

**KNOWLEDGE, ATTITUDES AND PRACTICES OF ORAL  
HEALTH CARE WORKERS OF LESOTHO REGARDING  
THE MANAGEMENT OF PATIENTS WITH ORAL  
MANIFESTATIONS OF HIV/AIDS**



**A thesis submitted to the Faculty of Dentistry, University of the Western Cape  
in partial fulfilment of the requirement for Master's degree (M.Ch.D) in  
Community Dentistry**

**Supervisor: Professor Sudeshni Naidoo, PhD**

## ABSTRACT

### **Knowledge, attitudes and practices of oral health workers of Lesotho regarding the management of oral manifestations of HIV/AIDS**

**Background:** Lesotho has the third highest prevalence of HIV in the world with an estimated 23% of the adult population infected. At least 70% of people living with HIV/AIDS (PLWHA) present with oral manifestations of HIV as the first sign of the disease. While Lesotho has a population of fewer than 2 million people, it is faced with the harsh reality of a dire shortage of health care workers including oral health care workers (OHCWs). The high prevalence of HIV is of major concern to oral health workers who regularly encounter patients presenting with oral lesions associated with HIV disease. Oral health care workers need to have adequate knowledge of these conditions for effective management thereof.

**Aim:** To determine the knowledge, attitudes and practises of oral health care workers (OHCWs) of Lesotho regarding the management of oral manifestations of HIV/AIDS.

**Methodology:** A descriptive cross-sectional survey was conducted on all 46 OHCWs in 26 public and private care facilities in all ten districts of Lesotho. A self-administered questionnaire was used to gather information on demographic characteristics of OHCWs and their knowledge, attitudes and practices regarding the management of oral lesions associated with HIV. A visual aid depicting seven colour images of lesions strongly associated with HIV was used to assess knowledge. Data was analysed using Microsoft Excel® and the R statistical package. The outcome of the study was then presented using tables and charts as appropriate. Frequencies, means and 2x2 contingency tables were generated and Fisher's exact tests were used for associations. A significance level of ( $p < 0.05$ ) was used.

**Results:** The response rate of the study was 100%. There were forty six participants and the majority were dentists and male. The age range was between 25 and 73 years with the mean age of 41 years. The mean years of experience were 13.5 years and over three quarters (77.8%) worked in the public sector. Nearly all (94.7%) agreed that oral lesions are common in people living with HIV and/or AIDS. The majority (91.3%) mentioned oral candidiasis (OC) as the most common lesion found in PLWHA while Kaposi's Sarcoma (KS) (34.7%) and Oral Hairy Leukoplakia (OHL) (32.6%) were mentioned as the least common oral lesions of HIV. Nearly all correctly identified the images of oral candidiasis (97.8%), angular cheilitis (86.9%) and herpes zoster (80.4%).

However, less than 60% correctly identified Kaposi's sarcoma and only 58.6% correctly identified oral hairy leukoplakia. Only 16.7% felt they had comprehensive knowledge of oral HIV lesions, although 84.8% reported having previously received training and 63% felt confident in managing HIV patients.

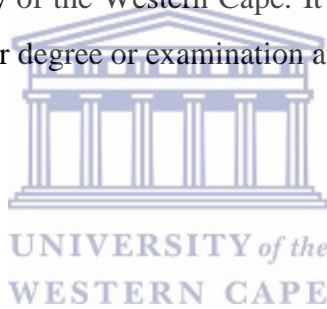
Almost three quarters (71%) reported that there was no need to treat HIV positive patients differently from HIV negative and this concurred with the 70% who stated that they provide the same treatment to patients presenting with oral lesions regardless of their HIV status.

Correlations conducted between the age of OHCW and their knowledge of oral HIV lesions revealed no statistically significant difference, however, more participants older than 39 years of age could not correctly identify angular cheilitis ( $p=0.021$ ). The association between knowledge and employment sector showed that participants working in the public sector encountered more frequently oral lesions such as herpetic gingivostomatitis and herpes zoster hence their ability to correctly identify these lesions ( $p=0.030$  and  $p=0.0257$ ). A higher proportion of participants in the public sector reported that they do not administer the same treatment/advice for HIV+/HIV- patients presenting with the same oral diseases when compared to private sector ( $p=0.048$ ).

**Conclusion:** It can be concluded from the findings of the present study that OHCWs of Lesotho lack an in-depth knowledge of oral lesions of HIV, have low confidence in managing dental patients with oral HIV lesions and those in the private sector were less experienced. The number of people living with HIV/AIDS continues to increase in Lesotho and there is a need for comprehensive training with regard to diagnosis and management of oral lesions. In addition, due to the shortage of OHCWs, the training of other cadres of health care workers (like nurses, community health workers) in the diagnosis and management of oral HIV lesions for early diagnosis and to reduce transmission needs to be considered.

## DECLARATION

I, Khabiso Jemimah Ramphoma (Student No. 2039220) the undersigned, hereby declare that this thesis is my own original work except where indicated in acknowledgements and references. It is being submitted in partial fulfilment of a Master's degree (M.Ch.D) in Community Dentistry at the Faculty of Dentistry, University of the Western Cape. It has not been previously submitted in part or its entirety towards any other degree or examination at any other university.

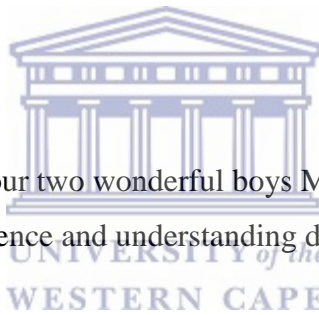


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## DEDICATION

This work is dedicated to my wonderful mother 'Makhabiso Ramphoma, who has been my source of inspiration, a great support system and for always believing in me even when times got tough. Words cannot express how thankful I am for all you have sacrificed just so you could give me a descent upbringing. Thank you for your love and encouragement. I love you very much.



My husband Masupha Letsie and our two wonderful boys Molapo and Lesaoana for their endless support, patience and understanding during this time.

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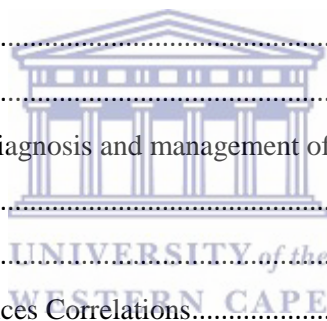
Thank you to Dr Karen Simpson for being a wonderful source of encouragement always and all the advice on how best to multi-task. I would also like to thank my colleague Dr. Dirk Smit whom I have had the pleasure of walking this path with and have learnt so much from. Thank you for the moral support throughout this experience and for being such a good sport. Thank you to Mrs Felicity Vanqa and to Miss Shana Graham for their assistance and support throughout. Thank you to Dr Moteetee, Director General of Health Services Lesotho for giving me permission to conduct this study. I would also like to thank all the participants, as this study would not have been possible without all of you.

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## **ACRONYMS AND ABBREVIATIONS**

**AC-** Angular Cheilitis

**AIDS** – Acquired Immune Deficiency Syndrome

**CHAI-** Clinton Health Access Initiative

**CHAL-** Christian Health Association of Lesotho

**DHS-** Demographic and Health Survey

**GoL-** Government of Lesotho

**HAART-** Highly Active Anti-Retroviral Therapy

**HIV-** Human Immunodeficiency Virus

**KAP-** Knowledge Attitudes and Practices

**KP-** Kaposi's Sarcoma

**LHDS-** Lesotho Demographic Health Survey

**MOHSW-** Ministry of Health and Social Welfare

**OC-** Oral Candidiasis

**OHL-** Oral Hairy Leukoplakia

**OHCW-** Oral Health Care Workers

**PLWHA-** People Living with HIV infection and/or AIDS

**UVCT-** Universal Voluntary Counselling and Testing

**WHO-** World Health Organization



# CHAPTER 1: INTRODUCTION AND BACKGROUND

## 1.1 Introduction

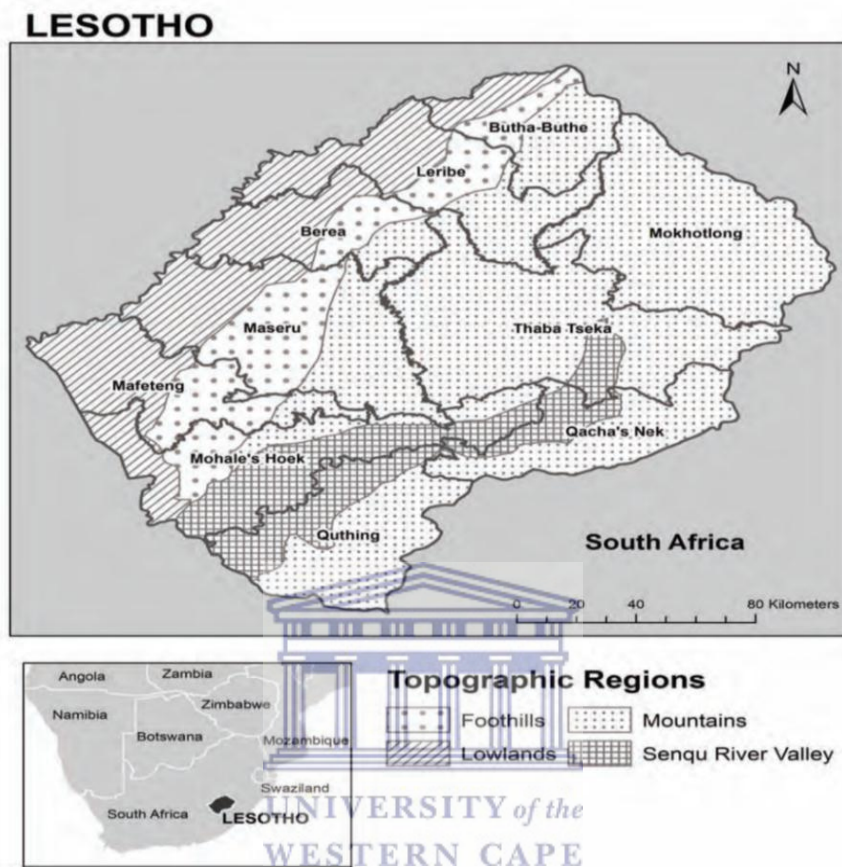
The on-going HIV (Human Immunodeficiency Virus) and AIDS (Acquired Immune Deficiency Virus) pandemic has negatively affected the lives of many, particularly those living in third world countries of the Sub-Saharan Africa including Lesotho (UNAIDS 2010). It has been over three decades since the world first came to know of AIDS, nonetheless stigma, discrimination and victimisation continue. Sub-Saharan Africa, which is the hardest hit by the pandemic, is home to an estimated 22.5 million HIV infected people out of 33.3 million globally (UNAIDS 2010).

Lesotho is reported to have one of the highest adult prevalence of HIV/AIDS, estimated to be the third highest prevalence in the world, with nearly a quarter of the adult population infected with HIV (MOHSW National antiretroviral guidelines, 2007). In 2007, the prevalence of HIV in adults was estimated at 23.2% and the following year showed a slight increase to 23.6% (USAID, 2009). According to the Ministry of Health and Social Welfare (MOHSW) and the National AIDS Commission (2009), HIV prevalence was 24% in the adult population. It is estimated that HIV/AIDS related infections account for 10% of all causes of morbidity in males, 13% in females and 6% in children under the age of 12 years in Lesotho (MOHSW Annual Joint Review, 2011).

The HIV/AIDS pandemic continues to pose a great threat to the health of the Basotho nation with a negative impact on life expectancy. Lesotho became the first African country to initiate the universal voluntary counselling and testing (UVCT) and only the second country in the world after Brazil (WHO, 2007). The financial implications of such catastrophe on the already extremely frail health care system of the country are great. Similar to other developing countries, Lesotho faces many problems such as high rates of unemployment and an overburdened health-care system. The public healthcare sector lacks sufficient resources, funding, personnel and facilities. The health care personnel in government hospitals and clinics are generally overworked and the queues are never ending. The infected are often the poor and disadvantaged (UNAIDS 2010).

While there are many activities and educational campaigns with regards to increasing HIV awareness, testing and treatment, there has been little if any consideration on the oral effects of HIV/AIDS and the role of oral health care workers in reducing the disease transmission. (Government of Lesotho, National HIV/AIDS Strategic Plan, 2006-2011). Despite of the wealth of information on oral manifestations of HIV, little is known about the knowledge of OHCWs and their management of these lesions, especially in poor resource countries such as Lesotho.

**Map 1: Map of Lesotho with all the districts**



## 1.2 Background

Lesotho is a small, low-income mountain kingdom surrounded by South Africa, with an estimated population of 1,876,633 that is slowly declining due to the HIV/AIDS epidemic (Lesotho Population and Housing Census, 2006). Approximately 75% live in remote and rural areas and poverty is extensive. The country is divided into 10 healthcare districts namely Maseru (capital city), Berea, Butha-Buthe, Leribe, Mokhotlong, Thaba-Tseka, Mafeteng, Mohale's Hoek, Quthing and Qacha's Nek. Of the 10 districts of Lesotho, only one district Butha-Buthe has an HIV prevalence of less than 20%, with the capital city Maseru having the highest prevalence of 27%. Rural areas have a slightly low prevalence of HIV when compared to urban areas (Lesotho Demographic and Health Survey, 2009).

Given that Lesotho is a poverty stricken country and one of the hardest hit by the HIV pandemic in Africa (USAID, 2009), the lack of properly qualified personnel and medical facilities aggravates the health care situation (MOHSW, 2009). The hospitals in all the districts accommodate both the urban and rural communities and due to the mountainous terrain and many remote villages, many patients travel for hours to get medical assistance (Umunna et al. 2009).

In a country with such a great burden of infectious diseases, oral health is not a priority and often neglected. However, the high prevalence of HIV in the Lesotho, essentially with its oral manifestations cannot be ignored and this warrants for a paradigm shift in the manner in which oral health related issues are addressed. OHCWs have the opportunity to identify the oral lesions of HIV/AIDS, such as oral candidiasis, oral Kaposi's sarcoma and oral hairy leukoplakia, which are indicative of immune suppression and which require urgent and timely control of the virus (Eyeson et al. 2002; Hodgson et al. 2006(b); Miziara and Weber, 2006).

The HIV/AIDS epidemic has affected the development of the country and has placed high burden on the already frail health care system. The World Bank report in 2004 estimated that by the year 2015, the gross domestic product in the country would be reduced by almost a third due to HIV/AIDS. The estimated population living with HIV was between 260000-290000 in 2007 (Lesotho Demographic and Health Survey, 2009). Children are among the extremely vulnerable victims of HIV because they can be infected through mother-to-child transmission but also through the loss of a parent(s) to AIDS. Approximately 12,000 children in Lesotho under the age of 15 are infected with HIV, while 110,000 children under the age of 18 have been orphaned by HIV/AIDS, with 34% of 523,000 school going children having lost one or both parents to AIDS (USAID, 2009; Lesotho Demographic and Health Survey, 2009).

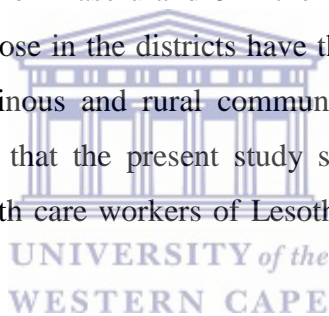
### **1.3 Health care services**

Health care in Lesotho is mainly provided by the Government of Lesotho (GoL) and the Christian Health Association of Lesotho (CHAL), which is the biggest partner in provision of health care in the country. This faith based organization is subsidised by the GoL to provide health care services to the country. Dental care services are mainly provided by GoL and CHAL. Although private health care has grown in the recent years, it only provides health care services for a smaller proportion of the population. Because of the gross human resource shortage, in year 2000, the

GoL initiated a programme to decentralize the health care system, which unfortunately has not succeeded due to limited funding (MOHSW, 2009).

The country has no formal institutions for medical education other than nursing schools and students travel to South Africa and other countries to study medicine and dentistry, the majority of whom do not return upon completion of their studies. This has contributed to the lack of qualified Basotho medical doctors and dentists. The few licensed professionals that are in the country are mostly expatriates, majority from other parts of Africa and majority of the dental assistants have no formal training and are therefore trained on the job (GoL, Lesotho Health Policy, 2011; MOHSW, 2009).

The high prevalence of HIV infection necessitates a greater need for more knowledgeable and competent oral health personnel to assist with appropriate diagnosis and treatment of oral lesions of HIV. On the other hand, there is also a severe shortage of OHCWs with just 20 dentists in public sector, 12 in the capital city of Maseru and 8 in the remaining 9 districts and of the 20, a mere three are native Basotho. Those in the districts have the responsibility of overseeing to the patients coming from the mountainous and rural communities of the country (Umunna et al. 2009). It is with this background that the present study set out to investigate the knowledge attitudes and practices of oral health care workers of Lesotho regarding the management of oral manifestations of HIV/AIDS.



#### **1.4 Significance of the study**

Dentists and OHCWs in general have been identified as being central in providing not only holistic treatment to patients but also in preventing on-going HIV disease transmission (McLean et al. 2012). The importance of OHCWs is that they are in the most ideal position to identify, diagnose, manage and treat HIV-associated oral lesions. Moreover, they have the responsibility, not only to themselves but also to their patients to be up-to-date with the evolving area of HIV/AIDS and related issues (McLean et al. 2012; Robinson, 2006).

The appropriate knowledge of the HIV disease process, its oral manifestations and modes of transmission is strongly associated with readiness to provide treatment to patients (McCarthy et al. 1995; Godin et al. 1999; Irigoyen et al. 1998). If OHCWs were skilled in this regard, they would be well positioned to diagnose and identify the signs and symptoms of oral manifestations of



HIV/AIDS at an early stage. They would also be able to prevent the spread of HIV infection as well as the progression and debilitating after effects of the disease if left untreated. In addition, they will refer patients for the initiation of HAART treatment, resulting in decreased morbidity and mortality and consequent improvement in quality of life of PLWHA.

A few studies on oral manifestations of HIV/AIDS have previously been conducted in Lesotho, however, they were conducted on Primary Health Care nurses and not on oral health workers (Walid et al. 2004; Prithiviraj, 2012). The high prevalence of HIV and its oral manifestations thereof warrants for all OHCWs in the country to be well-equipped with the appropriate knowledge and skills in the management of PLWHA. The present study sought to determine the knowledge, attitudes and practises of oral health care workers of Lesotho regarding the management of patients with oral manifestations of HIV/AIDS. The entire dental team were investigated including dentists, dental therapists, dental assistants, oral hygienists, dental nurses, dental technologists and nurse assistants.



## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter reviews the literature on the oral manifestations of HIV/AIDS vis-à-vis the types and prevalence of the lesions, knowledge of these lesions by dental as well and other cadres of health care professionals, the attitudes towards PLWHA in the dental setting and the recommended management of these lesions. The literature review was conducted using various scientific literature including abstracts, journal articles as well as books with the main focus on different dental health professionals under the umbrella name of ‘oral health care workers’.

The literature review was conducted in several stages using PubMed, Ebscohost, Medline, Google Scholar and other journal search engines. The key search terms included HIV and AIDS, oral manifestations, oral/dental health care workers. These terms were used in isolation and in varying combinations with each other, as well as with other subsidiary search terms, namely the management of oral lesions, knowledge, attitudes, willingness to treat and practices. The majority of the studies found were conducted on dentists and dental students while others focused on dental hygienists and dental therapists. Others included studies on caregivers and nurse practitioners.

### **2.2 Oral lesions associated with HIV/AIDS**

From the time HIV infection was first diagnosed, it has been recognized that the associated oral lesions are important clinical markers. This is more relevant in the developing countries where laboratory tests to determine disease progression such as the HIV viral load tests are not always easily accessible. It has been documented that presence of oral manifestations of HIV in persons who may otherwise appear healthy may be indicative of early clinical signs of infection. They may also predict the disease progression and may act as clinical markers for staging and classification of HIV (Chapple and Hamburger, 2002; Ramos-Gomez et al. 2000; Coogan et al. 2005).

Several studies have shown that oral manifestations of HIV/AIDS occur in as many as 70-90% of all HIV/AIDS cases in both children and adults and these conditions may be prevented or treated with regular dental care (Seacat et al. 2009; Kamiru and Naidoo, 2002; Patton et al. 2002; Ramos-Gomez, 2000; Arendorf et al. 1998). If they are left untreated, they may cause discomfort, dysfunction, and impact negatively on the oral health quality of life of an individual (Johnson et al. 2006; Yengopal and Naidoo, 2008).

Studies have also shown that people living with HIV/AIDS do not receive adequate oral care treatment and some of the identified barriers to care include financial problems, lack of confidentiality, socio-psychological factors such as prejudice and discrimination among dental health workers (Seacat et al. 2009; Kamiru and Naidoo, 2002; Patton et al. 2002).

Oral lesions associated with HIV have two main classifications, firstly according to the aetiology of lesions, which may be bacterial, viral, fungal or neoplastic in nature (Pindborg, 1989). The second classification is most widely used and was proposed in 1993 by EC Clearinghouse on Oral Problems Related to HIV Infections and WHO Collaborating Center on Oral Manifestations of HIV (Patton et al. 2002). The lesions were classified into three groups in relation to the degree of the association with HIV. They were classified in adults and children and categorized according to (I) lesions strongly associated with HIV, (II) lesions less commonly associated with HIV and (III) lesions seen in HIV infection.

This classification has however undergone a few changes since the introduction of highly active antiretroviral therapy (HAART) which has contributed significantly to the reduction in the prevalence of oral lesions of HIV (Eyeson et al. 2002; Hodgson et al. 2006a). The most common lesions in HIV/AIDS are oral candidiasis, oral hairy leukoplakia, periodontal diseases such as linear gingival erythema and necrotizing ulcerative gingivitis, Kaposi's sarcoma, recurrent aphthous ulcers and herpes simplex virus lesions. Kaposi's sarcoma is reported to be more common in Africa than in other regions (Bhayat et al. 2010; Ranganathan and Hemalatha, 2006; Reznik, 2005).

For the purpose of the present study, the focus was on the more common oral lesions associated with the HIV disease.

### **2.3 Impact of oral diseases on the quality of life**

Studies conducted on oral manifestations of HIV/AIDS have reported that in about 50% of HIV infections, oral lesions of HIV present as early signs of the disease (Lim et al. 2002). The presence of oral diseases lead to discomfort, dysfunction and disability and may be so debilitating to an individual's life to an extent of causing morbidity. It is therefore crucial that OHCWs take a holistic approach when treating patients presenting with oral lesions of HIV (Yengopal and Naidoo, 2008).

Yengopal and Naidoo (2007) found that PLWHA complain of physical pain and disability, functional limitations, psychological disability and discomfort. Almost 30% reported that their lives have been negatively affected due to the presence of these oral diseases (Yengopal and Naidoo, 2008).

## **2.4 Knowledge, attitudes and practices (KAP) of oral manifestations of HIV/AIDS**

Various studies have been conducted on KAP of oral manifestations of HIV/AIDS, not limited to oral health workers only but also to other cadres of health care professionals such as nurse practitioners, health caregivers as well as nursing and dental students (Rudolf and Ogunbodede, 1999; Walid et al. 2004; Gachigo and Naidoo, 2001; Malele-Kolisa, 2009; Mathebathe, 2006; Seacat et al. 2009; Irigoyen et al. 1998; Kitaura et al. 1997; Darling et al.1992). Some of these studies focused on knowledge and practices while others included attitudes.

### **2.4.1 Knowledge of oral manifestations of HIV**

Darling et al. (1992) conducted one of the first studies in South Africa to determine the knowledge and attitudes of dentists in caring for HIV infected patients. The study was conducted on 1000 randomly selected dentists from the Dentists' Register in South Africa. Questionnaires were mailed to the dentists and the response rate was 40.8% (n=408). Knowledge questions included routes of transmission, sources of knowledge, common oral manifestations encountered and cross-infection measures. The findings revealed that while participants were well acquainted with the routes of transmission, others (11%) thought HIV might be acquired through insect bites. Participants said oral lesions encountered more frequently on patients were candidiasis (76%), Kaposi's sarcoma (74%) and herpes infections (46%), all of which are strongly associated with HIV (EC-Clearinghouse, 1993).

They practised adequate infection control measures, however, 71% felt that the risk of HIV transmission in the clinic was very likely. The findings brought to the fore the dentists' reluctance and anxiety in providing dental care to PLWHA which was confirmed by the majority (82%) who stated that dentists with special training should treat such individuals. Recommendations made from the study were the provision of educational training on HIV/AIDS and infection control measures for the entire dental team.

Rudolf and Ogunbodede (1999) conducted a study on HIV infection and oral health care in South Africa. The aim was to determine the knowledge, attitude and practices of oral health care workers in public dental clinics in 9 provinces towards HIV/AIDS and the implementation of infection control measures. The sample population included dentists, dental therapists, oral hygienists and dental assistants. A total of 727 questionnaires were sent and the response rate was 38% (n=276). The questions were on knowledge of HIV/AIDS, infection control practices, continuing education and ethical and psychosocial issues. Participants named oral candidiasis and Kaposi's sarcoma among lesions commonly seen. However, 25% of the clinicians reported that they could not make a tentative diagnosis of some of the common oral HIV lesions. Some participants (12.8%) thought transmission was possible through mosquito bites while others (10%) were not certain about transmission modes. Only 61.2% were aware of their ethical obligation to treat PLWHA and the vast majority (85.9%) expressed the need for educational training in the form of seminars, workshops and discussions. Some of the limitations of the study were the low response rate which was attributed to the indirect methods used in distributing the questionnaires and the poor communication and infrastructures in some provinces.

A descriptive cross-sectional survey was conducted in Nairobi Kenya to assess the HIV/AIDS knowledge, attitudes and behaviour of Kenyan dentists. The sample included 145 randomly selected dentists from Nairobi Kenya and the response rate was 72% (n=105). The questions were on the knowledge of HIV/AIDS, infection control procedures, attitudes towards HIV/AIDS/ethical positions and sexual practice beliefs. The results indicated reasonable level of knowledge with regards to transmission routes, lesions strongly associated with HIV and adequate infection control measures. Approximately 94% and 91% correctly identified oral candidiasis and Kaposi's sarcoma respectively as lesions strongly associated with HIV. Nonetheless, almost half reported the risk of transmission in the dental clinic as high and they reported health care workers to be at a higher risk of HIV infection (60%). The study concluded that dentists need to improve in their compliance with the acceptable guidelines for infection control measures and further education regarding risks of transmission (Gachigo and Naidoo, 2001).

A cross-sectional survey was conducted in South Africa on a sample of 62 caregivers on knowledge, attitudes and practices regarding oral manifestations of HIV/AIDS. The study subjects were caregivers providing palliative care for HIV positive patients in non-governmental organisations and community-based organizations in Johannesburg, Gauteng. Participants were categorized into those who received oral health care training and those who did not. The response rate was 84% (n=52).

The questions were based on knowledge of common oral manifestations of HIV, beliefs and practices. The results demonstrated that the caregivers who received oral health care training had more knowledge, better attitudes and practices towards patients with oral diseases associated with HIV/AIDS than those without training. Furthermore, caregivers who did not have training in oral health care were less willing to provide care to patients citing reasons such as caring for a mouth of an HIV-infected patient proved to be an unpleasant and a difficult task to perform, moreover, they felt it posed higher risk of infection to them. The same group demonstrated appropriate practises for fewer oral health conditions as compared to the group that received training. The study recommended for the incorporating oral health care training into the programmes of all caregivers providing palliative care in the various institutions (Malele-Kolisa, 2009).

Mathebathe (2006) performed a cross-sectional study on knowledge, attitudes and practices of oral health practitioners of South Africa regarding HIV/AIDS. The study population included all oral hygienists (n=831) and dental therapists (n=329) (1160) registered with the Health Professions Council of South Africa at the time. The response rate was very low (27% n=318) with only 255 oral hygienists and 63 dental therapists who responded. The questions were based on general and oral health specific HIV/AIDS knowledge, attitudes towards PLWHA and infection control practises and ethical and legal issues. The results demonstrated that the respondents had sound knowledge of oral manifestations of HIV/AIDS including the modes of transmission and adequate infection control measures. However, there were some deficiencies identified with 10% of the OHCWs under the misconception that the virus could be acquired through a mosquito bite and 25% said through saliva. An alarming 73.8% felt that more infection control measures needed to be implemented when treating PLWHA in the dental clinic. The study concluded that there was a need for further education and training of oral hygienists and dental therapists in this regard. The low response rate was regarded as the main limitation of the study, which made it impossible to generalize the findings to the entire population.

Kitaura et al. (1997) investigated the knowledge of HIV/AIDS of Japanese dental health care workers (n=174), including dentists, dental nurses, dental students and dental hygienists. The study site was a university dental hospital and the response rate was 100%. The questions were on knowledge of HIV/AIDS such as modes of transmission, risk factors and methods of prevention and views on educational matters. Participants were further asked about their attitudes towards HIV-infected patients and practices on preventing HIV transmission in the dental clinic. Most participants (80.5%) felt their knowledge was more than average.

Nasir et al. (2008) conducted a cross-sectional study on knowledge of HIV/AIDS among 782 third, fourth and fifth year dental students attending private and public dental schools in Sudan. The purpose of the study was to assess HIV/AIDS knowledge, main sources of information and the need for further education of dental students. The response rate was 82% (n=642) and the results indicated that the main source of HIV/AIDS related information was from lectures (61%) and TV/radio (44%). Almost half of the students expressed the need for further education on HIV/AIDS with more emphasis on the management of PLWHA (84%), how patients present clinically (81%) and the recommended treatments (79%). An alarming 79.1% thought health workers were among the groups most at risk of getting HIV infection whereas groups such as truck drivers were considered to be at a much lower risk (35.9%). Students had overall good and accurate knowledge of modes of transmission of HIV-infection, however, deficiency in knowledge was observed more among public dental students than their private counterparts.

#### **2.4.2 Attitudes of OHCWs towards patients with oral manifestations of HIV**

There are only a few studies that have evaluated the attitudes of dentists in the provision of dental treatment to PLWHA (Irigoyen et al. 1998; Bennett et al. 1995; McCarthy et al. 1995). Studies that include attitudes often focus on willingness of dentists to provide treatment and factors relating to that. Others include factors such as motivators behind the intention to provide treatment, ethical responsibility, causes of fears and perceptions regarding occupational risk of transmission.

A national survey of Canadian dentists investigated factors associated with refusal to treat PLWHA. While 32% of the respondents had knowingly provided dental treatment to PLWHA, almost one fifth (16%) reported that they would refuse to treat patients with HIV. One of the reasons cited was that participants felt they did not have any ethical responsibility to do so. The study further found that participants less than 30 years of age were least likely to refuse to treat PLWHA and this finding was closely associated with their more formal and recent education on HIV. Moreover, they were more aware of their ethical responsibility towards the management of PLWHA as opposed to older dentists. Further important predictors associated with refusal to treat patients with HIV were lack of knowledge of oral manifestations associated with HIV/AIDS concerns related to safety, loss of patients from the practice and costs of infection control procedures.

Recommendations made from the study were the need for training in ethics, both in the undergraduate and postgraduate levels to restore that moral obligation and the responsibility to treat patients. Overall, dentists appeared to have a much more negative attitude towards treating other high-risk groups in comparison to PLWHA (McCarthy et al. 1999).

Godin et al. (1999) conducted a survey on understanding the intentions of a random sample of a thousand Quebec dentists to provide dental care to HIV/AIDS patients, using the theory of planned behaviour. According to this theory, intentions which may also be defined by attitudes, subjective social norms and perceptions represent the individual's motivation to adapt certain behaviour. Findings revealed that the willingness or unwillingness to treat PLWHA related to among others, fear or perception of risk of infection and extent of clinician's knowledge about HIV/AIDS, but overall there were positive attitudes and high intentions of dentists to provide dental care to PLWHA. In addition, dentists who felt they were morally obligated to treat patients regardless of the HIV status were less concerned about risks of infection and safety than those who disregarded this responsibility. Having previously treated PLWHA was identified as another factor related to the habit of providing dental care to PLWHA. A national survey conducted in 1991 on a random sample of a thousand dentists in the United States also provided interesting information. This was one of the few studies that focussed only on the attitudes of dentists towards the treatment of HIV-positive patients. Respondents demonstrated a high willingness to treat PLWHA (67%). However, 84% felt it was their right to decide whether to treat PLWHA in their dental clinics, implying that they felt no obligation to do so. Approximately 31% felt they would eventually contract HIV if they continued providing dental treatment to PLWHA and this fear was found to contribute significantly towards their job satisfaction. Almost half preferred to refer PLWHA and 31% were unaware of their ethical obligation to treat patients. Fear and stigma were found to be related to the responses (Bennett et al. 1995).

Irigoyen et al. (1998) conducted a study on Mexican City dentists on the factors associated with willingness to treat PLWHA. The findings also revealed high willingness to treat PLWHA (74%). Among factors identified as strongly associated with willingness to treat were the appropriate knowledge of the disease transmission, regular use of infection control measures and lack of fear of losing non-HIV infected patients. A national survey was conducted on a sample of 450 dentists in India assess factors associated with the refusal to treat HIV infected patients. It also assessed whether these discriminatory attitudes were related to lack of knowledge. The results showed that overall, 68.4% were willing to treat patients, majority of whom were employed in the public sector (53.8%).



Those who refused to treat PLWHA were not aware of their ethical obligation to do so, and felt the risk of cross-infection in the dental setting was high. It was also observed that they lack adequate knowledge to deal with PLWHA. Study recommended biomedical ethics courses for undergraduate and post-graduate level as well as further training on HIV/AIDS for dentists (Bodhade et al. 2013).

### **2.4.3 Types of oral lesions associated with HIV/AIDS and the recommended management**

#### **2.4.3.1 Oral Candidiasis (OC)**

Fungal infections are the most prevalent oral manifestations of HIV and often associated with the disease progression (Reichart et al. 2003; Agbelusi et al. 2005; Adedigba et al. 2008). It presents as removable white creamy plaques usually on the dorsum of the tongue and palatal mucosa. Four types are described; pseudomembranous candidiasis, also known as thrush, generally appears anywhere intra-orally as well as on the oropharynx. Angular cheilitis presents as red cracks on the corners of the lips and may be found unilaterally or bilaterally (Chapple and Hamburger, 2000; EC-Clearinghouse, 1993). Chronic hyperplastic candidiasis may appear as red or white and red adherent speckled lesion. In HIV infection, it may appear more on the buccal surface and has the potential to be malignant. Erythematous candidiasis is often found on the dorsum of the tongue and palatal mucosa in HIV infection. *Candida albicans* is the most common species responsible for oral candida, but *Candida dubliniensis* has been implicated in HIV (Chapple and Hamburger, 2000; EEC-Clearinghouse, 1993).

Oral candidiasis lesions may cause discomfort and requires management with topical and systemic antifungal treatment. Topical anti-fungals such nystatin, amphotericin and clotrimazole have been found to be ineffective due to resistance particularly on those patients with a low CD4 cell count. The recommended systemic antifungals are ketoconazole and fluconazole. Chlorhexidine mouth rinses have been found to be beneficial (Hodgson et al. 2006b; Barasch et al. 2004; Scully et al. 1991).

#### **2.4.3.2 Oral Hairy Leukoplakia (OHL)**

Oral Hairy Leukoplakia was first described in 1984 and is associated with the Epstein-Barr virus (EBV). It appears as a painless white corrugated lesion on the lateral borders of the tongue. It is classified as a lesion strongly associated with HIV, with the disease progression to AIDS and with low CD4 cell counts and high viral loads (Greenspan, 1997; Eyeson, 2002).

It is commonly found in HIV patients but can also be seen in patients that are HIV-negative who are severely immunocompromised. The lesion has been identified in both the developed and developing countries and is said to be more common in males than females (Chidzonga, 2003). It is a benign lesion and treatment is rarely indicated and in some cases has been reported to improve spontaneously. HAART therapy has decreased the prevalence of OHL (Chapple and Hamburger, 2000; Frezzini et al. 2005; Scully et al. 1991).

#### **2.4.3.3 Kaposi's Sarcoma (KS)**

Kaposi's sarcoma has been described as the most commonly occurring neoplasm of the oral cavity in PLWHA, and is frequently found in both male and females (Chidzonga, 2003; Ranganathan et al. 2000; Nichols et al. 1993), with many other oral lesions of HIV/AIDS, the prevalence of KS has also decreased due to the availability of HAART, however, it is still commonly found in the Sub-Saharan region (Chu et al. 2010; Johnson, 2010).

KS is often indicative of a lower CD4 cell counts, poor prognosis and high rates of mortality (Chu et al. 2010) and may also occur as a result of immune reconstitution inflammatory syndrome (IRIS), which occurs soon after a patient has been introduced to HAART therapy (Feller and Lemmer, 2008). It is commonly associated with Human Herpes virus-8 (HHV-8) and appears as multiple lesions on the palate and gingiva as red, purple or dark red, flat or nodular and may be pigmented. When present on gingival tissues, it may result in tooth mobility and bone destruction. Symptoms include pain, discomfort and difficulty in swallowing. Various treatment options are available (Chapple and Hamburger, 2000; Khammissa et al. 2012; Gnanasundaram, 2010).

#### **2.4.3.4 Herpes Simplex Virus (HSV)**

Patients living with HIV are at a higher risk of acquiring viral infections, which may present in a more severe and unusual manner and are often recurrent. The most common viruses in PLWHA are the HSV 1 and 2, Varicella zoster virus (VZV), cytomegalovirus (CMV), human papilloma virus (HPV), Epstein-Barr virus (EBV), Molluscum contagiosum virus 2 (MCV2) and human herpes virus 8 (HHV8) (Casilgia and Woo, 2000). HSV can appear in the oral cavity as primary or recurrent infections. The majority of people are introduced to the HSV-1, which is the more common of the two early on in life.

The typical presentation of the primary infection is small vesicles affecting the oral mucosal surface on keratinized tissues of the hard palate and the gingivae. Patient may be feverish, have a lymphadenopathy and painful small circular ulcers. In PLWHA, primary HSV is infrequent due to high prevalence of antibodies to HSV (Chapple and Hamburger, 2000). After HSV is reactivated from the latent trigeminal ganglia, the virus may lead to a more widespread mucocutaneous disease. In HIV infection, the ulceration can affect the whole oral mucosa and when the lips are involved, there may be crusting and bleeding. In HIV patients, these lesions may be prolonged and severe. Treatment is usually by oral acyclovir (Chapple and Hamburger, 2000).

#### **2.4.3.5 Recurrent aphthous ulcers**

Recurrent aphthous ulcers occur more frequently in PLWHA as compared to the rest of the population (Chapple and Hamburger, 2000) and affect the quality of life of these patients. This lesion is commonly found on the labial mucosa, buccal mucosa or the ventral surface of the tongue. Three major forms have been described; minor, which is the most common, major and herpetiform. The ulcers are characterised by white-yellow pseudomembrane and surrounded by an erythematous halo (Scully, 2006). Aetiology may be bacterial, viral, fungal or protozoal with viral being the most common cause. HIV-associated aphthous ulcerations are more frequent, have a longer duration and are more painful. Pain may also be triggered by consumption of spicy and salty or acidic foods. Severity is an indication of low CD4 cell count and a marker for disease progression. Treatment is usually by topical steroids systemic corticosteroids or thalidomine (Chapple and Hamburger, 2000). The use of chlorhexidine gluconate has been found to reduce the severity of an episode but not the incidence of the ulcers (Porter and Scully, 2005).

#### **2.4.3.6 Periodontal diseases**

There are several types of periodontal diseases associated with the HIV infection. Linear gingival erythema (LGE) affects the gingival tissues and presents as a red band along the margin of the gingivae. Aetiology is thought to be associated with candida and a decreased CD4 cell count. Acute necrotising ulcerative gingivitis (ANUG) can be seen in immunosuppressed individuals. *Treponema vincentii* and *Fusobacterium nucleatum* are causative agents. Patients complain of ulcers and excruciating pain associated with necrosis of the soft tissues of the mouth. Pain from the interdental papillae and the marginal gingivae are common (Coogan et al. 2005; Nokta, 2008).

Acute necrotising ulcerative periodontitis (ANUP) is a severe form of ANUG and involves the hard tissues of the mouth such as the underlying bone. It causes the destruction of alveolar bone and the periodontal ligament resulting in mobile teeth. It is an indication of severe immunosuppression in HIV infected individuals. Treatment is metronidazole and root surface debridement. Acute necrotising stomatitis (ANS) is more aggressive than ANUP because it causes an ulceration of the gingivae and leads to necrosis of underlying bone and to loss of vitality. If the patient being treated is reasonably fit to take general anaesthetic with no difficulties then an excision of the involved area is done and surgical packing of the defect can be an option (Coogan et al. 2005; Nokta, 2008).

Chronic adult periodontitis (CAP) is very common in HIV positive patients and is characterised by loss of attachment leading to tooth mobility. Treatment for mild cases can be carried out in general dental practice, and but more complicated cases may require specialised treatment (Nokta, 2008). Treatment and management is by local debridement and metronidazole, analgesics and antibiotics, the removal of plaque, calculus and necrotic tissues. The use of a mouth rinse such as chlorhexidine gluconate twice daily has also been found to be effective in the reduction of gingival erythema, bleeding and pocket depths. The patient needs to maintain good oral health and make regular check-ups with the dentist (Hodgson et al. 2006b). Xerostomia or dry mouth is a common finding in PLWHA and is a side-effect of some antiviral drugs (Diz-Dios et al. 1999). Dry mouth is often the cause of higher levels of dental caries in PLWHA (Sjamsodin et al. 1996). Xerostomia has negative impact on the quality of life of the patient because it causes pain in the mouth, difficulty in tasting and swallowing food. Xerostomia may be managed with saliva substitutes such as Oral balance and secretory stimulants. Patients may also be advised to regularly sip water, chew sugar free gum and use lubricating agents (Greenspan et al. 1992; Frezzini et al. 2005).

## **2.5 Training needs for improved knowledge, attitudes and practises in the management of oral lesions of HIV**

Knowledge of HIV/AIDS is an important factor in the willingness of oral health workers to treat patients with HIV/AIDS and stigma and discrimination persists where there is a lack of knowledge (Bennett et al. 1995). Therefore, there is a need to provide education and promotion programmes to health workers and the population in general. While education, information and communication campaigns may influence one's knowledge on certain issues, it does not always lead to changes in behaviour.

Some of the contributory factors, which have been identified as possible barriers preventing people from behaving according to their knowledge, include their attitudes and values. This has led to the development of many approaches to further understand the factors associated with the inconsistencies between knowledge and behaviour (Hausmann-Muela and Muela Ribera, 2003).

Education regarding HIV/AIDS and appropriate training play a fundamental role in the OHCWs willingness to treat PLWHA, boosts their confidence and makes them more comfortable to manage patients. Education has the ability to dispel any uncertainties pertaining to the disease transmission, fears of contracting HIV and essentially the professional consequences of contracting HIV (McCarthy et al. 1995; Lewis et al. 2000).

Training needs were identified in several areas among United Kingdom dentists. Though the response rate was low, 50% of the participants revealed that they were uncertain of their clinical skills to manage PLWHA and less than a third were confident in recognizing and diagnosing oral lesions of HIV. Some of the training needs identified were HIV information update, recognition and management of oral HIV lesions, communication skills training to address HIV related problems and occupational risk. Lewis and colleagues held a 2-day HIV/AIDS education and communication skills training course for dental hospital consultants in two London teaching hospitals with the aim of raising awareness about HIV/AIDS. The course was found to have increased knowledge of oral lesions of HIV and the management thereof. Additionally, participants were less anxious about treating PLWHA and showed improvements in infection control procedures (Lewis et al. 2000). Mulligan et al. (2006) utilised pre/post-test methodology to determine the effects of HIV/AIDS educational program on KAP of dental professionals and found that when dental care providers were given additional information regarding HIV/AIDS such as routes of transmission and universal precautions, there was an improvement on their attitudes and behaviour towards people living with HIV/AIDS.

Kuthy et al. (2007) conducted a survey to analyse the perceptions of dental students in the management of selected special group patients (HIV-infected and vulnerable groups) post community based assignments and found that knowledge gained through previous experiences of treating PLWHA and other vulnerable groups resulted in improved attitudes and more enthusiasm to treat such patients.

## **2.6 The role of OHCWs in the treatment and prevention of HIV transmission**

The oral cavity is the gateway to the digestive system. It is an integral part of general health and is often the first site of opportunistic infections when the immune system is immunocompromised. In PLWHA, malnutrition can exacerbate the already compromised immune system thereby reducing the survival rate of PLWHA. Moreover, oral manifestations of HIV/AIDS are considered a considerable impediment to improved health (Hodgson et al. 2006a; Baylor College of Medicine, 2001, Petersen, 2006). The World Health Organization has emphasised the importance of oral health care professionals in the prevention and treatment of HIV-related symptoms for PLWHA

Furthermore, the oral cavity is an important environment for early detection of HIV/AIDS as most lesions associated with HIV infection present in the mouth during the first stages of the disease. In cases where PLWHA are not on treatment, oral lesions may occur as an indication of disease progression (Seacat et al. 2009; Kamiru and Naidoo, 2002; Patton et al. 2002).

The WHO Oral Health Programme, which is one of the technical programmes within the chronic disease prevention and health promotion programmes, aims to prevent HIV/AIDS related oral lesions on a global scale through the development of policies for disease prevention and oral health promotion. Some of the initiative suggested by the programme focused on identifying lesions most likely to be associated with HIV/AIDS, the training of other cadres of health care professionals to screen for these lesions and the effective use of communication to provide information on the disease prevention (Petersen, 2006).

Delayed diagnosis of HIV is said to be one of the greatest challenges of the HIV epidemic and is associated with dire consequences including higher risk of progression to AIDS and significant morbidity and mortality. Oral health care workers are among the health care professionals identified as being more likely to be the first to encounter HIV-infected patients, which require that they are familiar with common HIV-associated lesions in order to diagnose and manage patients appropriately (Campo et al. 2012).

Some authors have specified the various roles of OHCWs including providing routine dental care, practising appropriate infection control measures to curb the spread of HIV and providing education about HIV/AIDS (WHO, 2007; Hodgson, 2006b; Coogan et al. 2005; Petersen, 2006). In addition, when oral lesions associated with HIV are diagnosed early, it improves the prognosis and reduces disease transmission (McLean et al. 2012; Robinson, 2006).

It has also been identified that while regular dental care of PLWHA may not necessarily have an effect on systemic AIDS-related symptoms and complications, it may result in better oral health outcomes. This is significant because poorly managed oral health and HIV-associated oral lesions are debilitating and results in poor oral health quality of life. Regular oral health care in PLWHA can result in reduction in the mean periodontal pocket depth, gingival erythema index as well as the rate of dental caries (Brown et al. 2002).

The literature shows that while OHCWs often feel that it is their responsibility to care for PLWHA (Kaste and Bednarshe, 2007), some perceive themselves as being at high risk of contracting the disease from patients, which results in reluctance to provide treatment to PLWHA.

## **2.7 Summary of the literature review**

It is evident from the findings of the literature review that prevalence of HIV associated lesions is high and the presence of these lesions is debilitating and has a negative impact on the quality of life. OHCWs have been identified as the healthcare professionals most likely to be the first to encounter these lesions in patients, hence it is pertinent that they are well up-to-date with knowledge of HIV for provision of effective management. While the literature review conducted was not solely on OHCWs, it highlighted significant factors such as the deficiencies in the knowledge of oral lesions associated with HIV by health care workers, a finding which has led to many authors recommending further training in this regard. It also exposed some of the key dynamics associated with the willingness to treat PLWHA and the importance of OHCWs to be cognisant of their moral obligation to treat patients in an indiscriminative manner regardless of their HIV status.

## **CHAPTER 3: AIM AND OBJECTIVES**

### **3.1 AIM**

To determine the knowledge, attitudes and behaviour of oral health care workers in Lesotho regarding the management of patients presenting with oral manifestations of HIV/AIDS.

### **3.2 OBJECTIVES**

To determine

- Oral health care workers knowledge of oral manifestations of HIV/AIDS
- The attitudes of oral health care workers towards treating patients with oral lesions associated with HIV/AIDS
- The behavioural practises towards the management of patients presenting with oral manifestations of HIV/AIDS





## CHAPTER 4: MATERIALS AND METHODS

### 4.1 Introduction

This chapter outlines the background of KAP surveys, the methodology used including the study design, population and study sites. It also provides information regarding the formulation of the questionnaire, the pilot study and the actual data collection and analyses thereof. Knowledge, attitudes and behaviour/practice (KAP) surveys are a common form of cross-sectional studies used to measure changes in human knowledge, attitudes and practices in response to a specific intervention. KAP studies determine what people know about certain topics, how they feel, and how they behave in relation to their knowledge. Such studies function as educational diagnosis of a specific community regarding a topic and are useful in creating awareness and finding solutions. Advantages of KAP surveys include ease of study design, interpretation and a concise display of results and generalizability. Moreover, KAP surveys have the ability to reveal individuals' ideas regarding the topic of discussion. Some shortfalls of KAP studies are the inability to reveal new problems and to deepen the understanding of the problem because of the use of fewer open-ended questions. In essence, the study may reveal what is said by the participants but not necessarily, what is being done (Kaliyaperumal, 2004; Launiala, 2009).

- **Knowledge** refers to the knowledge and understanding of the study sample regarding the issue being discussed viz. oral manifestations of HIV/AIDS by oral health workers. The extent of knowledge evaluated by a KAP survey is useful in tracing areas where information and education efforts need to be introduced or re-enforced.
- **Attitude** refers to study sample's feelings and any preconceived ideas about the topic at hand, in this case the oral health workers' feelings and any conceptualized ideas towards providing treatment for patients with oral manifestations of HIV/AIDS. Attitudes, which may be positive or negative, are heavily influenced by the individual's knowledge, beliefs, values or emotions. The challenge with attitudes is that they are not easily measurable, hence the need to assess them which is one method of obtaining insight related to the behavior of individuals.
- **Practice** denotes the ways in which individuals respond through their actions. In the context of the present study, oral health care workers may demonstrate their practices through their actions by way of treatment and management (Kaliyaperumal, 2004)

## 4.2 Study design

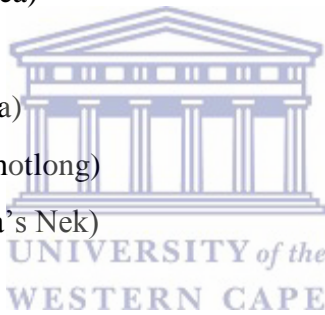
The study design used was a descriptive cross-sectional survey.

## 4.3 Study sites

There were 26 sites visited, 20 provided services to the public and six were private practices. Study sites were in all the 10 districts of Lesotho and the district hospitals (n=10), satellite filter clinics (n=3), health centre (n=1), missionary hospitals (n=5), military hospitals (n=1) and private practises (n=6) all of which offer dental services.

### District government hospitals

- Queen 'Mamohato Memorial Hospital (referral hospital Maseru)
- Berea Hospital (Berea)
- Teyateyaneng Hospital (Berea)
- Motebang Hospital (Leribe)
- Butha-Buthe Hospital (Berea)
- Mokhotlong Hospital (Mokhotlong)
- Machabeng Hospital (Qacha's Nek)
- Quthing Hospital (Quthing)
- Mafeteng Hospital (Mafeteng)
- Ntšekhe Hospital (Mohale's Hoek)



### Satellite filter clinics (All in Maseru)

- Likotsi filter clinic,
- Mabote filter clinic
- Qoaling filter clinic.

### Christian Health Association of Lesotho Hospitals

- Maluti Seventh Day Adventist Hospital (Berea)
- Seboche Mission Hospital (Butha-Buthe)
- St Joseph Mission Hospital (Roma, Maseru)
- Morija Scott Hospital (Maseru)
- Paray Mission Hospital (Thaba-Tseka)

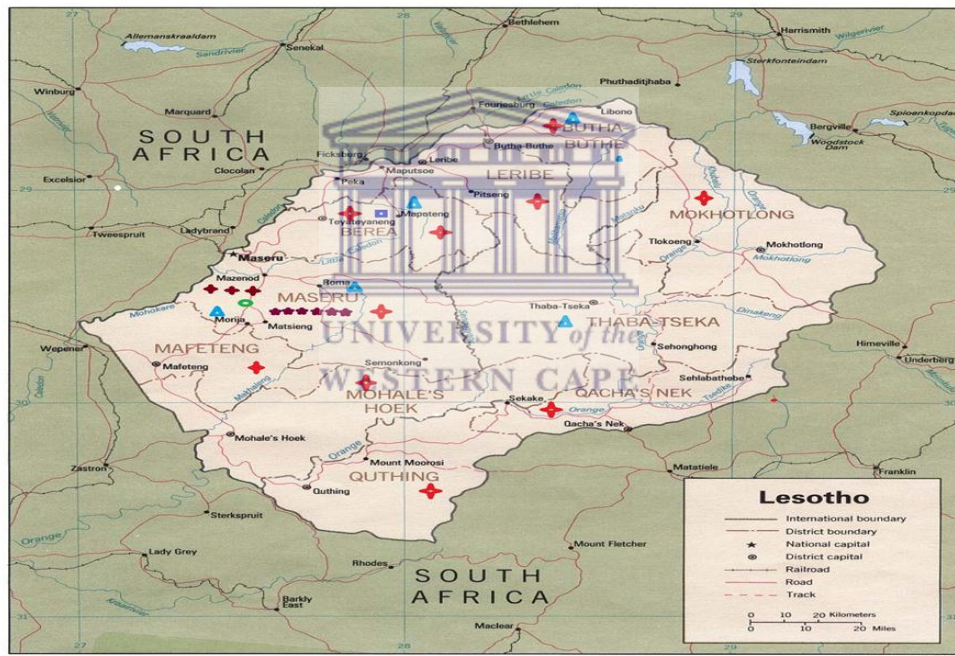
## Health centre

- Center for Equal Health Access Lesotho (CEHAL, Teyateyaneng Berea)

## Military hospital

- Makoanyane Hospital (Maseru)
- All the six private practises were in Maseru

**Map 2: All facilities included in the study sites**



- |   |   |
|---|---|
| + | - District government hospital                      |
| + | - Satellite filter clinics                          |
| ▲ | - Christian Health Association of Lesotho Hospitals |
| ★ | - Private practices                                 |
| ● | - Military Hospital                                 |
| ■ | - Health centre                                     |

#### **4.4 Study population**

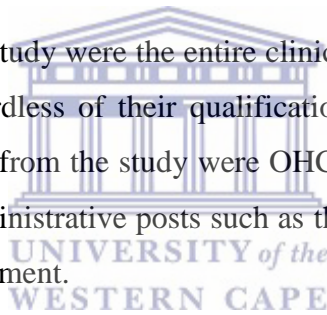
The study population included all oral health care workers (OHCWs) in Lesotho at the time of the study, in both public and private sectors.

#### **4.5 Study sample**

Forty six oral health care workers (46) including dentists (n=26), dental therapists (n=4), oral hygienists (n=1), dental assistants (n=10), nurse assistants (n=3) and dental technologists (n=1) all trained to perform dental work.

#### **4.6 Inclusion and exclusion criteria**

Study participants included in the study were the entire clinic based OHCWs of Lesotho engaging in patient management daily regardless of their qualifications and the sector they practice (i.e. public or private). Those excluded from the study were OHCWs who do not engage with patients daily, viz. those that are in the administrative posts such as the health headquarters at the Ministry of Health in the Oral Health Department.



#### **4.7 Development of the questionnaire**

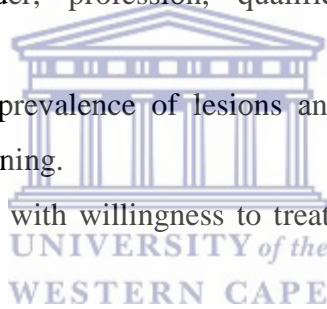
The instrument used for the study was a structured self-administered questionnaire written in simple English language since all of the OHCWs have basic understanding of the language. The questionnaire consisted of closed and open ended questions and unlabelled images of common oral manifestations of HIV/AIDS. The images were printed in colour on a separate laminated A0 paper (Appendix 3). The initial development of the questionnaire took place in November 2011. The guidelines used were obtained from previous KAP of oral manifestation of HIV/AIDS studies following an extensive review of the literature. It was borne in mind what was to be attained by the questionnaire, and the questions were formulated as such. Visual aid was used to accompany the questions on the knowledge section. The data collected was on the following information: demographics, knowledge, attitudes and practices (Appendix 2).

## 4.8 Pilot study

A pilot study was conducted to test the feasibility of the study and the questionnaire, the time it would take to complete the questionnaire, clarity and the ease of understanding of the questions. The study was piloted on a small sample of five dentists working at the University of the Western Cape Tygerberg Oral Health Centre. Participants of the pilot study were not included in the study sample.

Following the pilot study, the questionnaire was refined and minor adjustments were made with regards to clarity of some questions, which were ambiguous, while others were rephrased for better understanding. Some of the images were replaced with clearer ones for more precise diagnosis. The questionnaire (Appendix 2) was refined as needed and the final questionnaire included 18 questions and seven images. The final questionnaire included the following:

- A. Demographics- age, gender, profession, qualifications, years of experience and employment sector
- B. Knowledge- to determine prevalence of lesions and adequate diagnosis and perceived knowledge and need for training.
- C. Attitude- factors associated with willingness to treat patients, perceived risk of infection and referral patterns
- D. Practices- perceived confidence in treating patients management practises used by OHCWs



## 4.9 Data collection

Data was collected in July 2012 for a period of 2 weeks and. All potential participants were identified by approaching management of the respective health care institutions. Forty-six (n=46) OHCWs consented for participation in the study. Upon signing the consent form (Appendix 1) questionnaires were administered to the participants. The questionnaire (Appendix 2) developed for the study had four sections and consisted of 18 questions. Section A was on socio-demographic information, Section B on knowledge regarding oral manifestations of HIV. Section C elicited information on attitudes concerning the management of PLWHA and Section D consisted of questions on behavioural practices on the subject of oral manifestations of HIV/AIDS. Section A consisted of independent variables such as age, sex, qualification, years of experience as OHCW, employment status, and employment sector.

## **Knowledge of oral lesions associated with HIV**

Most questions are related to the identification of oral lesions and description thereof. Visual references used were unlabelled images of common oral lesions associated with HIV/AIDS. Furthermore, participants were questioned on the different sources of their knowledge and education regarding these oral conditions.

## **Attitudes towards the management of patients presenting with oral lesions of HIV**

Questions in this section are related to the willingness of OHCWs to treat PLWHA, how they feel about treating them, their thoughts about referring such patients and if they felt they needed to be treated differently from patients that are not HIV-infected.

## **Behavioural practises in the management of patients with oral lesions of HIV**

Section D included questions that have to do with behavioural practices such as instructions given to patients when they present with different oral conditions such as toothache, bleeding gums and oral ulcers.



### **4.10 Validity and Reliability**

Although many studies on knowledge, attitudes and practises have been conducted, there are no specific standardized questionnaires that can be used for data collection. In most cases, researchers used extrapolated questionnaires that suit their study. To ensure validity of the present study, the questionnaire was reviewed by the supervisor and modified according to the feedback acquired. An experienced statistician was involved for data analysis and interpretation. Moreover, the questionnaire was piloted on five dentists and questions refined as needed. To ensure reliability, all questionnaires were self-administered by the researcher thereby ensuring standardization of data collection method.

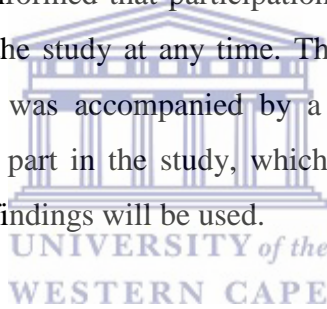
### **4.11 Data Analysis**

Data was captured using Microsoft Excel spread sheet before being imported into the R Statistical Package. In the statistical evaluation, frequency distributions and means were generated.

Regression analysis was used to analyse the relationship between continuous variables while the relationship between nominal variable was investigated using contingency tables (2x2) and chi-squared tests. In addition, Fisher's exact test was applied to each of the 2x2 contingency tables on dependant and independent variables. To identify associate variables, a significance level of 5% ( $p < 0.05$ ) was used.

#### **4.12 Ethical Considerations**

Ethical approval (Appendix 4-5) was obtained from the University of the Western Cape Senate Research Ethics Committee (Ref No.12/1/18). The study was also approved by the Research and Ethics Committee of the Ministry of Health and Social Welfare, Planning and Development Unit of Lesotho. Heads of institutions were requested for permission for the study to be conducted at their facilities. Participants were informed that participation was anonymous, voluntary and that they were free to withdraw from the study at any time. They were also assured of privacy and confidentiality. The questionnaire was accompanied by a consent form (Appendix 1), which participants signed prior to taking part in the study, which entailed detailed explanation of the intention of the study and how the findings will be used.



## CHAPTER 5: RESULTS

### 5.1 Introduction

The results presented below were obtained from the survey on oral health care workers (OHCWs) working in 26 public and private facilities that provide oral health care services in Lesotho. The study data was analysed using Microsoft Excel® and the R statistical package. The results are presented using frequency tables, bar graphs and pie charts. Frequency counts differ for some questions due to the presence of non-respondents.

### 5.2 Response Rate

The sample consisted of all the oral health care workers working in Lesotho at the time of the study. There was a 100% response rate (n=46).



### 5.3 Demography

The majority (58.0%) was male. The age range was between 25 and 73 years with the mean age of 41 years. Nearly two thirds (58.0%) were dentists. The number of years of experience ranged from 2 to 45 years (mean 13.5 years). Just over three quarters (77.8%) worked in the public sector and nearly all (97.8%) worked full-time (Table 1).

### 5.4 Knowledge

Nearly all (94.7%) agreed that oral lesions are common in PLWHA and listed oral candidiasis (91.3%) as the most common oral manifestation and oral hairy leukoplakia as the least common oral lesion in HIV (32.6%) (Table 2). Oral candidiasis was correctly identified by most respondents (97.8%), angular cheilitis by 86.9% and herpes zoster by 80.4%. Just over half (52.1%) of respondents correctly identified Kaposi's sarcoma (Table 3).



Less than a fifth of the respondents felt that they had a comprehensive knowledge of the oral manifestations of HIV while almost half of the participants said they had average knowledge of oral HIV (Figure 1).

**Table 1: Demographic data**

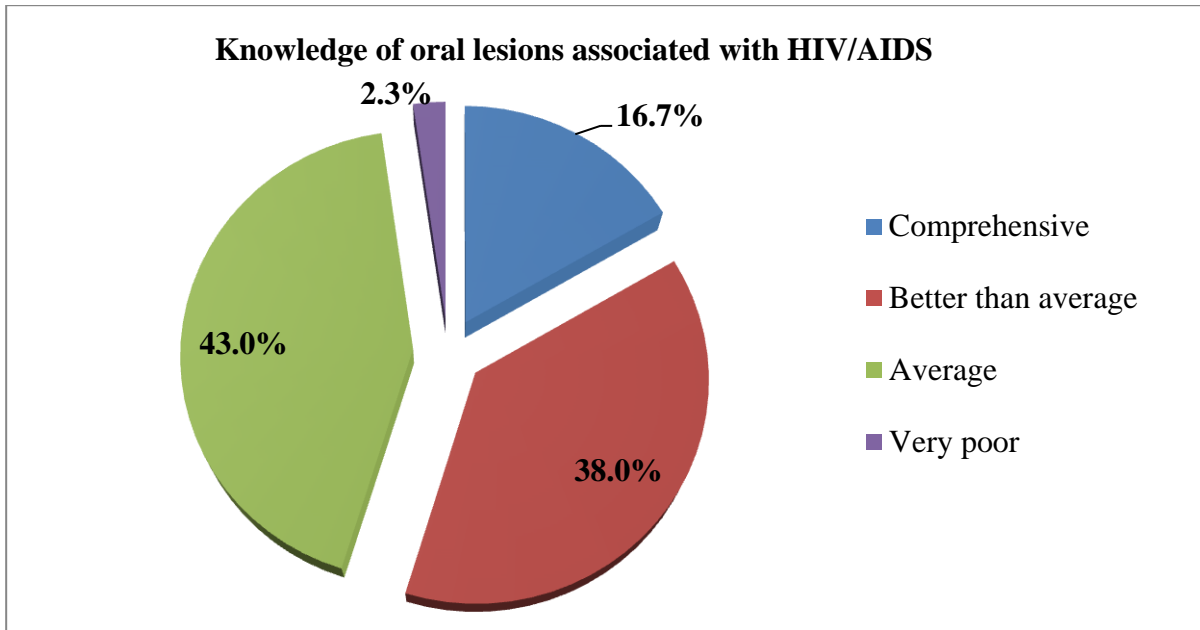
	<b>Variable</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
<b>Age (years)</b> (n=43)	21-20	7	16.2
	31-40	16	37.2
	41-50	14	32.6
	>50	6	14.0
<b>Gender</b> (n=45)	Male	26	58.0
	Female	19	42.0
<b>Profession</b> (n=45)	Dentist	26	58.0
	Dental therapist	4	8.8
	Oral hygienist	1	2.2
	Dental assistant	10	22.2
	Dental technologist	1	2.2
	Nurse assistant	3	6.6
<b>Years of experience as OHCW</b> (n=45)	1-10	20	44.4
	11-20	18	40.0
	>20	7	15.6
<b>Employment sector</b> (n=45)	Public	35	77.8
	Private	10	22.2
<b>Employment status</b> (n=45)	Full-time	44	97.8
	Part-time	1	2.2

**Table 2: Common oral lesions associated with HIV**

<b>Common oral lesions</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Oral candidiasis	42	91.3
Herpes infections	18	39.1
Kaposi's sarcoma	16	34.7
Oral hairy leukoplakia	15	32.6
Periodontal infections	19	41.3
Aphthous ulcerations	16	34.7
Other	20	43.4

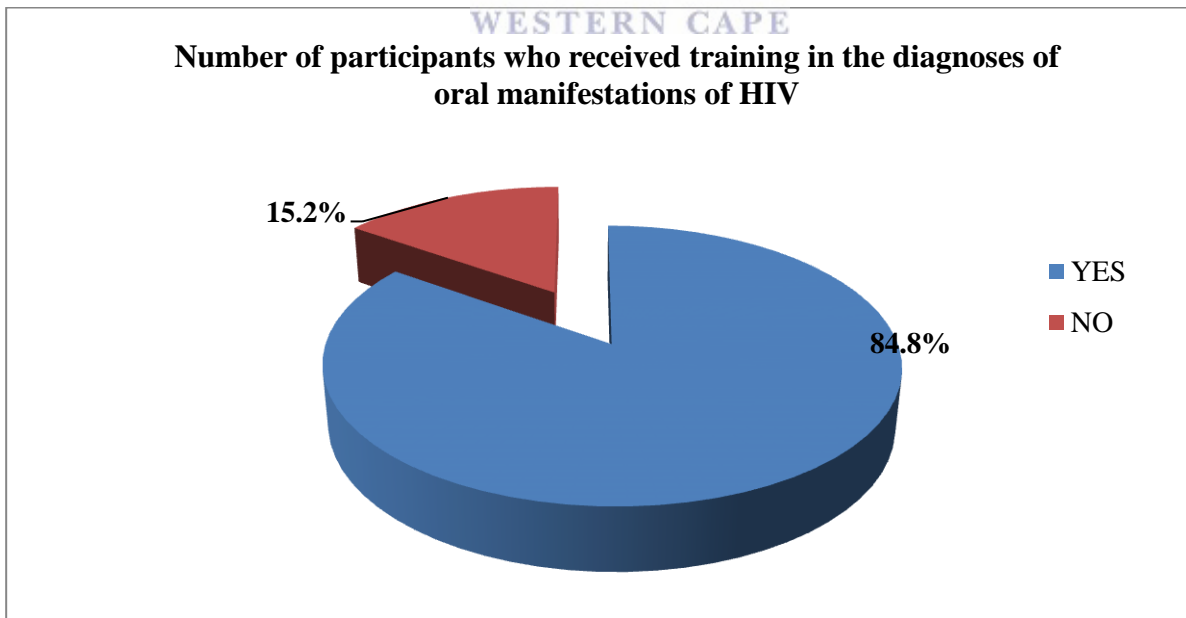
**Table 3: Number of participants who correctly identified the lesions**

<b>Oral lesions</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Image 1. Oral candidiasis	45	97.8
Image 7. Angular cheilitis	40	86.9
Image 6. Herpes zoster	37	80.4
Image 3. Oral ulcerations	33	71.7
Image 4. Major aphthous ulcer	29	63.0
Image 2. Oral hairy leukoplakia	27	58.6
Image 5. Kaposi's sarcoma	24	52.1



**Figure 1: Distribution of OHCWs by knowledge of oral lesions associated with HIV**

Eighty five per cent (n=39) reported having received training in the diagnosis of oral lesions associated with HIV - the majority while they were at dental school. Training was mainly from the attendance of workshops (Figure 3). Despite this, nearly all respondents (91.1%) said they felt they still require further training in understanding the oral manifestations of HIV.



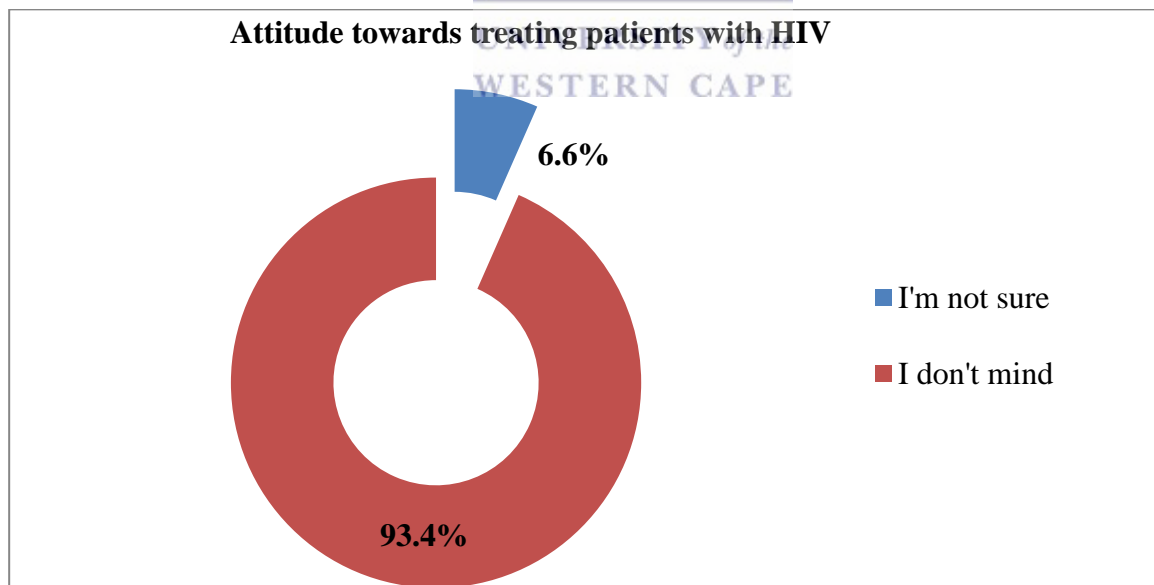
**Figure 2: Distribution of OHCWs by training in the diagnosis of oral HIV**

**Table 4: Sources of training in the diagnosis and management of oral manifestations of HIV**

Source (n= 39)	Frequency (n)	Percentage (%)
Dental school	14	36.0
Workshop	9	23.0
Course	6	15.3
Other	6	15.3
Dental school/CPD seminar/course	3	7.7
CPD seminar	1	2.6

### 5.5 Attitudes

Almost all participants (93.4%) said they did not mind treating PLWHA, but 6.6% said they were not sure.



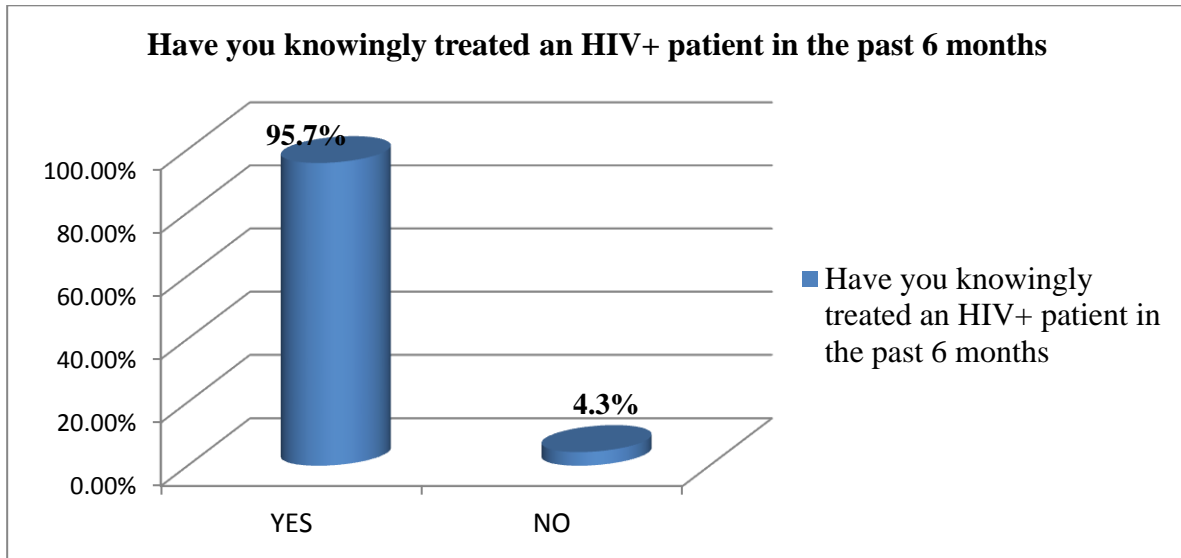
**Figure 3: Distribution of OHCWs by willingness to treat HIV+ patients**

The majority (95.7%) felt that patients who are HIV positive should be referred for dental treatment and more than half the participants (57.0%, n=25) said referrals should be to public dental clinics. More than two thirds (71.0% n= 32) reported that it was not necessary to treat PLWHA differently from HIV negative patients (Table 5).

**Table 5: Referral patterns and reasons for treating HIV+ patients differently from HIV- patients**

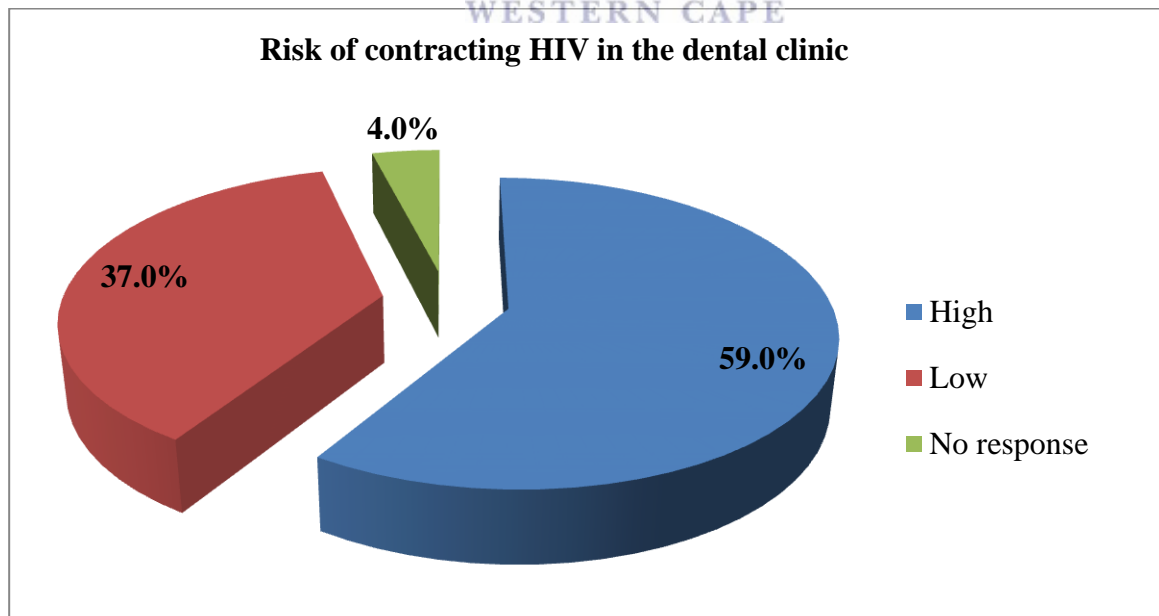
Question	Response	
	Frequency (n)	Percent (%)
<b><i>1. Should patients with HIV be referred?</i></b>		
YES	44	95.7
NO	2	4.3
<b><i>If YES, where should they be referred to?</i></b>		
	<b>(n=44)</b>	<b>(%)</b>
Public dental clinics	25	57.0
Dedicated HIV clinics	11	25.0
Dedicated HIV clinics/ public dental clinics	2	4.5
Public dental clinics/ private dental clinics	2	4.5
Other	2	4.5
No response	2	4.5
<b><i>2. Should HIV+ patients be treated differently from HIV- patients?</i></b>		
	<b>(n=46)</b>	<b>(%)</b>
YES	13	29.0
NO	32	71.0
<b><i>If YES , please give reasons</i></b>		
	<b>(n=13)</b>	<b>(%)</b>
Due to their immunocompromised state	3	23.0
Due to their compromised immunity and drugs prescribed	1	7.7
For holistic treatment	1	7.7
Other	8	61.6

Almost all participants (95.7%) reported having knowingly treated an HIV positive patient in the past 6 months (Figure 4).



**Figure 4: Percentage distributions of OHCWs who have knowingly treated HIV+ patients**

Nearly two thirds (59.0%) perceived the risk of contracting HIV in the dental clinic to be high (Figure 5).



**Figure 5: Distribution of OHCWs by risk of contracting HIV in the dental clinic**

## 5.6 Behavioural practices

Approximately two thirds (63.0%) reported that they felt very confident when it comes to the management of dental patients with HIV/AIDS (Figure 6).

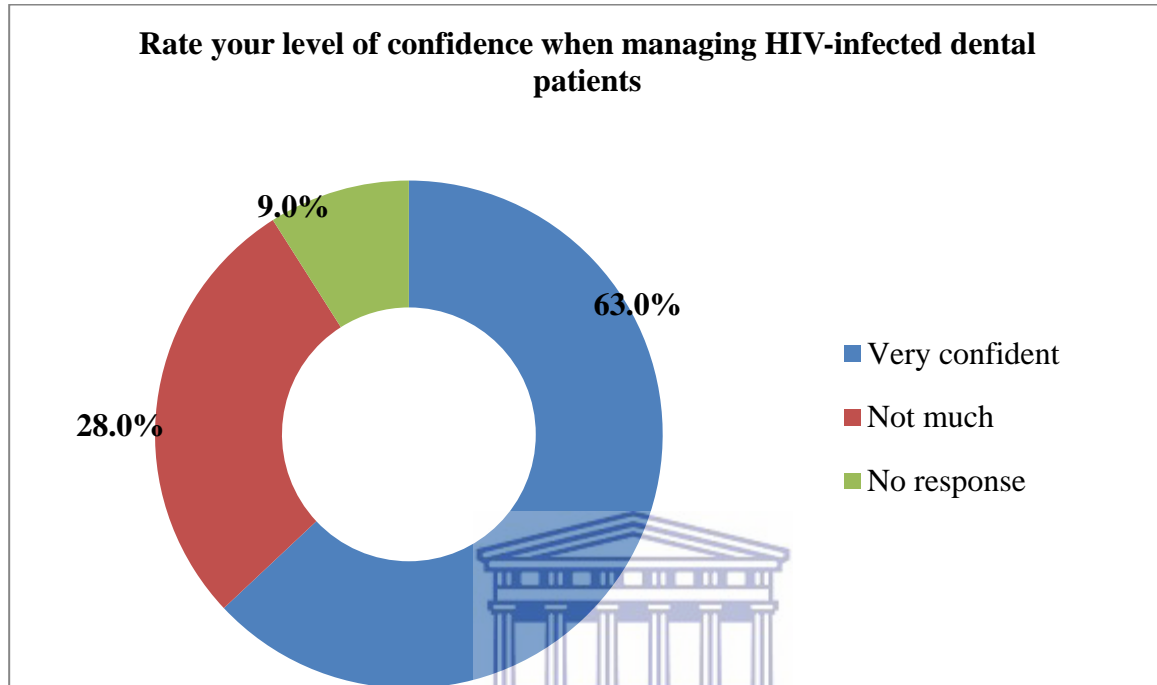


Figure 6: Distribution of OHCWs by level of confidence when treating HIV+ patients

The majority of the respondents reported that they would give the same treatment and/or advise to both HIV+ and HIV- patients (70.0%, n= 32). Almost all (90.7% n=39) said they gave the same treatment for patients with dry mouth (Figure 7, Table 6).

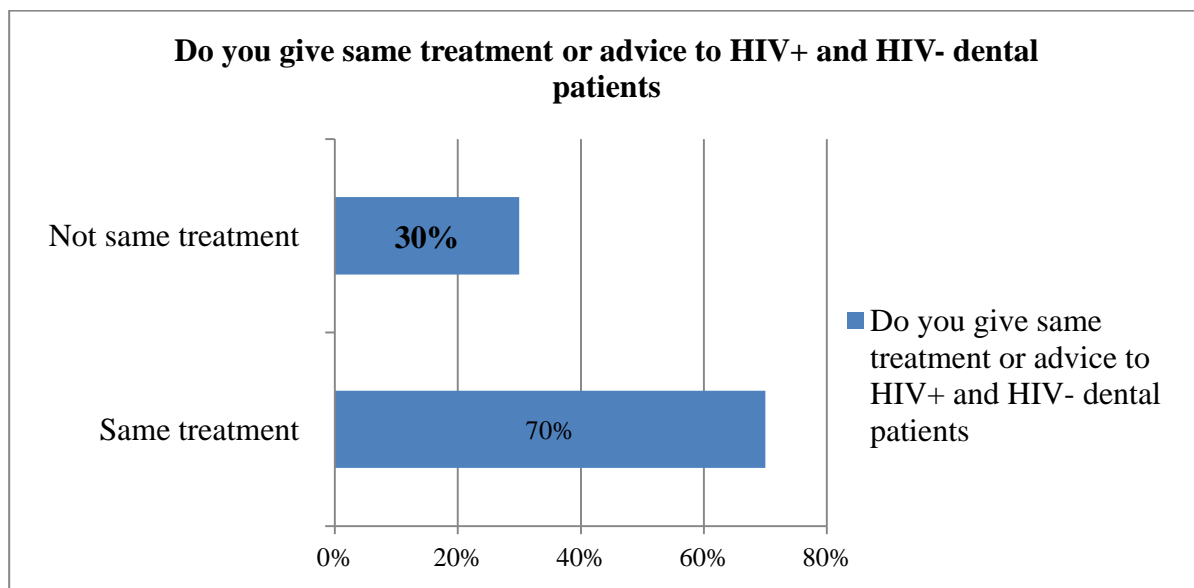


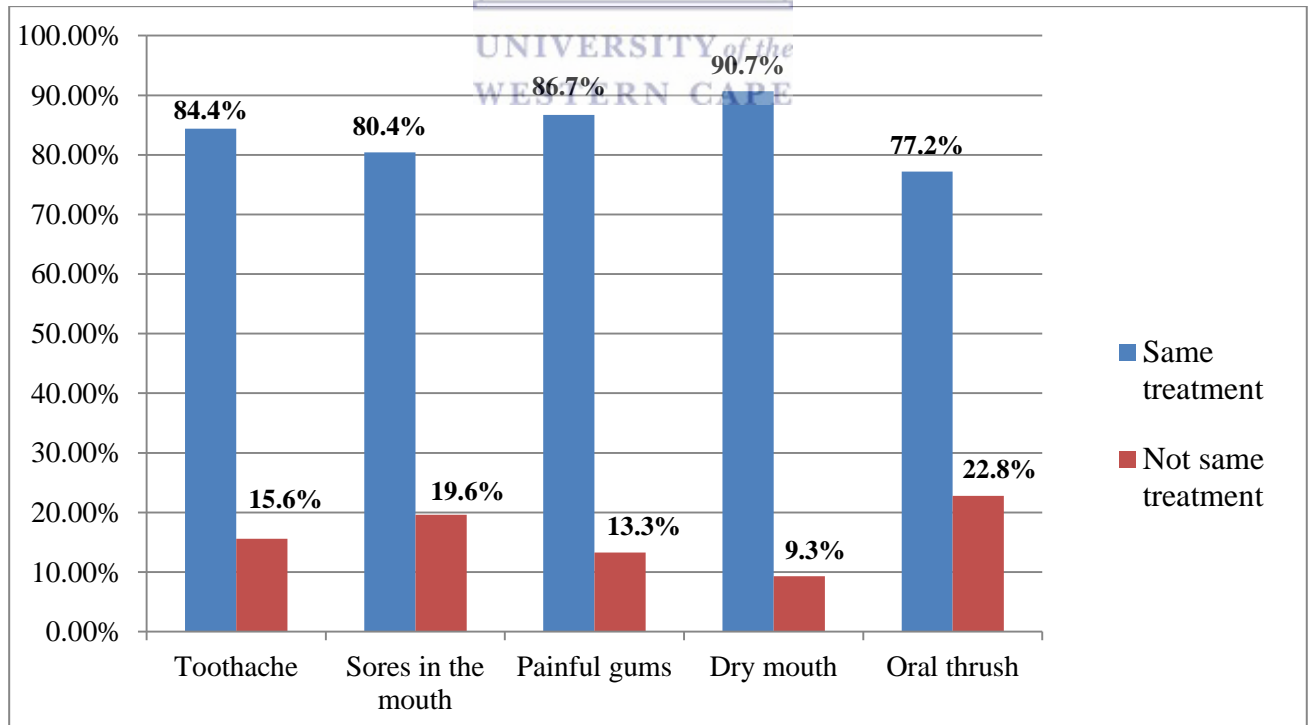
Figure 7: Distribution of OHCWs by treatment of HIV+ and HIV- dental patient

Most respondents did not treat HIV+ patients any differently from HIV- dental patients with more than two thirds giving the same treatment for any dental condition.

**Table 6: Treatment advice given to HIV+/HIV- patients presenting with the same conditions**

Variable	Same treatment(n)	Percentage (%)	Not same treatment (n)	Percentage (%)
Toothache	38	84.4	7	15.6
Sores in the mouth	37	80.4	9	19.6
Painful gums	39	86.7	6	13.3
Dry mouth	39	90.7	4	9.3
Oral thrush	34	77.2	10	22.8

For common oral conditions found in HIV-infected and non-HIV infected patients, over two thirds of OHCWs administer the same treatment with a slight difference in patients presenting with oral thrush where 22.8% (n=10) said they would not give the same treatment/advice (Figure 8.)



**Figure 8: Distribution of OHCWs by treatment advice to HIV+ and HIV- dental patient**

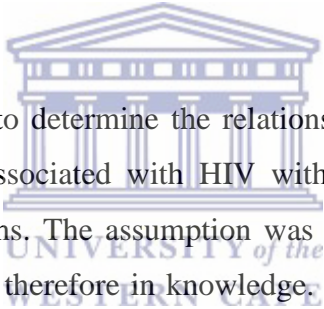


## **5.7 Knowledge, Attitudes and Practices Correlations**

Further correlations were performed between certain selected demographic characteristics (age, years of experience and employment sector) and selected questions on the knowledge, attitudes and practice sections. One question was considered for each of the KAP sections for correlations. The cross-tabulations were used to determine if there were any significant associations between the above-mentioned variables and the different KAP sections. The Fisher's exact test of association was applied to 2x2 contingency tables and the significance was set at  $p=0.05$ . The results are reported with the exact p-values. Many of the correlations indicated statistically insignificant findings and this may likely be attributed to the small sample population of the study ( $n=46$ ), though representative of the whole population of OHCWs of Lesotho.

### **5.7.1 Knowledge**

#### **5.7.1.1 Knowledge and age**



Cross-tabulations were performed to determine the relationship between the age of OHCW and their knowledge of oral lesions associated with HIV with the purpose of determining if age increased knowledge of HIV lesions. The assumption was that an increase in age is associated with an increase in experience and therefore in knowledge. The median age of 39 years old was used for this association and OHCWs were categorized in two groups of  $\leq 39$  and  $>39$  years. The decision to utilise the median instead of the mean age was due to the skewed nature of the data because of some outliers making the median more appropriate to use. Comparisons were made between the two different age groups with regards to their knowledge and ability to identify the lesions correctly. The outcome of the results indicated no association between age and knowledge of oral lesions of HIV with regards to the ability to name and identify the lesions correctly with all the  $P > 0.05$  for all images with the exception of one (Appendix 3, image 7). The results show that the majority of the participants from both age groups who had previously seen oral candidiasis could correctly identify it. However, greater proportion of participants above  $>39$  years old ( $n=5$ ) could not correctly identify angular cheilitis despite the fact that only one of them had not seen the lesion previously ( $p=0.021$ ) as compared to  $\leq 39$  who all correctly identified the lesion. It was also observed that not all participants who had seen the lesions previously were able to correctly identify them and it was also interesting that some who claimed they had not seen some lesions before were however able to identify them correctly (Table 7).

**Table 7: Knowledge of oral HIV lesions by OHCWs grouped by age**

Name of Oral lesion	Seen lesion before				p-value	Correctly identified lesion				p-value
	Median age of OHCW					Median age of OHCW				
	≤39 years		>39 years			≤39 years		>39 years		
	Yes	No	Yes	No		Yes	No	Yes	No	
1. Oral candidiasis	21	1	19	1	p =0.738	22	0	20	1	p =0.488
2. Oral Hairy Leukoplakia	17	5	15	4	p =0.483	15	6	11	10	p =0.274
3. Herpetic Gingivostomatitis	17	3	18	2	p =1	15	6	16	5	p =1
4. Major aphthous ulcer	19	1	15	4	p =0.351	16	5	11	9	p =0.353
5. Kaposi's sarcoma	18	2	12	6	p =0.196	13	8	11	8	p =0.901
6. Herpes zoster	16	4	17	2	p =0.867	17	4	18	2	p =0.827
7. Angular cheilitis	22	0	19	1	p =0.233	22	0	16	5	p = <b><u>0.021</u></b>

**5.7.1.2 Knowledge and years of experience**

The median age of 12 years of experience was used and OHCWs categorized into two groups of ≤12 years and >12 years of experience. Generally there no statistically significant differences in years of experience in knowledge of seeing a lesion and correct identification of lesion in both the grouped years of experience with all p>0.05. The majority of those who had seen the lesions before in both groups were able to identify them correctly. Even those who had previously not seen some of the lesions were able to correctly identify them and this may be attributed to prior training (Table 8).

**Table 8: Knowledge of oral HIV lesions by OHCWs grouped by years of experience**

Name of Oral lesion	Seen lesion before				p-value	Correctly identified lesion				p-value
	Years of experience of OHCWs					Years of experience of OHCWs				
	≤12 years		>12years			≤12 years		>12years		
	Yes	No	Yes	No		Yes	No	Yes	No	
1. Oral candidiasis	22	2	20	0	p =0.493	24	1	20	0	p =1
2. Oral Hairy Leukoplakia	17	6	16	3	p =0.477	14	9	13	7	p =1
3. Herpetic Gingivostomatitis	18	4	19	1	p =0.346	17	7	16	4	p =0.728
4. Major aphthous ulcer	20	2	16	3	p =0.649	17	7	11	8	p =0.521
5. Kaposi's sarcoma	18	4	13	5	p =0.705	13	11	11	7	p =0.757
6. Herpes zoster	18	4	17	2	p =0.668	20	4	16	3	p =1
7. Angular cheilitis	23	1	20	0	p =1	24	1	16	4	p =0.155

**5.7.1.3 Knowledge and employment sector**

A correlation made between the two employment sectors of OHCWs (private and public) and their knowledge with regards to the ability to identify oral HIV lesions revealed several significant findings with  $p < 0.05$ . The results indicated that OHCWs in public sector encounter patients presenting with oral candidiasis ( $n=34$ ;  $p = 0.048$ ), oral hairy leukoplakia ( $n=28$ ;  $p = 0.023$ ), herpetic gingivostomatitis ( $n=32$ ;  $p = 0.005$ ) and herpes zoster ( $n=30$ ;  $p = 0.0149$ ) more frequently than their counterparts in the private sector. They equally, have a significantly better ability to correctly identify herpetic gingivostomatitis ( $n=29$ ;  $p = 0.030$ ) and herpes zoster ( $n=31$ ;  $p = 0.0257$ ) than those in private (Table 9).

**Table 9: Knowledge of oral HIV lesions by OHCWs grouped by employment sector**

Name of Oral lesion	Seen lesion before				p-value	Correctly identified lesion				p -value
	Employment sector of OHCWs					Employment sector of OHCWs				
	Private		Public			Private		Public		
	Yes	No	Yes	No		Yes	No	Yes	No	
1. Oral candidiasis	8	2	34	0	p = <b><u>0.048</u></b>	9	1	35	0	p = 0.222
2. Oral Hairy Leukoplakia	5	5	28	4	p = <b><u>0.023</u></b>	4	5	23	11	p = 0.257
3. Herpetic Gingivostomatitis	5	4	32	1	p = <b><u>0.005</u></b>	4	5	29	6	p = <b><u>0.030</u></b>
4. Major aphthous ulcer	7	2	29	3	p = 0.351	6	3	22	11	p = 1
5. Kaposi's sarcoma	6	3	25	6	p = 0.394	3	6	21	12	p = 0.139
6. Herpes zoster	5	4	30	2	p = <b><u>0.0149</u></b>	5	4	31	3	p = <b><u>0.0257</u></b>
7. Angular cheilitis	9	1	34	0	p = 0.227	8	2	32	3	p = 0.306

## 5.7.2 Attitudes

### 5.7.2.1 Attitudes and Age

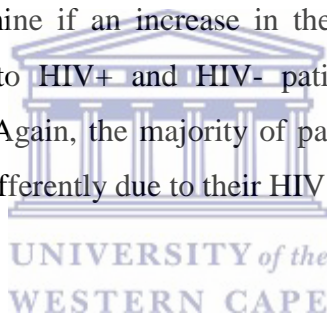
Correlations were made to determine which age group reported that HIV infected patients need to be treated differently from HIV negative patients. There were no statistically significant findings indicating that the majority from both age groups did not feel HIV+/HIV- patients needed to be treated differently with p-value = 1 (Table 10).

**Table 10: Perceived attitudes of OHCWs in the treatment of HIV+/HIV- patients grouped by age**

Question	Age of OHCWs				p-value
	≤39 years		>39 years		
	Yes	No	Yes	No	
Do you think HIV+ patients need to be treated differently from HIV- patients?	5	16	6	15	p = 1

**5.7.2.2 Attitudes and years of experience**

Correlations were made to determine if an increase in the years of experience influenced the treatment OHCWs administered to HIV+ and HIV- patients and there were no significant associations with p-value > 0.05. Again, the majority of participants in both age groups did not feel patients needed to be treated differently due to their HIV status (Table 11).



**Table 11: Perceived attitudes of OHCWs in the treatment of HIV+/HIV- patients grouped by years of experience**

Question	Years of Experience of OHCWs				p-value
	≤12 years		>12 years		
	Yes	No	Yes	No	
Do you think HIV+ patients need to be treated differently from HIV- patients?	6	18	7	13	p = 0.522

### 5.7.2.3 Attitudes and employment sector

Correlations were made to determine the attitudes of participants with regards to the treatment of HIV+/HIV- patients based of their employment sector. Results indicate that the majority of participants from both the private and public sectors did not think patients needed to be treated differently regardless of their HIV status and there were no statistically significant findings between the two variables with p-value 0.522 (Table 12).

**Table 12: Perceived attitudes of OHCWs in the treatment of HIV+/HIV- patients grouped by employment sector**

Question	Employment sector of OHCWs				p-value
	Private		Public		
	Yes	No	Yes	No	
Do you think HIV+ patients need to be treated differently from HIV- patients?	3	7	10	24	p =0.522



### 5.7.3 Practices

#### 5.7.3.1 Practices and age

Correlations were done to determine if there were any associations between age groups in relation to administering treatment to HIV positive as opposed to HIV negative patients presenting with the same oral disease conditions. The purpose was to determine if patients would be given the same treatment or advice regardless of status. There were no statistically significant differences with p-values > 0.05. It was also noted that slightly more participants in both age groups did not give same treatment or advice for patients presenting with sores in the mouth and oral thrush.

**Table 13: Practices of OHCWs in the treatment of HIV+/HIV- patients grouped by age**

Question	Age of OHCWs and Practices				p-value
	≤39 years		>39 years		
Do you give same treatment/advice?	Yes	No	Yes	No	
1. Toothache	18	3	18	3	p =1
2. Sores in the mouth	16	6	18	3	p =0.457
3. Painful gums	18	4	18	2	p =0.664
4. Dry mouth	19	2	17	2	p =0.844
5. Oral thrush	16	6	16	3	p =0.291

**5.7.3.2 Practices and years of experience**

Correlations were done to determine if there was an association between the number of years of experience and the participants and treatment or advice given to patients. The outcomes revealed no association between the variables with all p-values >0.05. It was also noted that treatment of oral thrush remains consistent with a slightly higher proportion of respondents in both age groups not administering the same treatment.

**Table 14: OHCWs’ practices in the treatment of HIV+/HIV- patients grouped by years of experience**

Question	Years of experience of OHCWs				p-value
	≤12 years		>12 years		
Do you give same treatment/advice?	Yes	No	Yes	No	
1. Toothache	21	3	16	4	p =0.684
2. Sores in the mouth	19	6	17	3	p =0.710
3. Painful gums	21	4	17	2	p =0.684
4. Dry mouth	21	3	17	1	p =0.622
5. Oral thrush	19	6	14	4	p =1

### 5.7.3.3 Practices and employment sector

A test of association was carried out to determine if participants from the different employment sectors (private and public) provide the same treatment or advice to HIV+/HIV- patients presenting with the same common dental conditions. The results revealed that generally participants gave the same treatment/advice to patients regardless of their status. However, there was a statistically significant difference in the treatment of oral candidiasis ( $p=0.048$ ) with a significantly higher proportion of participants in the public sector not administering the same treatment/advice ( $n=10$ ) as compared to those in the private sector who all gave the same treatment or advice (Table 15).

**Table 15: OHCWs' practices in the treatment of HIV+/HIV- patients grouped by employment sector**

Question	Employment sector of OHCWs				p-value (Fishers exact test)
	Private		Public		
Do you give same treatment/advice?	Yes	No	Yes	No	
1. Toothache	8	1	29	6	$p = 0.557$
2. Sores in the mouth	9	1	27	8	$p = 0.345$
3. Painful gums	9	1	29	5	$p = 0.585$
4. Dry mouth	9	1	29	3	$p = 0.679$
5. Oral thrush	10	0	23	10	$p = \mathbf{0.048}$



## **CHAPTER 6: DISCUSSION**

### **6.1 Introduction**

The present study, the first of its kind in Lesotho, sought to determine the KAP of oral health care workers in Lesotho. This chapter discusses the findings of the present study, what they signify and compares the results with the reviewed literature. The discussion includes the knowledge of oral lesions associated with HIV/AIDS, attitudes of OHCWs towards patients and management of the lesions.

### **6.2 Demography**

The response rate was an excellent 100% since all the participants consented and completed the questionnaires and the majority were qualified dentists. While most countries legally permit dentists and dental therapists to perform invasive dental procedures such as dental extractions, minor dental surgeries and restorations, in Lesotho due to the dire shortage of OHCWs, all the above-mentioned cadres are entrusted with these clinical responsibilities. Most of them are trained on the job without any prior formal education.

The majority of the participants (44.4%) had a range of 1-10 years of experience and this may be due to the fact that most qualified dentists are emigrants who work in Lesotho immediately after they attain their dental degrees in their countries and often are on short-term contracts.

### **6.3 Knowledge**

The findings of the present study revealed that OHCWs demonstrated a fair knowledge of the oral manifestations of HIV with nearly all in agreement that oral lesions are a common finding in PLWHA and this concurs with the literature (Nichols et al. 1993; Lim et al. 2002; Seacat et al. 2009). This was also in agreement with the findings of other studies conducted in Lesotho confirming the high prevalence of oral lesions in PLWHA (Walid et al. 2004; Prithiviraj, 2012; Kamiru and Naidoo, 2002).

The majority listed oral candidiasis as the most common oral lesion associated with HIV, which also highlights the high prevalence of this lesion in PLWHA in Lesotho. This was similar to the findings of several studies (Gachigo and Naidoo, 2001; Darling et al. 1992; Prithiviraj, 2012; Kolisa-Malele, 2009; Rudolf and Ogunbodede, 1999). These all reported that participants encountered oral candidiasis as the most commonly found oral lesion in PLWHA. Different findings were reported in another South African study where participants named necrotising ulcerative gingivitis as the most commonly seen lesion (Mathabathe, 2006).

Oral lesions of HIV such as periodontal infections, herpes infections, Kaposi's sarcoma and Oral hairy leukoplakia are classified as lesions strongly associated with HIV (Classification and Diagnostic Criteria for Oral Lesions in HIV Infection. EC-Clearinghouse on Oral Problems Related to HIV Infection and WHO Collaborating Centre on Oral Manifestations of the Immunodeficiency Virus, 1993). However, fewer than 50% of the OHCWs listed these lesions as less common than documented in the literature. This finding concurred with the results of a South African study by Darling et al. (1992), where less than 50% of the participants named oral hairy leukoplakia, herpes infections and periodontal diseases as common lesions of HIV, with the exception of Kaposi's sarcoma (74%). This was contrary to the findings in the Kenyan study by Gachigo and Naidoo (2001) where more than half of all the participants correctly identified periodontal infections, herpes infections, Kaposi's sarcoma and oral hairy leukoplakia as lesions strongly associated with HIV. One possible explanation to this contrast could be the fact that the study was conducted on dentists, all of whom had formal dental education. This further indicates the need for education and training of all OHCWs in this regard.

The presence of Kaposi's sarcoma is indicative of disease progression and high mortality. A study conducted in PHC facilities in South Africa revealed the significance of early diagnosis and timely access to HAART and chemotherapy for patients (Chu et al. 2010). Lack of adequate knowledge of this lesion by OHCWs may lead to delayed diagnosis resulting in detrimental effects, including morbidity and mortality. This also indicates the need for further education and training.

Oral hairy leukoplakia is also strongly associated with HIV and its presence indicates progression to AIDS. A possible explanation for OHCWs describing these lesions as uncommon may indicate that the lesions are not encountered as frequently as oral candidiasis and herpes infections or may signify lack of knowledge of these lesions and their association with HIV/AIDS. Regardless, this suggests that OHCWs require further training in diagnosing such lesions to prevent delayed diagnosis, which may lead to poor health and quality of life caused by discomfort, dysfunction and disability (Yengopal and Naidoo, 2008).

Despite the fact that 84% reported having received training in the diagnosis of oral lesions of HIV, less than a fifth perceived that they had comprehensive knowledge of oral HIV lesions. Just over a third felt their knowledge was 'better than average' and nearly all expressed the need for further training in this regard. This response was similar to the Japanese oral health care workers (Kitaura et al. 1997). On the contrary, this finding was different from that of a study by Darling et al. (1992) on South African dentists where 71% thought they had adequate knowledge of HIV, although this may be attributed to the fact that the study was conducted only on dentists. Even though the majority of the participants had received training in diagnosing oral lesions of HIV, they felt their knowledge was inadequate and required further training. Training and education in the management of PLWHA may need to be on a continuous basis and in the form of refresher courses.

To further test the participants' knowledge, they were asked to identify seven unlabelled photographic images depicting lesions strongly associated with HIV. The images correctly identified by the majority of participants were oral candidiasis, angular cheilitis herpes zoster and oral ulcerations respectively. Just over half the participants correctly identified Kaposi's sarcoma and oral hairy leukoplakia, which are lesions strongly associated with HIV. Even though some of these lesions were listed by the participants in the questionnaire as less commonly associated with HIV, slightly higher proportions were able to identify them correctly when provided with the visual images. This result may be due to increased uptake of HAART therapy, which is found to significantly reduce the prevalence of oral lesions of HIV (Chapple and Hamburger, 2000; Frezzini et al, 2005; Scully et al. 1991; Chu et al. 2010; Johnson, 2010).

It may also indicate poor practical knowledge and perhaps the significance of history in identifying specific oral lesions because the onset of some conditions as expressed by patients will often aid the diagnosis. Fungal infections are the most common infections in HIV/AIDS patients. Oral candidiasis is the most common lesion linked to HIV disease progression. Candidiasis presents on the oral mucosa during the early stages of the HIV disease, while the oesophageal mucosa becomes more affected as the disease progresses to AIDS (Laskaris, 2000; Adedigba et al. 2008; Campo et al. 2002). Nearly all participants in the present study correctly identified oral candidiasis as the most common oral HIV lesion similar to other studies (Darling et al. 1992; Gachigo and Naidoo, 2001; Agbelusi and Wright, 2005).

Correlations conducted between the knowledge and demographic variables such as age, years of experience and employment sector revealed few statistically significant findings. There were statistically significant results between knowledge and age where a slightly higher proportion of the age group >39 years old (n=5) could not correctly identify angular cheilitis as compared to only one participant in the age group ≤39 years despite the fact that all the participants in >39 years old group had seen the lesion before (p=0.021). In addition, there were statistically significant results between knowledge and employment sector suggesting that participants working in the public sector frequently encountered common oral lesions associated with HIV and were more able of correctly identifying them than their private practice colleagues.

The association between knowledge and years of experience showed that the knowledge of HIV by OHCWs increases with an increase in the number of years of experience. It was anticipated that the greater the number of years of experience the more knowledgeable the OHCW would be. This correlation was tested with respect to the ability to name and correctly identify the common oral lesions associated with HIV as depicted on the visual images but there were no statistically significant findings.

#### **6.4 Attitudes**

While numerous studies have been conducted on the KAP of dentists with regards to HIV/AIDS (Gachigo and Naidoo, 2001; Mulligan et al. 2006; Darling et al. 1992), few have focused on other OHCWs such as dental therapists, dental hygienists and dental nurses (Rudolf and Ogunbodede, 1999; Kitaura, 1997; Mathabathe 2006). Few studies have been conducted on attitudes of dentists with regards to treating PLWHA (Irigoyen et al. 1998; Bennett et al. 1995; McCarthy et al. 1995; Bodhade et al. 2013), most of which focussed on the reasons associated with willingness and refusal to treat patients.

The present study found that an overwhelming majority did not mind treating PLWHA. This might be related to the high prevalence of HIV in Lesotho and the frequency of providing dental care to PLWHA. Nearly all participants reported that they had treated a known HIV positive patient in the past six months. These are commendable findings and are suggestive of the level of trust between the patients and the OHCWs and knowledge of the disease process. The findings of a Canadian study by McCarthy et al. (1999) indicated adequate knowledge of HIV/AIDS and awareness of ethical responsibility to treat (all) patients as factors associated with willingness to treat patients.

The high response on willingness to treat concurred with other studies (Bennett et al. 1995; Godin et al. 1999; Gachigo and Naidoo, 2001; Irigoyen et al. 1998; Bodhade et al. 2013), but is contrary to a much earlier South African study in which only 45% reported willingness to deliver dental care to HIV positive patients (Darling et al. 1992). This difference in the findings may be explained by the current wealth of knowledge of HIV and its routes of transmission, which was very low in the early '90s.

Some studies have identified knowledge regarding the risk of transmission of HIV and the use of infection control measures as some of the factors associated with willingness to treat HIV/AIDS patients where the OHCW may be fearful regarding cross-infection (Irigoyen et al. 1998; Bodhade et al. 2013; McCarthy et al. 1995). The high willingness reported in the present study may indicate fact that OHCWs are cognizant of their ethical obligation in providing treatment to all patients. Rudolph and Ogunbodede (1999) reported similar findings in their study of HIV infection and oral health care in South Africa where they reported that 81.5% of the participants were willing to treat PLWHA based on their professional responsibility.

While the vast majority of OHCWs of Lesotho showed willingness to treat HIV/AIDS patients, a surprising 59% believed that the risk of contracting HIV in the dental clinic was high. This general misconception is consistent with other studies (Irigoyen et al. 1998; Gachigo and Naidoo, 2001; Kaste and Bednarshe, 2007). More than two thirds reported that there was no need to treat HIV-positive patients differently. While those who disagreed felt that on account of their immunocompromised state and prescribed drugs, special care was needed. Many of those who felt HIV-positive patients needed to be referred named public dental clinics (57%) and dedicated HIV clinics (25%) as facilities patients would be referred to. This was also consistent with other findings where participants felt patients must be referred to dedicated clinics, academic hospitals and by dentists with special training (Gachigo and Naidoo, 2001; Darling et al. 1992).

## **6.5 Practises**

It is the responsibility of OHCWs to effectively manage the oral health conditions of PLWHA just as much as they would for any other patient. However, the challenges with PLWHA are many, and include possible neglect of oral hygiene due to pain and discomfort but this does not justify poor management (Diz-Dios, 1999; Johnson, 2010).

In general, one would not adapt the dental treatment of a patient merely based on their HIV status, however, certain considerations such as the referral of the patient for further management may be made due to the patient's compromised immune state.

Participants were asked to rate their confidence levels in managing PLWHA and to specify if they would provide the same treatment options and/or advise for five common oral diseases/conditions, which may be found in PLWHA and HIV-negative patients. Overall, OHCWs displayed good practises in the management of oral lesions associated with HIV. Nearly two thirds reported high levels of confidence in managing dental patients presenting with oral HIV lesions. They stated that they would give the same treatment to both PLWHA and the HIV-negative patients presenting with the same oral diseases. For those who stated that they would give different treatment/advised, the reasons mentioned were positively discriminatory towards PLWHA.

For example, they would provide the patient with prophylactic antibiotic cover prior to dental extraction and they would spend more time emphasizing the importance of individual oral self-care because of their susceptibility to infections.

It has been established that severe oral ulcerations may occur in HIV-infected adult patients, often characterized by pain and fever. These may range from recurrent aphthous ulcers, herpes infections, cytomegalovirus infections and Epstein-Barr virus infections (Johnson et al. 2006). However, Arendorf et al. (1998) reported a small prevalence (2.9%) of oral ulcerations in a group of 600 HIV-positive patients and these findings were consistent with other findings by Ranganathan and Hemalatha (2006). For patients presenting with sores in the mouth, the vast majority reported that they would offer the same treatment after taking a thorough medical examination to establish the aetiology, duration and frequency of the ulcers.

Different treatments suggested included advice to HIV-negative patients to go for testing and counselling, referral for blood tests to establish the causes of ulcerations and if widespread, referral to a physician for further management.

Several periodontal conditions have been described as a common finding in PLWHA, all of which may lead to moderate and severe pain in the gums. These are linear gingival erythema, necrotizing ulcerative gingivitis, necrotizing ulcerative periodontitis and necrotizing stomatitis. Other related symptoms include bleeding gums, tooth mobility and general discomfort in the mouth. These conditions have been reported to be highly predictive of the underlying HIV infection in individuals who may seem otherwise healthy (Coogan et al. 2005; Nokta, 2008).

Less than half of the participants listed periodontal diseases as common lesions of HIV and almost all reported that they would not give different treatment to patients presenting with painful gums. This finding may likely indicate lack of knowledge since periodontal diseases have been described as a common finding in PLWHA and therefore warrants for further education and training. It was commendable for the few others who said that they would refer such patients for HIV testing and counselling and for CD4 cell count tests.

An overwhelming 90.7% of the OHCWs said they would give the same treatment or advice to both HIV+/HIV- patients presenting with xerostomia. It has been reported that HIV-infection may lead to a reduction in the flow of saliva, which may be indicative of salivary gland dysfunction and a side-effect of long-term HAART therapy. Furthermore, dry-mouth in PLWHA has been found to be crucial in the HIV disease progression (Frezzini et al. 2005; Younai et al. 2001). The management of xerostomia in PLWHA is important considering the discomfort it causes the patient and the inability to function adequately.

Less than ten per cent reported that they would probe further into the medical history of the patient specifically regarding the medications taken by patients and advice accordingly. Possible explanation for this is that OHCWs may not be aware of the association between xerostomia and HIV/AIDS, or they do not frequently encounter patients presenting with xerostomia.

The majority of respondents reported that they would provide the same treatment to both categories of patients presenting with oral candidiasis. However, others suggested that they provided different treatment options for PLWHA presenting with oral thrush, including recommending for a CD4 count test and prescribing systemic antifungal medication instead of topical antifungals. They also stated that they would recommend HIV testing and counselling for HIV-negative patients/patients whose status is unknown, who present with oral thrush. The management practices of OHCWs are in line with the recommendations for treatment of oral candidiasis where systemic antifungals such as fluconazole are especially required in cases where a definitive HIV diagnosis has been made. OHCWs also reported the use of topical antifungals such as amphotericin B and nystatin for mild cases of candida infections, which have also been reported to be effective (Johnson et al. 2006).

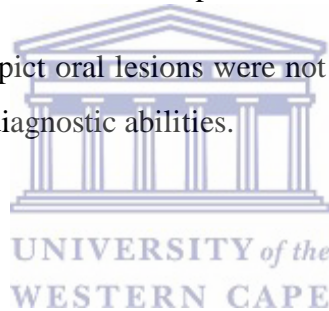
## 6.6 Limitations of the study

The present study was on all OHCWs of Lesotho but it needs to be taken into consideration that that not all participants received formal training in a dental school hence their knowledge of HIV/AIDS in dental patients may differ.

While KAP methodology surveys have been found to be useful in conducting research on the general public health information on knowledge and treatment practises, it has been criticized for several reasons including its ability to measure attitudes and practises. Often participants gave responses, which they believed were acceptable to the researcher resulting in acquiescence bias.

Therefore, the responses may not have been a true reflection of the actions of OHCWs. The KAP methodology has also been criticized for the rigid nature of the questionnaire design with the use of very few open-ended questions and in some instances, participants had few choices with the close-ended questions and were limited in their responses.

The colour photographs used to depict oral lesions were not accompanied by medical histories of patients and may have limited the diagnostic abilities.





## **CHAPTER 7: CONCLUSION AND RECOMMENDATIONS**

The results of the present study revealed that OHCWs of Lesotho demonstrated fair knowledge of oral manifestations of HIV/AIDS, however, they lacked confidence in managing dental patients with oral HIV lesions. Those in the private sector were less experienced as compared to their counterparts in the public sector. Participants demonstrated general willingness to treat PLWHA, which is indicative of positive attitudes with many confirming that they do not mind providing dental treatment to PLWHA. The results further indicated that OHCWs displayed good practises in the management of oral lesions associated with HIV. This was evident in the treatment/advice provided for patients presenting with oral lesions associated with HIV.

The study findings highlight the pivotal role played by oral health care workers in the identification, diagnosis and management of oral manifestations of HIV/AIDS. In resource-limited settings such as Lesotho, the value of their role cannot be overemphasised, especially considering the high prevalence of HIV coupled with the dire shortage of human resources in health including OHCWs. Despite the recent initiatives to increase the uptake of HAART therapy in resource limited countries such as Lesotho, not all patients have access to the HAART therapy, therefore early diagnosis and treatment of lesions in patients not yet on treatment is imperative. In view of the shortage of OHCWs, it is recommended that other cadres of health professionals (nurses, community health care workers etc.) be trained in the diagnosis and management of oral lesions of HIV.

The presence of oral lesions of HIV contribute significantly to the reduced oral health quality of life causing pain, difficulty in eating and swallowing and consequently leading to poor nutritional intake. Furthermore, the presence of oral lesions may be indicative of disease progression. This warrants a more comprehensive approach in the training of health workers in managing oral lesions of HIV including regular routine screening for lesions in PLWHA. The present study has provided some insight into the knowledge, attitudes and practices of OHCWs in Lesotho regarding oral lesions associated with HIV/AIDS. It further revealed that above average knowledge yields positive attitudes and good, acceptable practices. However, further training concerning risk in the dental clinic setting is required and may help to dispel fears and lead to more positive attitudes and increased willingness to treat patients. The present study focussed only on OHCWs and it may be useful to investigate the knowledge, attitudes and practises of other cadres of healthcare workers regarding their KAP of the oral manifestations of HIV/AIDS.

## REFERENCES

- Adedigba, M.A., Ogunbodede, E.O., Jeboda, S.O., Naidoo, S., (2008). Patterns of oral manifestation of HIV/AIDS among 225 Nigerian patients. *Oral Diseases*, 14:341-6
- Agbelusi, G.A., Wright, A.A., (2005). Oral lesions as indicators among routine dental patients in Lagos Nigeria. *Oral Diseases*, 11,370-373
- Arendorf, T.M., Bredekamp, B., Cloete, C.A.C., Sauer, G., (1998). Oral manifestations of HIV infection in 600 South African patients. *Journal of Oral Pathology and Medicine*, vol. 27, 176-179
- Barasch, A., Safford, M.M., Dapkute-Marcus, I., Fine, D.H., (2004). Efficacy of chlorhexidine gluconate rinse for treatment and prevention of oral candidiasis in HIV-infected children: a pilot study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 97:204-207
- Baylor College of Medicine. (2001). HIV curriculum for the health professional. Baylor International Pediatric AIDS Initiative, *Baylor College of Medicine*, Texas, USA
- Bennett, M.E., Weyant R.J., Wallisch, J., Green, G., (1995). A national survey: Dentists' attitudes towards the treatment of HIV-positive patients. *JADA*, Vol 126, 509-514
- Bhayat, A., Yengopal, V., Rudolph, M., (2010). Predictive value of group I oral lesions for HIV infection. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 109:720-723
- Bodhade, A., Dive, A., Khandekar S., Dhoble, A., Moharil, R., Gayakwad, R., Tekade S., (2013). Factors associated with refusal to treat HIV-infected patients: national survey of dentists in India, *Science Journal of Public Health*, Vol. 1, No. 2, 2013, pp.51-55
- Brown, J.B., Rosenstein, D., Mullooly, J., O'Keeffe Rosetti, M., Robinson, S., Chiodo, G., (2002). Impact of intensified dental care on outcomes in human Immunodeficiency virus infection. *AIDS Patient Care STDs* 16:479:86
- Campo, J., Cano, J., Del Romero, J., Hernando, V., del Amo, J., Moreno, S., (2012). The role of the dental surgeon in the early detection of adults with underlying HIV infection/AIDS. *Med Oral Pathol Oral Cir Bucal*. 1; 17 (3):e401-8
- Campo, J., Del Romero, J., Castilla, J., Garcia, S., Rodriguez, C., Bascones, A., (2002) Oral candidiasis as a clinical marker related to viral load, CD4 lymphocyte count and CD4 lymphocyte percentage in HIV-infected patients. *J Oral Pathol Med*, 31: 5-10

- Casiglia, J.W., Woo, S., (2000). Oral manifestations of HIV infection. *Clin Dermatol* 18:541-51
- Chapple, L.C., Hamburger J., (2000). The significance of oral health in HIV *Sex Transm Infect*; 76:236-243.
- Chidzonga, M.M., (2003). HIV/AIDS orofacial lesions in 156 Zimbabwean patients at referral oral and maxillofacial surgical clinics. *Oral Dis*; 9: 317–22
- Chu, K.M., Mahlangeni, G., Swannet, S., Ford, N.P., Boulle, A., Van Cutsem, G., (2010). AIDS-associated Kaposi's sarcoma is linked to advanced disease and high mortality in a primary care HIV programme in South Africa. *Journal of the International AIDS Society*, 13:23
- Coogan, M.M., Greenspan, J., Challacombe, S.J., (2005). 'Oral lesions in infection with human immunodeficiency virus', *Bulletin of the World Health Organization* 83(9), 700–706
- Darling, M., Arendorf, T., Samaranayake, L.P. (1992). Oral Care of HIV infected patients: the knowledge and attitudes of South African Dentists. *J Dent Assoc S Afric* Sept, 47(9):399-402
- Diz-Dios, P., Fernandez-Feijoo, J., Vazquez-Garcia, E., (1999). Tooth extraction in HIV seropositive patients. *Int Dent J*, 49: 317–321
- EC-Clearinghouse on Oral Problems related to HIV Infection, (1993). WHO Collaborating Centre on Oral Manifestations of the Immunodeficiency Virus. Classification and diagnostic criteria for oral lesions in HIV infection. *J Oral Pathol Med*, 22:289-91
- Eyeson, J.D., Tenant-Flowers, M., Cooper, D.J., Johnson, N.W., and Warnakulasuriya, K.A.A.S., (2002). Oral manifestations of an HIV positive cohort in the era of highly active anti-retroviral therapy (HAART) in South London. *Journal of Oral Pathology Medicine* 31: 169-74
- Feller, L., Lemmer, J., (2008). "Insights into pathogenic events of HIV-associated Kaposi sarcoma and immune reconstitution syndrome related Kaposi sarcoma," *Infectious Agents and Cancer*, vol. 3, article 1
- Frezzini, C., Leao, J.C., Porter, S., (2005) Current trends of HIV disease of the mouth. *J Oral Pathol Med*, 34(9):513-531
- Gachigo, J.N., Naidoo, S., (2001). HIV/AIDS: the knowledge, attitudes and behaviour of dentists in Nairobi, Kenya. *South African Dental Journal*, Dec 56(12):587-91

Gnanasundaram, N., (2010). Key to Diagnose HIV/AIDS Clinically through its Oral Manifestations. *Journal of Indian Academy of Oral Medicine and Radiology*, July-September 22(3):119-125

Godin, G., Naccache, H., Brodeur, J.M., Alary M., (1999). Understanding the intention of dentists to provide dental care to HIV and AIDS patients. *Community Dent Oral Epidemiol*, 27: 221–7

Godin, G., Kok, G., (1996). The theory of planned behaviour: a review of its applications to health-related behaviours. *Am J Health Promot* 11:87–98

Government of Lesotho (GoL)/ Christian Health Association of Lesotho (CHAL), (2007). Hospital and Health Centre Certification and Accreditation Summary Report

Government of Lesotho. National HIV/AIDS Strategic Plan 2006-2011

Government of Lesotho. (2011). Ministry of Health and Social Welfare. Lesotho Health Policy Available at: <http://www.nationalplanningcycles.org>

Greenspan, J.S., Barr, E.C., Sciubba, J.J., Winkler, R.J., (1992). Oral manifestations of HIV infection, definitions, diagnosis criteria and principles of therapy. *Oral Surg Oral Med Oral Pathol* 73: 142–144

Greenspan, J.S., (1997). Sentinels and signposts; the epidemiology and significance of the oral manifestations of HIV disease. *Oral Diseases*, 3 Suppl 1: S13-17

Hausmann-Muela S., Muela-Ribera J., (2003). Recipe knowledge: A tool for understanding some apparently irrational behaviour. *Anthropology and Medicine*, Vol. 10, No. 1; 87-103

Hodgson, T.A., Greenspan, D., Greenspan. J.S., (2006a) Oral Lesions of HIV Disease and HAART in Industrialized Countries. *Adv Dent Res*, 19:57-62

Hodgson, T.A, Naidoo, S., Chidzonga, M., Ramos Gomez, F., Shiboski, C., (2006b). Identification of the oral health care needs in children and adults, management of oral disease. *Adv Dent Res* 19:106-117

Irigoyen, M., Zepeda, M., Lopez-Camara, V., (1998). Factors associated with Mexico City dentists' willingness to treat AIDS/HIV-positive patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 86: 169–174

Johnson, N.W., (2010). The mouth in HIV/AIDS: markers of disease status and management challenges for the dental profession. *Australian Dental Journal*, 55: (1 Suppl): 85-102

Johnson, N.W., Glick, M., Mbuguye, T.N.L., (2006). Oral health and general health. *Adv Dent Res* 19:118-121

Kaliyaperumal, K., (2004). Guideline for Conducting a Knowledge, Attitude and Practice (KAP) Study. *Community ophthalmology AECS Illumination* Vol. IV, No.1; 7-9

Kamiru, H.N., Naidoo, S., (2002). Oral HIV lesions and oral health behaviour of HIV-positive patients attending the Queen Elizabeth II Hospital, Maseru, Lesotho. *SADJ: Journal of the South African Dental Association*, vol. 57:11, pp. 479-482

Kaste, L.M., Bednarshe, H., (2007). The Third Decade of HIV/AIDS: A Brief Epidemiologic Update for Dentistry *Journal of Canadian Dental Association*. December 2007/January 2008, Vol. 73, No. 10

Kitaura, H., Adachi, K., Kobayashi, K., Yamada T., (1997). Knowledge and attitudes of Japanese dental health care workers towards HIV related disease. *Journal of Dentistry*, Vol, 25, No 3-4, pp. 279-283

Khammissa, R.A.G., Pantanowitz, L., Feller, L., (2012). Oral HIV-Associated Kaposi Sarcoma: A Clinical Study from the Ga-Rankuwa Area, South Africa. *AIDS Research and Treatment*. Vol 2012: 1-9

Kuthy, R.A., Heller, K.E., Riniker, K.J., McQuistan, M.R., Qian, F., (2007). Students' opinions about treating vulnerable populations immediately after completing community-based clinical experiences. *J Dent Educ*; 71(5):646-54

Laskaris, G., (2000). Oral manifestations of HIV disease. *Clin Dermatol*; 18:447-455

Launiala, A., (2009). How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. *Anthropology Matters Journal*, Vol 11 (1)

Lesotho Population and Housing Census. April 2006

Lesotho Demographic and Health Survey LDHS. HIV prevalence data. (2009)

- Lewis, D.A., Brain, G., Cushing, A.M., Hall, A., Zakrzewska, J.M., (2000). Description and evaluation of an education and communication skills training course in HIV and AIDS for dental consultants. *Eur J Dent Educ*, 4: 65–70
- Lim, A.A., Leo, Y.S., Lee, C.C., Robinson, A.N., (2002). Oral manifestations of human immunodeficiency virus (HIV) - infected patients in Singapore. *Annals of Academic Medicine in Singapore*, 30: 600-606
- Malele-Kolisa Y., (2009). *Knowledge, attitudes and practices of caregivers about oral lesions in HIV positive patients in NGOs / CBOs in Region, Johannesburg, Gauteng*. Thesis (MChD) University of the Witwatersrand. South Africa
- Mathabathe., N.C., (2006). *Oral health practitioners and HIV/AIDS: knowledge, attitudes and practices*. Thesis (MPH). University of Witwatersrand
- McCarthy, G.M., Koval, J.J., Morin R.J., (1995). Factors associated with dentists' willingness to treat HIV-infected patients. In: Greenspan JS, Greenspan D. *The Oral Manifestations of HIV Infection*. Chicago, Ill: Quintessence Publishing Co Inc. 351-355
- McCarthy, G.M., Koval, J.J., John, K., MacDonald, M.A., (1999). Factors Associated With Refusal to Treat HIV-Infected Patients: The Results of a National Survey of Dentists in Canada. *American Journal of Public Health*. Vol 89, No.3:541-545
- McLean, A.T., Wheeler, E.K., Cameron, S., Baker, D., (2012). HIV and dentistry in Australia: clinical and legal issues impacting on dental care. *Australian Dental Journal* 57:256-270
- Ministry of Health and Social Welfare. National antiretroviral guidelines, July 2007; P: 5
- Ministry of Health and Social Welfare and National AIDS Commission. 2009. National HIV and AIDS estimates for Lesotho 2009. <http://www.nas.org.ls/documents>
- Miziara, I.D, Weber, R., (2006). Oral candidiasis and oral hairy leukoplakia as predictors of HAART failure in Brazilian HIV-infected patients. *Oral Dis*, 12:402-407
- Mulligan, R., Seirawan, H., Galligan, J., Lemme, S., (2006). The effect of an HIV/AIDS program on the knowledge, attitudes, and behaviours of dental professionals. *J Dent Educ*; 70(8):857–68
- Nasir, E.F., Astrom, A.N., David, J., Ali, R.W., (2008). HIV and AIDS related knowledge, sources of information, and reported need for further education among dental students in Sudan- a cross sectional study. *BMC Public Health* 8:286; 1-9

- Nichols, C.M., Flaitz, C.M., Hicks, M.J., (1993). Treating Kaposi's lesions in the HIV infected patient. *J Am Dent Assoc* 124: 78–84
- Nokta, M., (2008). Oral Manifestations Associated with HIV Infection. The science of HIV medicine. *Curr HIV/AIDS Rep*, 5: 5–12
- Patton, L.L., Phelan, J.A., Ramos-Gomez, F.J, Nittayananta, W., Shiboski, C.H., Mbuguye, T.L., (2002). Prevalence and classification of HIV-associated oral lesions. *Oral Dis*, 8(Suppl 2):98-109
- Petersen, P.E., ( 2006). Policy for Prevention of Oral Manifestations in HIV/AIDS: The Approach of the WHO Global Oral Health Program. *Adv Dent Res*, 19, 17-20
- Pindborg, J. J., (1989). Classification of oral lesions associated with HIV infection. *Oral Surgery, Oral Medicine, Oral Pathology* 67, 292–295
- Porter, S., Scully C., (2005). Aphthous ulcers (recurrent). *Clin Evid* 13:1687-94
- Prithiviraj, T.G., (2012). *Knowledge, attitudes and practice among Primary Health Care nurse practitioners regarding oral health and oral HIV lesions in QE II and Roma health service areas in Maseru Lesotho*. Thesis (MPH). University of Witwatersrand
- Ramos-Gomez, F.J., Petru, A., Hilton, J.F., (2000). Oral manifestations and dental status in paediatric HIV infection. *Int J Paed Dent*, 10:3-11
- Ranganathan, K ., Hemalatha, R., (2006). Oral lesions in HIV infection in developing countries. An overview. *Adv Dent Res* 19: 63-68
- Ranganathan, K., Reddy, B.V., Kumarasamy, N., Solomon, S., Viswanathan, R., Johnson, N.W., (2000). Oral lesions and conditions associated with human immunodeficiency virus infection in 300 south Indian patients. *Oral Dis*, 6: 152–57
- Reichart, P.A., Khongkuntian, P., Bendick, C., (2003). Oral manifestations in HIV-infected individuals from Thailand and Cambodia. *Med Microbiol Immunol (Berl)* 192:157-160
- Reznik, D.A., (2005). Oral manifestations of HIV disease. *Top HIV Med*.2005/06; 13: 143-8
- Robinson, P.G., (2006). Implications of HIV Disease for Oral Health Services. *Adv Dent Res* 19:73-79
- Rudolph, M.J., Ogunbodede, E.O., (1999). HIV infection and oral health care in South Africa. *South African Dental Journal*, Dec; 54(12):594-601

Scully, C., Laskaris G., Porter S.R., (1991). Oral manifestations of HIV infection and their management. I. More common lesions. *Oral Surge, Oral Med, Oral Pathol*. Vol 71, No. 2: 158-164

Seacat, J.D., Litt, M.D., Adam, S., Daniels M.S., (2009). Dental Students Treating Patients Living with HIV/AIDS: The Influence of Attitudes and HIV Knowledge. *J Dent Ed* 73 (4): 34-39

Sjamsedin, D.A., Schulten, E.A., van der Waal, I., (1996). Dental treatment in HIV infection: Experience with 250 patients in The Netherlands. Third International Workshop on the Oral Manifestations of HIV Infection. London (UK), pp9.8

Umunna, A. O., James, V.S., Ricks, E. J., (2009). The experiences of dentists in the management planning of oral health services in Lesotho, Africa. *The International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy*, 9:1213. Available from: <http://www.rrh.org.au/>. Accessed March 10 2011

UNAIDS AIDS epidemic update October 2010. Geneva, Switzerland.

USAID Lesotho, HIV/AIDS profile, 2009

Walid, E.I., Nasir, F., Naidoo, S., (2004). Oral health knowledge, attitudes and behaviour among nursing staffing Lesotho. *South African Dental Journal*, 59: 288-292

World Bank Report (2004). Geneva: World Bank

World Health Organization (2009). Lesotho Nursing Initiative. Ministry of Health and social Welfare and Clinton Health Access Initiative

World Health Organization.(2007). WHO in HIV/AIDS update. Available from: [http://www.who.int/oral\\_health/action/communicable/en/](http://www.who.int/oral_health/action/communicable/en/)

Yengopal, V., Naidoo, S., (2008). Do oral lesions associated with HIV affect quality of life. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, Vol 106 No 1, 66-73

Younai, F.S., Marcus, M., Freed, J.R., Coulter, I.D., Cunningham, W., Der-Martirosian, C., Guzman-Bercerra, N., Shapiro M., (2001). *Journal of oral surgery oral medicine oral pathology*, Vol 2 No 6, 629-636



**Appendix 1: Informed Consent**

**Department of Community Oral Health  
Faculty of Dentistry and WHO Collaborating Centre for Oral Health**



**UNIVERSITY OF THE WESTERN CAPE: FACULTY OF DENTISTRY**

**INFORMED CONSENT FOR CONDUCTING RESEARCH**

Dear.....

I am a dentist from the University of the Western Cape: Faculty of Dentistry, Department of Community Oral Health. I am conducting research regarding knowledge, attitudes and behaviour about oral manifestations of HIV/AIDS by oral health care workers in Lesotho.

May I kindly request that you fill in this questionnaire, it will take 15 minutes of your time to complete.

All information about you is completely confidential. You will not be identified by your name and the forms will be kept in a secure place. Participation in this survey is voluntary and if you decide for one reason or the other that you wish to withdraw from the study, you are free to do so and you will not be penalised in any way.

Please help me by participating. For any queries or questions, feel free to contact me at 0027 829598565 or 0027 219034977 or email me at [kramphoma@uwc.ac.za](mailto:kramphoma@uwc.ac.za)

With many thanks and appreciation

Dr Khabiso Ramphoma

.....

I agree to participate in the study

Name.....

Signature.....

Date:.....

## Appendix 2: Questionnaire

### QUESTIONNAIRE FOR ORAL HEALTH CARE WORKERS

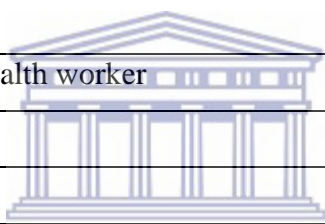
**Thank you for agreeing to participate in this study. The purpose of this questionnaire is to ascertain the knowledge, attitudes and behaviour of oral health care workers of Lesotho regarding the management of patients with HIV/AIDS. It would be much appreciated if you could answer the following questions as honestly as you can.**

Record number.....

*Please indicate your response with a cross (X) or in writing where applicable*

#### SECTION A: DEMOGRAPHICS

1.	Age (in years)		
2.	Gender	Male	Female
3.	Profession		
4.	Qualification		
5.	Years of experience as an oral health worker		
6.	Employment sector	Public	Private
7.	Employment status	Full-time	Part-time



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#### SECTION B: KNOWLEDGE of oral manifestations of HIV/AIDS

8.	<p><b>Are oral lesions common in HIV infected individuals?</b></p> <p>If yes please list the common ones below:</p> <p>a. ....</p> <p>b. ....</p> <p>c. ....</p> <p>d. ....</p> <p>e. ....</p>	Yes	No	I don't know
9.	<p><i>Please examine the images and answer the following questions for each one:</i></p> <p><b>9.1 Image 1</b></p> <p>a. Have you ever seen this lesion?</p> <p>b. If yes, what is the lesion called</p> <p style="margin-left: 20px;">• .....</p>			
		Yes	No	

9.2	<b>Image 2</b> a. Have you ever seen this lesion? b. If yes, what is the lesion called • .....			
		Yes	No	
9.3	<b>Image 3</b> a. Have you ever seen this lesion? b. If yes, what is the lesion called • .....			
		Yes	No	
9.4	<b>Image 4</b> a. Have you ever seen this lesion? b. If yes, what is the lesion called • .....			
		Yes	No	
9.5	<b>Image 5</b> a. Have you ever seen this lesion? b. If yes, what is the lesion called • .....			
		Yes	No	
9.6	<b>Image 6</b> a. Have you ever seen this lesion? b. If yes, what is the lesion called • .....	Yes	No	
9.7	<b>Image 7</b> a. Have you ever seen this lesion? b. If yes, what is the lesion called • .....			
		Yes	No	
10.	<b>How would you rate your knowledge of oral lesions associated with HIV/AIDS?</b>			
	Very poor	Average	Better than average	Comprehensive
11.	<b>Have you been trained to diagnose oral manifestations of HIV/AIDS?</b>	Yes	No	
11.1	If yes, where were you trained?			
	Dental school	CPD Seminar	Course	Workshop

11.2	Do you feel that you require more training regarding the oral manifestations of HIV/AIDS?				Yes	No
	If yes, how would you like to have it?					
	Dental school	CPD Seminar	Course	Workshop	Other (please specify) ...	


**SECTION C: ATTITUDES towards people presenting with oral manifestations of HIV/AIDS**

12.	<b>How do you feel about treating patients with HIV/AIDS?</b>				
	I do not mind	I do not want to	I am not sure		
12.1	If you do not want to or are not sure please explain why ..... ..... ..... ..... ..... .....				
13	<b>Should patients with HIV be referred for dental treatment?</b>			Yes	No
	If yes, where do you think they should be referred to:				
	Public dental clinics	Dedicated HIV clinics	Other (please explain):		
14	<b>Do you think HIV+ patients need to be treated differently from patients who are not HIV positive?</b>			Yes	No
14.1	If yes, please explain why below ..... .....				

15.	<b>Have you knowingly treated an HIV+ patient in the past 6 months?</b>	Yes	No
16.	<b>How would you rate your risk of contracting HIV in the dental clinic setting?</b>		
	High	Low	I don't know

*Please respond to the following in writing in the boxes provided below*

**SECTION D: BEHAVIOURAL PRACTICES regarding oral manifestations of HIV/AIDS**

	<b>How confident are you to manage dental patients with HIV/AIDS?</b>		
	Very confident	Not much	Not at all
16.	<b>What treatment or advice would you give to each patient with the conditions below? Please complete both boxes.</b>		
	<b>Condition</b>	<b>HIV+ patient</b>	<b>HIV- patient</b>
16.1	<b>Toothache</b>		
16.2	<b>Sores in the mouth</b>		
16.3	<b>Painful gums</b>		
16.4	<b>Dry mouth</b>		
16.5	<b>Oral thrush</b>		

**Appendix 3: Visual Aids**

**IMAGES 1 TO 7**

**IMAGE 1**



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**IMAGE 2**



**IMAGE 3**



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WESTERN CAPE

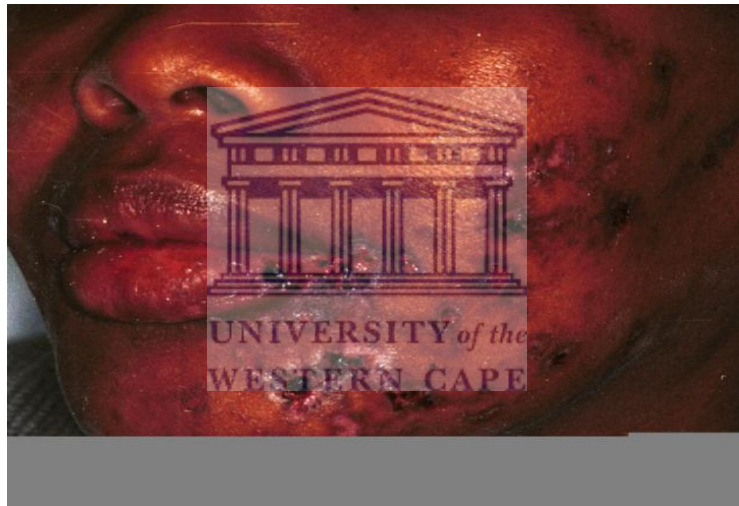
**IMAGE 4**



**IMAGE 5**



**IMAGE 6**



**IMAGE 7**





## Appendix 4: Ethical Approval Lesotho

36/2012



Ministry of Health  
and Social Welfare  
PO Box 514  
Maseru 100

11 May 2012

**Khabiso Ramphoma**  
Master in Dental Public Health Candidate  
University of Western Cape  
RSA

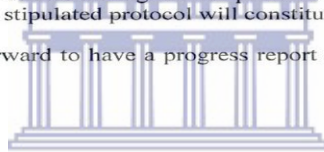
Dear Dr. Khabiso,

**Re: Knowledge, Attitude and Behaviour regarding oral manifestations of  
HIV/AIDS by oral health care workers in Lesotho**


Thank you for submitting the above mentioned protocol. The Ministry of Health and Social Welfare Research and Ethics Committee having reviewed your protocol hereby authorizes you to conduct this study among the specified population. The study is authorized with the understanding that the protocol will be followed as stated. Departure from the stipulated protocol will constitute a breach of the permission.

We are looking forward to have a progress report and final report at the end of your study.

Sincerely,



UNIVERSITY of the  
WESTERN CAPE

  
**Dr. M. M. Moteetee**  
Chairperson Research and Ethics Committee  
Director General of Health Services

**LETTER OF PERMISSION TO CONDUCT RESEARCH AT QUEEN 'MAMOHATO  
MEMORIAL HOSPITAL (QMMH) AND THE FILTER CLINICS**

**TO: DR KHABISO J RAMPHOMA**

**Cc: Operations Director  
Human Resources Manager  
Unit manager and HOD: Dental QMMH**

**Re: Research on: Knowledge, attitudes and behaviour regarding oral manifestations of HIV/AIDS by  
oral health care workers in Lesotho**

It is with pleasure that we inform you that your application to conduct research at Queen "Mamohato Memorial Hospital Dental clinic has been successful, subject to the following:

- i) All information with regards to Facility will be treated as confidential.
- ii) Tsepong and Netcare's name will not be mentioned without written consent from the Hospital's management.
- iii) Where Tsepong and, or Netcare's name is mentioned, the research will not be published without written consent from the Hospital Management.
- iv) A copy of the research will be provided to the Hospital Management once it is finally approved by the tertiary institution, or once complete.
- v) All legal requirements with regards to patient rights and confidentiality will be complied with.

We wish you success in your research.

Yours faithfully

**OPERATIONS DIRECTOR**

**Date:**



***Hope for Quality Health Care***

**TSEPONG (PTY) LTD**

**Directors:**

Dr. RH Friedland, Dr. T Masia, Dr. L Mosotho, S. Motseko, Dr K. Prins, Adv. S Seeiso

Reg. No. 2006/855

## Appendix: 5: Ethical Approval from University of the Western Cape



**Office of the Deputy Dean**  
**Postgraduate Studies and Research**  
Faculty of Dentistry & WHO Collaborating Centre for Oral Health



UNIVERSITY OF THE WESTERN CAPE  
Private Bag X1, Tygerberg 7505  
Cape Town  
SOUTH AFRICA

Date: 2<sup>nd</sup> March 2012

**For Attention: Dr K Ramphoma**  
**Community Oral Health**

Dear Dr Ramphoma

**STUDY PROJECT:** Knowledge, attitudes and behavior regarding oral manifestations of HIV/AIDS by oral health care workers in Lesotho

**PROJECT REGISTRATION NUMBER:** 12/1/18

**ETHICS:      Approved**

At a meeting of the Senate Research Committee held on Friday 3<sup>rd</sup> February 2012 the above project was approved. This project is therefore now registered and you can proceed with the study. Please quote the above-mentioned project title and registration number in all further correspondence. Please carefully read the Standards and Guidance for Researchers below before carrying out your study.

Patients participating in a research project at the Tygerberg and Mitchells Plain Oral Health Centres will not be treated free of charge as the Provincial Administration of the Western Cape does not support research financially.

Due to the heavy workload auxiliary staff of the Oral Health Centres cannot offer assistance with research projects.

Yours sincerely

Professor Sudeshni Naidoo