for my research ""knowledge and attitudes of nurses towards patients oral care at a University of Gondar comprehensive specialized hospital, Northwest Ethiopia".

With regards!

Chanyalew Worku

Susan Romano Rustvold, DMD, EdD
OHSU School of Dentistry
2730 SW Moody Avenue
Portland, OR 97201
USA
rustvols@ohsu.edu
susanrustvold@mac.com
503.705.8454

I hereby grant permission to Pelisa Khonco to use the questionnaires/instruments on oral health knowledge and beliefs I developed for my research on oral health literacy.

Sincerely,

Susan Rustvold, DMD, EdD

Appendix G: Adapted questionnaires

- WHO: oral health questionnaire for adults
- Susan Rustvold: oral health knowledge inventory and oral health attitude questionnaire

World Health Organization

Oral Health Questionnaire for Adults

Identification number 1. ☐☐☐☐ (1 4)

Sex Male ☐ (1) Female ☐ (2)

Location Urban ☐ (1) Periurban ☐ (2) Rural ☐ (3)

2. **How old are you today?** _____ (Years)

3. **How many natural teeth do you have?**
   - No natural teeth ..... ☐ 0
   - 1–9 teeth ..... ☐ 1
   - 10–19 teeth ..... ☐ 2
   - 20 teeth or more ..... ☐ 3

4. **During the past 12 months, did your teeth or mouth cause any pain or discomfort?**
   - Yes ..... ☐ 1
   - No ..... ☐ 2
   - Don't know ..... ☐ 9
   - No answer ..... ☐ 0

5. **Do you have any removable dentures?**

	Yes (1)	No (2)
A partial denture?	☐	☐
A full upper denture?	☐	☐
A full lower denture?	☐	☐

6. **How would you describe the state of your teeth and gums? Is it "excellent", "very good", "good", "average", "poor", or "very poor"?**

	Teeth	Gums
Excellent	☐ 1	☐ 1
Very good	☐ 2	☐ 2
Good	☐ 3	☐ 3
Average	☐ 4	☐ 4
Poor	☐ 5	☐ 5
Very poor	☐ 6	☐ 6
Don't know	☐ 9	☐ 9

7. **How often do you clean your teeth?**

Never	☐ 1
Once a month	☐ 2
2–3 times a month	☐ 3
Once a week	☐ 4
2–6 times a week	☐ 5
Once a day	☐ 6
Twice or more a day	☐ 7

8. **Do you use any of the following to clean your teeth?**
(Read each item)

	Yes 1	No 2
Toothbrush	☐	☐
Wooden toothpicks	☐	☐
Plastic toothpicks?	☐	☐
Thread (dental floss)	☐	☐
Charcoal	☐	☐
Chewstick/miswak	☐	☐
Other	☐	☐
Please specify	☐	☐

9.

	Yes	No
a) Do you use toothpaste to clean your teeth	☐ 1	☐ 2
b) Do you use a toothpaste that contains fluoride?	☐ 1	☐ 2
Don't know	☐ 9	

10. **How long is it since you last saw a dentist?**

Less than 6 months	☐ 1
6–12 months	☐ 2
More than 1 year but less than 2 years	☐ 3
2 years or more but less than 5 years	☐ 4
5 years or more	☐ 5
Never received dental care	☐ 6

11. **What was the reason of your last visit to the dentist?**

Consultation/advise	☐ 1
Pain or trouble with teeth, gums or mouth	☐ 2
Treatment/ follow-up treatment	☐ 3
Routine check-up/treatment	☐ 4
Don't know/don't remember	☐ 5

12. **Because of the state of your teeth or mouth, how often have you experienced any of the following problems during the past 12 months?**

	Very often 4	Fairly often 3	Some-times 2	No 1	Don't know 0
(a) Difficulty in biting foods	☐	☐	☐	☐	☐
(b) Difficulty chewing foods	☐	☐	☐	☐	☐
(c) Difficulty with speech/trouble pronouncing words	☐	☐	☐	☐	☐
(d) Dry mouth	☐	☐	☐	☐	☐
(e) Felt embarrassed due to appearance of teeth	☐	☐	☐	☐	☐
(f) Felt tense because of problems with teeth or mouth	☐	☐	☐	☐	☐
(g) Have avoided smiling because of teeth	☐	☐	☐	☐	☐
(h) Had sleep that is often interrupted	☐	☐	☐	☐	☐
(i) Have taken days off work	☐	☐	☐	☐	☐
(j) Difficulty doing usual activities	☐	☐	☐	☐	☐
(k) Felt less tolerant of spouse or people who are close to you	☐	☐	☐	☐	☐
(l) Have reduced participation in social activities	☐	☐	☐	☐	☐

13. **How often do you eat or drink any of the following foods, even in small quantities?**
(Read each item)

	Several times a day 6	Every day 5	Several times a week 4	Once a week 3	Several times a month 2	Seldom /never 1
Fresh fruit	☐	☐	☐	☐	☐	☐
Biscuits, cakes, cream cakes	☐	☐	☐	☐	☐	☐
Sweet pies, buns	☐	☐	☐	☐	☐	☐
Jam or honey	☐	☐	☐	☐	☐	☐
Chewing gum containing sugar	☐	☐	☐	☐	☐	☐
Sweets/candy	☐	☐	☐	☐	☐	☐

Lemonade, Coca Cola or other soft drinks ..	☐	☐	☐	☐	☐	☐
Tea with sugar	☐	☐	☐	☐	☐	☐
Coffee with sugar	☐	☐	☐	☐	☐	☐

(Insert country-specific items)

14. **How often do you use any of the following types of tobacco?**
(Read each item)

	Every day 6	Several times a week 5	Once a week 4	Several times a month 3	Seldom 2	Never 1
Cigarettes	☐	☐	☐	☐	☐	☐
Cigars	☐	☐	☐	☐	☐	☐
A pipe	☐	☐	☐	☐	☐	☐
Chewing tobacco	☐	☐	☐	☐	☐	☐
Use snuff	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

Please specify _____

15. **During the past 30 days, on the days you drank alcohol, how many drinks did you *usually drink per day*?**

Less than 1 drink ..... ☐ 0
1 drink ..... ☐ 1
2 drinks ..... ☐ 2
3 drinks ..... ☐ 3
4 drinks ..... ☐ 4
5 or more drinks ..... ☐ 5
Did not drink alcohol during the past 30 days ..... ☐ 9

16. **What level of education have you completed?**

No formal schooling ..... ☐ 1
Less than primary school ..... ☐ 2
Primary school completed ..... ☐ 3
Secondary school completed ..... ☐ 4
High school completed ..... ☐ 5
College/university completed ..... ☐ 6
Postgraduate degree ..... ☐ 7

(Insert country-specific categories)

That completes our questionnaire
Thank you very much for your cooperation!

Year	Month	Day	Interviewer	District	Country
☐☐	☐☐	☐☐	☐☐	☐☐	☐☐☐☐

Rustvold Oral Health Knowledge Inventory

1. Sugar contributes to tooth decay because?
a) Sugar directly harms tooth enamel
b) Sugar combines with proteins in saliva to create a hard layer on teeth.
c) Sugar is changed by bacteria into acid that harms tooth surfaces

2. What is plaque?
a) the protective coat that naturally occurs on teeth
b) a harmless substance that can be removed completely with brushing
c) a germ-containing substance that collects on the surface of teeth
d) a whitening substance that makes your teeth shine

3. Does fluoride in toothpaste make any difference to the health of your teeth?
a) No, it makes no difference at all, and fluoride is now being phased out because it isn't safe
b) Fluoride in toothpaste has hugely improved oral health by decreasing cavities
c) It isn't dangerous, but toothpaste without fluoride is just as effective at preventing cavities.
d) Nobody really knows because there haven't been many studies in the area

4. What is the truth about flossing?
a) flossing is bad for your teeth
b) it is OK to floss, but you should stop immediately if your gums start bleeding
c) flossing is fine if it makes your mouth feel fresher but it doesn't improve the health of your mouth
d) regular flossing is an important part of your dental health routine and you shouldn't worry if your gums bleed a bit at first

5. What is gingivitis?
a) poor support of the bone that supports the teeth
b) a condition where the teeth stain
c) inflammation of the gums that involves swelling and bleeding
d) the name given to germs that inhabit the mouth
e) a name made up by advertising agencies to scare consumers into buying their products
f) another name for having several cavities at the same time

Rustvold Oral Health Knowledge Inventory, continued

6. If you do want to enjoy a sugary treat, when is the most "tooth-friendly" time to eat it?
a) first thing in the morning or last thing at night
b) along with a meal
c) as a snack on its own
d) it doesn't make any difference

7. **What is the goal when we brush our teeth?**
a) To remove germs (bacteria) from all tooth surfaces
b) To remove food from tooth surfaces
c) neither a nor b (some other reason than to remove germs or food)
d) both a and b (to remove germs, to remove food)

8. Research studies have shown a link between periodontal (gum) disease and which of the following?
a) Low Birth Weight Babies (premature babies)
b) Diabetes
c) Heart Disease and Stroke
d) none of the above
e) a, b, and c

9. What are the two most important dental health habits?
a) Brushing twice daily and rinsing with mouthwash after each brushing
b) Brushing after every meal and using a water-pick device daily
c) Brushing twice daily and flossing once a day
d) Flossing every day and rinsing with mouthwash after each flossing

10. Which of the following statements is/are true about smoking cigarettes?
a) Half of all cases of periodontal disease (destructive disease of the bone and gums that support the teeth) are due to cigarette smoking.
b) Three-fourths of all cancers of the mouth are due to tobacco smoking.
c) Smoking can cause lung cancer, but doesn't harm the mouth.
d) both a and b: ½ of periodontal disease cases; ¾ of all cancers of the mouth

Oral Health Attitudes Questionnaire

1. I believe that only the dentist can prevent cavities.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

2. I believe that if my parents have bad teeth, brushing and flossing will not help my teeth.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

3. I believe that by brushing and flossing my teeth I am less susceptible to tooth decay.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

4. I believe that tooth loss is a normal part of growing old.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

5. I am likely to have gingivitis or gum disease in the next year or two.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

6. I believe that I am responsible for preventing the loss of my teeth.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

7. I believe that by flossing my teeth I can prevent gingivitis.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

8. I believe dentures are less trouble than taking care of my natural teeth.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

9. I believe I know how to brush my teeth correctly
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

10. If my gums bleed when I floss this usually means that I am hurting my gums and I should stop flossing my teeth
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

11. If I knew the facts a out dental health I could help prevent the loss of my teeth
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

12. I believe visiting the dentist is only necessary when I am experiencing pain
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

13. I am likely to have tooth decay in the next year or two.
❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

Oral Health Attitudes Questionnaire, continued

14. If my gums bleed when I brush this usually means that I am brushing too hard and I should stop brushing my teeth

❑ I agree completely ❑ I agree partly ❑ I disagree partly ❑ I disagree completely

15. How often do you brush your teeth?

❑ more than twice a day
❑ twice a day
❑ once a day
❑ 2–3 times a week
❑ less frequently

16. How often do you clean your between your teeth (by dental floss, tooth pick or interdental brush)?

❑ once a day or more
❑ 2–3 times a week
❑ once a week
❑ less frequently
❑ never

17. How often do you visit a dentist?

❑ more than once a year
❑ once a year
❑ every two years
❑ every three years
❑ less frequently
❑ Never

18. I plan to visit the dentist

❑ when I have a toothache
❑ when I have dental insurance
❑ to have a routine exam within the next year
❑ to have my teeth cleaned within the next year
❑ I don't know when

19. Do you smoke cigarettes or use another form of tobacco? ❑ Yes ❑ No

20 . Have you ever used alcohol or other drugs to calm you to help you go to a dental appointment?

❑ Yes
❑ No

Senait Tadesse Andargiea, Chanyalew Worku Kassahun questionnaire:

The frequency of nurses' attitude towards patients' oral care on.

The frequency of nurses' attitude towards patients' oral care on each item at

Attitude items
1. All patients should have an oral checkup during admission
2. Cleaning the oral cavity is unpleasant task
3. The oral cavity is difficult to clean
4. Do you think a nurse responsibility to check the oral cavity of the patient
5. Oral care is high priority specially in critically ill patients
6. Oral care is not my job to do
7. Patient oral care is one daily task of nursing
8. Proper oral care is needed for the general health of the patient
9. Providing adequate oral care may prevent complication
10. Doctors should preferably do oral care by the m selves
11. Oral problems and their treatments can be delayed as they are not life treating
12. Are you willing to accompany a patient for their oral care treatment
13. Nursing staff follows oral care practices properly only if doctors insists
14. Need to involve dental hygienists to give better oral care

(S.A. = strongly agree; S.D. = strongly disagree).

Appendix H: Questionnaire

KNOWLEDGE, ATTITUDE, AND PRACTICE OF STUDENT NURSES' REGARDING ORAL HEALTH AT A UNIVERSITY IN WESTERN CAPE

SECTION A: DEMOGRAPHIC INFORMATION

Please answer question 1 by ticking one box below according to your gender, answer question 2 by writing your approximate age expressed in years. Please select your year level, marital status and race by placing an "x" in front of the answer in the appropriate box.

1. Gender	Male						Female				
2. Age											
3. Year Level	Year 1			Year 2			Year 3			Year 4	
4. Marital Status	Single	Married	Divorced				Widowed	Partner	Other		

SECTION B: ORAL HEALTH STATUS
Please answer question 1 to 10 by placing an "x" over the answer in the appropriate box.

1. How many natural teeth do you have?	No natural teeth	1-9 teeth	10-19 teeth	20 or more			
2. During the past 12 months, did your teeth or mouth cause any pain or discomfort?	Yes	No	Don't know	No answer			
3. Do you have any removable dentures?	A partial denture Yes No	A full upper denture Yes No	A full lower denture Yes No				
4. How would you describe the state of your teeth	Excellent	Very Good	Good	Average	Poor	Very Poor	Don't Know
5. How would you describe the state of your gums	Excellent	Very Good	Good	Average	Poor	Very Poor	Don't Know
6. How often do you clean your teeth	Never	Once a month	2-3 x month	Once a week	2-6 x week	1x /day	2x/day
7. Do you use the following to clean your teeth							
a) Toothbrush	Yes	No					
b) Toothpicks (wood)	Yes	No					
c) Toothpicks (plastic)	Yes	No					
d) Thread (dental floss)	Yes	No					
e) Other	Yes	No					
Specify							
8. a. Do you use toothpaste to clean your teeth	Yes	No					
b. Do you use a toothpaste with fluoride?	Yes	No	Don't know				
9. How long since you last saw a dentist?	< 6 mths ago	6-12 mths	>1yr < 2 yrs	>2yr < 5 yrs	>5 yrs	Never	
10. What was the reason for your visit	Consultation/ advice	Pain teeth gums or mouth	Treatment follow up	Routine check	Don't know or remember		

Please answer question 11 to 13 by ticking an appropriate box on a scale below.

11. Because of the state of your teeth or mouth, how often do you experience any of the following problems during the past 12 months?

	Very often	Fairly Often	Sometimes	No	Don't Know
a. Difficulty in biting food					
b. Difficulty in chewing food					
c. Difficulty with speech/trouble pronouncing words					
d. Dry mouth					
e. Felt embarrassed due to appearance of teeth					
f. Felt tense because of problems with teeth or mouth					
g. Have avoided smiling because of teeth					
h. Had sleep that is often interrupted					
i. Have taken days off work					
j. Difficulty doing usual activities					
k. Felt less tolerant of spouse or people who are close to you					
l. Have reduced participation in social activities					

12. How often do you eat or drink any of the following food, even in small quantities?

	Several times a day	Every day	Several times a week	Once a week	Several times a month	Never
a. Fresh fruit						
b. Biscuits, cakes or cream cakes						
c. Sweet pies buns						
d. Jam or honey						
e. Chewing gum with sugar						
f. Sweets/candy						
g. Lemonade, Coca-Cola or other sugar soft drinks						
h. Tea with sugar						
i. Coffee with sugar						

13. How often do you use any of the following types of tobacco?

	Several times a day	Every day	Several times a week	Once a week	Several times a month	Never
a. Cigarettes						
b. Cigars						
c. Chewing tobacco						
d. Snuff						
e. Other						
Specify						

14. During the past 30 days, on the days you drank alcohol, how many drinks do you usually drink per day?

Please select the appropriate answer by placing an "x" over answer in the appropriate box.

< 1 drink	1 drink	2 drinks	3 drinks	4 drinks	5 or more drinks	NONE

SECTION C: ORAL HEALTH KNOWLEDGE

Choose and encircle the most appropriate answer to the multiple-choice questions below.

1. Sugar contributes to tooth decay because?

a) Sugar directly harms tooth enamel

b) Sugar combines with proteins in saliva to create a hard layer on teeth.

c) Sugar is changed by bacteria into acid that harms tooth surfaces

2. What is plaque?

a) the protective coat that naturally occurs on teeth

b) a harmless substance that can be removed completely with brushing

c) a germ-containing substance that collects on the surface of teeth

d) a whitening substance that makes your teeth shine

3. Does fluoride in toothpaste make any difference to the health of your teeth?

a) No, it makes no difference at all, and fluoride is now being phased out because it isn't safe

b) Fluoride in toothpaste has hugely improved oral health by decreasing cavities

c) It isn't dangerous, but toothpaste without fluoride is just as effective at preventing cavities.

d) Nobody really knows because there haven't been many studies in the area

4. What is the truth about flossing?

a) Flossing is bad for your teeth

b) It is OK to floss, but you should stop immediately if your gums start bleeding

c) Flossing is fine if it makes your mouth feel fresher, but it doesn't improve the health of your mouth

d) Regular flossing is an important part of your dental health routine and you shouldn't worry if your gums bleed a bit at first

5. What is gingivitis?

a) Poor support of the bone that supports the teeth

b) A condition where the teeth stain

c) Inflammation of the gums that involves swelling and bleeding

d) The name given to germs that inhabit the mouth

e) A name made up by advertising agencies to scare consumers into buying their products

f) Another name for having several cavities at the same time

6. If you do want to enjoy a sugary treat, when is the most "tooth-friendly" time to eat it?

a) first thing in the morning or last thing at night

b) Along with a meal

c) As a snack on its own

d) It doesn't make any difference

7. What is the goal when we brush our teeth?

a) To remove germs (bacteria) from all tooth surfaces

b) To remove food from tooth surfaces

c) Neither a nor b (some other reason than to remove germs or food) d) both a and b (to remove germs, to remove food)

8. Research studies have shown a link between periodontal (gum) disease and which of the following?

a) Low Birth Weight Babies (premature babies)

b) Diabetes

c) Heart Disease and Stroke

d) None of the above e) a, b, and c

9. What are the two most important dental health habits?

a) Brushing twice daily and rinsing with mouthwash after each brushing

b) Brushing after every meal and using a water-pick device daily

c) Brushing twice daily and flossing once a day

d) Flossing every day and rinsing with mouthwash after each flossing

10.Which of the following statements is/are true about smoking cigarettes?

a) Half of all cases of periodontal disease (destructive disease of the bone and gums that support the teeth) are due to cigarette smoking.

b) Three-fourths of all cancers of the mouth are due to tobacco smoking.

c) Smoking can cause lung cancer but doesn't harm the mouth.

d) Both a and b: ½ of periodontal disease cases; ¾ of all cancers of the mouth

SECTION D: PERSONAL ORAL HEALTH ATTITUDE

Please indicate your response by ticking an appropriate box on a scale below.

No	Items	I agree completely	I agree partly	I disagree partly	I disagree
1	I believe that only the dentist can prevent cavities				
2	I believe that if my parents have bad teeth, brushing and flossing will not help my teeth.				
3	I believe that by brushing and flossing my teeth I am less susceptible to tooth decay				
4	I believe that tooth loss is a normal part of growing old				
5	I am likely to have gingivitis or gum disease in the next year or two.				
6	I believe that I am responsible for preventing the loss of my teeth.				
7	I believe that by flossing my teeth I can prevent gingivitis.				
8	I believe dentures are less trouble than taking care of my natural teeth.				
9	I believe I know how to brush my teeth correctly				
10	If my gums bleed when I floss this usually means that I am hurting my gums and I should stop flossing my teeth				
11	If I knew the facts out dental health, I could help prevent the loss of my teeth				
12	I believe visiting the dentist is only necessary when I am experiencing pain				
13	I am likely to have tooth decay in the next year or two.				
14	If my gums bleed when I brush this usually means that I am brushing too hard and I should stop brushing my teeth.				

5. What is gingivitis?

a) Poor support of the bone that supports the teeth

b) A condition where the teeth stain

c) Inflammation of the gums that involves swelling and bleeding

d) The name given to germs that inhabit the mouth

e) A name made up by advertising agencies to scare consumers into buying their products

f) Another name for having several cavities at the same time

6. If you do want to enjoy a sugary treat, when is the most "tooth-friendly" time to eat it?

a) first thing in the morning or last thing at night

b) Along with a meal

c) As a snack on its own

d) It doesn't make any difference

7. What is the goal when we brush our teeth?

a) To remove germs (bacteria) from all tooth surfaces

b) To remove food from tooth surfaces

c) Neither a nor b (some other reason than to remove germs or food) d) both a and b (to remove germs, to remove food)

8. Research studies have shown a link between periodontal (gum) disease and which of the following?

a) Low Birth Weight Babies (premature babies)

b) Diabetes

c) Heart Disease and Stroke

d) None of the above e) a, b, and c

9. What are the two most important dental health habits?

a) Brushing twice daily and rinsing with mouthwash after each brushing

b) Brushing after every meal and using a water-pick device daily

c) Brushing twice daily and flossing once a day

d) Flossing every day and rinsing with mouthwash after each flossing

10.Which of the following statements is/are true about smoking cigarettes?

a) Half of all cases of periodontal disease (destructive disease of the bone and gums that support the teeth) are due to cigarette smoking.

b) Three-fourths of all cancers of the mouth are due to tobacco smoking.

c) Smoking can cause lung cancer but doesn't harm the mouth.

d) Both a and b: ½ of periodontal disease cases; ¾ of all cancers of the mouth

SECTION E: STUDENT'S ATTITUDE TOWARDS PATIENT ORAL HEALTH

Please indicate your response by ticking an appropriate box on a scale below.

no	items	I agree completely	I agree partly	I disagree partly	I disagree
1	All patients should have an oral check-up during admission				
2	Cleaning the oral cavity is unpleasant task				
3	The oral cavity is difficult to clean				
4	Do you think a nurse's responsibility is to check the oral cavity of the patient?				
5	Oral care is high priority specially in critically ill patients?				
6	Oral care is not my job to do				
7	Patient oral care is one daily task of nursing				
8	Proper oral care is needed for the general health of the patient				
9	Providing adequate oral care may prevent complication				
10	Doctors should preferably do oral care by themselves				
11	Oral problems and their treatments can be delayed as they are not life treating				
12	Are you willing to accompany a patient for their oral care treatment				
13	Nursing staff follow oral care practices properly only if doctors insists				
14	Need to involve dental hygienists to give better oral care				

That completes the questionnaire

Thank you very much for your cooperation!

Appendix I: Editor certificate

ENGLISH LANGUAGE GRAMMAR EDIT

This is to certify that the attached titled

KNOWLEDGE, ATTITUDES AND PRACTICES OF STUDENT NURSES REGARDING ORAL HEALTH AT A UNIVERSITY IN THE WESTERN CAPE

prepared and submitted by

PELISA KHONCO
Student Number: 3157273

has gone through an English language grammar edit carried out by Duncan Harford.

18/11/2022

DATE

SIGNATURE

Appendix J: Turnitin certificate