

**OCCUPATIONAL EXPOSURE TO BLOOD IN  
SELECTED ORAL HEALTH FACILITIES IN  
BOTSWANA: EXPERIENCES AND  
PRACTICES OF ORAL HEALTH STAFF**

**Siphiwo Ndlovu  
0515747K**

**A research report submitted to the Faculty of Health Sciences, University of the  
Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the  
degree of Master of Public Health.**

**Johannesburg, April 2012**

I, Sipiwo Ndlovu, student number 0515747K, declare that this research report is my own work. It is being submitted for the degree of Master of Public Health at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

\_\_\_\_\_  
\_\_\_\_ day of \_\_\_\_\_

## **DEDICATION**

To my daughters Lindelwa and Nelisiwe, for being the centre of my world and my  
inspiration;  
my partner Teboho for being my friend and my 'soft place to land' always;  
and my mother Eileen Siboniso for always being there, day or night, to provide love and  
guidance.

## **ABSTRACT**

**Introduction:** Sub-Saharan Africa has a high burden of HIV and other blood borne pathogens. Botswana's estimated prevalence of HIV and HBV are between 17-40%, and 14 % respectively. Ninety percent of the three million health care workers exposed annually to blood borne pathogens through injury are in developing countries. Previous studies in Botswana indicate 24%-26% health workers sustain needle stick and other sharps injuries annually, posing a threat to them. Dentistry requires work with sharp objects in a confined space; thus oral health workers (OHWs) are at high risk of infection from occupational blood exposures (OBEs). Universal (Standard) Precautions were first recommended by the Center for Disease Control in the United States of America and were adopted in several countries, including Botswana, to minimize the risk of exposure to, and infection from, blood. However, studies in different health care settings, mainly in developed countries, have shown that these guidelines are not always adhered to. Few studies have been done to evaluate their utilization in developing countries.

**Aim:** To quantify the occupational blood exposure experience of OHWs in Botswana's public service and determine the infection control practices through self reporting and observation. The Objectives were: 1) To determine the demographic profile of the OHWs in Botswana, 2) To determine self reported blood exposure experience of oral health workers within the 12 months prior to the study, 3) To determine self reported infection control practice of oral health workers within the 12 months prior to the study, 4) To determine the knowledge of risks associated with blood borne pathogens amongst oral health workers at the time of the study, 5) To determine, by observation, which

precautions were practiced by oral health workers to prevent exposure at the time of the study, 6) To assess whether there was a written policy available in the dental facility on the prevention and management of occupational blood exposures.

**Methodology:** A cross sectional descriptive survey was carried out using a combination of self reporting and observation. A total of 85 OHWs in 5 of the 6 main oral health facilities were invited to participate. Knowledge of risks pertaining to blood borne pathogens, frequency of blood exposures and practice of universal precautions were assessed. Documents and posters were also reviewed.

**Results:** Sixty eight (80%) OHWs returned the questionnaires and 51 (60%) observations were carried out. At least 80% of respondents had correct knowledge of occurrences that can contribute to the spread of blood borne pathogens in the dental environment. Over 60% were aware of universal precautions and 75% knew that post exposure prophylaxis (PEP) was available at their facilities. Almost 43% of the respondents had experienced blood splashes in the last year and 35.3% experienced needlestick injuries. Half of these reported the injury and 16.2% took PEP. Predictors of needlestick injuries during the previous year were perception of risk, knowledge of and compliance with, Universal Precautions Personal protective equipment was poorly utilised; only 17.6% were observed to use protective eye wear. Two thirds of the respondents were observed to use double-handed recapping. None of the facilities visited had a written protocol displayed.

**Conclusion and recommendations:** The prevalence and reporting of OBEs amongst

OHWs were comparable with findings of other studies. Self protection through compliance with universal precautions, immunization and post exposure prophylaxis was not fully utilised. The high burden of disease in the country warrants that further efforts be made to protect oral health workers. Appropriate guidelines should be made available at all dental facilities and staff needs to be retrained regarding standard precautions. Monitoring of exposures and vaccination status should be carried out. Further research should be undertaken regarding the poor uptake of prophylaxis.

## ACKNOWLEDGEMENTS

I would like to thank the following:

- Oral Health Division and Ministry of Health, Botswana for permission to carry out the study,
- The staff and clients of all participating facilities for their unbounded support, especially Scottish Livingstone Hospital Dental Clinic, Molepolole, for their feedback while developing the questionnaire,
- Norma Tsotsi and Simon Mbulaheni Nmutandani for starting this journey with me,
- Dr Ahmed Bhayat for gallantly stepping in to continue with me,
- And Prof M Rudolph for completing the journey with me and his continued support,
- Mary Kawonga for her continued support,
- Michelle Kermode for her kind permission to modify and use her questionnaire.

<b>CONTENTS</b>	<b>PAGE</b>
CANDIDATE'S DECLARATION	ii
DEDICATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENTS	vii
TABLE OF CONTENTS	viii
LIST OF FIGURES	x
LIST OF TABLES	xi
ABBREVIATIONS	xii
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 BACKGROUND	1
1.2 STATEMENT OF THE PROBLEM	5
1.3 JUSTIFICATION FOR THE STUDY	6
1.4 LITERATURE REVIEW	6
1.4.1 OCCUPATIONAL EXPOSURE IN DEVELOPING COUNTRIES	6
1.4.2 OCCUPATIONAL EXPOSURE IN DEVELOPED COUNTRIES	7
1.4.3 MEASURING OCCUPATIONAL BLOOD EXPOSURE	8
1.4.4 INFECTION CONTROL PRACTICES IN DEVELOPING COUNTRIES	9
1.4.5 INFECTION CONTROL PRACTICES IN DEVELOPED COUNTRIES	10
1.5 AIM OF THE STUDY	12
1.6 STUDY OBJECTIVES	12
<b>2 METHODOLOGY</b>	<b>13</b>
2.1 STUDY DESIGN	13
2.2 STUDY PERIOD	13
2.3 STUDY POPULATION	13
2.4 SAMPLING	14
2.5 DATA COLLECTION AND TOOLS	14
2.5.1 DATA COLLECTION	14
2.5.2 QUESTIONNAIRE	15
2.5.3 OBSERVATION CHECKLIST	16
2.5.4 DOCUMENT REVIEW	16
2.6 DATA MANAGEMENT AND ANALYSIS	17
2.7 ETHICAL CONSIDERATIONS	18

<b>3 RESULTS</b>	19
3.1 RESPONSE OVERVIEW	20
3.2 SOCIODEMOGRAPHIC CHARACTERISTICS	20
3.3 KNOWLEDGE OF RISKS ASSOCIATED WITH BLOOD BORNE PATHOGENS	22
3.4 BLOOD EXPOSURE EXPERIENCE	26
3.5 SELF REPORTED PRACTICE	33
3.6 OBSERVATION OF PRECAUTIONS PRACTICED TO PREVENT EXPOSURE	37
3.7 WRITTEN POLICY AVAILABILITY IN DENTAL FACILITIES	39
<b>4 DISCUSSION</b>	40
4.1 RESPONSE RATE AND DEMOGRAPHICS	40
4.2 KNOWLEDGE OF RISKS ASSOCIATED WITH BLOOD BORNE PATHOGENS	41
4.3 BLOOD EXPOSURE EXPERIENCE	44
4.4 SELF REPORTED AND OBSERVED PRACTICE	48
4.5 OBSERVATION OF PRECAUTIONS PRACTICED TO PREVENT EXPOSURE	51
4.6 WRITTEN POLICY AVAILABILITY IN DENTAL FACILITIES	51
4.7 LIMITATIONS	52
<b>5 CONCLUSION AND RECOMMENDATIONS</b>	55
5.1 CONCLUSION	55
5.2 RECOMMENDATIONS	55
<b>REFERENCES</b>	59
APPENDIX A: PRECAUTIONS IN THE DENTAL SETTING	67
APPENDIX B: QUESTIONNAIRE	68
APPENDIX C: OBSERVATION CHECKLIST	86
APPENDIX D: PARTICIPANTS' INFORMATION LETTER	87
APPENDIX E: CONSENT FORM	91
APPENDIX F: ETHICAL CLEARANCE	93
APPENDIX G: LETTER TO HEAD OF ORAL HEALTH DIVISION	94

<b>FIGURES</b>	<b>PAGE</b>
FIGURE 1: NUMBER AND PERCENTAGE DISTRIBUTION OF RESPONDENTS BY LOCATION OF FACILITY	20
FIGURE 2: NUMBER AND PERCENTAGE OF OHWS' ATTENDANCE OF CROSS INFECTION TRAINING IN THE LAST YEAR	25
FIGURE 3: NUMBER AND PERCENTAGE OF OHWS ENCOUNTERING BLOOD AND BODY FLUIDS TO THE SKIN OR FACE	26
FIGURE 4: PERCENTAGE OF OHWS' EXPERIENCE OF SHARPS INJURY AND SPLASHES IN THE LAST YEAR	27
FIGURE 5: PERCENTAGE OF OHWS' EXPERIENCE OF INSTRUMENT CAUSING SHARPS INJURY	29
FIGURE 6: PERCENTAGE OF OHWS' EXPERIENCE OF WHEN INJURY OCCURRED	30
FIGURE 7: PERCENTAGE OF OHWS REPORTING INJURIES AND TAKING PEP FOLLOWING INCIDENT, BY PROFESSIONAL CATEGORY	31
FIGURE 8: PERCENTAGE OHWS SELF-REPORTED PRACTICE	33
FIGURE 9: REPORTED PREVALENCE OF HEPATITIS B VIRUS VACCINATION AMONGST RESPONDENTS	35
FIGURE 10: PERCENTAGE OHWS' OPINION ON THEIR WORK ENVIRONMENT	36
FIGURE 11: PERCENTAGE OF OBSERVED PRECAUTIONS PRACTICES	37

<b>TABLES</b>	<b>PAGE</b>
TABLE 1: NUMBER AND PERCENTAGE OF OHWS' PROFESSIONAL INFORMATION BY SEX AND EDUCATION	20
TABLE 2: NUMBER AND PERCENTAGE OF CORRECT RESPONSES TO KNOWLEDGE OF PRECAUTIONS	22
TABLE 3: NUMBER AND PERCENTAGE OF OHWS' PERCEPTION OF RISK FROM BLOOD BORNE VIRUS BY EDUCATION	23
TABLE 4: NUMBER AND PERCENTAGE OF OHWS' KNOWLEDGE OF HIV POST EXPOSURE PROPHYLAXIS AND AWARENESS OF UNIVERSAL PRECAUTIONS BY ATTENDANCE OF CROSS INFECTION CONTROL TRAINING	24
TABLE 5: PREDICTORS OF SHARPS INJURY IN THE PREVIOUS YEAR	28
TABLE 6: NUMBER AND PERCENTAGE OF OHWS' REASONS GIVEN FOR NOT REPORTING INCIDENTS AND NOT TAKING POST EXPOSURE PROPHYLAXIS	32
TABLE 7: SUMMARY COMPARISON OF OBSERVED AND REPORTED PRACTICE	38

## **ABBREVIATIONS**

AIDS	Acquired Immunodeficiency Syndrome
APP	annual performance plan
ARV	antiretroviral
BAIS II	Botswana AIDS Impact Survey II
BBV	blood borne pathogens
CDC	Centre for Disease Control
CIC	cross infection control
CLE	cleaner
CTO	chief technical officer
DO	dental officer
DS	dental specialist
DSA	dental surgery assistant
DT	dental therapist
FET	fisher's exact test
HBV	Hepatitis B virus
HCA	health care auxiliary
HCV	Hepatitis C Virus
HCW	health care worker
HEP B	Hepatitis B Virus
HEP C	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
ICC	infection control committee

ICO	infection control officer
JC	junior certificate
OBE	occupational blood exposure
OHW	oral health worker
PEP	post exposure prophylaxis
PMTCT	prevention of mother to child transmission (of HIV)
PPE	personal protective equipment
PTO	principal technical officer
SDO	senior dental officer
STD	sexually transmitted disease
STO	senior technical officer
TO	technical officer
UNAIDS	United Nations AIDS project
UP	universal precautions

# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND

This chapter highlights the burden of blood borne diseases and the associated risk of infection from occupational exposure for health care workers in general and specifically oral health

care workers, with particular reference to Botswana. A statement of the problem is raised and the chapter concludes by outlining the purpose and objectives of the study.

Blood borne diseases continue to have substantial impacts on human development (UNAIDS, 2009). This is especially relevant with the continued epidemic of Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS). A significant number of people with HIV and AIDS live in the developing world, and Africa is estimated to carry the largest proportion of this burden (UNAIDS, 2009). It is estimated that 68% of new adult HIV infections had occurred in sub-Saharan countries in 2008 (UNAIDS, 2009). In these countries, the most vulnerable and most likely to be infected with HIV are in the economically productive age group of 15-49 years (AIDS/STD Unit, 2003). This has a direct impact on the economy and continuing development of those countries. The threat of this epidemic adds to the burden associated with local outbreaks of other blood borne diseases, including Hepatitis B and C, in these countries (Tarantola et al., 2005).

Botswana is one of the hardest hit countries in the sub-Saharan region with regard to HIV and AIDS. The population of Botswana has grown rapidly to an estimated 1.7 million people (Botswana Government, 2001) and according to the Botswana AIDS Impact Survey (BAIS) II Report (Botswana Government, 2005), an estimated 290,000 people (17%) are infected with HIV. The UNAIDS (2009) estimated the country's prevalence for HIV amongst 15-49 year olds to be 23.9% in 2008. Antiretroviral (ARV) therapy, a measure taken to mitigate the impact of the disease, is estimated to cover 80% of those who qualify for it (UNAIDS, 2009). Prevention of mother to child transmission of HIV (PMTCT) is another measure that has been introduced to curb the spread of HIV, while a national programme of post exposure prophylaxis (PEP) has been introduced for health care workers (Botswana Government, 2008).

Other blood borne viruses in Botswana include the Hepatitis B virus (HBV) for which the country has a 14% prevalence rate (Southern Africa Integrated Disease Surveillance Feedback Bulletin, 2004), and Hepatitis C (HCV) for which data is not readily available.

According to some studies, there has been an increased number of occupational exposures among health care workers (HCW) in developing countries, including oral health workers (Kotelchuck et al., 2001; Shah et al., 2006; Nemitandani et al., 2007). Three million health care workers are exposed to blood borne viruses through percutaneous injuries every year worldwide; 90% of whom are in developing countries (Kermode et al., 2005a).

In Botswana, a 2008 study found 26% of doctors, nurses, other health care workers and housekeeping staff sustained needlestick and sharps injuries annually (Mwaniki, 2008).

Despite an estimated 70% of people infected with HIV living in sub-Saharan Africa, reported HCWs' infections from this region make up only 4% of the world's documented infections acquired through occupational blood exposure. This could suggest under reporting of exposures in the region (Sagoe-Moses et al., 2001).

The risk to these HCWs is considered greater due to the proportion of the population infected with HIV. In facilities where patients have a high prevalence of HIV, HCWs have up to a 1000 times greater risk of infection (Shahid et al., 2005). This risk is even greater for HCWs if the patients' viral loads are high, and if the HCWs are exposed frequently to potential infections (Tarantola et al., 2005). In Botswana, higher blood viral loads are commonly found in patients presenting at ARV clinics when compared with individuals commencing ARV therapy in Western Europe and North America (Huff, 2003).

Guidelines and universally accepted practice for prevention of cross infection are developed based on, or influenced by, evidence and experience. The need for infection control guidelines to change and adapt as new knowledge and evidence become available has been highlighted by various authors (De Paola, 2004; Harte, 2004). Studies regarding occupational exposures help provide this valuable evidence. The scarcity of studies in terms of occupational blood exposures (OBEs) based in sub-Saharan Africa means that

the experiences of this region are not available when guidelines are being formulated (Sagoe-Moses et al., 2001). These guidelines may then not be suited to practice in the region.

Oral health workers (OHWs) are described as being at risk from air and blood borne infections. These are considered to be of greater importance than other hazards such as noise disturbances, eyestrain and allergic reactions to materials. Gonzalez (1998) and John (2000) attribute this to the high concentration of blood borne pathogens in the oral cavity. These pathogens are present in the oral cavity at the time of carrying out invasive procedures and include HIV, Hepatitis B and Hepatitis C (McCarthy, 2000).

There are two types of exposures to blood:

- **mucocutaneous**, which includes splashes to mucous membranes such as the eyes and mouth, and inhalation of aerosol into the respiratory passages. The risk of inhaling aerosol borne pathogens is heightened when using equipment that creates aerosol such as dental handpieces. This is exacerbated by inadequate aspiration and ventilation which may occur in dental practice (Scully et al., 1990);
- **percutaneous**, which includes sharps injuries with needles, forceps, elevators and splashes on broken skin (Scully et al., 1990).

It is essential that all dental personnel are familiar with methods of preventing cross infection between patients, and between themselves and patients. Employers must ensure that staff are trained in the practice of universal precautions and should provide an

environment conducive to best practice. Guidelines have become increasingly similar between countries and generally accepted universal precautions are documented (CDC, 2003). The guidelines recommend that every patient should be treated as potentially infectious (Appendix A) (Mayfield, 1993; CDC, 2003).

The theory embodied in universal precautions has been broadened and applied to other modes of disease transmission and are now known as standard precautions. They encompass, amongst others, the management of occupational exposure to blood borne pathogens. They call for the use of devices with safety features to prevent sharps injury and recommend having infection control policies and work restriction of HIV infected health care personnel (Huber and Terezhalmay, 2007).

## **1.2 STATEMENT OF THE PROBLEM**

OHWs are at risk of infection through occupational blood exposures (OBEs). This is due to ‘exposure prone’ procedures that require the daily or frequent use of sharp instruments in a confined anatomical space with obscured vision. This definition includes procedures carried out in dentistry and means that the risk of an injury with an instrument in a blood-filled environment is considered high (Avery et al., 1999).

There is lack of information about OBEs and infection control practices among OHWs in Botswana (Kefas, 2000). In a study looking into the quality of dental health services in Botswana, the author raised concern about the lack of standards of operation. The study noted the haphazard use of personal protective equipment and cross infection measures

but this was not dealt with in depth (Kefas, 2000). Recommendations from the study included provision of training for staff and development of standards to improve the quality of the service.

Therefore, given the burden of blood borne diseases in Botswana's population, the high viral loads in HIV positive individuals, and operating in an exposure prone environment, OHWs in Botswana are potentially at great risk of infection through OBEs.

### **1.3 JUSTIFICATION FOR THE STUDY**

This current study served to provide baseline knowledge on the exposure experiences and practices of OHWs. The results will be used in the development and modification of infection control guidelines for the facilities involved.

### **1.4 LITERATURE REVIEW**

There appears to be an increase in published studies relating to OBE in the developing world, but literature specific to dental settings is limited to West and South Africa. Studies based in developed countries tended to be more readily accessible.

#### **1.4.1 Occupational blood exposure in developing countries**

The literature reviewed for this study showed needlestick injuries to be the most frequent form of percutaneous injuries in parts of Africa and the developing world. The frequencies of reported percutaneous injuries ranged from 37 to 100%. Aerosol splatter and mucosal exposures accounted for 15 to 27% of exposures (Adegboye et al., 1994;

Fasunloro and Owotade, 2004; Tarantola et al., 2005; Vong et al., 2005; Nemutandani et al., 2007).

In South Africa, Nemutandani et al. (2007) found that 44% of dental assistants reported occupational blood exposures. A West African study involving all health care personnel and housekeeping staff in a hospital, found that medical doctors and nurses had the greatest proportion of exposures at 23% and 19% respectively (Tarantola et al., 2005).

In a sample of hospital personnel in Nigeria, Adegboye and colleagues (1994) found that 29% of exposed staff stated unexpected patient movement during treatment as the cause of their injury. Further to this, 23% reported mishandling or incorrect disposal of needles, 18% reported recapping with two hands and 18% being unintentionally stuck or struck by a colleague during a procedure.

#### **1.4.2 Occupational blood exposure in developed countries**

Similarly, in developed countries, percutaneous injuries, particularly needlestick, were most frequently reported. A study into injuries amongst 400 nurses caring for diabetic patients, in the United States, revealed that 74% had experienced a needlestick injury. Of these, 40% suffered multiple needlestick injuries. A case of contracting Hepatitis C through occupational blood exposure was reported in the same study (Botteman et al., 2005). A ten-year study into OBE in a dental teaching environment in New York revealed that 98% of the 504 injuries were percutaneous, while 2% were mucosal (Kotelchuck et al., 2001).

In analysing workers' compensation claims, Shah et al. (2006) found that 20% of percutaneous injuries were reported by dental personnel; 75% of these were reported by dental assistants. A large amount of the percutaneous injuries involved syringes and needles. Other dental instruments implicated in injuries included burs, explorers, periodontal scalers and scalpels (Shah et al., 2006).

### **1.4.3 Measuring occupational blood exposure**

The risks associated with contracting infections through OBE are low at 0.3% for HIV; between 1.8% for HCV and up to 30% for HBV respectively (CDC, 2003). This reflects the chances of being exposed and potentially contracting an infection from blood borne pathogens (Shahid et al., 2005). Despite this, studies across the world have continued to focus mainly on measures to prevent exposure and infection rather than epidemiological studies assessing consequences and effect of exposure (Fasunloro et al., 2004; Kermode et al., 2005b; Utomi, 2007).

Some of the studies reviewed were descriptive and used a questionnaire to obtain part or all of the necessary data (Fasunloro et al., 2004; Kermode et al., 2005b; Utomi, 2007; Tarantola et al., 2005; Vong et al., 2005; Nemitandani et al., 2007). However, there is a possibility of recall bias that is associated with retrospective surveys (Hassan, 2006). In an attempt to overcome this, some studies have included observation (Henry et al., 1992; Shahid et al., 2005; Mehtar et al., 2007).

#### **1.4.4 Infection control practices in developing countries**

Studies have shown that despite the availability of infection control guidelines, HCWs do not always adhere to them (Hersey and Martin, 1994). A Cambodian survey of injection practices revealed incorrect handling of instruments and waste disposal. Up to 58% of the respondents recapped the needle using both hands and 13% reported that they disposed of the needle incorrectly after administering an injection (Vong et al., 2005). Aderinokun and Taiwo (2002) reported that while barrier protection was well utilised, poor injection technique and poor history taking were employed and the disposal of sharps was not always into a puncture proof container.

Immunisation is one of the precautions over which an individual HCW has greater control. However, South African dentists were found to have poor compliance with HBV vaccination, which indicated a need for clearer guidelines (Naidoo, 1997). Correct management of exposures is also considered an effective means of preventing infection (Huber and Terezhalmay, 2007). Despite this, Tarantola et al. (2005) found that of those who experienced an exposure, 69% did not report it or manage it further. Data collated by the Ministry of Health in Botswana indicated poor adherence to post exposure prophylaxis guidelines even when source patients test positive for HIV (Mwaniki, 2007).

The use of barrier protection is influenced by personal preference and its availability, which may be out of the control of the HCW (Ansa et al., 2002). The wearing of eye protection by different categories of OHWs has been found to be the least adhered to infection control measure in developing countries. Utilization of eye protection in various

studies ranged between 18 and 32 % (Fasunloro et al., 2004; Kermode et al., 2005b; Utomi, 2007). The use of face masks was found to be higher between 76% and 94% (Fasunloro et al., 2004; Nemutandani et al., 2007; Utomi, 2007) and gloves were almost universally used at 74 to 98% (Fasunloro et al., 2004; Nemutandani et al., 2007; Utomi, 2007).

#### **1.4.5 Infection control practices in developed countries**

Although infection control guidelines were more frequently available in developed countries, there was still a lack of compliance amongst HCWs (Kermode et al., 2005b). An Italian based study showed that less than 30% of dentists had a written protocol to follow. Nevertheless, there was a good understanding of cross infection measures and use of personal protective equipment amongst all the dentists (Veronesi et al., 2004).

In spite of the available information pertaining to long term sequelae of Hepatitis B, it has been shown that, similar to developing countries, dentists in developed countries do not always comply with immunisation requirements and cross infection control measures (Almeida et al., 1991; McCarthy, 2000). Barrier protection was found to be better utilised in developed countries. While there were some reports of poor utilisation of eyewear, most studies reported high rates of compliance ranging between 80 and 94% (Gershon et al., 1998; McCarthy and MacDonald, 1998; Veronesi et al., 2004,). However, a Berlin based study (Ammon et al., 2000), found lower rates of compliance with only 58% of dentists and 33% of dental assistants always wearing protective eyewear.

With respect to utilisation of other forms of barrier protection, Veronesi et al. (2004) found that gloves were used by 98% of dentists and masks by 94%. McCarthy and MacDonald (1998) reported that the use of gloves increased from 92 to 94% while that of masks went up from 73 to 79% from 1994 to 1995. These increases were attributed to two possible causes: increases in provider education through continuing education; and publicity regarding the discrimination of patients and possible legal action (McCarthy and MacDonald, 1998). Gershon et al. (1998) also reported high rates of use of gloves and masks at 98 % and 78 % respectively. However, Ammon et al. (2000) reported lower compliance rates of gloves and masks of 54% and 50% by dentists, and 57% and 50% by dental assistants. Reasons for the low compliance were not given.

It has also been noted that in Canada, cases of exposure and needlestick injuries were generally under reported (McCarthy, 2000). This reduced the chances of preventing infection by correctly managing exposures. Cervini and Bell (2005) found that more than half of medical students in Toronto, who experienced a high risk exposure, did not report the exposure nor seek advice. Reasons for not reporting were either related to the occupational health office being closed or a lack of encouragement from hospital staff. In a systematic literature review by Gordon et al. (2001), it was concluded that although dentists' knowledge was considered adequate in most of the 78 studies reviewed, circumstances differed between countries. The studies that were included reported an increase in the use of personal protective equipment over time with gloves being the most utilised item. Protective eyewear was found to be the least popular item. The review also identified a poorer compliance of cross infection measures by dental assistants compared

to dentists and hygienists. Immunisation against HBV was found to be increasing amongst dentists but the rest of the dental team did not show any increase in their vaccination. Occupational exposures were routinely under reported.

### **1.5 AIM OF THE STUDY**

The study aimed to quantify the occupational blood exposure experience of OHWs in Botswana's public service and determine infection control practices through self reporting and observation.

### **1.6 STUDY OBJECTIVES**

The specific objectives of the study were:

- 1) To determine the demographic profile of the oral health workers in Botswana.
- 2) To determine self reported blood and other body fluid exposure experience of oral health workers within the 12 months prior to the study.
- 3) To determine self reported infection control practice of oral health workers within the 12 months prior to the study.
- 4) To determine the knowledge of risks associated with blood borne pathogens amongst oral health workers at the time of the study.
- 5) To determine, by observation, which precautions were practiced by oral health workers to prevent exposure at the time of the study.
- 6) To assess whether there was a written policy available in the dental facility on the prevention and management of occupational blood exposures at the time of the study.

## **CHAPTER TWO**

### **METHODOLOGY**

In this chapter, the methods used to carry out this research are outlined. These include the population of study and sampling procedure as well as instruments used to gather data. It also describes data management and analysis. Ethical considerations are described.

#### **2.1 STUDY DESIGN**

This study was a cross sectional descriptive survey.

#### **2.2 STUDY PERIOD**

The study was carried out in August 2006.

#### **2.3 STUDY POPULATION**

There are six main oral health facilities in Botswana which function as referral centres for numerous smaller satellite clinics. Five of these centres were chosen as the study sites. These were Gaborone, Lobatse, Maun, Serowe and Selibe-Phikwe oral health facilities. The sixth main centre, Francistown, was excluded for ethical reasons, as well as issues of bias, as the researcher is a member of staff there.

The study population consisted of all dental specialists, dentists, dental therapists, dental surgery assistants, health care auxiliaries and cleaners<sup>1</sup>, (N=85) who were currently employed during the study period.

---

<sup>1</sup> cleaners included in the study were those whose had provided assistance to a dentist or dental therapist treating a patient

## **2.4 SAMPLING**

Five of the six main oral health facilities were chosen. Selection was based on convenience and was influenced by the following factors: likelihood of finding the facility operational; ease of access; likelihood of having procedures to observe; and availability of different cadres in large numbers.

### **Inclusion and exclusion criteria**

**Inclusion:** All clinicians and those who gave direct clinical assistance to clinicians during treatment of patients were included in the study.

**Exclusion:** Cleaners whose duties did not involve providing direct clinical assistance to clinicians during treatment of patients were not included in the study.<sup>2</sup> Any member of staff who had not provided treatment to patients in the last year was excluded as the period of study was one year prior to the study.

## **2.5 DATACOLLECTION AND TOOLS**

### **2.5.1 Data collection**

Data was collected over a period of 2-5 days per facility using a questionnaire and direct observation with a checklist. Questionnaires were self-administered by those who indicated their wish to participate in the study by completing a consent form (Appendix E). The researcher was available to address queries as they arose. Completed questionnaires were then placed in a self sealing envelope and placed in a collection box to maintain anonymity. Participants were notified of the length of stay of the researcher

---

<sup>2</sup> Some cleaners are utilised as dentist's assistants whenever there is a shortage of staff.

and were able to deposit questionnaires in the box up to the last day.

For the observation phase of the study, the operator sought the patient's consent prior to inviting the researcher into the surgery to commence the observation. Observations were made on tooth extraction procedures only, as no restorative work was done at the time of the study. Observations were carried out once per respondent due to time constraints. Both the questionnaire and the observation aspects of the survey were administered anonymously.

### **2.5.2 Questionnaire**

An anonymous, self-administered questionnaire was used (Appendix B) with 55 closed ended questions and 3 open ended questions. Three of the closed ended questions had room to elaborate if a respondent felt their response was not covered in the options. Demographic information was collected to build a profile of the respondents. The questionnaire measured the following: knowledge of risks, blood borne pathogens and precautions; blood exposure experience relating to number and types of exposure and mode of injury; practice with regards use of protective equipment, correct handling of sharps, HBV vaccination, injury reporting and use of post exposure prophylaxis. Respondents were also asked for information related to their work environment that may impact on practice. This included availability of personal protective equipment and existence of an Infection Control Committee (ICC).

The questionnaire was modified from a previous study by Kermode et al. (2005a), who

gave permission for its use and modification. The questionnaire has been used before in studies in the United States of America and India, where its reliability and internal validity were tested (Kermode et al., 2005a). Modifications made were to exclude questions irrelevant to the dental setting, therefore, reliability was assumed to remain valid. It was translated into Setswana and translated back into English to ensure the items were consistent. Both language questionnaires were then piloted at Scottish Livingstone Hospital. This is a mid-level facility in Botswana and is not one of the six main facilities. No subsequent changes were made to the questionnaire before it was administered. Participants had the option to complete the questionnaire in English or Setswana.

### **2.5.3 Observation checklist**

An observation checklist was drawn up based on CDC guidelines (2003) (Appendix C). It focused on the availability and use of personal protective equipment and safe practices such as single handed needle recapping, use of personal protective equipment and hand washing. Availability of written protocol was also noted. Use of observation to supplement self reported practice has been used before in surveys of this nature (Henry et al., 1992).

### **2.5.4 Document review**

Documents, including posters, were also reviewed. The availability and displaying of written protocols and reporting procedures were documented on the checklist.

## **2.6 DATA MANAGEMENT AND ANALYSIS**

Questionnaires were given a unique identification code. Epi Info version 6 was used to enter and analyse the data. Data was entered twice and the correctness tested with the Epi Info validate program. No discrepancies were reported.

Descriptive analyses were carried out and summarised with measures of central tendency, measures of dispersion, frequencies and percentages. Further tests were undertaken with SPSS version 19. Compliance, knowledge and exposure variables were tested against professional designation, location of facility, sex, education, length of service and attendance of cross infection training in the last year. Strength of association between variables was tested using Chi-square tests, Fisher's exact tests where applicable, and one way ANOVA.

Two separate linear regressions were carried out to identify predictors of "sharps injuries" and "blood splashes". The dependent variables were "number of sharps in the last year" and "number of blood in eyes or face in the last year" respectively. The independent variables were: professional designation, location of facility, sex, and education, length of service and attendance of cross infection training in the last year, and selected practice variables. Differences were considered significant at the 5% level. Differences between observed and self-reported practice were not tested for significance. This was due to the observations having been carried out once per facility and the respondents for that phase being fewer than the self reported phase. The small sample size limited the interpretation of statistical analyses.

## **2.7 ETHICAL CONSIDERATIONS**

Ethical clearance was obtained from the University of the Witwatersrand Human Research Ethics Committee (Medical) (Appendix F), and permission also sought from the Health Research Unit of the Ministry of Health Botswana. An information letter (Appendix D) was provided explaining that all participation was voluntary and written consent was obtained from all participants (Appendix E). All documents except the ethical clearance were provided in English and Setswana.

## CHAPTER THREE

### RESULTS

The response overview will be followed by a general demographic representation of the respondents. The results will be presented according to objective. Statistical tests of significance have been applied solely for the purposes of making recommendations and should be interpreted with caution as they have been applied to a non random sample.

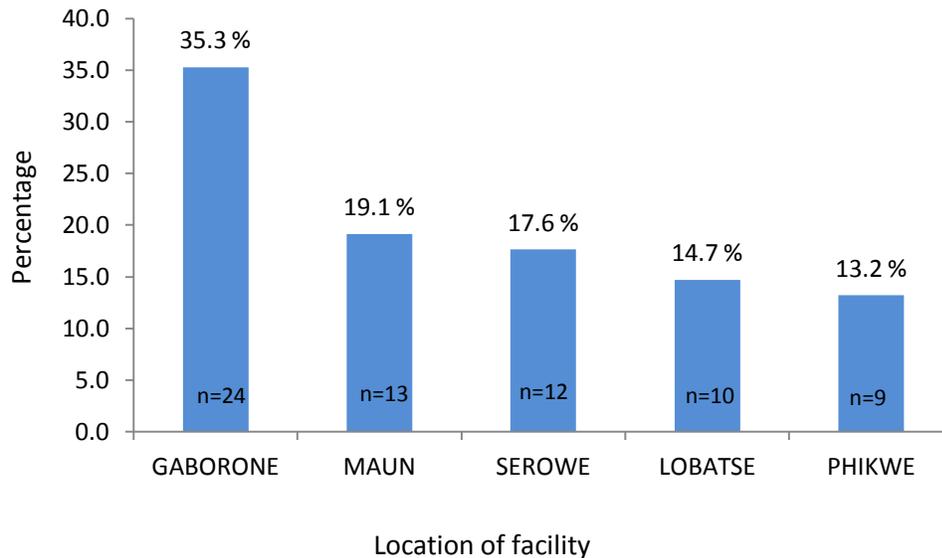
#### 3.1 Response overview

Of the 85 information letters and consent forms handed out, 74 oral health care workers indicated an interest in participating in the study and completed consent forms. Of these, 68 returned usable completed questionnaires and 51 participated in the observation phase of the study<sup>3</sup>. There was a response rate of 80% for the questionnaire and 60% for the observation. Four subjects were excluded; three were in assisting cadres but had not done any assisting in the previous year and a driver who had only once provided assisting duties prior to the period under study. Eleven respondents completed the questionnaire in Setswana, 2 cleaners and 9 assistants.

---

<sup>3</sup> 2 of the 74 wished to participate in the observation only, while not everyone who completed a questionnaire wished to be observed

### 3.2 Socio demographic characteristics



**Fig 1. Number and percentage distribution of respondents by location of facility**

Fig.1 shows that most respondents (35%) were from Gaborone while Selibe-Phikwe had the least number of respondents (13%). The mean number of respondents per location was 13.6, range 9-24 with a standard deviation of 6.025.

**Table 1. Number and percentage of OHWs' professional information by sex and education**

PROFESSIONAL DESIGNATION	GENDER			EDUCATION				
	FEMALE	MALE	TOTAL	PRIMARY	JC	O LEVEL	TERTIARY	TOTAL
DSA	10 (14.7%)	1 (1.5%)	<b>11 (16.2%)</b>	6 (8.8%)	4 (5.9%)	1 (1.5%)	0 (0.0%)	<b>11 (16.2%)</b>
HCA	11 (16.2%)	4 (5.9%)	<b>15 (22.1%)</b>	0 (0.0%)	0 (0.0%)	4 (5.9%)	11(16.2%)	<b>15 (22.1%)</b>
CLEANER	2 (2.9%)	0 (0.0%)	<b>2 (2.9%)</b>	2 (2.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	<b>2 (2.9%)</b>
DENTIST	3 (4.4%)	2 (2.9%)	<b>5 (7.4%)</b>	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (7.4%)	<b>5 (7.4%)</b>
SPECIALIST	2 (2.9%)	2 (2.9%)	<b>4 (5.8%)</b>	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (5.9%)	<b>4 (5.9%)</b>
THERAPIST	12 (17.6%)	19(27.9%)	<b>31 (45.6%)</b>	0 (0.0%)	0 (0.0%)	0 (0.0%)	31(45.6%)	<b>31 (45.6%)</b>
<b>TOTAL</b>	<b>40 (58.8%)</b>	<b>28(41.2%)</b>	<b>68 (100.00%)</b>	<b>8 (11.8%)</b>	<b>4(5.9%)</b>	<b>5 (7.4%)</b>	<b>51 (75.1%)</b>	<b>68 (100%)</b>

Table 1 shows that most of the respondents were female (59%). However, the largest professional group, therapists, comprised more males than females (28% of respondents compared to 18%). The largest professional group (46%) was dental therapists making up almost half the respondents. These were followed by auxiliaries, (22.1%) and assistants (16.2%). Dentists and Specialists made up 7.4% and 5.8% of the respondents. The least represented cadre was cleaners making up only 3% of the total.

A positive association was found to exist between professional category and education (59.785,  $p < 0.01$ , FET). All the operators had tertiary education while all those with primary education were to be found amongst cleaners and Dental Surgery Assistants (DSAs). Some DSAs had Junior Certificate (JC) while 1 had 'O' level. HCAs had a combination of 'O' level and tertiary education (6% and 16% of respondents respectively). In general, most of the respondents had tertiary level education (75%); 12% had primary level education while only 7% had 'O' level and 6% had junior certificate (J.C.).

The mean number of years of service was 8 years and one month. The minimum length of service was one year and the maximum 24 years. The length that occurred most frequently was 2 years, while the 25<sup>th</sup> and 75<sup>th</sup> quartiles were 3 and 12 years respectively. The standard deviation was found to be 6.34 years and variance 40.195.

### 3.3 Knowledge of risks associated with blood borne pathogens

**Table 2. Number and percentage of correct responses to knowledge of precautions.**

	DT (n=31)	DS (n=4)	DO (n=5)	DSA (n=11)	HCA (n=15)	CLE (n=2)	N (%)	X <sup>2</sup> p value
1. The following can contribute to the spread of blood borne viruses (such as HIV and HBV):								
a. needlestick injuries	31(100%)	4 (100%)	5 (100%)	11(100%)	15(100%)	2(100%)	68(100%)	
b. blood splashing in the eyes or mouth	26 (83.9%)	3 (75%)	5 (100%)	9 (81.8%)	13 (86.7%)	2(100%)	58 (85.3%)	
c. saliva splashing in the eyes or mouth	9 (29%)	1 (25%)	0 (0%)	1 (9.1%)	7 (46.7%)	(0.0%)	18 (26.5%)	
d. re-using needles and syringes	29 (93.5%)	4 (100%)	5 (100%)	11(100%)	14 (93.3%)	2(100%)	65 (95.6%)	
e. a cut with a used scalpel or blade	31(100%)	4 (100%)	5 (100%)	11(100%)	15(100%)	2(100%)	68(100%)	
f. blood on broken skin	31 (100%)	4 (100%)	5 (100%)	11(100%)	15(100%)	2(100%)	68(100%)	
g. blood on unbroken skin	27(87.1%)	4 (100%)	3 (60%)	10 (90.9%)	9 (60%)	2(100%)	55 (80.9%)	
h. re-using disposable equipment	29 (93.5%)	3 (75%)	5 (100%)	11(100%)	15(100%)	2(100%)	65 (95.6%)	
i. inadequate sterilisation of equipment	30 (96.8%)	4 (100%)	5 (100%)	10 (90.9%)	15(100%)	2(100%)	66 (97.1%)	
j. contaminated surfaces	28 (90.3%)	4 (100%)	5 (100%)	8 (72.7%)	15 (100%)	2(100%)	62 (91.2%)	
2. Oral health workers and other health workers have high risk of catching blood borne diseases (such as HIV/AIDS and HBV) while caring for patients	30 (96.8%)	4 (100%)	5 (100%)	7 (63.6%)	13 (86.7%)	1(50%)	60 (88.2%)	<b>18.950</b> <b>p=0.010</b>
3. Oral health workers and other health workers have high risk of catching tuberculosis while caring for patients	26 (83.9%)	3 (75%)	3 (60%)	5 (45.5%)	10 (66.7%)	2(100%)	49 (72.1%)	<b>12.672</b> <b>p=0.139</b> (Not significant)
4. It is not practical to treat the blood of all patients as potentially infectious	28 (90.3%)	4 (100%)	5 (100%)	3 (27.3%)	5 (33.3%)	0 (0.0%)	45 (66.2%)	<b>32.732</b> <b>p=0.000</b>
5. Routinely testing all patients for HIV is part of Universal Precautions or infection control	5 (16.1%)	3 (75%)	3 (60%)	0 (0.0%)	2 (13.3%)	1 (50%)	14 (20.6%)	<b>22.046</b> <b>p=0.003</b>

**KEY**  
DT=DENTAL THERAPIST; DS=DENTAL SPECIALIST; DO=DENTAL OFFICER; DSA= DENTAL SURGERY ASSISTANT; HCA= HEALTH CARE AUXILIARY; CLE=CLEANER

Table 2 shows that most respondents had correct knowledge of occurrences that can contribute to the spread of blood borne pathogens in the dental environment. All the respondents agreed that needlestick injuries, cuts with scalpels and blood splashes on broken skin could contribute to the spread of blood borne viruses. However, a much

lower number (27%) gave the correct response to saliva as a contributor to blood borne disease and 21% correctly indicated that routine testing was not part of universal precautions. The table summarises the knowledge categorized by professional designation. Statistically significant relationships are indicated in Table 2. Education was also found to be a significant factor for all the knowledge variables below the 5% significance level.

**Table 3. Number and percentage of OHWs' perception of risk from blood borne viruses by education**

EDUCATION	HIVRISK		HEPBRISK		HEPCRISK	
	NO	YES	NO	YES	NO	YES
PRIMARY	1(1.5%)	7(10.3 %)	5(7.4%)	3(4.4%)	7(10.3%)	1(1.5%)
JC	0(0.0%)	4(5.9 %)	3(4.4%)	1(1.5%)	4(5.9%)	0(0.0%)
'O' LEVEL	4(5.9%)	1(1.5 %)	1(1.5%)	4(5.9%)	5(7.4%)	0(0.0%)
TERTIARY	11(16.2%)	40 (58.8%)	29(42.6%)	22(32.4%)	45(66.2%)	6(8.8%)
Total	16(23.5%)	52(76.5%)	38(55.9%)	30(44.1%)	60(88.2%)	8(11.8%)
	68 (100%)		68 (100%)		68 (100%)	

HIV and Hepatitis B were considered to be of risk to oral health workers. Hepatitis C was incorrectly considered to be of no risk to oral health workers by most of the respondents.

An association between perception of risk from HIV and education was found

(8.141,  $p=0.025$ , FET) with those with 'O' level education least likely to perceive risk from HIV. No other factors were significantly linked.

Botswana's HIV prevalence was only known to 15% of the respondents, who stated that it was between 11 and 25% (the correct response). Half (50%) of the respondents were of the opinion that the prevalence was between 26 and 40%, and 24% thought that the

prevalence was between 41-80%. The rest of the respondents (12%) stated that they did not know. There was a statistically significant difference between the professional designations in knowledge of the population HIV prevalence (22.462,  $p=0.024$ , FET) with all the dentists and most of the specialists over estimating the prevalence.

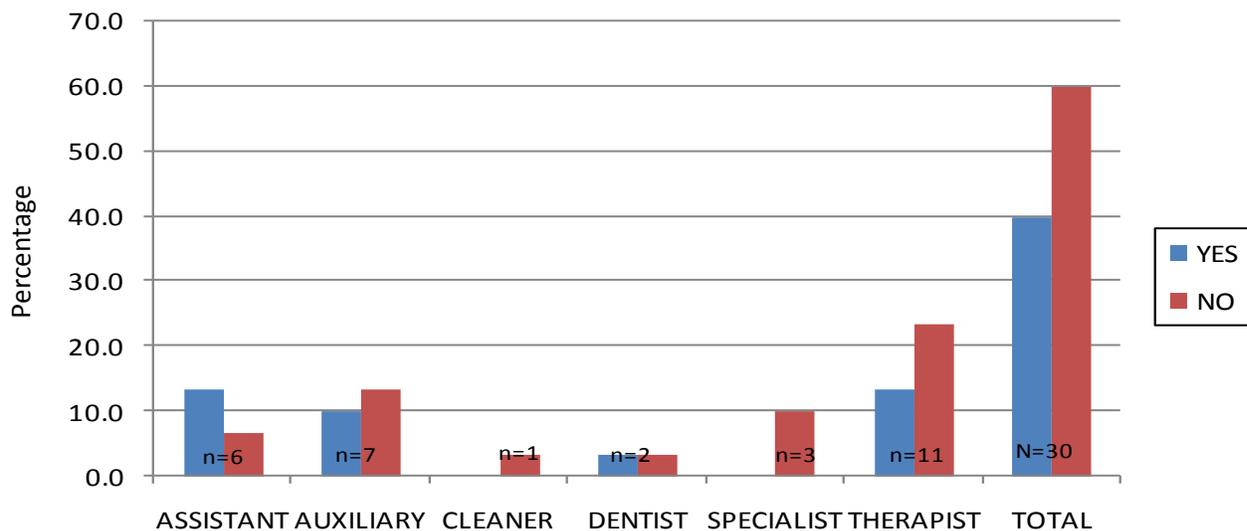
Almost half (44%) of the respondents felt that between a quarter to half of patients attending their facility were infected with HIV; 16% thought that none of the patients had HCV, 7% thought none had HBV while no one thought no patients had HIV.

**Table 4. Number and percentage of OHWs’ knowledge of HIV Post Exposure Prophylaxis (PEP) and awareness of Universal Precautions (UP), by attendance of cross infection control training.**

CROSS INFECTION TRAINING CONTROL	KNOW OF HIV PEP			IS PEP AVAILABLE			AWARE OF UP		
	YES	NO	TOTAL	YES	NO	TOTAL	YES	NO	TOTAL
YES	30(44.1%)	1(1.5%)	31(45.6%)	28(41.2%)	3(4.4%)	31(45.6%)	27(39.7%)	4(5.9%)	31(45.6%)
NO	28(41.2%)	9(13.2%)	37(54.4%)	23(33.8%)	14(20.6%)	37(54.4%)	14(20.6%)	23(33.8%)	37(54.4%)
<b>TOTAL</b>	<b>58(85.3%)</b>	<b>10(14.7%)</b>	<b>68(100%)</b>	<b>51(75%)</b>	<b>17(25%)</b>	<b>68(100%)</b>	<b>41(60.3%)</b>	<b>27(39.7%)</b>	<b>68(100%)</b>
<i>p</i> value	(5.986, df=1, $p<0.05$ , $\chi^2$ )			(6.948, $p=0.022$ , FET)			(17.096, df=1, $p=0.000$ , $\chi^2$ )		

Table 4 shows that most respondents (85%) were aware of post exposure prophylaxis (PEP). The differences in the knowledge of PEP between those who had attended training and those who had not, were found to be significant (5.986,  $df=1$ ,  $p<0.05$ ,  $\chi^2$ ). Those who had attended training were also significantly more aware of PEP availability in their facility (6.948,  $p=0.022$ , FET) and had knowledge of universal precautions (UPs) (17.096,  $df=1$ ,  $p=0.000$ ,  $\chi^2$ ).

Most of those who were unaware of PEP were the dental therapists, dental surgery assistants, healthcare auxiliaries and cleaners. There was however, no significant difference between the professional categories, length of stay and education level on knowledge of PEP (3.464,  $p=0.625$ , FET).

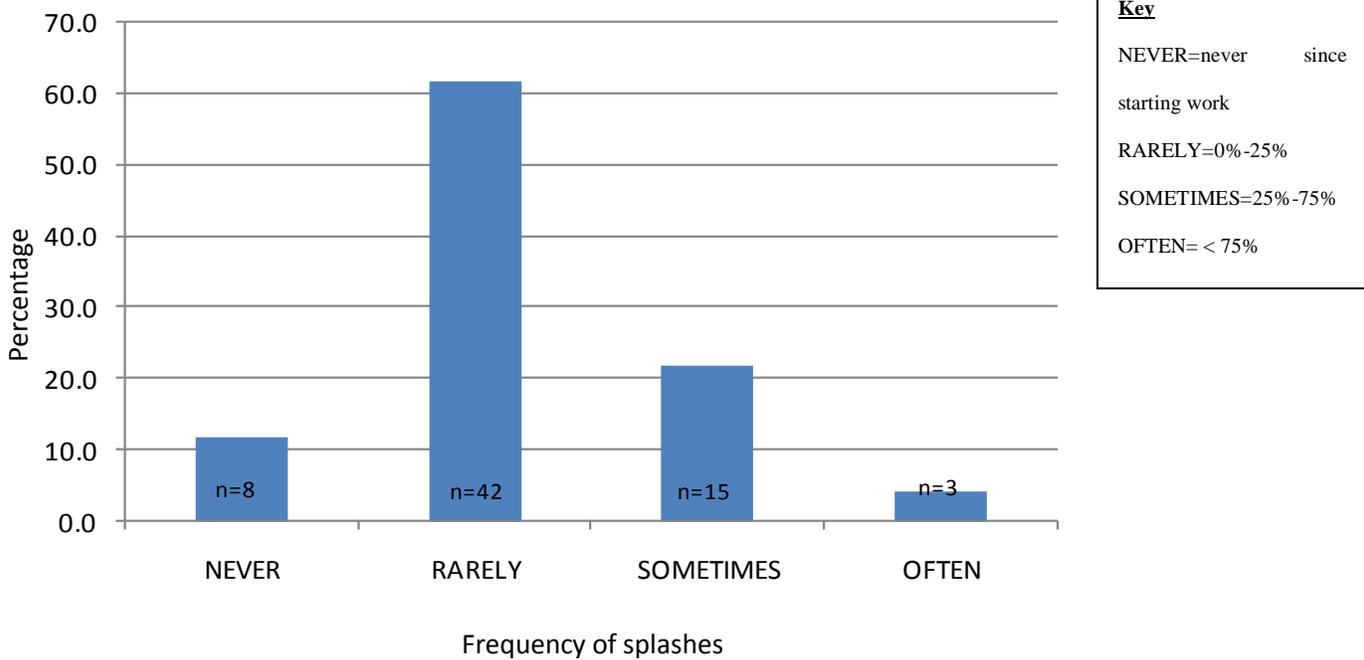


**Fig 2. Number and percentage of OHWs'attendance of cross infection training in the last year**

Out of all the respondents, less than half (46%) had attended a training session or workshop on cross infection control in the time they had been employed. Of these, 12 (18% of all respondents and 40% of those who had attended training in their career) had attended a workshop or a training session within the last 12 months. Figure 2 shows that none of the specialists or cleaners had attended a training session in the last year. Most of the assistants who had had training had attended in the last year while a high proportion of therapists (7 out of 11) had not attended in the last year. The differences between the professional categories were not statistically significant (93.756,  $p=0.629$ , FET).

Location, however, was found to have a significant link with attendance of training (13.064,  $p=0.009$ ). The likelihood of attendance of training differed between the five locations  $F(4,63) = 3.72$ ,  $p=0.009$ . Respondents in Lobatse were more likely to have attended training { $M=0.9$ , 95% CI (0.67, 1.13)} compared to those from Maun { $M=0.17$ , 95% CI (-0.8, 0.41)}. Comparisons between the other groups were not significant.

### 3.4 Blood exposure experience

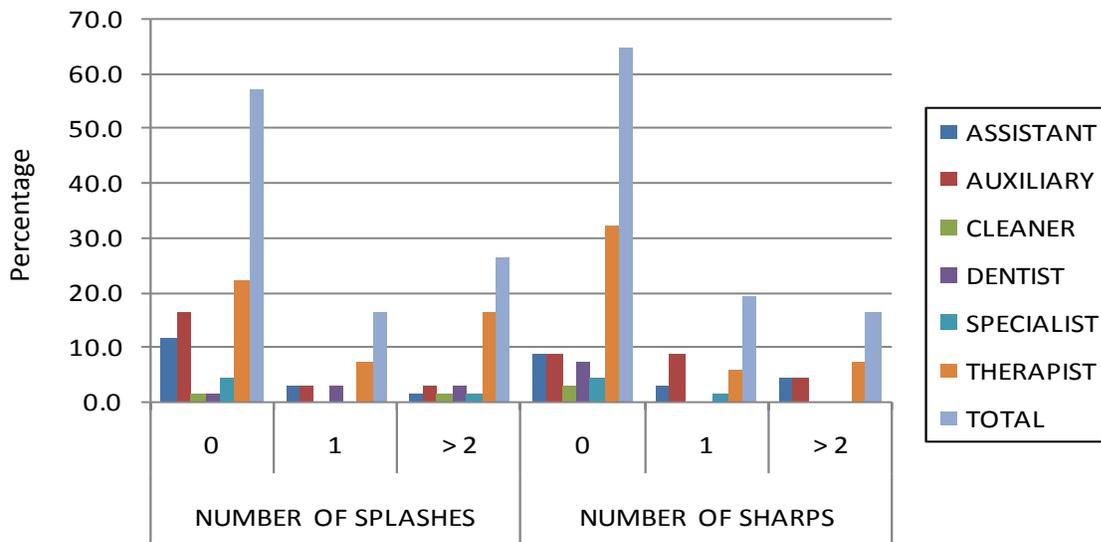


**Fig 3. Number and percentage of OHWs encountering blood and body fluids to the skin or face**

More than 60% of the respondents experienced few splashes to their faces. This was termed “rarely” and defined as 0%-25% of the time spent working. Less than 5% experienced these splashes often (more than 75% of the time). Those who had been working 6 years and less appeared to experience blood and body fluids splashes more ‘rarely’ than those who had worked longer. All those who experienced blood and body

fluids splashes often were found to have worked 9 years or longer. This relationship, however, was not found to be statistically significant (56.587,  $p=0.356$ , FET).

There was no significant link found between encountering a splash from blood or other body fluids and education, profession or attendance of training in cross infection control. However, when analyzing reported use of personal protective equipment and other universal precautions against encountering a splash, it was found that those who were less likely to encounter splashes were those who reported use of masks always (25.855,  $p=0.002$ , FET), used coats (19.070,  $p=0.006$ , FET) and thought that equipment to protect oneself was adequate (18.191,  $p=0.038$ , FET). The association with use of goggles or gloves was not found to be significant at the  $p<0.05$  level (15.870,  $p=0.087$ , FET and 4.808,  $p=0.382$ , FET respectively).



**Fig. 4. Percentage of OHWs' experience of sharps injury and splashes in the last year.**

In the last year, it was found that more than 50% of recipients had received no sharps

injuries or blood or other body fluid splashes. One blood or other body fluid splash was reported by 16% of the respondents while 27% experienced multiple splashes. Nearly one fifth (19%) experienced one needlestick injury in the last year and 16% encountered multiple needlestick injuries. The number of sharps injuries and splashes were not linked to attendance of training, education, length of service, profession, gender or location. The highest number of blood or other body fluid splashes was 20 (n=2) and the highest number of sharps injuries was 10 (n=1) in the last year. The average number of sharps injuries was 0.72, while that of blood and other fluid splashes was 1.62, with standard deviations of 1.52 and 3.78 respectively.

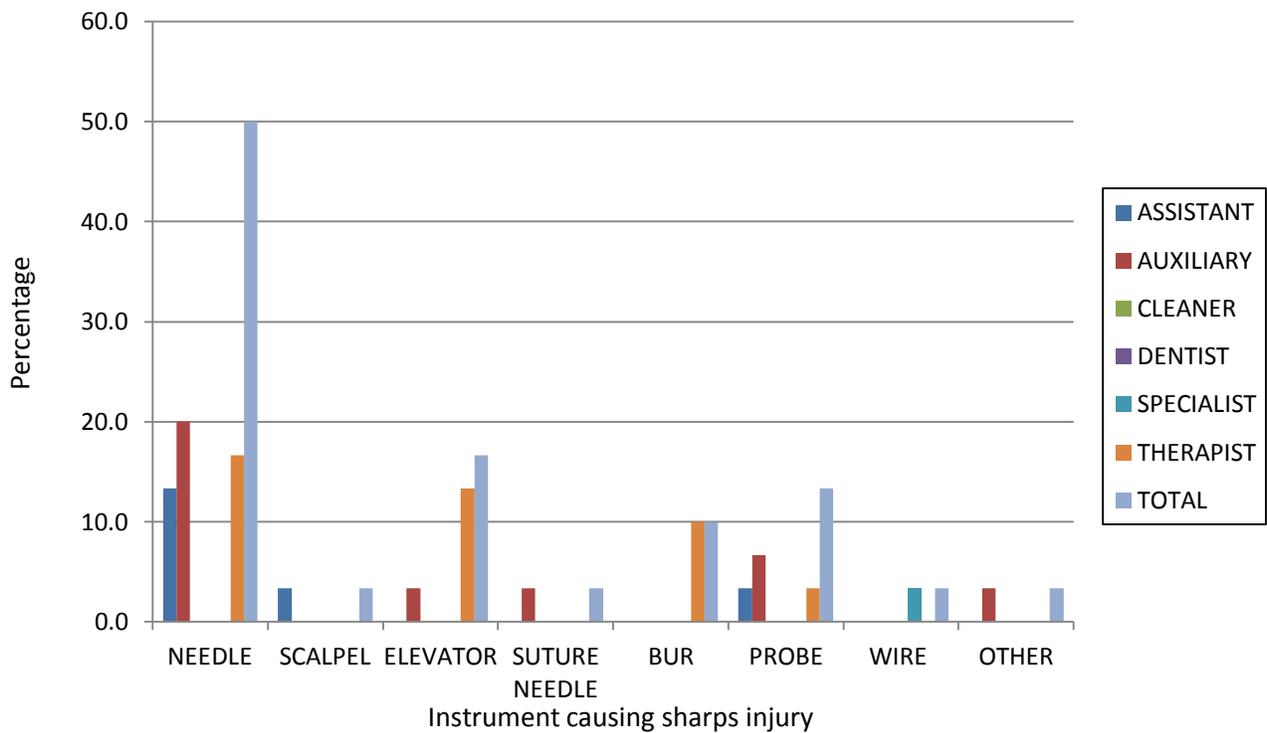
The frequency of sharps injuries was found to be independently associated with variables relating to knowledge of risk from blood borne pathogens, knowledge of UPs, practice of UPs and perception of work climate. A regression analysis using number of sharps in the previous year as the dependent variable and the variables indicated above as independent variables, revealed a limited number of predictors as shown in Table 5.

**Table 5. Predictors of sharps injury in the previous year.**

Variable	$\beta$ coefficient	p value	95% confidence interval	
			Lower	Upper
Sharps containers are available	0.610	0.00	1.862	3.269
At risk of Hepatitis C	0.234	0.05	2.288	1.780
Use gloves always	0.233	0.04	0.810	4.681
Use goggles always	0.206	0.016	0.038	0.352

When sharps injuries were predicted, the perception that sharps containers are readily

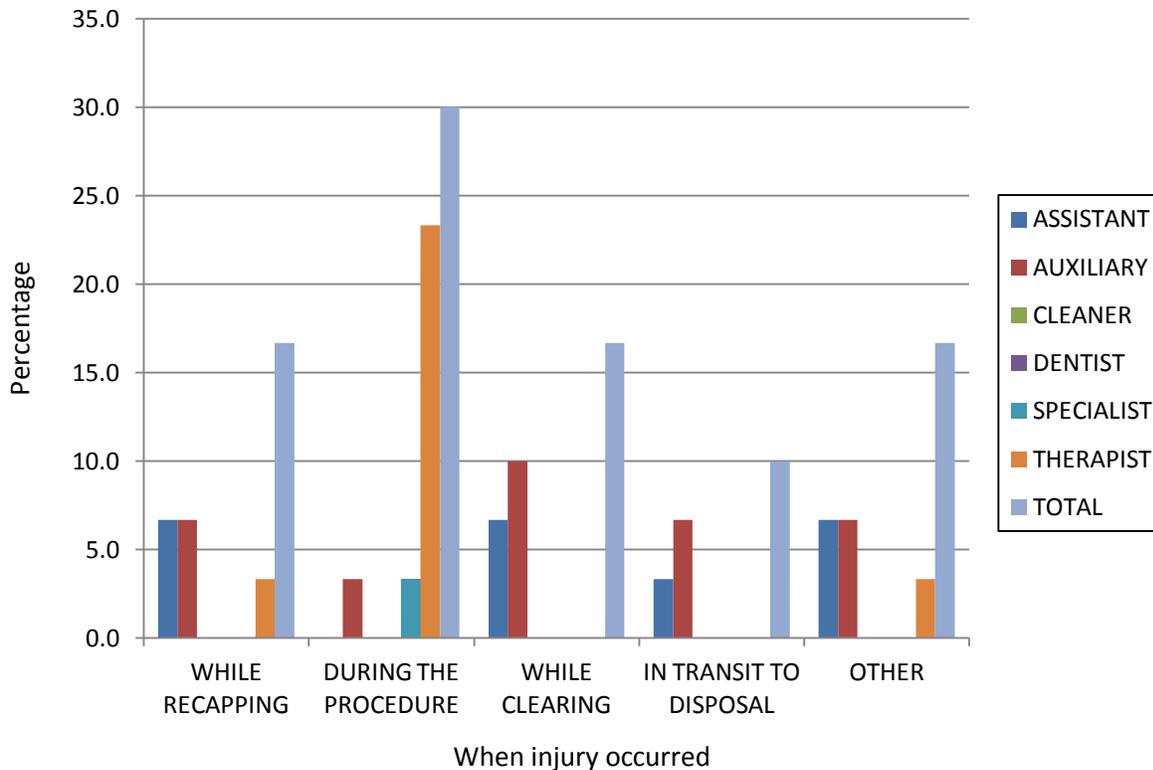
available (beta= 0.610,  $p < 0.05$ ), the knowledge that OHWs are at risk from Hepatitis C (beta=0.234,  $p < 0.05$ ) and the consistent use of glove and goggles (beta =0.233 and 0.206 respectively,  $p < 0.05$ ) were found to be significant predictors. Adjusted  $R^2$  value was 0.557, thus the model accounted for 55.7% of the variance in the number of sharps injuries (adjusted  $R^2 = 0.557$ ;  $F_{4,62} = 21.739$ ,  $p < 0.0005$ ).



**Fig 5. Percentage of OHWs' experience of instrument causing sharps injury (N=30)**

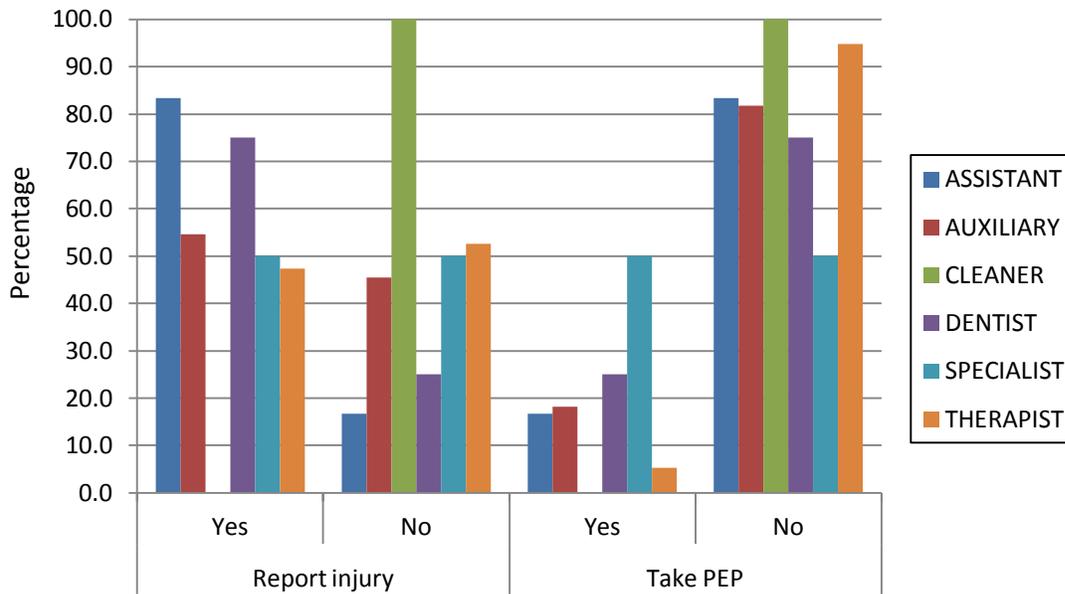
The instrument which was found to cause the greatest number of sharps injury was the needle (49%). The instruments causing the least number of injuries were the scalpel (3%), suture needle (3%) and wire (3%). Other instruments included denture clasps and scaling instruments. A positive association was found between injury with a wire and profession (7.678,  $p = 0.042$ , FET) with specialists being the only profession to experience

injury with this instrument. The needle caused the greatest proportion of injuries. Auxiliaries, therapists and assistants experienced these at 20, 16.7 and 13.3 % of those who experienced sharps injuries.



**Fig 6. Percentage of OHWs' experience of when sharps injury occurred (N=30)**

Most injuries were reported to occur during the procedure (32%), followed by when recapping and clearing (discarding) used instruments (19%). An association was found between professional designation and injury occurring during the procedure (12.619,  $p=0.002$ , FET). Dental therapists were found to be the most likely to have an injury at this time compared to other cadres. A positive association was also found between gender and having an injury during the procedure (12.800 df=1,  $p=0.001$ ,  $\chi^2$ ) with more males reporting being injured during the procedure.



**Fig 7. Percentage of OHWs’reporting injuries and taking PEP by professional category**

Just over half of the respondents (55%) who experienced either a sharps injury or a blood splash reported the incident to the relevant person or supervisor. Only 14% of these reported taking PEP following the incident. Figure 7 shows that nearly all in the assistant category who experienced an injury reported it (83%) and yet nearly all of them did not take PEP (83%). Auxiliaries were split fairly evenly in terms of reporting versus non reporting of an exposure (55% compared to 46%) and yet most of them did not take PEP (82%). Therapists were also fairly evenly split in terms of reporting (44% compared with 56%) and yet almost all of them did not take PEP (94%). Three quarters of the dentists reported the exposure but three quarters of those who experienced an exposure did not take PEP. None of the cleaners who experienced an injury reported and did not take PEP. No significant difference was found between the professional categories or working length, and the reporting of an incident or taking PEP.

**Table 6. Number and percentage of OHWs’reasons given for not reporting incidents and**

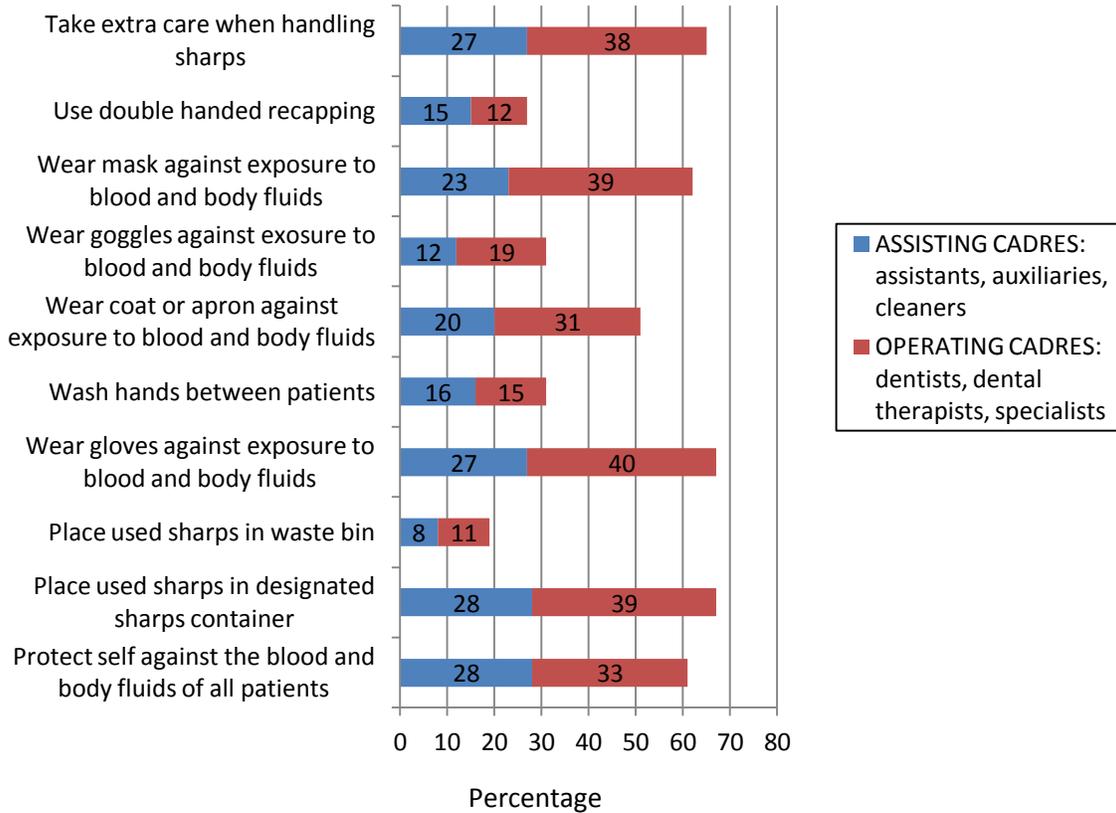
**not taking PEP**

NOT REPORTING INCIDENT		NOT TAKING POST EXPOSURE PROPHYLAXIS	
Reason	Frequency	Reason	Frequency
<b>Did not know who to report to</b>	6 (31.6%)	<b>Did not know PEP was available</b>	10 (27.8%)
<b>Was on trip away from supervisor</b>	1(5.3%)	<b>Did not know who to report to</b>	1 (2.8%)
<b>No risk perceived</b>	2 (10.5%)	<b>Felt no need</b>	8 (22.2%)
<b>Not yet ready to have an HIV test</b>	1 (5.3%)	<b>Prayed to God</b>	3 (8.3%)
<b>Prayed to God</b>	1(5.3%)	<b>Source patient HIV negative</b>	2 (5.6%)
<b>Source patient HIV negative</b>	3 (15.8%)	<b>Supervisor advised little risk</b>	1 (2.8%)
<b>No explanation given</b>	5 (26.3%)	<b>No explanation given</b>	9 (25%)
		<b>Other</b>	2 (5.6%)
<b>Total</b>	<b>19 (100%)</b>	<b>Total</b>	<b>36 (100%)</b>

Some of the reasons for not reporting the incident included: not knowing the correct person to whom to report (32%), no reason cited (26%) and considered the source patient to be HIV negative (16%). For those who did not take PEP, 28% stated they did not know it was available, 25% did not give an explanation and 21% felt no need to take PEP.

There was no relation between professional category and reasons for not reporting injury or taking PEP.

**3.5 Self reported practice**

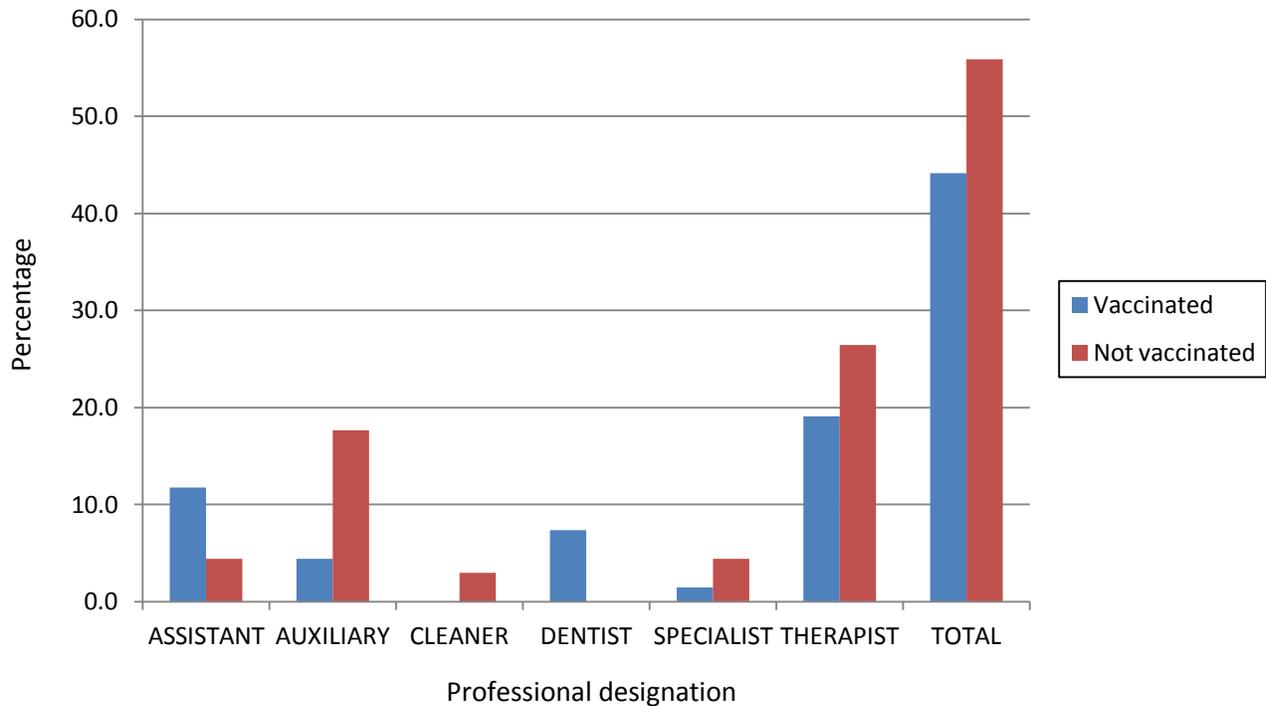


**Fig 8. Percentage of OHWs’self reported practice**

In general, most respondents (>90%) indicated that they always use masks and gloves, as well as protecting themselves against body fluids, taking care when using sharps and correct disposal of sharps. Fewer (75%) reported correct use of coats and/or aprons. Nearly 30 % reported always disposing of sharps inappropriately in waste bins, while less than 40% reported using a double handed recapping method always. Less than 50% reported always washing hands and using goggles.

In comparing the consolidated categories of operating cadres (comprising dentists, specialists and dental therapists) and assisting cadres (comprising DSAs, HCAs and cleaners), it was found that operating cadres consistently outperformed assisting cadres in implementing recommended practice in all aspects that were investigated. They also, however, erroneously placed used sharps in a waste bin in larger frequencies than support staff. This difference, however, was not found to be statistically significant. Significant differences in the recommended practices were only associated with use of masks ( $p=0.039$ , FET) and use of gloves ( $p=0.05$ ,  $\chi^2$ ). Use of goggles was generally low in both categories. Differences within the categories were not statistically significant for any of the practices.

The frequency of washing hands varied significantly between locations (22.278,  $p=0.010$ , FET) as did the likelihood of using goggles (23.777,  $p=0.026$ , FET). The use of goggles was also significantly linked to attendance of training in the previous year (13.117,  $p=0.007$ , FET). Protection of self was found to be significantly linked to profession (16.567,  $p=0.05$ , FET). There was no association between availability and use of PPE.

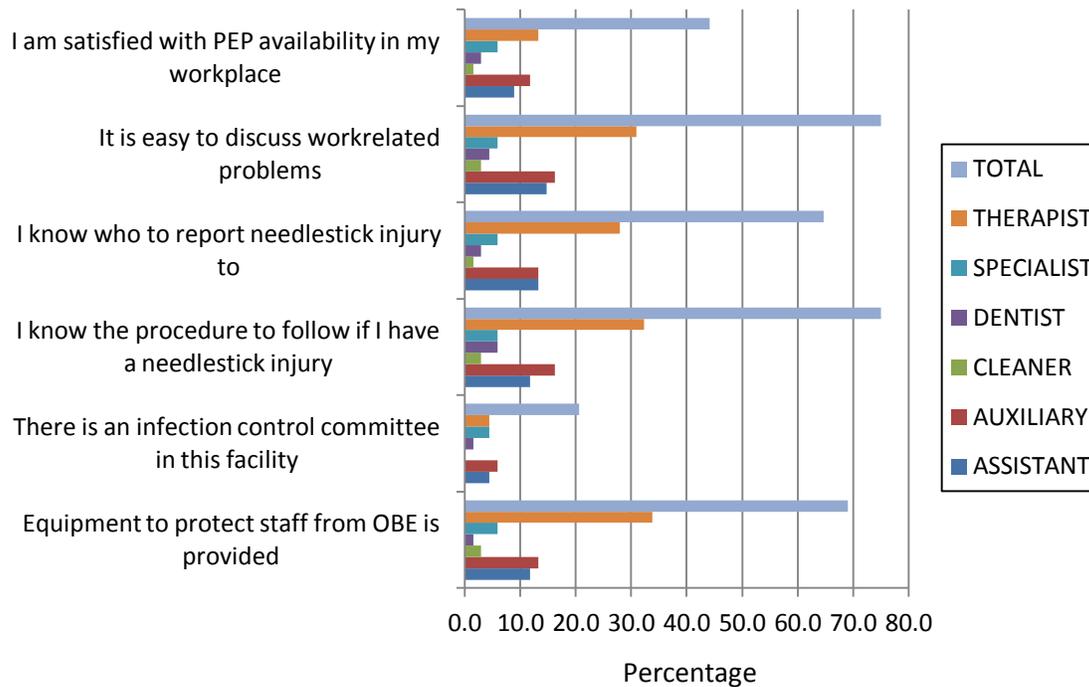


**Fig 9. Reported prevalence of HBV vaccination amongst respondents**

Less than 50% of respondents reported that they had been vaccinated against Hepatitis B as is recommended for HCWs. Forty percent of these had only received a single dose of the vaccine. Only one third had received the recommended three booster doses, while the rest could not remember how many doses had been administered to them. None of the cleaners had ever been vaccinated. Slightly less than half of therapists and 80% of auxiliaries had not been vaccinated. All of the dentists had been vaccinated. These differences between the professional categories were found to be significant (15.142,  $p=0.003$ , FET).

An analysis of variance showed that location had a significant effect on likelihood of complying with requirement to have HBV vaccine. This likelihood differed significantly

across the five locations  $F(3.834, 12.931) = 4.669, p = .002$ ). Respondents in Lobatse were more likely to have been vaccinated  $\{M=0.7, 95\% \text{ CI } (0.35, 1.05)\}$  than those in the other locations combined  $\{M=0.15, 95\% \text{ CI } (-0.07, 0.38)\}$ .



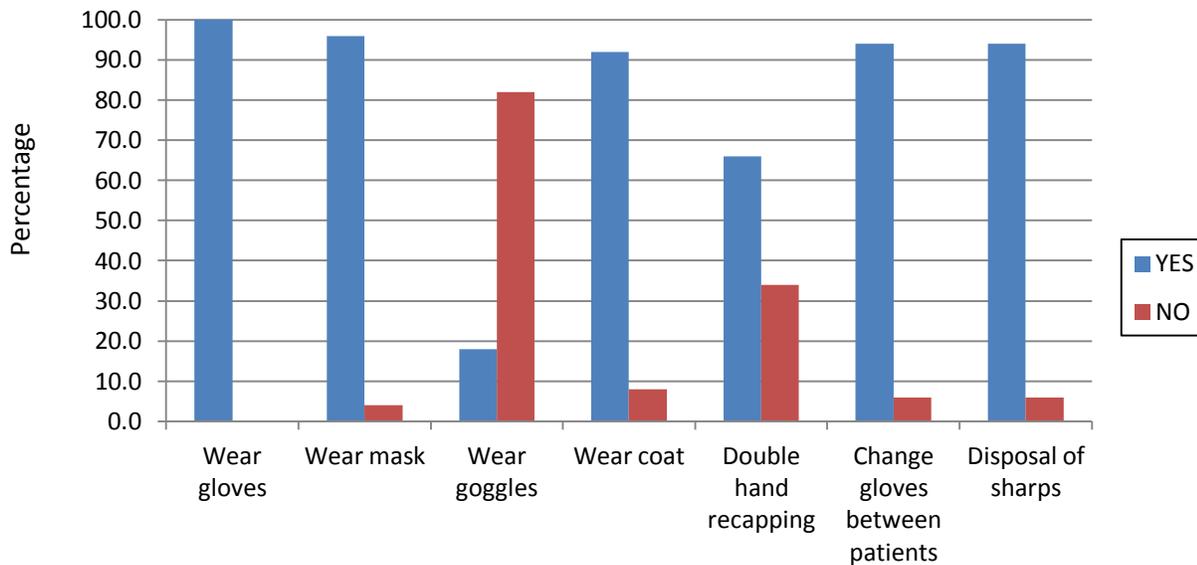
**Fig 10. Percentage of OHWs’ opinion on their work environment**

Less than half the respondents (44%) were satisfied with availability of PEP in their facility. There was also uncertainty regarding the presence of infection control committees (ICC) in facilities. More than 30% of respondents stated that they were not sure if a committee existed while only 20% of respondents were certain of its existence. in their facility Most respondents (69%), however, felt that there was sufficient availability of equipment necessary to ensure safety and that it was easy to discuss work related issues (75%). There was a strong sense from 75% of respondents that the procedure to follow if they had a needlestick injury was known. Two thirds of respondents knew the person to whom to report injuries and exposures. Some aspects of

the overall satisfaction with the work environment were found to be significantly linked to professional designation. The awareness of existence of an ICC and the view that it is easy to discuss work related issues were both associated with profession (25.775,  $p=0.045$ , FET and 29.838,  $p=0.023$ , FET respectively).

Nearly three quarters of the respondents thought there was no written protocol on universal precautions available in their facility. A quarter were not sure, while the rest felt there was one available.

### 3.6 Observation of precautions practiced to prevent exposure.



**Fig 11. Percentage of observed precautions practiced**

As seen in Fig. 11, the wearing of gloves while treating patients was adhered to by all respondents. Nearly all respondents wore a mask and a coat while treating patients (96% and 92% respectively) and changed their gloves between patients (94%). Most (96%) of those observed (34 instances) disposed their sharps themselves into the appropriate

container. In those instances where recapping of needles was observed (38 instances), 66% inappropriately used double handed recapping. Only 18% complied with wearing of eye protection. It was noted that those who wore prescription eye wear did not use goggles. There was only one instance where gloves were perforated and they were changed immediately.

**Table 7. Summary comparison of number and percentage observed and reported practice**

	<b>REPORTED (n=68)</b>	<b>OBSERVED (n=51)</b>
Wear gloves	98.5%	100.0%
Wear mask	91.2%	96.1%
Wear goggles	45.6%	17.6%
Wear coat	75.0%	92.2%
Double hand recapping	39.7%	65.8%(n=38)
Change gloves between patients	*	94.1%
Disposal of sharps	98.5%	94.1%(n=34)
Gloves available	85.3%	100.0%
Mask available	91.2%	98.0%
Goggles available	63.2%	60.8%
Coat available	*	100.0%
Sharps container available	95.6%	86.3%
Universal precautions availability	27.9%	0.0%

\*Question was not asked on questionnaire.

Table 7 summarises the differences between practice reported to occur always and that observed. Most categories showed similar proportions but there were a few discrepancies. Almost half (46%) of respondents stated they used eyewear always while only 18% were seen to do so. Only 40% stated that they use double-handed recapping while 66% were observed to do so. Only 75% reported that they use a coat always and yet 92% were

observed to use them. It was not possible to compare by different professional categories, the self reported and observed practice, as profession was not recorded for the observation phase.

Masks, gloves and coats were available in areas where patients were being treated. Protective coats were brought in by each individual for their own use. Aprons were not always available. In one instance, surgical masks were not available and the operator opted to proceed without one. Sharps containers were available in all surgeries except for observations done in Lobatse, where the sharps container was located in the sterilising area. Protective eye wear was not always readily available and was largely the responsibility of each individual. The sample size varied for recapping and disposing of needles as it was not always the observed respondent who carried out these tasks.

### **3.7 Written policy availability in dental facilities.**

None of the facilities visited had a written protocol or standard precautions available or displayed. In Maun dental clinic, a generic hospital cross infection manual was available while Gaborone had draft guidelines which were not available to staff.

## **CHAPTER FOUR**

### **DISCUSSION**

In this chapter, the findings of the study are discussed in relation to current literature. Each objective will be discussed in turn. Limitations of the study will also be discussed. Conclusions will then be drawn from the findings in the previous chapter. Finally, practical recommendations will be made.

#### **4.1 RESPONSE RATE AND DEMOGRAPHICS**

The response rate for the questionnaire was 80% which is comparable to other related studies. Henry et al. (1992) drew a response rate of 75% for the self response aspect in a study involving observation and self report at an emergency department in the U.S., while Kermode et al.(2005a, 2005b) obtained a response rate of 87% in a similar study . It was not possible to determine how many people took part in both aspects of this study, as there was no coding at this stage to indicate specific individuals. The observation phase drew a response rate of 60%. The relatively high response rate may have been due to respondents having time to complete the questionnaire as several days were spent at each facility, the relatively low effort involved in returning the questionnaire and participating in the observation, and the researcher's presence may have served as a reminder. The perceived benefit of having recommendations developed from respondents' feedback may also have influenced participation. The origin or source of a survey is considered to influence response rate and in this instance, respondents may have recognised it as originating from a "colleague". The topic may also have been considered to be relevant and current (Edwards et al, 2002; Harrison and Cock, 2004)

The largest number of respondents was from Gaborone clinic which also has the largest number of staff. This was expected, as it is the largest referral facility in the country. The largest group represented were the dental therapists who also made up the largest professional group in the workforce. There were two cleaners who took part in the survey as in their line of duty they have had to assist clinicians while treating patients. There were slightly more females than males and this reflected the makeup of the oral health workforce as a whole. Respondents had worked on average for just over eight years with the longest working period being 24 years. DSAs had the longest periods of service while health care auxiliaries had the shortest working period; being a newly introduced cadre in the health field in Botswana. Most of the respondents had tertiary level education (dentists and dental therapists) and the least attained level of education was primary (cleaners). Health care auxiliaries gave varied responses, some stating they had tertiary education while others stated that they had 'O' level education. This demographic information will be useful for tailoring appropriate recommendations.

#### **4.2 KNOWLEDGE OF RISKS ASSOCIATED WITH BLOOD BORNE PATHOGENS**

There was good knowledge of risks associated with blood borne pathogens although this did not translate into practice as will be outlined later. Only 26.5% of respondents were aware that saliva was an unlikely infective agent for blood borne disease particularly HIV. This confusion may arise from the fact that HIV, HBV and HCV are detectable in the saliva. There have been investigations into, and questions raised, about saliva as an agent for HBV (van der Eijk et al., 2004) but it is still deemed to be an unlikely agent for

HIV and HCV (Goncalves et al., 2005).

Almost 90% of the respondents stated there was high risk of ‘catching’ blood borne diseases from treating infected patients, and 72% thought there was a high likelihood of cross infection associated with TB. Despite this, there was under reporting of exposures and unwillingness to take PEP as will be discussed elsewhere in this chapter.

One of the tenets of Universal (Standard) Precautions (Appendix A) is to treat blood of all patients as potentially infectious as it is not always possible to know, even after taking a medical history, if someone is a carrier of a blood borne disease. However, 66% of the respondents felt it was not possible to treat the blood of all patients as potentially infective which in turn may then influence the adherence to guidelines. Training would have to address this pertinent issue. Twenty one percent of respondents incorrectly considered routine testing for HIV, which is offered to all patients in government facilities in Botswana, to be part of Universal Precautions. It is offered to all patients as a means of encouraging the knowledge of HIV status and promote uptake of ARVs.

Shahid and colleagues (2005) indicated that there was an increased risk of infection with HIV when there was increased numbers of infected patients. This means, if more dental patients presenting for treatment were HIV positive, then a dentist would have more frequent encounters with potential exposure. Current figures vary depending on source but BAIS II (Botswana Government, 2005) puts the national HIV prevalence rate for people aged 18 months to 60 years as 17%, while UNAIDS (2009) estimates it at 24%.

This was used as an estimate for patients presenting at clinics, although prevalence varies from region to region. About half (44%) of respondents thought that a quarter to half the patients presenting to the facilities were infected with HIV. This perception of high prevalence would then motivate staff to practice UPs more frequently and stringently. Observation of UPs corroborates this, particularly with respect to certain practices such as use of coats, gloves and masks (barrier protection), which were used almost 100% of the time. Lack of knowledge may, however, prevent full compliance with UPs (Janjua et al., 2007), and may be responsible for the lack of compliance with other aspects of UPs.

The risk of contracting HBV from a percutaneous injury ranges from 20-60%, which is a significant risk to dentists (CDC, 2006). It is recommended that all healthworkers who are exposed to blood or body fluids be vaccinated against HBV following a three dose protocol of 0, 1 and 6 months. One of the recommendations of the CDC is that dentists be immunised against HBV and that exposed individuals be provided with post exposure prophylaxis. In Botswana, there are currently no requirements for OHWs to be vaccinated against HBV and no PEP for HBV is offered. Most of the respondents felt there was a risk from HIV but less than half felt there was risk from Hepatitis B. This may explain the poor compliance with HBV vaccination. Despite increasing concern for Hepatitis C infections, only 12% felt there was any risk to oral health workers from it. The lack of awareness may be due to the paucity of information regarding HCV in Botswana. This perception of low risk would again influence how well one tries to prevent exposure (Janjua et al., 2007).

Current recommendations are that post exposure prophylaxis be taken within an hour of exposure and certainly within 24 hours for HBV and no more than 36 hours for HIV post exposure in order to stand a chance of preventing infection (CDC, 2005). This raises concern for the 15% of respondents who stated they had not heard of PEP and would therefore, not take it. Although PEP was available at all facilities visited, up to 25% of respondents were not sure of its availability or thought it unavailable. Thus, even after an OBE, compliance with procedures could be expected to be low as the assumption would be that PEP was not available.

Sixty percent of respondents had heard of Universal Precautions. This was considerably lower than the findings in a study carried out amongst health workers in India where only 12% were unfamiliar with Universal Precautions (Kermode et al., 2005b). The forty percent who are unaware of Universal Precautions would have difficulty applying its principles and thus be vulnerable to OBEs. Despite the arguments that knowledge improves compliance (Janjua et al., 2007), there are studies that indicate that knowledge does not always translate into practice as there are other barriers to compliance (Gershon et al., 1991). While this study did not analyse barriers to compliance it would be presumptuous to assume lack of knowledge to be the sole impediment. This will be taken into consideration in the recommendations.

### **4.3 BLOOD EXPOSURE EXPERIENCE**

Most respondents reported that blood splashes occurred rarely (0-25%) in their line of work. Sharps injuries followed a similar pattern with 35% experiencing needlestick

injuries. This rate of injury is lower than found in other studies. One study found that 100% of dentists had suffered a needlestick injury over a period of one year (Adegboye et al., 1994) while Tarantola et al. (2005), Vong et al. (2005) and Edwards et al. (2005) reported rates between 53% and 80%. It is unlikely that the low rate encountered in this study is due to recollection bias alone as other studies have also utilised periods of one year. It should be noted that these studies were carried out a few years ago and findings may no longer be applicable today. The low rates may then indicate that Universal Precautions are effective to a limited extent, but would not suggest that there is no scope for improvement.

The number of predictors identified was small due to the very small sample in this study. The results are to be treated with caution. However, similarities to predictors in other studies were found. Kermode et al. (2005a) found that predictors for percutaneous injury included perception of risk and compliance with universal precautions. Contrary to the findings in this study, however, Kermode et al. (2005a) found that professional category and hospital site (location of facility) were also predictors for percutaneous injuries. This can be attributed to the numbers in these samples being very limited in the current study, with three out of six professional categories having 5 or less respondents

Less than 20% of respondents reported one blood or other bodily fluid splash incident in the last year while 27% experienced multiple splashes. One fifth (19%) experienced one sharps injury in the last year and 16% suffered multiple injuries. Another study found 40% of respondents had experienced multiple sharps injuries (Botteman et al., 2005).

The study reported lower experiences of multiple splashes but it is still of concern that a quarter of respondents experienced multiple exposures as increased frequency of blood exposure increases the risk of infection (Tarantola et al., 2005).

The instrument causing the greatest number of injuries (49%) was the needle. The injuries occurred mainly during procedures, but also while recapping needles and clearing the instruments. Shah et al. (2006) found that dental assistants were injured by needles while clearing away and disposing of instruments from trays. This presents an ideal opportunity for exposure reduction by introducing safe techniques. Dentists in that study (Shah et al., 2006) were injured mainly while administering anaesthetic and recapping. While double handed recapping clearly provides ample opportunity for injury, injuries with the elevator, probe and bur suggest incorrect handling of these instruments too.

Since assistants, mainly DSAs and auxiliaries, clear instruments following treatment of a patient, it would suggest that this category of worker would be more susceptible to injury at this time. However, no relationship was found to validate this supposition. This does not negate the need to acknowledge this as a high risk process. The nature of the needle is such that it requires unscrewing to detach it from the syringe, exposing a sharp end. This makes it difficult to comply with recommendations that needles not be removed from the device before being discarded using the current injecting devices in Botswana dental facilities (CDC, 2003). The need for repeated injections during treatment of a patient also exposes OHWs to risk of injury.

Of those who experienced injuries and splashes, just under half (45%) did not report them. This is similar to the findings of Cervini and Bell (2005) who found that half of the respondents did not report exposures. Tarantola et al. (2005) reported that 69% did not report exposures. In this study, respondents most frequently (65%) stated they knew whom to report needlestick injuries to. However, when exposures had occurred, the most frequently given reason for not reporting was not knowing who to report to. This may indicate that those who are exposed are those who are not familiar with Universal Precautions but this was not explored. Other reasons included the source patient being HIV negative, although a limitation of the questionnaire is that it did not enquire how the patient's status was determined. Persistent under reporting could lead to the burden of the problem being unrecognised with the likelihood that little will be done to correct it. The need for safer devices such as needle recapping devices and disposable syringe systems is recognised (CDC, 2003; Shah et al., 2006) but without the supporting data, justifying costly change or innovation that requires capital investment, becomes difficult. The burden of disease attributable to occupational exposure also becomes inestimable and the true cost will not be known.

PEP was taken by only 14% of those who sustained an injury. Reasons for not taking it included not knowing it was available, feeling no need to take it, thinking the source patient was HIV negative and being advised by a supervisor that there was little risk of infection. As some of the respondents are supervisors, and knowledge of PEP has been shown to be suboptimal, it cannot be assumed the supervisors' knowledge is complete. Having procedures and processes in place would allow for more effective counselling

where choices would be based on information rather than on speculation.

#### **4.4 SELF REPORTED AND OBSERVED PRACTICE**

This study, like others, found that not all respondents reported using PPE at all times when it was deemed necessary. A previous study carried out in Botswana into quality of dental care services, also reported a haphazard use of personal protective equipment (Kefas, 2000).

Gloves, masks and protective coats were reported to be well utilised. For coats this is most likely due to the fact that each individual is provided with coats and is then responsible for bringing them into the dental surgery every day. However, one respondent reported never using gloves, which is an unlikely scenario and could well be a misinterpretation of the question as no ungloved hands were noted during the observation aspect of the study. Eye protection was least well adhered to both through self reporting and observation. Those who wore prescription eye wear did not always supplement this with goggles or visors as recommended (CDC, 2003). This low compliance may in part be due to the poor availability of eye protection. This was also noted in the observation study where only 61% of the procedures observed had access to goggles. In other studies, one of the reasons for non compliance with eye protection was decreased visibility (Henry et al., 1992).

Despite being specifically cited as a high risk behaviour for increasing risk of injury (CDC, 2003), over 60% reported using double handed recapping method for recapping

needles at least sometimes. This may well be why 21% of needlestick injuries occurred during recapping. Similarly, Vong et al., (2005) found that 58% of respondents in Cambodia used double-handed recapping. In a study carried out in an Emergency Room, (Henry et al., 1992), it was found that double handed recapping occurred 79% of the time when respondents were observed.

Correct disposal of sharps was unclear because all respondent stated using designated containers and yet when later asked nearly 30% reported always disposing sharps in waste bins. This may be the fault of a poorly understood question, or honest respondents. Adegboye et al. (1994) reported that 23% of respondents stated that they disposed needles incorrectly after use. Incorrect disposal of needles and sharps in the dental setting places others outside the profession at risk, particularly other patients and those responsible for waste handling. In the same way, there was poor compliance with hand washing. Less than half of all respondents reported always doing it. In Gaborone, hand washing technique was displayed on the unit walls but during observation, it was noted that most only rinsed glove powder off between glove changes. In all the facilities visited, soap was not always available in soap dispensers.

While the impact of the layout and accessibility of utilities was not investigated in this study, it was noted that certain logistics made compliance appear cumbersome. Soap dispensers and hand towels were placed well away from the operator (OHW) in some of the surgeries requiring the movement around the dental chair and across the room. Sharps containers were not always located in the area where treatment was being carried

out. This meant only the person clearing away the instruments could dispose of needles and this was usually the assistant (DSA or HCA).

Studies have noted poor compliance with HBV vaccination despite knowledge of risks and the clear consequences of the disease (Almeida et al., 1990; Naidoo 1997; McCarthy 2000). In this study, less than half of the respondents thought OHW were at risk of contracting HBV and more than half thought none of the patients attending their facilities could be carriers. This is unlikely since Botswana has a prevalence rate of 14%. Forty four percent had had HBV vaccine in their careers. This included all of the dentists but none of the cleaners. A significant relationship was found between professional designation and HBV vaccination status. This again raises the concern for those who are exposed to blood who have neither formal training, nor an environment which supports their ongoing frequent education.

Work environment was investigated as it impacts on practice (Kermode et al., 2005b). Aspects of the physical, organisational and emotional environment were looked into. Just over 20% of respondents agreed that there was an infection control committee (ICC) in their facility. Only Maun Hospital had a member of the dental team sitting on their ICC. The hospital is a relatively small one and is quite remote. This may result in relations between all departments being good as a necessity for service delivery. This would allow collaboration with the dental team which was not evident in other facilities.

At the time of the study, it was noted that there was an acute shortage of gloves in one of the facilities (Phikwe) and operators had to be content with poorly fitting gloves. Ansa et

al., (2002) when investigating occupational risk of infection by HIV in south-eastern Nigeria also found widespread shortage of gloves, and protective eyewear was not available at all (Ansa et al., 2002).

PEP availability was considered satisfactory by 43% of the respondents while 37% were unsure of its availability. The procedure to be followed after an exposure was known to 75%. Government guidelines are specific about the procedure to be followed after OBE (Botswana Government, 2008). All the facilities visited are based in hospitals that are ARV sites (Botswana Government, 2008) and therefore availability of PEP should be guaranteed. For staff to show a lack of this knowledge raises concern about awareness raising and education.

#### **4.5 OBSERVATION OF PRECAUTIONS PRACTICED TO PREVENT EXPOSURE**

Observation is usually used in conjunction with or instead of self reported practice to obtain a more accurate picture of practice (Henry et al., 1992). This objective was used to substantiate and support self reported practice as far as possible. While fewer respondents opted to participate in this phase of the study, there was still a good response rate of 60%. The findings have been discussed in conjunction with objective three and other aspects of this study.

#### **4.6 WRITTEN POLICY AVAILABILITY IN DENTAL FACILITIES.**

It is a general recommendation that procedures be displayed as flow charts and written

protocols are made available to staff in order to increase compliance (CDC, 2006). This objective aimed to determine how far facilities met this criterion.

Nearly half the respondents did not know if there was a written protocol for UP or CIC available in their facility. None of the facilities were able to produce a protocol. Maun hospital had the use of a hospital cross infection manual. This manual, however, was not tailored to the dental setting. Gaborone had draft guidelines which were not finalised and thus not available to staff.

However, it may not always follow that displayed procedures are more easily complied with. Other factors influence compliance such as environmental barriers, personal or attitudinal barriers and process barriers (Chagpar, Banez, Lopez and Cafazzo, 2010). This was seen in Gaborone where there was a written hand washing guide displayed on the walls of operating areas but the environment or layout played a greater part by making it difficult that this procedure was always done, and when done, it was not according to the displayed instructions.

#### **4.7 LIMITATIONS**

When considering the findings of this study and implementing the recommendations the following limitations should be borne in mind:

##### Tools:

Self administered questionnaires do not always represent an accurate picture of practice. One of the reasons is that there is the possibility that questions are not understood in the same way by different respondents. Although the questionnaire was translated to

Setswana and then back into English, it may not have been possible to convey the meaning of all questions to Setswana, particularly the use of scientific terminology, for example, universal precautions. In an effort to overcome this, the questionnaire was pre-tested but was not validated. The researcher was also available for clarification while respondents were completing the questionnaire.

The standardization of questions may have overlooked some key information peculiar to individual participants. While closed ended questions are useful for analysing data by limiting the number of options that can be given as answers, there is the risk of missing vital information that may not have been included in the options given. This was overcome in some form by allowing free phrasing when reasons for non compliance with PEP and reporting actions were sought in the questions. This does not, however, eliminate this limitation. The use of the “agree-disagree” scale may have raised the problem of response acquiescence, where respondents tend to agree with statements. The use of both positively and negatively phrased questions was used to in an effort to address this.

Surveys that require recollection of information are known to contain an element of recall bias (Hassan, 2006). While attempts to overcome this were made by introducing an aspect of observation, this potentially introduced response bias with those more certain of their safe practice being more willing to participate. It is also possible that performance while being observed was modified, as respondents are known to seek to be socially and professionally desirable when participating in surveys (King and Bruner, 2000).

However, respondents did not have access to the observation sheet and therefore, did not know what issues or procedures were noted. The use of real patient treatment sessions aimed to create a normal working environment to elicit normal responses. There were no records to validate frequency of exposures.

#### Sampling:

The sample was selected using the convenience method; opting to visit those facilities that were easily accessible and have large numbers of staff. This, however, meant that the sample was not necessarily representative of the whole population of OHWs and the findings may not be generalisable to all oral health facilities. Another reason that adds to the sample being non representative is that the sites are dissimilar to satellite facilities. In satellite facilities the most senior member of staff is a dental therapist. Despite this limitation, inferences were made, more for the purposes of making recommendations rather than finding statistical relationships.

There were different response rates for the observation and questionnaire aspects of the survey. Therefore, comparison of the relevant parts of these should be treated with caution, as proportions compared are not from similar group sizes.

#### Exclusion criteria:

The exclusion of staff who had not treated patients in the last year may incorrectly suggest they would not have been previously exposed. However, the period of exposure and practice under study was the year prior to the study and contributed to two key

objectives. Therefore, these staffs had to be excluded.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATIONS**

#### **5.1 CONCLUSION**

The study aimed to quantify the occupational blood exposure experience of OHWs in Botswana's public service and determine infection control practices. In general, contrary to findings elsewhere, there was a low number of incidences per person overall, with 35% needlestick injuries and 47 % bloodsplashes in the last year. However, there was poor reporting of incidents mainly due to lack of knowledge, which suggests poor information dissemination. The lack of clear written guidelines made it difficult to know what to follow and what to enforce. The limitations of the study, in particular the validity of the tool, may have influenced the reported incidences.

Recommended cross infection control guidelines were fairly well adhered to but with notable low compliance of personal protective equipment, particularly relating to use of protective eye wear. There were also low levels of Hepatitis B vaccination. This could be due to lack of knowledge or the result of having no set standards or policies or protocols. Poor uptake of PEP was evident which seemed due to a lack of knowledge combined with fear and unwillingness to investigate for HIV.

#### **5.2 RECOMMENDATIONS**

The rates of OBEs given the high prevalence rates of blood borne infections require that OHW safety be made a priority. Making it a standalone objective in the annual

performance plan (APP) of the Oral Health Division would give it the impetus it deserves and initiate activities into decreasing OBEs. Based on the findings the following recommendations are made:

Practical:

Occupational exposures

In order to create awareness of occupational exposures and their consequences clear **guidelines** should be drawn up, made accessible to all staff at all times, workshopped and flowcharts should be displayed indicating procedures to follow in the event of an exposure.

All staff should be **trained** in cross infection control with particular emphasis on use of personal protection and safe instrument handling techniques such as not using double handed recapping. **Safer injection devices** should be utilised and safer injection techniques employed. Investment in recapping devices and disposable injection systems should be made. Retraining of staff should be done to introduce better practices such as the use of dental mirrors to retract soft tissues. Training should be offered periodically, ideally annually. If this is included in annual plans, it can be easily monitored. Every facility should have an **Infection Control Officer** (ICO). Training could then be carried out or facilitated at facility level by the local ICO.

**PPE** should be adequately planned and budgeted for and made apriority. Its availability should be guaranteed for all procedures.

**Monitoring** of exposures needs to be implemented or improved. Immediate and correct documentation of every adverse exposure should be done following the guidelines in CDC PEP steps (CDC 2006). Monitoring and reporting should be the responsibility of the ICO. If monitoring is set as a target in the APP then quarterly reporting will become mandatory.

#### HBV vaccination

Clear **guidelines** on the organisation's policy on Hepatitis B vaccination need to be drawn up and implemented. Staff should be **educated** and **assisted** to know and update their HBV status. Assistance should include the ICO liaising with the facility's HBV provider (usually the Maternal and Child Care Unit) to arrange for staff who are due for revaccination to be attended there. The ICO should also give reminders to these staff members who are due for vaccination.

#### Research:

Further research is recommended into the use, or lack thereof, of **PEP** by practitioners as it is an accepted means of minimising risk of infection with HIV and HBV. There seems to be a poor uptake of PEP despite it being available at no cost. The reasons for the poor uptake need to be identified and addressed by relevant means such as in service lectures, workshops and also provision of counsellors specifically for HCWs in general and OHWs in particular.

When this or other similar studies are repeated, it would be beneficial to determine how patients are deemed to be HIV negative when OHWs choose not to take PEP. The consideration of a patient being in the “window period” should also be investigated.

An improved methodology with a different sampling, and a tool validated after translation, would be beneficial in allowing results to be generalisable. This would provide evidence on which to base policy change.

## REFERENCES

1. Adegboye, A.A., Moss, G.B., Soyinka, F., Kreiss, J.K. (1994) The epidemiology of needlestick and sharp instrument accidents in a Nigerian Hospital. *Infection Control and Hospital Epidemiology* 15(1): 27-31
2. Aderinokun, G.A., Taiwo, J.O. (2002) Assessing cross infection prevention measures at the Dental Clinic, University College Hospital, Ibadan. *African Journal of Medicine and Medical Science* 31(3): 213-7
3. AIDS/STD Unit (2003) *HIV/AIDS surveillance report 2003*, Ministry of Health. Government Printer. Gaborone.
4. Almeida, O.P. de, Scully, C., Jorges, J. (1991) Hepatitis B vaccination and infection control in Brazilian dental practice. *Community Dentistry and Oral Epidemiology* 19: 225-7
5. Ammon, A., Reichart, P.A., Pauli, G., Petersen, L.R. (2000) Hepatitis B and C among Berlin dental personnel: incidence, risk factors, and effectiveness of barrier prevention measures. *Epidemiology and Infection* 125(2): 407-13
6. Ansa, V.O., Udoma, E.J., Umoh, M.S., Anah, M.U. (2002) Occupational risk of infection by Human Immunodeficiency and Hepatitis B viruses among health workers in south-eastern Nigeria. *East African Medical Journal* 79(5): 254-256
7. Avery, C.M.E., Gallagher, P., Birnbaum, W. (1999) Double gloving and a glove perforation indication system during the dental treatment of HIV positive patients: are they necessary? *British Dental Journal* 186(1): 27-29
8. Botswana Government (2001) *2001 Population census*, Government Printer. Gaborone.

9. Botswana Government (2005) *Botswana AIDS Impact Survey II 2004 Statistical Report*, Government Printer. Gaborone, Botswana.
10. Botswana Government (2008) *Botswana National HIV/AIDS Treatment Guidelines: 2008 Version* [www.moh.gov.bw](http://www.moh.gov.bw) [Accessed 20/02/2010]
11. Botteman, M.F., Lee, J.M., Lobden, D., Nicklasson L., Pashos C.L. (2005) Needlestick injury in acute care nurses caring for patients with Diabetes mellitus: a retrospective study. *Current Medical Research and Opinion* 21(5): 741-7
12. Center for Disease Control and Prevention (2003) Guidelines for infection control in dental health-care-settings. *MMWR Surveill Summ* 2003; 52, RR-57
13. Center for Disease Control and Prevention (2005) Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Post Exposure Prophylaxis. *MMWR Recommendations and Reports* 2005; 54:RR-9
14. Center for Disease Control and Prevention (2006) *PEP Steps- A Quick Guide to Post Exposure Prophylaxis in the Health Care Setting*. [Leaflet] Mountain Plains AIDS Education and Training Center. Denver, Colorado.
15. Cervini, P., Bell, C. (2005) Brief report: needlestick injury and inadequate post exposure prophylaxis practice in medical students. *Journal of General Internal Medicine* 20 (5): 419-21
16. Chagpar, A., Banez, C., Lopez R., and Cafazzo, J.A. (2010) Challenges of hand hygiene in healthcare: The development of a toolkit to create supportive processes and environments. *Healthcare Quarterly* 13 (Sp) 2010: 59-66
17. DePaola, L.G. (2004) Infection control and dental practice: frequently asked

- questions. *Compendium of Continuing Education in Dentistry* 25(1 suppl): 38-42
18. Edwards, P., Roberts, I., Clarke, M., DiGiuseppi, C., Pratap, S., Wentz, R. and Kwan, I. (2002) Increasing response rates to postal questionnaires: systematic review. *British Medical Journal* 324(7347): 1183  
<http://www.bmj.com/cgi/content/full/324/7347/1183> [Accessed 20/02/2010]
19. Edwards, C., Metcalfe, L., Alan, J., Haynes, A. (2005) Reducing the risk of injuries to staff from insulin pens. *Nursing Times* 101(25): 34-6
20. Fasunloro, A., Owotade, F.J. (2004) Occupational hazards among clinical dental staff. *The Journal of Contemporary Dental Practice* 5(2): 1-10
21. Gershon, R., Curbow, B., Vlahov, D., Celentano, D.D., Saah, A.J. (1991) Low compliance with universal precautions among hospital employees despite high perceived risk. *International Conference on AIDS*. 1991 Jun 16-21; 7: 434 (abstract no. W.D.4187).
22. Gershon, R., Karkashian, C., Vlahov, D., Grimes, M., Spannhake, E. (1998) Correlates of infection control practices in dentistry. *American Journal of Infection Control* 26 (1): 29-34.
23. Goncalves, P.L., Cunha, C.B., Busek, S.C.U, Oliveira, G.C., Ribeiro-Rodrigues, R., Pereira, F.E.L. (2005) Detection of Hepatitis C virus RNA in saliva samples from patients with seric anti-HCV antibodies *Brazilian Journal of Infectious Diseases* 9(1): 28-34
24. Gonzalez, Y.M. (1998) Occupational diseases in dentistry. Introduction and epidemiology. *New York State Dental Journal* 64(4): 26-8
25. Gordon, B.L., Burke, F.J.T., Bagg, J., Marlborough, H.S., McHugh, E.S. (2001)

- Systematic review of adherence to infection control guidelines in dentistry.  
Journal of Dentistry 29 (8): 509-16
26. Harrison, R.A. and Cock, D. (2004) Increasing response to a postal survey of sedentary patients – a randomised controlled trial. BMC Health Services Research 4:31doi:10.1186/1472-6963-4-31 <http://www.biomedcentral.com/1472-6963/4/31#B22>[Accessed 20/02/2010]
27. Harte, J.A. (2004) Looking inside the 2003 CDC dental infection control guidelines. Journal of the California Dental Association 32(11): 919-35
28. Hassan, E. (2006) Recall bias can be a threat to retrospective and prospective research designs. The Internet Journal of Epidemiology 3(2) <http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ije/vol3n2/bias.xml> [Accessed 20/02/2010]
29. Henry, K., Campbell, S., Maki, M. (1992) A comparison of Observed and Self-reported compliance with Universal Precautions among emergency department personnel at a Minnesota Public Teaching Hospital: Implications for assessing infection control programs. Annals of Emergency Medicine 21(8), 940-946
30. Hersey, J.C., Martin, L.J. (1994) Use of infection control guidelines by workers in health care facilities to prevent occupational transmission of HBV and HIV: results from national survey. Infection Control and Hospital Epidemiology 1994;15:243-52
31. Huber, M.A., Terezhalmay, G.T. (2007) HIV: infection control issues for oral healthcare personnel Journal of Contemporary Dental Practice 8(3): 1-12.
32. Huff B (2003) ARV in sub-Saharan Africa: 17 reports. *Newsletter of experimental*

- AIDS therapies*. 2003 July/August vol 17 number7-8.
33. Janjua, N.Z., Razaq, M., Chandir, S., Rozi, S. and Mahmood, B. (2007) Poor knowledge – predictor of non-adherence to universal precautions for blood borne pathogens at first level care facilities in Pakistan. *BMC Infectious Diseases* 7:81 doi:10.1186/1471-2334-7-81. <http://www.biomedcentral.com/1471-2334/7/81>[Accessed 20/02/2010]
  34. John, M. (2000) Risk of bacterial transmission in Dental Practice. *Journal of the Canadian Dental Association* 66: 550,554
  35. Kefas, J. (2000) Study on the quality of clinical oral health services in the five main oral health centres- Botswana. <http://www.shared-global.org/projectsummary.asp?Kennummer=3079>[Accessed 23/06/2005]
  36. Kermode, M., Jolley, D., Langkhan, B., Thomas, M., Crofts, N. (2005a) Occupational exposure to blood and risk of blood borne virus infection among healthcare workers in rural north India healthcare settings. *American Journal of Infection Control* 33(1): 34-41
  37. Kermode, M., Jolley, D., Langkhan, B., Thomas, M., Crofts, N. (2005b) Compliance with Universal/Standard Precautions among health care workers in rural north India. *American Journal of Infection Control* 33(1): 27-33
  38. King, M. and Bruner, G. (2000) Social desirability bias: a neglected aspect of validity testing. *Psychology and Marketing* 17(2):79-103
  39. Kotelchuck, D., Murphy, D.C., Younai, F.S. (2001) Occupational exposure to blood in a dental teaching environment: results of a ten year surveillance study. *Journal of Dental Education* 65(5): 436-48

40. Mayfield, E. (1993) Protecting patients and professionals from blood borne disease. *FDA Consumer Magazine* April 1993. [www.fda.gov](http://www.fda.gov)[Accessed 13/01/2006]
41. McCarthy, G.M. (2000) Risk of Transmission of Viruses in the dental office. *Journal of the Canadian Dental Association* 66: 554-5
42. McCarthy, G.M., MacDonald, J.K. (1998) Improved compliance with recommended infection control practices in the dental office 1994–1995. *American Journal of Infection Control* 26(1): 24–8
43. Mehtar, S., Shisana, O., Mosala, T. & Dunbar, R. (2007) Infection control practices in public dental care services: findings from one South African Province. *Journal of Hospital Infection* 66: 65-70
44. Mwaniki, N.K. (2007) Needlestick injuries among health care workers in Botswana’s public hospitals. Presented at the 4<sup>th</sup> IAS conference on HIV Pathogenesis, Treatment and Prevention. 22-25 July 2007. Sydney, Australia
45. Mwaniki, N., Jamu, S., Gabaitiri, L., Mudongo, K. (2008) Needlestick and sharp object injury prevention in the health sector of Botswana: a prospective cross-sectional study. Gaborone, Botswana: MMIS for the office of the Global AIDS Coordinator, and the Department of Health and Human Services/Centers for Disease Control and Prevention.
46. Naidoo, S. (1997) Dental Practitioner risk, knowledge and practice with regard to the Hepatitis B vaccination in South Africa. *Oral Diseases* (33): 172-5
47. Nmutandani. M,S,, Yengopal, V., Rudolph, M.J., Tsotsi, N.M. (2007) Occupational exposures among dental assistants in public health care facilities,

- Limpopo Province. *South African Dental Journal* 62(8): 348, 352-5
48. Sagoe-Moses, C., Pearson, R.D., Perry, J., Jagger, J. (2001) Risks to health care workers in developing countries. *New England Journal of Medicine* 345(7): 538-41
49. Scully, C., Cawson, R.A., Griffiths, M. (1990) *Occupational hazards to Dental staff*. British Dental Association. London
50. Shah, S.M., Merchant, A.T., Dosman, J.A. (2006) Percutaneous injuries among dental professionals in Washington State *BMC Public health* 6:269 <http://www.biomedcentral.com/1471-2458/6/269> [Accessed 23/06/2005]
51. Shahid, M., Leedham-Green, M. and Breuer, J. (2005) Does adherence to universal precautions correlate with the prevention of blood borne infections. *Journal of Hospital Infection* 60(3): 289-90
52. Southern Africa Intergrated Disease Surveillance Feedback Bulletin (2004) [www.afro.who.int/csr/ids/bulletins/southern/feb2004.pdf](http://www.afro.who.int/csr/ids/bulletins/southern/feb2004.pdf) [Accessed 27/06/2005]
53. Tarantola, A., Koumare, A., Rachline, A., Sow, P.S., Diallo, M.B., Doumbia, S., Aka, C., Ehui. E, Brucker, G., Bouvet, E. (2005) A descriptive, retrospective study of 567 accidental blood exposures in health care workers in three West African countries. *Journal of Hospital Infection* 60(3): 276-82
54. UNAIDS (2009) AIDS epidemic update. *Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) 2009*. Geneva, Switzerland.
- [http://data.unaids.org/pub/Report/2009/JC1700\\_Epi\\_Update\\_2009\\_en.pdf](http://data.unaids.org/pub/Report/2009/JC1700_Epi_Update_2009_en.pdf)  
[Accessed 20/02/2010]

55. Utomi, I.L. (2007) Attitudes of Nigerian dentists towards hepatitis B vaccination and use of barrier techniques. *West African Journal Medicine* 24(3): 223-6
56. van der Eijk, A.A., Niesters, H.G., Gotz, H.M., Janssen, H.L., Schalm, S.W., Osterhaus, A.D., de Man, R.A. (2004) Paired measurements of quantitative Hepatitis B virus DNA in saliva and serum of chronic hepatitis B patients: implications for saliva as infectious agent. *Journal of Clinical Virology* 29(2): 92-94
57. Veronesi, L., Bonanini, M., Dall'Aglio, P., Manfredi, M, Pizzi, S. and Tanzi, M.L. (2004) Health hazard evaluation in private dental practices: a survey in a province of northern Italy. *Acta Biomed Atene Parmense* 75(1): 50-5
58. Vong, S., Perz, J., Sok, S., Som, S., Goldstein, S., Hutin, Y., Tulloch, J. (2005) Rapid assessment of injection practices in Cambodia in 2002. *BMC Public health* 5(1):56 <http://www.biomedcentral.com/1471-2458/5/56> [Accessed 13/01/2006]

## **Appendix A**

An outline of precautions in the dental setting:

- 1 Immunisation of oral health staff against preventable infections such as Hepatitis B
- 2 The use of barriers and protective clothing such as gloves, protective eyewear, masks and aprons
- 3 Correct handling such as not using two handed recapping of needles
- 4 Sterilisation of instruments and disinfection of non sterilisable surfaces
- 5 Disinfection of impressions prior to sending to the laboratory
- 6 The correct management of waste such as the correct disposal of used needles in puncture resistant containers
- 7 Taking of an adequate medical history

(Goldman et al., 1984; Gordon et al., 2001; CDC, 2003).

**Appendix B**

<b>Section 1 DEMOGRAPHIC AND OTHER INFORMATION</b>
<p>1. Sex[PLEASE CIRCLE THE CATEGORY THAT APPLIES TO YOU]</p> <ul style="list-style-type: none"><li>a. Male</li><li>b. Female</li></ul>
<p>2. Professional information[PLEASE CIRCLE THE CATEGORY THAT APPLIES TO YOU]</p> <ul style="list-style-type: none"><li>a. Dental specialist</li><li>b. Dentist (SDO, DO, Intern)</li><li>c. Dental therapist (CTO, PTO, STO, TO)</li><li>d. Dental Surgery Assistant</li><li>e. Health Care auxiliary</li><li>f. Cleaner</li></ul>
<p>3. How many years have you been working as an oral health worker/ within the oral health division?(Include your training years in this calculation)</p> <p>_____ years</p>
<p>4. What is your level of education?</p> <ul style="list-style-type: none"><li>a. primary</li><li>b. junior certificate</li><li>c. 'O' level</li><li>d. tertiary</li></ul>

**Section 2**  
**GENERAL INFORMATION**

[FOR ALL QUESTIONS BELOW PLEASE CIRCLE THE APPROPRIATE RESPONSE]

1. In your opinion, which of the following poses a risk to oral health staff?

- a. HIV
- b. Hepatitis B
- c. Hepatitis C
- d. none of the above

2. What percentage of Botswana's population do you think are infected with HIV?

- a. 0-10%
- b. 11%-25%
- c. 26%-40%
- d. 41%-80%

3. In your opinion, how many of the patients coming to this clinic are infected with the following?

- |                |      |                    |               |                     |
|----------------|------|--------------------|---------------|---------------------|
| a. HIV         | none | few(less than 1/4) | some(1/4-1/2) | most(more than 1/2) |
| b. Hepatitis B | none | few                | some          | most                |
| c. Hepatitis C | none | few                | some          | most                |

4. Have you heard of **HIV Post exposure Prophylaxis (PEP)**?

- a. Yes
- b. No

5. Is post exposure prophylaxis available in your facility?

- a. Yes
- b. No
- c. Don't know

6. Have you ever had hepatitis B vaccine?

a. No

b. Yes → 7. If yes, how many doses have you had?

[PLEASE CIRCLE THE APPROPRIATE RESPONSE]

a. 1 dose

b. 2 doses

c. 3 doses

d. 4 or more doses

e. Not sure

8. Are you aware of Universal Precautions?

a. Yes

b. No

9. Have you **ever** attended a training session/workshop on Cross Infection Control since joining the service?

a. No

b. Yes → 10. If yes, have you attended a training session/workshop on the practice of Universal Precautions **in the last year**?

[PLEASE CIRCLE THE APPROPRIATE RESPONSE]

a. No

b. Yes

11. Is there a written protocol in Universal precautions/cross infection control in your workplace that you can refer to if necessary?

a. Yes

b. No

c. Don't know

### Section 3 PRECAUTIONS

FOR EACH OF THE STATEMENTS LISTED BELOW, PLEASE CIRCLE THE APPROPRIATE RESPONSE

	DO YOU AGREE?		
	Agree	Disagree	Not sure
<p>1. The following can contribute to the spread of blood borne viruses(such as HIV/AIDS and hepatitis B) in the dental environment:</p> <p>a. needlestick injuries</p> <p>b. Blood splashing in the eyes or mouth</p> <p>c. Saliva splashing in the eyes or mouth</p> <p>d. Re-using needles and syringes</p> <p>e. A cut with a used scalpel blade</p> <p>f. Blood on <u>unbroken</u> skin</p> <p>g. Blood on <u>broken</u> skin</p> <p>h. reusing disposable equipment</p> <p>i. inadequate sterilisation of equipment</p> <p>j. contaminated surfaces</p>	Agree	Disagree	Not sure
2. Oral health workers and other health workers have a high risk of catching blood borne diseases (such as HIV/AIDS and hepatitis B) while caring for patients	Agree	Disagree	Not sure
3. Oral health workers and other health workers have a high risk of catching tuberculosis while caring for patient	Agree	Disagree	Not sure
4. It is not practical to treat the blood of <u>all</u> patients as potentially infectious	Agree	Disagree	Not sure
5. Routinely testing all patients for HIV is a part of Universal Precautions or cross infection control	Agree	Disagree	Not sure

**Section 4**  
**OCCUPATIONAL EXPOSURES**

1. In your current work, how often do you get patients' blood or other body fluids **on your own skin or face?**

**[PLEASE CIRCLE THE APPROPRIATE RESPONSE]**

- a. Never (never since starting to work)
- b. Rarely (0%-25% of the time)
- c. Sometimes(25%-75% of the time)
- d. Often(>75% of the time)

2. How many times **in the last year** have you experienced blood or other body fluids splashing in your eyes or mouth?(State number)

\_\_\_\_\_

3. How many times **in the last year** have you experienced a needlestick or sharps injury (cut or puncture) involving a needle or sharp instrument that had been (or may have been) used on a patient? (State number)

\_\_\_\_\_

4. What instrument did you injure yourself with?(circle all that apply)

**[PLEASE CIRCLE THE APPROPRIATE RESPONSE]**

- a. needle
- b. scalpel
- c. elevator
- d. suture needle
- e. bur
- f. other \_\_\_\_\_

5. If you had a needlestick, when did the injury occur?(circle all that apply)

**[PLEASE CIRCLE THE APPROPRIATE RESPONSE]**

- a. recapping needle
- b. during the procedure
- c. while clearing instruments
- d. in transit to disposal
- e. other\_\_\_\_\_

6. Did you ever report any of these needlestick/sharps injuries or blood splashes to someone responsible for accident documenting or health and safety issues?

**[PLEASE CIRCLE THE APPROPRIATE RESPONSE]**

- a. This question does not apply to me because I have not had any injuries or splashes
- b. Yes
- c. No     7. If no, give reason why not. \_\_\_\_\_

8. Did you take post exposure prophylaxis following these incidents (needlestick/sharps injuries or blood splashes)?

**[PLEASE CIRCLE THE APPROPRIATE RESPONSE]**

- a. Yes
- b. No     9. If no, give reason why not

**[PLEASE CIRCLE THE APPROPRIATE RESPONSE]**

- a. Source patient HIV negative
  - b. Felt no need
  - c. Did not know it was available
  - d. Other(please elaborate)\_\_\_\_\_

**Section 5****UNIVERSAL PRECAUTIONS /INFECTION CONTROL PRACTICE**

FOR EACH OF THE STATEMENTS LISTED BELOW, PLEASE CIRCLE HOW OFTEN THIS APPLIES TO YOU

	HOW OFTEN DOES THIS APPLY TO YOU?				
	Never	Rarely	Sometimes	Often	Always
1. I protect myself against the blood and body fluids of all patients, regardless of their diagnosis					
2. I put used needles and other sharp objects into the designated sharps container					
3. I dispose of used needles and other sharp objects into the waste bin					
3. I wear gloves whenever there is a possibility of exposure to blood or other body fluids					
4. I wash my hands between patients					
5. I wear a waterproof apron/coat whenever there is a possibility of blood or other body fluids splashing on my clothes					
6. I wear eye protection (goggles/glasses) whenever there is a possibility of blood or other body fluids splashing in my face					
7. I wear a surgical mask whenever there is a possibility of blood splashing in my face					
8. I use a double handed recapping method					
9. I take extra care when using or discarding scalpels, needles, razors or other sharps objects					

**Section 6**  
**YOUR WORKPLACE**

FOR EACH OF THE STATEMENTS LISTED BELOW, PLEASE CIRCLE THE EXTENT TO WHICH YOU AGREE

	TO WHAT EXTENT DO YOU AGREE?				
1. In my work area all the equipment necessary to protect staff from exposure to blood borne viruses (such as hepatitis B and HIV/AIDS) is provided	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
2. There is an infection control committee in this facility	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
3. I know the procedure to follow if I have a needlestick injury	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
4. If I have a needlestick injury, I know who to report it to	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
5. In my work area, it is easy to discuss work-related problems with other staff	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
6. I am satisfied with post exposure prophylaxis availability in my work place	Strongly agree	Agree	Not sure	Disagree	Strongly disagree

FOR EACH OF THE STATEMENTS LISTED BELOW, PLEASE CIRCLE THE EXTENT TO WHICH THIS APPLIES

	DOES THIS APPLY IN YOUR FACILITY?		
7. Masks are available in my work area	Always	Never	Sometimes
8. Gloves are available in my work area	Always	Never	Sometimes
9. Eye protection (goggles/glasses) is available in my work area	Always	Never	Sometimes
10. Sharps containers (for used needles and other sharps <u>only</u> ) are available in my work area	Always	Never	Sometimes

**THIS IS THE END OF THE SURVEY**

**THANKYOU FOR YOUR TIME**

## Section 1

[TSHWAYA KARABO E E LEBANENG LE WENA]

### 1. Bong

- a. Monna
- b. Mosadi

### 2. Ke dira ke le

- a. Dental specialist
- b. Dentist (SDO, DO, Intern)
- c. Dental therapist (CTO, PTO, STO, TO)
- e. Dental Surgery Assistant
- e. Health Care auxiliary
- f. Cleaner

3. O na le dingwaga di le kae o dira mo lephateng la botsogo jwa legano (Balela le dingwaga tsa go ithutela tiro)?

Dingwaga \_\_\_\_\_

4. Supa gore o ithutile ko sekolong go ema ka lekwalo lefe?

- a. primary
- b. junior certificate
- c. 'O' level
- d. tertiary

## Section 2

[MO DIPOTSONG TSOTLHE TSHWAYA KARABO E O DUMALANANG LE YONA]

1. Ka pono a gago, ke a fe malwetse a a ka nnang diphatsa mo badiring ba botsogo jwa legano?

- a. HIV
- b. Hepatitis B
- c. Hepatitis C
- d. none of the above

2. Ke sephatlo se se kae sa sechaba sa Botswana se se tshelang le mogare wa HIV?

- a. 0-10%
- b. 11%-25%
- c. 26%-40%
- d. 41%-80%

3. Ka pono ya gago, ke bale kae balwetse ba ba tlang kokelong e ba ba nang le tse di latelang?

- |                |         |                        |                  |                        |
|----------------|---------|------------------------|------------------|------------------------|
| a. HIV         | ha gona | bonnye (less than 1/4) | bangwe (1/4-1/2) | bontsi (more than 1/2) |
| b. Hepatitis B | ha gona | bonnye                 | bangwe           | bontsi                 |
| c. Hepatitis C | ha gona | bonnye                 | bangwe           | bontsi                 |

4. O kile wa utlwa ka HIV Post exposure Prophylaxis (dipilisi tse di le kang go itsa HIV ha o amilwe ke madi a motho yo o nang le mogare)?

- a. Ee
- b. Nnyaa

5. A post exposure prophylaxis (PEP) e teng mo kokelong ya lona?

- a. Ee
- b. Nnyaa
- c. Ga ke itse

6. A o kile wa kentelwa go iphemela malebana le hepatitis B?

a. Nnyaa

b. Ee → 7. Ha o kentilwe, o boeletse mokento ga kae?

a. 1

b. 2

c. 3

d. 4 le go feta

e. Not sure

8. O kile wa utlwa ka Universal Precautions?

a. Ee

b. Nnyaa

9. A o kile wa tsenelela dithuto kgotsa thuto seka dipuisanyo malebang le Cross Infection Control go tlogeng o simolola go direla lephata la botsogo jwa legano?

a. Nnyaa

b. Ee → 10. Ha go ntse jalo, a o di tseneletse mo ngwageng o fitileng?

a. Nnyaa

b. Ee

11. A gona le mokwalo wa tsamaiso ya Universal precautions/cross infection control o o ka o balang fa go tlhokega mo bodirelong jwa gago?

a. Ee

b. Nnyaa

c. Ga ke itse

### Section 3

#### MO DIPOTSONG TSOTLHE TSHWAYA KARABO YE O DUMALANANG LE YONA

	A OA DUMALANA?		
<p><b>1. Ke dife mo go tse dilatelang tse di ka rotloetsang go anama ga malwetse a a ka tshelanwang ka madi mo kokelong ya tsa legano:</b></p> <p>a. go itlhaba ka lemao/mokento</p> <p>b. madi a gasegela mo matlhong kgotsa mo molomong</p> <p>c. mathe a gasegela mo matlhong kgotsa mo molomong</p> <p>d. go boelela go dirisa mekento</p> <p>e. go itshega ka legare</p> <p>f. Madi a gasegela mo letlalong le sena ntho</p> <p>g. madi a gasegela mo letlalong le na le ntho</p> <p>h. go boelela go dirisa di dirisiwa tse di latlhiwang (disposable)</p> <p>i. go tlhoka go apaya ditshipi sentle</p> <p>j. madirelo a a seng phepa</p>	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
	Ee	Nnyaa	Ga keitse
<p><b>2. Badiri ba botsogo jwa legano ba ka tshabelwa ke malwetse aa ka tshelanwang ka madi (jaaka HIV/AIDS and hepatitis B) ha ba tlhokometse balwetse</b></p>	Ee	Nnyaa	Ga keitse
<p><b>3. Badiri ba botsogo jwa legano ba ka tshabelwa ke malwetse aa tshwanang le kgotholo e tona (TB) ha ba tlhokometse balwetse</b></p>	Ee	Nnyaa	Ga keitse
<p><b>4. Ha go kgonagale gore re ka itshireletsa ka go tlhokomela madi a balwetse botlhe jaaka madi a a ka nnang borai mo go rona</b></p>	Ee	Nnyaa	Ga keitse
<p><b>5. Go tthatlhobela balwetse botlhe HIV ke nngwe ya ditsela tsa gore re itshireletse le go femela cross infection control</b></p>	Ee	Nnyaa	Ga keitse

## Section 4

1. Mo tirong ya gago ya tsatsi le letsatsi, ke ga kae o gasegelwa ke madi a balwetse mo mathlong kgotsa mo letlalong la gago?

- a. Ga ise (never since starting to work)
- b. Ka seweloy (0%-25% of the time)
- c. Ka nako tse dingwe(25%-75% of the time)
- d. Ga ntsi (>75% of the time)

2. Ke ga kae mo ngwageng o fitileng o kileng wa gasegelwa ke madi a molwetse mo mathlong kgotsa mo molomong (Kwala palo)

\_\_\_\_\_

3. Ke ga kae mo ngwageng o o fitileng mo o tlabelweng ke lemao kgotsa wa bona kgobalo ka tshipi e e bogale e e neng e dirisiwa mo molwetseng? (Kwala palo)

\_\_\_\_\_

4. O ne o ikgobaditse ka tshipi efe? (tshwaya tsotlhe tse di lebaneng)

a. mokento

b. legare

c. elevator

d. nnale o o rokang (suture needle)

e. bur

f. e nngwe \_\_\_\_\_

5. Ha o ne o itlhabile, go diragetse leng?(tshwaya tsotlhe tse di go amang)

a. ha ke khurumela nnale

b. ha molwetse a santse a thusiwa

c. ha ke ntsha ditshipi

d. ha ke latlha didirisiwa tse dingwe

e. e nngwe\_\_\_\_\_

6. A o ile wa bolelela mongwe yo o lebaneng ka dikgobalo tse kgotsa go gasegelwa ke madi?

a. Potso e ga e nkame ka gore gaise ke gobale kgotsa ke gasegelwe ke madi

b. Ee

c. Nnyaa 7. Ha o sa bolelela ope, tloholosa gore ke ka go reng o sa dira jalo

\_\_\_\_\_

8. A o ile wa tsaya PEP morago ga kgobalo kgotsa go gasegelwa ke madi?

a. Ee

b. Nnyaa 9. Ha o sa dira jalo, tthalosa gore ke eng o sa dira jalo

a. Molwetse o ditshipi di dirisitsweng mo go ene o ne a sena mogare wa HIV

b. Ke ne ke sa bone go tlhokafala

c. Ke ne ke sa itse ha PEP e le teng

d. E nngwe(tlhalosa)\_\_\_\_\_

## Section 5

### MO DIPOTSONG TSE DI LATELANG TSHWAYA GO SUPA GORE O DIRA SE SE TLHALOSITSWENG GA KAE.

	DI GO AMA GA KAE?				
1. Ke itshireletsa mo madding a balwetse botlhe le ntswa ke sa itse seemo sa bone sa botsogo	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
2. Ke baya bo nnale ba ba dirisitsweng le di dirisiwa tse dinwe tse di bogale mo lebotleleng le le tshwaetsweng tiro e.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
3. Ke baya bo nnale ba ba dirisitsweng le di dirisiwa tse dinwe tse di bogale mo ke latlhelang matlakala otlhe.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
3. Ke rwala diglove go itshireletsa ha gona le gore ke tla amana le madi a molwetse.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
4. Ke tlhapa mabogo morago ga go bona molwetse pele ha ke bona yo mongwe.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
5. Ke sireletsa diaparo tsame ka apron ha go nale gore di tla gasegelwa ke madi a molwetse	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
6. Ke rwala digalase tse di sireletsang matlho ha go nale gore ke tla gasegelwa ke madi a molwetse mo sefatlhegong.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
7. Ke rwala surgical mask ha go nale gore ke tla gasegelwa ke madi a molwetse mo sefatlhegong.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
8. Ke dirisa mabogoa le mabedi (double handed recapping) ha ke khurumela nnale wa mokento	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe
9. Ke kelothoko thata ha ke latlha magare, lomao, le didirisiwa tse dingwe tse di bogale.	Ga nke ke dira	Ka sewelo	Nako tse dingwe	Ga ntsi	Nako tsotlhe

## Section 6

### MO DIPOTSONG TSE DI LATELANG TSHWAYA GO SUPA GORE O DUMALANA GO LE KANA KA ENG

	SELEKANYO SA TUMALANO				
1. Ha ke direlang teng didirisiwa totlhe tse ditlhokegang go re babereki ba itshireletse mo go amaneng le madi di teng.	Ke dumalana thata	Ke a dumela	Ga ke itse	Ga ke dumalane	Ke dumalana thata
2. Go na le komiti ya go sireletsa babereki kgotsa ya infection control mo kokelong ye.	Ke dumalana thata	Ke a dumela	Ga ke itse	Ga ke dumalane	Ke dumalana thata
3. Ke itse tsamaiso e ke tshwanetseng go e latela ha ke thabilwe ke mokento kgotsa nnale.	Ke dumalana thata	Ke a dumela	Ga ke itse	Ga ke dumalane	Ke dumalana thata
4. Ha ke thabilwe ke mokento kgotsa nnale, ke itse motho yo ke tshwanetseng go mmolelela.	Ke dumalana thata	Ke a dumela	Ga ke itse	Ga ke dumalane	Ke dumalana thata
5. mo tirong ya me go motlhofo go bua ka mathata a re nang le one mo tirong le babereki ba bangwe.	Ke dumalana thata	Ke a dumela	Ga ke itse	Ga ke dumalane	Ke dumalana thata
6. Ke kgotsofalela ka fa PEP e bonwang ka teng mo tirong ya rona.	Ke dumalana thata	Ke a dumela	Ga ke itse	Ga ke dumalane	Ke dumalana thata

### MO DIPOTSONG TSE DI LATELANG TSHWAYA GO SUPA GORE A OA DUMALANA

	A OA DUMALANA?		
7. Di'mask' di teng ha ke direlang teng.	Nako tsotlhe	Le ha ele ka nako epe	Nako tse dingwe
8. Di'glove' di teng ha ke direlang teng	Nako tsotlhe	Le ha ele ka nako epe	Nako tse dingwe
9. Digalase tsa go sireletsa matlho di teng ha ke direlang teng.	Nako tsotlhe	Le ha ele ka nako epe	Nako tse dingwe
10. Di'sharps container' (tsa mamao le mekento) di teng ha ke direlang teng.	Nako tsotlhe	Le ha ele ka nako epe	Nako tse dingwe

**PATLISISO E E FELELA FA**

**KE LEBOGELA NAKO YA GAGO LE SEABE SA GAGO.**

Appendix C

**OBSERVATION CHECKLIST**

<b>OBSERVATION</b>	<b>YES</b>	<b>NO</b>
<b>AVAILABILITY</b>		
Sharps container		
Disposable gloves		
Protective eye wear		
Surgical masks		
Protective coats		
Universal precautions displayed		
Accident reporting procedure displayed		
Written protocol		
<b>PRACTICE</b>		
Wear gloves		
Wear mask		
Wear protective eye gear		
Wear coat		
Singlehanded needle recapping		
Change gloves between patients		
Change gloves if perforated		
Disposal of sharps in appropriate container		
Handwashing between patients		

## Appendix D

### INFORMATION LETTER

My name is Siphwo Ndlovu, Senior Dental Officer Jubilee Dental Clinic, currently studying towards a Master of Public Health at the University of the Witwatersrand in South Africa. As part of my requirements I am carrying out research into the *“Occupational exposure to blood in selected Oral Health Facilities in Botswana: experiences and practices of oral health staff”* and would be grateful if you would consider participating in this study.

The reasons I am doing this study is that research in industrialised countries shows blood exposures still pose a threat to health workers, particularly in light of the range of blood borne diseases, but few studies have been carried out to explore the nature and frequency of exposures in the unique context of developing countries and none in Botswana. Identifying occupational hazards particularly blood exposures, is the first step to developing appropriate policies to eliminate or minimise risk. To this end, recommendations will be made to the Oral Health Division based on the findings of the study.

The study will need the once off completion of a questionnaire and observation of you carrying out a single procedure. The questionnaire should take approximately 30(thirty) minutes to complete. You will need to circle relevant responses to indicate the answers you agree with. Please add on to the end of the questionnaire any information which may not be covered by the questionnaire which you feel may be important or relevant to the study. The observation will be of a simple extraction or a simple restoration during which cross infection practice will be noted. This observation will be carried out by myself.

Your identification will be protected and the information you give will be treated with the utmost confidentiality. You will not be required to give your name on the questionnaire though your gender will be requested. No means of identification will be put on the observation checklist. None of the completed questionnaires or checklists will be accessible to anyone but myself. A report of the findings will be submitted to the Head of Oral Health Division and the University of Witwatersrand in part fulfillment of my masters requirements. Dissemination of findings is planned to take place at a workshop at the next year but a copy of the recommendations will be sent to all participating facilities.

Participation is voluntary and if you do not wish to take part DO NOT complete the questionnaire. A consent form is attached to this letter. If you are happy to take part in the study, please complete the attached consent form and hand it in before filling in the questionnaire. Place all completed questionnaires in the envelope provided and place in the box left for collection.

For any further information or clarification, I can be contacted by telephone, fax or e-mail at the contacts given below:

+267 72228473 (cell)

+267 3923791 (fax)

[ssndlovu@yahoo.com](mailto:ssndlovu@yahoo.com) (e-mail)

For questions regarding your rights as a participant, please contact:

Mrs. Shenaaz El-Halabi (Head of Health Research Unit)

Tel: 3914467 or 3632018

Thankyou.

## LEKWALO LA KITSISO

Ke bidiwa Siphiwo Ndlovu, ke dira ke le Senior Dental Officer ko Jubilee Dental Clinic. Ka nako e, ke ithutela Master of Public Health ko University ya Witwatersrand mo South Africa. Dithuto tsame di akaretsa go dira patlisiso mme jalo ke dira patlisiso ka ***“Occupational exposure to blood in selected Oral Health Facilities in Botswana: experiences and practices of oral health staff”***. (***“Go amana le madi mo tirong mo dikokelwaneng dingwe tsa lephata la botsogo jwa legano mo Botswana: badiri ba botsogo jwa legano”***). Ke ka lebogela go tsaya karolo ga gago mo patlisisong e.

Mabaka a gore ke be ke dira patlisiso e ke gore dipatlisiso mo mafatsheng a tlhabologileng di supa ha go amana le madi go santse go kgona go nna diphatsa mo badiring ba botsogo, thata ha re labile malwetse a kgonang go tshelanwa ka kamano ya madi. Le ha gontse jalo, dipatlisiso mo mafatsheng a santseng a tlhabologa di boutsana, mme ha gona tse di dirilweng mo Botswana. Go lemoga dilo tse di ka nnang diphatsa mo badiring ke kgwetlho ya ntlha mo go tokafatseng bodirelo jwa rona. Ka jalo, ke tla itsise Oral Health Division seke tlaabong ke se bone me ke fe kgakololo gore go ka tokafadiwa seemo jang.

Patlisiso e e tla tlhoka gore o tlatse pampiri ya dipotso (questionnaire) le gore ke nne teng ha o dira tiro ya go thusa molwetsi (observation). Pampiri ya dipotso e tla tsaya metsoso e ka nna masome a mararo(30) gore o e tlatse. O tla tshwanelwa ke go tshwaya dikarabo tse o dumalanang le tsone mo pampering e. Ha o batla go tlatsa ka sengwe se o lemogang re lebetse go se botsa o ka kwala ka ha morago go pampiri ya teng. Mo karolong ya bobedi ya patlisiso ke tla nna teng ha o thusa molwetsi a ntshiwa leino(simple extraction) kgotsa le thibiwa phatlha (filling). Ke tlaabo ke lebeletse ka ha o itshireletsang, le molwetsi, mo go hapaanyeng megare (cross infection).

Ha go na ope yo o tla itseng gore ke wena o tladitseng pampiri ka go nne ha gona ha o tlamegang gore o kwale leina la gago. Le ha ke lebeletse o dira tiro ha gona ha ke kwalang maina teng. Mo godimo ga moo, ke nna fela ke tla bonang dipampiri tse di tlaabong di tladitswe gore ke kgone ke ke babalele dikarabo tsa gago. Tshobokanyo ya se ke tlaabo ke se bone e tla romelwa ko Head of Oral Health Division le ko University of Witwatersrand e le nngwe ya dikarolo tsa dithuto tsame. Mo tshobokanyong e, ha go na ha go tla kwalwang maina a ba tsaya karolo. Dikokelo tse di tsayang karolo di tla romelwa dikgakololo tse ke di dirang mme go nne le phatlalatso ya tshobokanyo mo

thuto-seka dipuisanyo mo ngwaeng o o tlang.

Go tsaya karolo ke ka bo ithaopo. Fa o sa eletse go tsaya karolo O SEKA wa tlatsa pampiri ya patlisiso. Pampiri ya go dumela go tsaya karolo e pataganye le lekwalo le. Ha o kgotsofaletse go ka tsaya karolo, e tlatse o e nneele pele o tlatsa pampiri ya patlisiso. Ha o fetsa go tlatsa pampiri ya patlisiso, e tsenye mo “envelope” o bo o e tsenya mo lebokosong(box).

Ha o na le dipotso, o ka ikgolaganya le nna ka ditsela tse di supilweng fa:

+267 72228473 (cell)

+267 3923791 (fax)

[ssndlovu@yahoo.com](mailto:ssndlovu@yahoo.com) (e-mail)

Fa o na le dipotso mabapi le Ditshwanelo tsa gago jaaka motsaya-karolo mo patlisisong e, ikgolaganye le:

Mme mma Shenaaz El-Halabi ( Head of Health Research Unit)

Tel: 3914467 or 3632018

Ke a leboga.

**Appendix E**

**Consent Form**

I, \_\_\_\_\_, hereby agree to participate  
in this study

(Please tick one or both to show which you wish to participate in)

Questionnaire \_\_\_\_\_

Observation \_\_\_\_\_

and give permission for my information to be used in the report.

I declare that my participation is voluntary and the study has been explained to me.

Date \_\_\_\_\_

Signature \_\_\_\_\_

### Tumelo go tsaya karolo

Nna, \_\_\_\_\_, ke dumela go tsaya karolo ya patlisiso e.

(Baya letshwao go lebagana le karolo kana dikarolo tse o dumelang go nna le seabe mo go yone)

Questionnaire \_\_\_\_\_

Observation \_\_\_\_\_

Gape ke dumela gore dikarabo tsame di dirisiwe mo phatlalatsong ya se se bonweng.

Ke bolela fa go tsaya karolo game go gololesegile le gore ke tlhalogantse gore patlisiso ke malebana le eng.

Letsatsi \_\_\_\_\_

Monwana \_\_\_\_\_

**Appendix F**

**UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG**

Division of the Deputy Registrar (Research)

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**

R14/49 Ndlovu

**CLEARANCE CERTIFICATE**

**PROTOCOL NUMBER M060540**

**PROJECT**

Occupational Exposure to Blood in  
Botswana's Oral Health Services:  
Experiences & Practices of Oral Health Staff

**INVESTIGATORS**

Dr S Ndlovu

**DEPARTMENT**

School of Public Health

**DATE CONSIDERED**

06.05.28

**DECISION OF THE COMMITTEE\***

APPROVED UNCONDITIONALLY

**Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.**

**DATE**            06.07.13

**CHAIRPERSON** .....



(Professor A Dhai)

\*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor :            Dr N Tsotsi

**DECLARATION OF INVESTIGATOR(S)**

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

*Sudlan*  
*21/07/2006*

**Appendix G**

32 Radnor Street  
Westdene  
2092

28<sup>th</sup> July 2006

The Consultant  
Head of Division  
Oral Health Division  
Ministry of Health  
Private Bag 00340  
Gaborone  
Botswana

Dear Madam

Request to carry out research in oral health facilities

I am a Senior Dental Officer based at Francistown Oral Health Services, currently studying for my Master of Public Health at the University of the Witwatersrand.

Part of the requirements to complete my programme is to carryout a research study. My study is titled "Occupational exposure to blood in selected Oral Health Facilities in Botswana: experiences and practices of oral health staff". The study aims to quantify the occupational blood exposure experience of oral healthworkers in Botswana's public service and determine infection control practices by observation and self reporting.

I request permission to carry out this study in the following Public Oral Health Facilities: Gaborone, Lobatse, Maun, S/Phikwe and Serowe. I will be administering an anonymous and confidential questionnaire to all clinicians, assistants and cleaners at these facilities on a voluntary basis. The running of these facilities will not be disrupted by this study.

Thanking you in anticipation.

Yours faithfully

SIPHIWO NDLOVU

cc. Dental Public Health Specialist: Gaborone, Lobatse, Maun, S/Phikwe, Serowe