

**AN INVESTIGATION INTO THE KNOWLEDGE AND  
PRACTICE OF UNDERGRADUATE NURSING STUDENTS  
REGARDING UNIVERSAL PRECAUTIONS AND THEIR  
FEAR OF OCCUPATIONAL EXPOSURE TO BLOOD BORNE  
PATHOGENS**

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A minithesis submitted in partial fulfillment of the requirements for the degree of  
Magister Curationis (Nursing Education) in the School of Nursing, Faculty of  
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## Keywords

- Knowledge
- Practice
- Universal precautions
- Undergraduate nursing students
- Relationship between knowledge and practice
- Fear
- Occupational exposure
- Blood borne pathogens
- Under-reporting
- Education



## Abstract

**Background:** Health care workers, more specifically, nursing students are at increased risk of occupational injury and exposure to blood borne pathogens. Compliance with universal precautions (UP) will minimise risk or transmission of HIV and HBV (Hepatitis B virus) according to the Department of Health of South Africa. **Aim:** The aim of this study was to investigate the knowledge and practice of universal precautions amongst nursing students and their fear of occupational exposure to blood borne pathogens. **Rationale:** The rationale for the study was to investigate what the students' knowledge and practice of UP were, to see if this could be a possible contributing factor to occupational exposure. **Research design:** The study was a quantitative, cross sectional survey using a questionnaire that included one open ended question. **Participants:** The participants for the study were the undergraduate nursing students in year levels two to four (n = 253) who and were selected by means of stratified random sampling. **Procedures:** A questionnaire was administered to the participants by the researcher. Analysis of the data collected was done through statistical package for social sciences (SPSS 16.0) and content analysis. **Results:** The researcher established that there is indeed a lack of knowledge regarding UP and that the students' self reported practice of UP is poor. No statistically significant correlation between knowledge and practice of UP were found. There is underreporting of occupational exposures to staff at the School of Nursing. The majority of students reported a moderate to severe fear for occupational exposures and contributing factors raised by them are reality in the clinical facilities. **Recommendations:** A more structured educational programme needs to be included in the curriculum that does not only focus on

knowledge of UP but also on behaviour modification of students, so as to improve practice of UP.



## Declaration

I declare that *Determining the knowledge and practice of nursing students at UWC with regards to universal precautions and their fear to occupational exposure to blood borne pathogens* is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full name: Lindy Sheryldene van der Berg

Date: November 2009

Signed: .....



## Acknowledgements

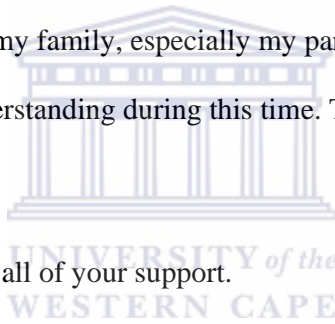
I would first of all like to acknowledge our heavenly Father for giving me the strength to reach my goal.

A special thank you to my wonderful husband, Noël, and beautiful daughter, Cady, for all the support, encouragement and sacrifices that they had to make during this trying time.

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## CHAPTER 1: INTRODUCTION

### 1.1 Introduction

“Health care workers, especially those whose work involves blood collection or the use of sharp instruments such as needles and scalpels, insertion of intravenous catheters, or minor and major surgery, are at increased risk of occupational injury and exposure to Human Immunodeficiency Virus (HIV) infected blood. The Human Immunodeficiency Virus attacks the immune system of the human body, making it more susceptible for infections (HIV/STI UNIT, n.d.). There is also a potential risk to workers handling soiled linen and those involved in handling corpses and performing post mortem examinations” (HIV and AIDS and STD Directorate, 1999). This document is the most recent document issued by the HIV and AIDS and STD Directorate for the management of occupational exposure. For the purpose of this study, occupational injury and occupational exposure to blood will be limited to needle stick injuries and exposure of non-intact skin and mucous membranes to bodily fluids such as blood, amniotic fluid, urine and faeces.

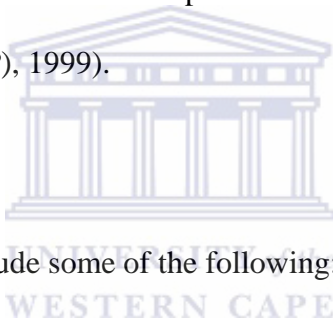
The standard risk of HIV infection from all types of reported percutaneous exposure (for example, needle stick injury) to HIV infected blood is 0.3% according to the document cited above. This means that almost 1 in every 300-330 exposures will result in an established HIV infection in the health care worker (HIV and AIDS and STD Directorate, 1999). According to the directorate, the risk is considered to be

higher than 0.3% if the exposure involves a large volume of blood or if the source patient has very high HIV titres in their blood.

According to the management guidelines for accidental exposure to HIV from the Department of Health, the risk of HIV transmission after mucous membrane or skin exposure to HIV infected blood depends on the volume of blood and the titre of HIV in the blood, and is reported to be in the order of 0.1% and less than 0.1% respectively. The risk from skin exposure to HIV infected blood is low but increases if the contact is prolonged, the contact involves an extensive area of skin, the skin is visibly compromised (has open wounds, diseased, or is inflamed), or if there is a high titre of HIV in the source patient's blood. A high HIV titre, or viral load, in the source patient's blood is often associated with advanced immune deficiency and a low CD4 cell count (CD 4 cells or T helper cells are lymphocytes which are usually attacked by HIV), the Acquired Immune Deficiency Syndrome (AIDS) phase of HIV disease, or with early HIV infection. Acquired Immune Deficiency Syndrome is a group of illnesses or conditions resulting from a weakened immune system (HIV/STI UNIT, n.d.). HIV viral titres may also rise during opportunistic infections such as active tuberculosis (Benson, Kaplan, Masur, Pau, & Holmes, 2004).

Transmission of HIV and other blood-borne viruses, such as Hepatitis B virus (HBV), is minimised by strict adherence to standard universal precautions (UP) and by

adoption of procedures to sterilise or disinfect equipment in contact with blood or blood products. The hepatitis B virus causes an infection of the liver known as Hepatitis B (Mortada & Nettleman, n.d.). Universal precautions proposed by the Centre of Disease Control and Prevention (CDC) require that health care workers treat the blood and body fluids of all persons as potential sources of infection, irrespective of perceived risk or diagnosis. Universal precautions are a set of guidelines that needs to be followed in order to prevent transmission of blood borne pathogens (BBP), for example, HIV when a person comes into contact with blood or other bodily fluids, or if there is a risk of potential exposure (Division of Healthcare Quality Promotion (DHQP), 1999).



Universal Precautions include some of the following: use of protective barriers, for example, gloves, goggles, gowns and face masks, when there is a risk of exposure to blood and bodily fluids. It also includes precautions that need to be taken by the health care worker when working with needles and other sharp instruments (Division of Healthcare Quality Promotion (DHQP), 1999). The UP was last updated by the CDC in 1996 and is applied globally. It is now known as Standard Precautions, but for the purpose of this study the term Universal Precautions will be used. The Standard Precautions is a combination and expansion of the UP and Body Substance Isolation guidelines, and are therefore too broad to include for the purpose of a mini-thesis. Compliance with UP will minimise risk or transmission of HIV and HBV (Centers for Disease Control and Prevention, 1991).

## 1.2 Rationale

This topic interested the researcher because it appeared to the researcher that the incidence of occupational exposure was on the rise amongst nursing students at the University of the Western Cape's (UWC) School of Nursing. The researcher made this observation during her three years of employment as clinical supervisor at UWC: 2006 – 2009. The clinical supervisors are almost always one of the first to be informed by the students when an occupational exposure has taken place and need to make sure that the incident is reported to the School of Nursing. They also need to make sure that the student follows the correct policy and procedure for occupational exposure to blood and bodily fluids. The incidents involving the researcher's students were mainly due to poor practices of universal precautions, for example, the unsafe disposal of needles and not wearing protective clothing such as masks when doing a delivery of a baby in the labour wards.

The researcher was stimulated, in dealing with these incidents, to find out whether this phenomenon is due to students' lack of competency or their lack of knowledge concerning universal precautions (UP). The researcher wanted to identify whether there is in fact a lack of knowledge regarding universal precautions as the researcher strongly suspected that there could be a link between the lack of knowledge and inadequate practises of UP and the rise in the incidence of occupational exposures. The researcher acknowledges that there might be other contributing factors, for

example, lack of proper equipment and supplies and fatigue. However, in order to limit the study, the researcher only focused on the knowledge and practices of UP. The size of the study needed to be limited because it was conducted for a mini-thesis with limited words. The researcher also wanted to determine whether there is under-reporting of occupational exposure amongst the students as reflected in the literature and whether students have a fear of occupational exposure.

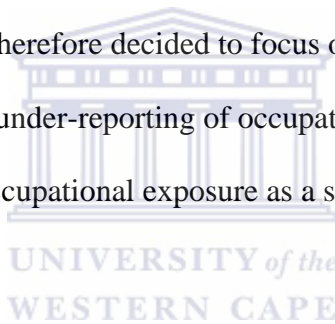
The researcher is of the opinion that it is relevant to investigate this phenomenon because occupational exposure needs to be addressed. Although there seems to be a decrease in reported cases from 2007 to 2008, where the total number of reported incidents of needle stick injuries and blood spatters in the eye and the mouth was 0.6% and 0.4% respectively, over all four year levels of the programme (E. Kearns, personal communication, October 3, 2008), there is still the possibility of under-reporting as shown by various studies (Deisenhammer, Radon, & Reichert, 2006; Osborn, Papadakis, & Gerberding, 1999; Patterson et al., 2003). The total population students for 2007 and 2008 were 979 and 1031 respectively.

In order to address the problem one needs to identify the cause. The question may be asked: Do nursing students know the UP and do they practise them consistently? The researcher will assess whether the students (participating) in this study experience fear with regards to occupational exposure to BBPs. The researcher is also of the



opinion that by involving the students and by making suggestions, for example improvement in the curriculum, based on their responses will result in better compliance from the students with regards to UP. The mere fact that they are participating in the study will evoke thoughts on their part about their own practices of universal precautions.

As mentioned above, there might be other factors, however, this is the first descriptive study done at the School of Nursing at UWC with regards to occupational exposure. The researcher therefore decided to focus on the knowledge and practice of universal precautions, the under-reporting of occupational exposure and the fear of students with regards to occupational exposure as a starting point for the enquiry into this phenomenon.



### **1.3 Problem Statement**


Various studies have shown that one of the more serious occupational hazards for medical and paramedical students is their risk of occupational exposure to blood-borne pathogens such as Hepatitis B (HBV), Hepatitis C (HCV) and human immunodeficiency virus (HIV) (Hutin, Hauri, & Armstrong, 2003; Patterson, Novak, Mackinnon, & Ellis, 2003; Shiao, Mclaws, Huang, & Guo, 2002; Smith, Cameron, Bagg, & Kennedy, 2001; Thomas, Gruninger, Siew, Joy, & Quinn, 1996).

Surveys have shown that the use of universal precautions significantly decreases the incidents of occupational exposure to blood (Motamed, BabaMahmoodi, Khalilian, Peykanheirati, & Nozari, 2006).

#### **1.4 Aim of the Study**

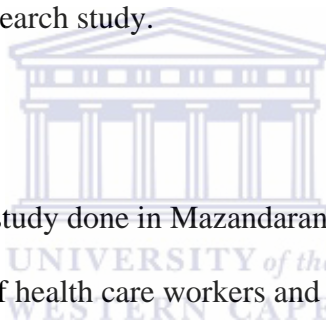
The aim of the study therefore was to investigate the knowledge and practice of nursing students with regards to UP and their fear towards occupational exposure to blood borne pathogens.

#### **1.5 Objectives of the Study**

- 
- 1.5.1 To investigate the knowledge and practice of undergraduate nursing students regarding universal precautions.
- 1.5.2 To investigate the correlation between the students' knowledge of universal precautions and the students' practice of universal precautions.
- 1.5.3 To investigate whether there is under-reporting of occupational exposure to blood and bodily fluids by nursing students to the occupational health and safety officer at the School of Nursing.
- 1.5.4 To investigate the possible fear of nursing students with regards to occupational exposure to blood borne pathogens.

## 1.6 Method of enquiry

The research paradigm that was used for the study was quantitative, with one open-ended question which was analysed by means of content analysis. Quantitative research is objective and involves the collection and analysis of quantitative, numerical data to identify statistical relations of variables such as knowledge and practice (Burns & Grove, 2003). This research paradigm was used because the researcher wanted to determine descriptive statistics to explain the different variables, as well as inferential statistics to explore relationships amongst the variables. The study was a descriptive research study.



A questionnaire used in a study done in Mazandaran Province, Iran, where the knowledge and practices of health care workers and medical students towards UP were surveyed, was adopted and adapted for use in this study. Permission was obtained from the main researcher involved (Motamed et al., 2006). (See Appendix 1). The questionnaire was relatively short, so as to keep participants from becoming irresponsive due to boredom (McMillan & Schumacher, 1997). The questions were close-ended and one was open-ended.

## 1.7 Limitations of the Study

Although there are other factors, such as work environment, fatigue and inexperience, contributing to occupational exposure to blood and other bodily fluids (Askarian & Malekmakan, 2006), the researcher did not address these contributing factors due to the fact that this study was conducted as a mini thesis with limitations in terms of its length. This study, therefore, only reports on the knowledge of undergraduate nursing students with regards to UP, the self reported practices of participants with regard to UP and their self reported fears with regards to occupational exposure to blood borne pathogens.



The first year students were excluded from the study due to the fact that the researcher planned to collect data in the first term of 2009. At that stage, the first year students were not yet exposed to the clinical settings and therefore did not meet the inclusion criteria, which will be discussed under sampling in Chapter 3.

Due to the fact that the researcher had an assumption that there is a lack of knowledge and practice of UP, the researcher might have been biased in analysing the results.

This was overcome by reporting all findings regardless of whether they proved the assumption right or wrong and by aiming to stay neutral.

Due to the data collection procedure, there was a possibility that the results would not be a true reflection of the population if the participants informed each other about the questions in the questionnaire before the questionnaires were administered to them. It was planned to overcome this by making sure that the data collection was done over a short period of time so that participants from other year levels were not advised of the content of the questionnaire. Unfortunately due to problems beyond the control of the researcher, this could not be achieved and may therefore be viewed as a limitation.

See Chapter 3 page 34 for some of the problems experienced during the data collection.



### **1.8 Ethical Considerations**

The proposal was submitted to the Higher Degrees Committee as well as the Senate Committee of the University of the Western Cape (UWC) for ethical clearance and approval (See appendix 2). The researcher also obtained permission from the Dean of Research of the University of the Western Cape, the Head of Department of the Nursing School, the year level co-ordinators, the lecturers of the different classes and the students to conduct the study and to use the students as participants (See appendix 3). In terms of voluntary participation, all participants, although randomly selected still had the right to take part out of their own free will. They were not in any way forced to participate against their will. On the day of the administration of the questionnaire, the researcher provided each participant with a written explanation

(See appendix 4) as well as a verbal explanation of what the study entailed, before the researcher obtained the participant's written informed consent (See appendix 5).

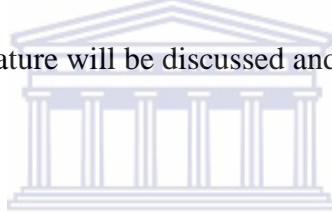
Confidentiality was also addressed on that day and throughout the study. As the researcher was conducting the research herself, she could assure the participants of the aforementioned. The researcher also informed them that they had the right to withdraw from the study at any point. There were no known risks, for example physical harm to the students or victimization, involved. If after completion of the questionnaire there were any participants that required support, they were encouraged to go for counselling at the Student Health Centre of the University. The researcher informed and negotiated with the manager of the centre before data collection commenced that she would be conducting this study and that there might be an influx of nursing students for voluntary counselling and testing for HIV due to the nature of the study and the questions posed to the students.

There were also no potential benefits to the students, but the study will be of benefit to the nursing programme and students in the programme. Preliminary results were made available for all academics, teaching UP programme and who incorporate UP in the modules they offer, to remediate, specifically with students where there was a low level of or non-compliance of UP. This was also done so that academics can

strengthen and reinforce the use of UP. There were no rewards or remuneration for participation due to a lack of resources.

## **1.9 Structural Overview**

The literature review in this study focuses on the knowledge of universal precautions, the practice of universal precautions, fear of occupational exposure, under-reporting of occupational exposures and the relationship between knowledge and practice of various health care workers. This will be discussed in Chapter 2. The findings of studies reported on in literature will be discussed and compared.



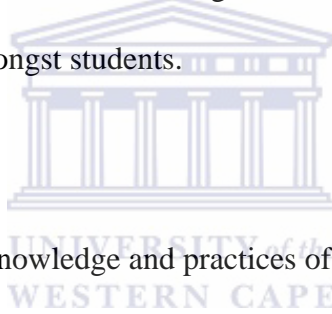
Chapter 3 will deal with the methodology of this study as a quantitative study and how the researcher went about implementing this in the study.

In Chapter 4 the data analysis will be covered which includes a descriptive analysis and inferential statistics. The open-ended question was analysed by means of content analysis. The presentation of the data as well as brief discussions on the different variables will also be presented.

Chapter 5 will deal with the interpretations of the findings as well as discussions thereof by means of comparing these findings with the literature. Recommendations based on the findings will also be dealt with in this chapter.

### **1.10 Summary**

Health care workers, especially students in the health care profession, are at an increased risk of occupational exposure to blood and bodily fluids. Proper knowledge and practice of universal precautions can significantly decrease the incidence of occupational exposure amongst students.



This study examined the knowledge and practices of nursing students with regard to UP, under-reporting and fear of occupational exposure. The research will contribute to the nursing programme by impacting on the curriculum by means of suggestions based on the findings of the study in order to increase the knowledge and practices of UP.



## CHAPTER 2: LITERATURE REVIEW

### 2.1. Introduction

As stated in the previous chapter this literature review will focus on the knowledge of universal precautions, the practice of universal precautions, fear of occupational exposure to blood-borne pathogens, under-reporting of occupational injuries and exposures and the relationship between knowledge and practice. The findings of other studies will be discussed and compared with each other. Although there is a wide variety of studies and information with regards to universal precautions, the researcher limited the literature review to the most relevant aspects relating to her intended study. The key terms used for the search included the words universal precautions, knowledge, practice and attitudes towards universal precautions, nursing students, occupational injury, and occupational exposure.

After an extensive initial search on various databases the researcher did not find studies with regard to UP involving nursing students in the South African context. However, a number of studies done abroad were reported on in the literature. The databases examined by the researcher included, amongst others, Academic OneFile; EbscoHost; CINAHL; Pubmed; Sabinet; Science Direct and Google. Although the researcher made use mainly of electronic searches, she did also search in the library online catalogue at UWC for journal articles but again could not find any studies in the South African context. A colleague of the researcher provided her with an article

titled “Knowledge of universal precautions and fears of occupational exposure to HIV/AIDS among student nurses and midwives in Ethiopia.” The journal is called the “Africa Journal of Nursing and Midwifery” (Aga & Mekonnen, 2004). This journal was used to review literature on fear and was also used to compare the findings of this study to the findings of Aga and Mekonnen (2004).

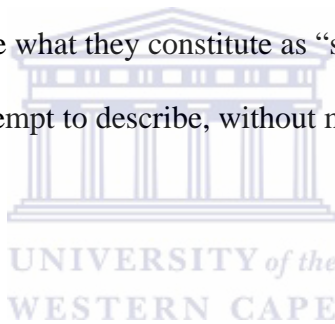
## **2.2. Knowledge of UP**

The following are a report of studies found by the researcher pertaining to students’ knowledge regarding UP. Askarian and Malekmakan (2006) reported in their study, a survey on the frequency of needle-stick injuries and the knowledge, attitude and practices of medical, dental, nursing and midwifery students at the university teaching hospitals of Shiraz in Iran, that 87.8% of the students received information with regards to UP compared to the 98% reported by Patterson et al (2003). Askarian and Malekmakan (2006) argue that this shows the need for more structured education with regards to UP.

Another study during which the knowledge of UP was tested showed that only 57.1% had “sufficient knowledge” (Aga & Mekonnen, 2004) compared to the study done by Motamed et al (2006, p. 653) where the mean score for knowledge among medical students was 78.1%, indicating a “low understanding” of universal precautions. Motamed et al (2006) also found that UP were not just understood poorly but also

selectively. Chan et al (2002) also found the knowledge of nurses with regards to UP to be inadequate. In the study done in Hong Kong, the researchers tested the knowledge and practices of nurses with regards to universal precautions and found the knowledge of nurses to be insufficient with a mean total score of 66.18%.

The terms “sufficient knowledge” and “low understanding” were terms used by the original researchers of the studies. They do not compare their results to a specific “amount of understanding” but only compare them with results of other studies. Aga and Mekonnon do not state what they constitute as “sufficient knowledge” in their study although they do attempt to describe, without much clarity, how they allocated the levels of knowledge.

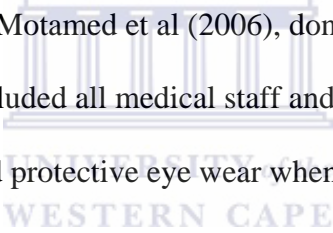


### **2.3. Practice of UP**

The discussion of practice of universal precautions will comprise of gloving, recapping of needles, wearing of gowns and eye protection as found in the available literature (Askarian & Malekmakan, 2006; Motamed et al., 2006).

With regards to the practicing of UP, Askarian and Malekmakan (2006) found that 96.2% of students reported wearing gloves during wound suturing as opposed to a study, cited within Askarian and Malekmakan (2006), done by Meaner et al (2004),

regarding blood exposure accidents among medical students, who reported that 50% of medical students did not use gloves. It was found that a total of 11.6% of the students “rarely to never” recapped the needles in the study done by Askarian and Malekmakan (2006) and 35.6% always discarded the needles in a sharp container. In other words 88% of students recapped needles and 64% of students did not follow the correct procedure for disposal of sharps. The percentage of students who did not routinely wear eye protection in operating and emergency rooms were 97.5%, while 52.5% of dental students wear eye protection routinely.

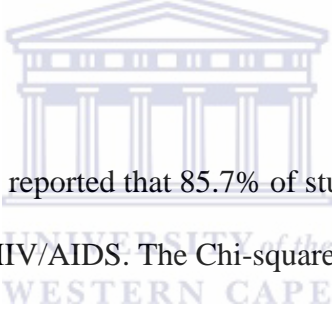


According to the study by Motamed et al (2006), done at two hospitals, almost all of the respondents, which included all medical staff and medical students, practiced wearing gloves, gowns and protective eye wear when exposed to blood products. A total of 19.2% at hospital A, 60.3% at hospital B and 33.9% of the total medical students, at both hospitals (A and B), knew that it is not necessary to apply UP when exposed to sweat. Only 16.1% at hospital A, 50.4% at hospital B and 25.2% of medical students at both hospitals, knew that health care workers with non-intact skin should not be involved in direct patient care until the condition has resolved. The practice of the disposal of sharps was very good with 94.8%, 99.3% and 100% respectively. This is a contradiction of the findings in the study of Askarian and Malekmakan (2006) as discussed in the previous paragraph. A total of 74.5% of all the medical students participating in the study reported that washing with soap and water for 5 minutes is the first step after contact with infective materials. Mohamed et

al (2006) also found that there was a significant relationship between knowledge and practice at hospital B. This is discussed in more detail below under point 2.6 which deals with the relationship between knowledge and practice.

#### **2.4. Fear of occupational exposure to blood and bodily fluids**

Askarian and Malekmakan reported that 58.1 % of students were “extremely to very concerned” about BBPs. In a study conducted by Patterson et al (2003) it was found that 87% of medical students were “extremely to very concerned” about BBPs.



Aga and Mekonnon (2004) reported that 85.7% of students had fears about occupational exposure to HIV/AIDS. The Chi-square test showed that this is a significant amount of respondents (Aga and Mekonnon, 2004). These authors also reported, by means of symmetric measures, that there seemed to be some relationship between student fears and their knowledge of UP. Other statistical tests like linear – by – linear association and Fisher’s exact test showed differences in year levels, indicating that the fear increased as the students progressed through their training. Could it be that as the knowledge increase, the fear also increases? The researchers give as possible factors for these findings the fact that the study did not assess the student’s skills in applying universal precautions as well as the fact that the study did not assess the available resources in the clinical areas. They state that further studies

are needed in order to relate these fears to specific factors (Aga and Mekonnon, 2004).

## **2.5. Under-reporting**

Studies have shown that, just like other health care workers, students tend to under-report occupational exposures to blood and other bodily fluids (Osborn, Papadakis & Gerberding, 1999; Patterson et al, 2003; Rosenthal et al, 1999; Deisenhammer et al, 2006; Askew, 2007; Singru & Banerjee, 2008). Although some of these studies do report the types of exposures, for example needle stick and sharps injuries, mucus membrane exposures, skin exposures (Askarian & Malekmakan, 2006; Askew, 2007; Singru & Banerjee, 2008), the researcher will not discuss these as she is focusing on the under-reporting and not on the types of exposure.

According to Osborn, Papadakis and Gerberding (1999), medical students at the University of California's San Francisco School of Medicine under-reported the total number of occupational exposures that occurred. One of the reasons for under-reporting was that respondents felt slight pressure to under-report when stuck by a colleague by accident (Osborn, Papadakis & Gerberding, 1999).

In another study done by Patterson et al. (2003) at the Washington University School of Medicine, 41% of the exposures among medical students were not reported. In a study done in France, at Nice University, only 39% of students reported an exposure to blood and bodily fluids (Rosenthal, Pradier, Keita-Perse, Altare, Dellamonica, & Cassuto, 1999). The reasons given by the students for not reporting were inability to influence the outcome, not knowing who to consult and being advised against reporting (Rosenthal et al, 1999).

Deisenhammer et al. (2006) found that 45% of students at the Ludwig-Maximilians-University and the Technical University in Germany did not report exposures. A study done in Brazil by Reis, Filho, Rampinelli, Soares, Prado and Pedroso in 2004 (Askew, 2007) at the Medical College of the Federal University of Minas Gerais, indicated that a total of 51% of the exposures were not reported.

A study done amongst health care workers in a teaching hospital in Mumbai, India found that 76% of residents and 77, 97% interns reported occupational exposure compared to only 26% of nurses, which was statistically significant (Singru & Banerjee, 2008). According to Singru and Banerjee (2008), unreported needlestick and sharp injuries are a critical obstruction and prevent health care workers from getting the proper treatment. Singru and Banerjee (2008) report that according to researchers, 40-70% of all needle-stick injuries are unreported. This number is

alarming high and suggests that up to 70% of health care workers who were exposed to needle stick injuries did not have proper treatment and if they should seroconvert at a later stage they would not be eligible for workers compensation benefits. For the purpose of this study seroconvert means the development of detectable HIV antibodies in the blood serum as a result of infection, in other words a person seroconverts from antibody-negative to antibody-positive (Prevention of Mother To Child Transmission of HIV- PMTCT OVERVIEW, 2008).

## **2.6. Relationship Between Knowledge of UP and Practice of UP**

Only one of the studies reviewed looked at the correlation between knowledge and practice of universal precautions (Motamed et al., 2006). They found that there was a significant relationship between the respondents' knowledge and practice of universal precautions in hospital B, where the Pearson correlation coefficient ( $r$ ) was 0.58. This means that there is a positive relationship between the two; as the knowledge increases, respondents became more compliant with UP requirements (Motamed et al., 2006).

The Pearson correlation coefficient is a statistical method of determining the strength or degree of relationship between two variables (Kruger, de Vos, Fouche, & Venter, 2007). Motamed et al. (2006) also looked at various other relationships amongst the variables such as knowledge and age group, knowledge and qualification, knowledge



and practice against years of experience, knowledge and occupation and knowledge and gender. For the purpose of this study, the researcher will only look at the correlation between the knowledge of universal precautions and the practice of universal precautions, as stated in the objectives of the study.

## **2.7. Summary**

From the literature review it becomes evident that there is generally poor knowledge and practice of universal precautions and one study indicated that there is some kind of relationship between the two. The literature also shows that there tends to be a fear of occupational exposure to blood-borne pathogens. Underreporting of occupational exposure is well addressed in the literature. These points all form the basis for this study and the researcher aims to discover whether the findings from this study will support previous international studies or whether any differences will be found. The next chapter deals with the methodology of this study as a quantitative study and how the researcher went about implementing this in the study.

## CHAPTER 3: RESEARCH METHODOLOGY

### 3.1. Introduction

This chapter deals with the methodology and implementation of this study as a quantitative study, which has one open ended question. Included in this chapter are the following: the discussion of the research tool and why it was chosen; the sample design; sampling techniques and the criteria used to determine the sample size. It will also focus on the data collection process and the data analysis procedure.

### 3.2. Research Design

The research paradigm that was used for the study was quantitative. A questionnaire survey was done and one open ended question was analyzed by means of content analysis. Quantitative research is said to be objective and involves the collection and analysis of quantitative, numerical data to identify statistical relations of variables such as knowledge and practice (Burns & Grove, 2003). This research paradigm was used because the researcher wanted to determine descriptive statistics to explain the different variables, as well as inferential statistics to explore relationships amongst the variables. The variables studied are knowledge and practice of UP, under-reporting of occupational exposures and fear of occupational exposures.

This study is descriptive in nature, used to study and identify variables that interest the researcher and to explore how these variables relate to one another. The researcher can however not test for relationships between variables and the direction of an effect. The important thing to remember about descriptive research is that the researcher is unable to compare between groups or determine cause and effect relationships amongst variables (Schneider, Whitehead, Elliott, Lobiondo-Wood, & Haber, 2007). This is because exploratory studies explores and attempts to describe phenomena. Burns and Grove (2003) defines descriptive research as exploring and describing occurrences in real world situations and that the result will be to describe the concept, to identify relationships and possibly develop a hypothesis for further research.



### **3.3. Sampling**

Sampling is when a smaller group is chosen from the greater group (population) to study and then generalize these findings of the small group back to the population from which it was drawn (Sampling, 2006).

### **3.3.1. Population**

The target population consisted of registered undergraduate nursing students, from year level two to year level four, of the University of the Western Cape during 2009.

The total population was 722 students.

### **3.3.2. Inclusion criterion**

The student had to be registered for B Cur Nursing at the University of the Western Cape and had to be in year level two to four.



### **3.3.3. Exclusion criterion**

The student must have been exposed to clinical practice in real situations and not only in the skills laboratory with simulated patients. For this reason, the first year students were excluded since this group of students had very little real life clinical exposure by the time data collection commenced. During the first year of study the nursing students are only placed in the clinical setting during the second term of the academic year (around the month of April) and usually during this initial clinical placement no invasive procedures are performed by the student nurse.

### **3.3.4. Sampling strategy**

As stated previously, the target population was registered undergraduate nursing students at UWC, more specifically, the second to fourth year students. The total number of students in the target population was 722. The totals per year level were as follows: 331 second year, 221 third year and 170 fourth year students. As the total amount of students was not equally distributed across the three year levels, the researcher decided to make use of proportional stratified random sampling with replacement, which will be discussed in more detail below.



#### **3.3.4.1. Sampling Design**

The sampling design was probability sampling. Kirk (1999) and Seaberg (1988), as cited in Strydom (2007), defined this type of sampling as one where each person in the population has the same known opportunity of being selected. The researcher made use of probability sampling in order to be able to generalize the findings of the study to the population. According to Brink, van der Walt and van Rensburg (2008), probability sampling is more likely to be representative of the population and reflect the variations of elements in the population. Another reason why this type of sampling was chosen was to reduce sampling bias and to use inferential statistics correctly.

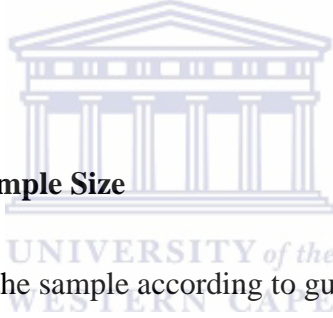
### **3.3.4.2 Proportional Stratified Sampling**

The sample size might not have been equal in weight across all three year levels if pure stratified random sampling was used. A way to overcome this was to use proportional stratified random sampling, where the proportions for each year level were equal, to allow for the findings of the study to be generalized to the population. A simplified example here was to select a percentage of participants based on the total percentage the specific level represents in the total target population, to have equal proportions over the four year levels (Leedy & Ormrod, 2005). In other words the researcher selected the percentages of the different year levels, for the sample population, based on the real percentages of the year levels in the entire target population, for example the second years represent 45.8% of the entire target population, therefore the researcher randomly selected 45.8% second year students out of the total number (253) needed for the sample size. Preserving proportions will allow for any small minority to be properly represented in the sample (Bless & Higson-Smith, 1995).

### **3.3.4.3. Stratified Random Sampling with Replacement**

Leedy and Ormrod (2005) state that the characteristics of the sample are approximately that of the population if random sampling is used. A stratified random sampling of the total number of registered nursing students at the University of the Western Cape was done because there are different year levels (strata) which have

distinctly different types of students (Leedy & Ormrod, 2005). All the students in the three year levels therefore had an equal chance of being selected (Leedy & Ormrod, 2005). According to Bless and Higson-Smith (1995), another reason for stratified random sampling is that it facilitates simple random sampling without decreasing the quality of the sample. When the researcher could not locate one of the participants or if a participant refused to answer questions or provide information, the researcher chose another participant. This is known as sampling with replacement, where a selected participant is replaced by another or next randomly selected member of the population (Bless & Higson-Smith, 1995).



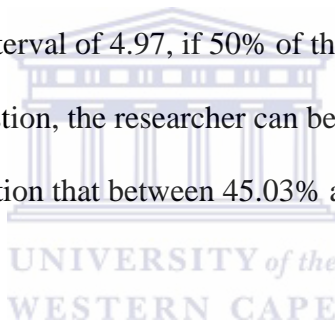
#### **3.3.4.4. Calculation of Sample Size**

The researcher calculated the sample according to guidelines from the Sample Size Calculator (2008). To calculate the sample size, a confidence interval and confidence level were established so that the responses of the sample are a true reflection of the population and to find the level of accuracy in the existing sample (Sample Size Calculator, 2008). The confidence interval for this study was determined once the total population was known.

The confidence level tells you how sure you can be that your results are a true reflection for the population. It tells you what percent of the population would have chosen a specific answer within the confidence interval. The researcher used a

confidence level of 95% which means that the researcher can be 95% sure that this is a true reflection of the population.

The confidence interval is the likely range of the true value for the population. There are three factors that determine the size of the confidence interval for a given confidence level, namely sample size, percentage and population size (Sample Size Calculator, 2008). The researcher had a confidence interval of 4.97 as calculated using the sample size calculator from the Survey System website. Based on the researcher's confidence interval of 4.97, if 50% of the sample chooses the same answer to a particular question, the researcher can be sure that if the answer were posed to the whole population that between 45.03% and 54.97% would have chosen that answer.



If the confidence level and confidence interval are put together, the researcher can say that she is 95% sure that between 45.03% and 54.97% of the population would have chosen that specific answer. The researcher made use of a sample size calculator to determine the sample size, but needed all of the aforementioned data in order to compute the size (Sample Size Calculator, 2008).



Based on the calculation, with a confidence level of 95% and a confidence interval of 4.97, the sample size of this study was determined as 253 students consisting of 45.8% (n = 116) second year students, 30.4% (n = 77) third year students and 23.7% (n = 60) fourth year students.

#### **3.3.4.5. Sampling Procedure**

The researcher obtained a list of all the registered nursing students from Information and Communication Services (ICS) of UWC and then used the randomizer function of Microsoft Excel 2007 to select the sample. All students who were randomly picked for the pilot study were excluded from the sample. There were no recruitment strategies due to the fact that it was a randomized sample. The researcher also obtained class lists from all of the course co-coordinators of each year level to determine in which class the participants were in order to know when and where to find whom.

### **3.4. Data Collection**

Data collection took place over a three week period and will be discussed below.

#### **3.4.1. Instrument Development**

A self administered questionnaire used in a study done in Mazandaran Province (Iran), where the knowledge and practices of health care workers and medical

students towards UP were surveyed, was adopted and adapted for use in this study, after permission was obtained from the lead researcher involved (Motamed et al., 2006). The questionnaire is relatively short so as to keep participants from becoming disrespondent due to boredom (McMillan & Schumacher, 1997). The questions were close - ended and one was open – ended (See appendix 6).

The researcher decided to use this questionnaire because it addressed her study objectives and was one of the main studies on which the literature review of the study focused. The fact that the researcher was also interested in studying the knowledge and practices of universal precautions (as were the original researchers) and also due to the fact that this study identified the reliability and validity of their questionnaire, made it an acceptable source for the researcher.

Questionnaires are usually designed according to certain guidelines. These guidelines are readily found in various academic sources. The basic steps would be to first define the objectives of the study (Colosi, 2006). This is done so that no time and money are wasted on questions that are not relevant to the study. The second step would be to determine the sampling group (Questionnaire Design, n.d.). The next step would be to start writing the questions or statements for the questionnaire. According to the webpage, Questionnaire Design General Considerations (2007), one should make sure that every question supports the reason for one's study and not use

questions that are purely “nice to know”, in other words, that are pointless. Also, one needs to keep in mind how the data will be analyzed. The second last step would be the questionnaire format. According to Colosi (2006), the appearance and format will greatly influence the quality of data collected. A good appearance will give a positive first impression and will encourage serious responses according to McMillan and Schumacher (1997). The final step is the pilot study. McMillan and Schumacher (1997) suggest one finds a sample of subjects similar to those in one's study and administer the questionnaire the same way as you would do with your respondents. Depending on your feedback, one would either correct the items that might pose a problem or redo the whole questionnaire.



### **3.4.2. Broad Research Questions**

The questionnaire consisted of four parts, as discussed below.

**3.4.2.1. Part one** was the demographic data that focused on age, gender and year level of study. In this section the student was also asked whether he or she had ever been occupationally exposed to blood or other bodily fluids during his/her training. If so, whether he/she had reported the incident to his/her immediate supervisor and whether it was a clinical supervisor or sister-in-charge in the setting. Students were also asked whether they had received prophylactic treatment after reporting an occupational exposure.

**3.4.2.2. Part two** determined the knowledge of the student with regards to UP by means of a three point Lickert scale. A Likert scale is the most common form of scaled items where the question is followed by a scale of predetermined responses (McMillan & Schumacher, 1997). The student had to answer “true”, “false” or “don’t know” to a set of statements. The student was then allocated a score depending on the number of statements answered correctly.

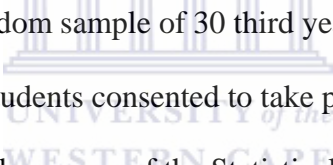
**3.4.2.3. Part three** was a self-report from the student with regards to practicing of UP. Statements were made with regards to disposal of sharps, protective clothing, gloving and cleaning of contaminated surfaces and the students needed to indicate on a five point Lickert scale the behavior applicable to him/herself. The options on the scale were: “always”, “usually”, “sometimes”, “seldom” and “never”. The student was then allocated a total score for all statements answered correctly.

**3.4.2.4. Part four** assessed whether students fear occupational exposure to blood-borne pathogens. If the student indicated he or she had a fear of occupational exposure, the student was expected to indicate on a five point Likert scale the level of the fear. The options ranged from “extreme fear” to “slight fear”. The student was also required to indicate what the contributing factors were with regard to his/her fear by means of answering an open-ended question.

The statements used to test knowledge and practice of UP were based on the questionnaire from a previous study (Motamed et al., 2006) as well as on the CDC guidelines for Universal Precautions (DHQP, 1999).

### **3.4.3. Pilot Study**

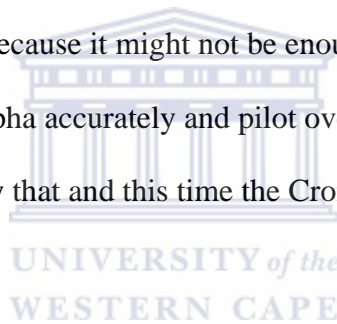
A pilot study was done in April 2009 to determine the reliability of the instrument. The researcher used Cronbach's Alpha again to determine the reliability of the adapted questionnaire, which is discussed below.



The researcher chose a random sample of 30 third year students in the midwifery group. Only 20 of the 30 students consented to take part in the pilot study. The researcher then computed, by means of the Statistical Package for Social Sciences (SPSS) 16.0, the Cronbach's alpha which measures the internal consistency of the questions. The Cronbach's alpha was 0.61 which the researcher considered to be too low. Cronbach's alpha measures how well a set of items (or questions) measures the same concept, for example, knowledge of UP (SPSS FAQ: What does Cronbach's alpha mean?, n.d.). The reliability coefficient for the questionnaire, in the original study for which it was initially used, was 0.71 (Motamed et al., 2006). A reliability coefficient of 0.70 or higher is considered "acceptable" in most social science research situations (SPSS FAQ: What does Cronbach's alpha mean?, n.d.).

The researcher then revised the questionnaire and did another pilot study in May 2009. This time the researcher again chose a random sample of 30 third year students. Again only 20 consented and completed the questionnaire. This time the Cronbach's alpha was even lower at 0.36.

The researcher then consulted a statistics coach from the Postgraduate Education and Throughput (PET) programme at the University of the Western Cape. The statistics coach then advised the researcher to increase the number of statements that tested the knowledge and practice, because it might not be enough for the software programme to compute Cronbach's alpha accurately and pilot over all three year levels. The researcher then did exactly that and this time the Cronbach's alpha was 0.50.



It also indicated if the researcher were to delete four items it could be 0.71. Deletion of even more items could yield an even higher alpha. The researcher decided to delete only the four items, because a Cronbach's alpha of 0.7 is acceptable although not good. The four items that were deleted were not that important as they covered issues like handling of sharps, the availability of an anti Hepatitis C vaccine and the use of protective equipment which was all covered in the questionnaire in different forms, except for the question regarding the Hepatitis C vaccine. These questions were 'trick questions' and therefore they could have been identified as not internally consistent by the software programme.

#### **3.4.4. Data Collection Procedure**

The students were not informed beforehand of the planned date for the collection of data due to the fact that the researcher anticipated that the students selected may then simply stay absent in order not to participate in the study, without being explained what the study was about. On the day of data collection, the researcher addressed all the selected participants together in a classroom setting and informed them in detail about the research study. The researcher supplied the students with an information sheet (See Appendix 4) to keep for their own reference. The information sheet had the contact details of the researcher should they have had any queries or should they decide to withdraw from the study. After the information session the students were asked to sign the consent form (See Appendix 5) if they are willing to participate in the study. The consent form had to be handed to the researcher before the participant was handed a questionnaire. This was done to increase the internal validity of the study by controlling the intervening variable of leaking of the questionnaire. Those who did not consent to the study could therefore not leak the content of the questionnaire to other students. Not all of the participants agreed but all the participants who agreed did sign the consent form. The researcher then did replacement sampling as discussed under 3.3.4.3. There were no participants who indicated that they want to withdraw during any stage in the study.

The questionnaires were administered to the participants on specific days, as arranged with the lecturers of the different groups. This was done at the University of the Western Cape and the Stellenbosch University where the fourth year students were attending lectures. This took place either before or after a lecture because it was easier to access the participants that way unless he or she was absent for the day. If a student was absent or refused to participate, the researcher chose another participant, as mentioned under replacement sampling. Data was collected over a period of three weeks due to some problems with accessing the students even after prearranging the data collection with the lecturers involved. One of the problems experienced was when the lecturer who consented to the study being conducted after his lecture did not inform the researcher when another lecturer was scheduled to take the lecture on the scheduled date. This lecturer was therefore not aware of the researcher's appointment with the students which retarded the process. Another reason was that the third and fourth year students could only be accessed on a Friday because the researcher had teaching commitments on Thursdays. The delay in the collection of the data could be viewed as a limitation of this study.

The questionnaire was administered to the participants in groups. The confidentiality of the questionnaire when administered in groups, in comparison with an interview, minimized bias in terms of social desirability. According to Stern (as cited in Mouton, 2001), the participant may be answering what he or she feels he or she "should" to please the researcher, rather than responding truthfully. It was more



effective for the researcher to administer the questionnaire to the participants personally, rather than a self administered or take-home questionnaire. With this strategy, participants were not able to consult other resources which could have ultimately impacted the findings, in which case the researcher would have obtained findings that were not a true reflection of the reality.

### **3.5. Data Analysis**

The Statistical Package for the Social Sciences (SPSS) software version 16.0 was used by the researcher to analyze the data in order to determine the mean, median, mode and standard deviation. The aforementioned were determined to describe and summarize the data. This is known as “measure of central tendency” (Kruger et al., 2005). The researcher also used frequency tables and percentage distribution to further describe the different variables.

Statistical analysis (inferential statistics) was also done, by means of SPSS, in order to relate the findings to the sample (Data Analysis- Quantitative Analysis- What It Is, n.d.). The researcher computed cross tabulations with Chi-square tests to determine whether there were any correlations and if so, whether the correlation were statistically significant. The level of significance was set at 0.05, meaning that the confidence level that the researcher used at all times was 95%. This means that if there is a significant relationship amongst variables, then, in 95 times out of a

hundred duplicated studies, the results are because of the independent variable (knowledge in this study) and not simply due to chance (Kruger et al., 2005).

The open-ended question was analysed by means of content analysis where themes were identified (Burns & Grove, 2003). Then, according to Burns & Grove (2003), the data was coded by reading each response and identifying key words. The researcher then grouped these responses into eight themes. The data was then organized according to these themes in order for the researcher to interpret and report the information.



### **3.6. Validity and reliability**

Validity of the instrument is the degree to which the questionnaire measures what it is supposed to measure (Schneider, Whitehead, Elliott, Lobiondo-Wood, & Haber, 2007). The researcher could not assume that the questionnaire was valid just because it was an established instrument (McMillan & Schumacher, 1997). According to McMillan and Schumacher (1997), it is best to establish validity of the questionnaire before data collection. In order for the researcher to have established this, a pilot study was conducted to test the instrument. To address internal validity, the questionnaire was administered by the researcher to control intervening variables, for example, students obtaining the answers to questions from somewhere else. Although the data were collected over a three week period, the researcher is confident that this

did not impact the validity of the study because the questionnaires were completed immediately and handed straight back to the researcher. Students would therefore have had to rely on recall if they were to inform each other of the content of the questionnaire. The fact that students were not informed before the day of the data collection of their selection to participate in the study also contributed to control of this intervening variable.

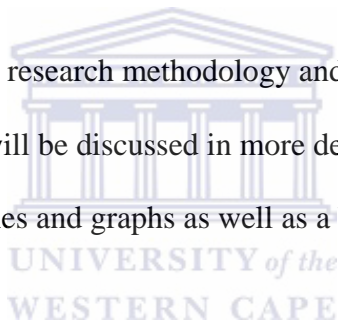
In addressing the issue of external validity, the researcher used the proportional stratified random sampling design in order to generalize the findings of the target population. The content validity of the questionnaire used in the study by Motamed et al. (2006) was addressed. This was achieved by means of experts from the infection control committees of the two hospitals surveyed the questionnaire used for their study (Motamed et al., 2006). The open – ended question in the questionnaire and the analysis of the responses were reviewed by the researcher’s supervisor for content validity.

Reliability of the instrument is the extent to which the instrument brings about the same outcomes on repeated times (Schneider, Whitehead, Elliott, Lobiondo-Wood, & Haber, 2007). Reliability of the instrument was discussed in great detail in 3.4.3. above.

Trustworthiness is used to address the accuracy of these findings (Schneider, Whitehead, Elliott, Lobiondo-Wood, & Haber, 2007). The researcher identified all the themes and then by means of peer analysis checking (Schneider, Whitehead, Elliott, Lobiondo-Wood, & Haber, 2007) established trustworthiness. The peer analysis checking was done by the researcher's supervisor to check the acceptability of the data analysis.

### **3.7. Summary**

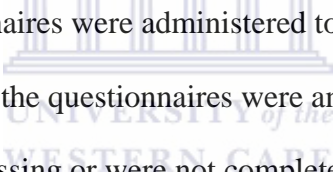
This chapter dealt with the research methodology and data collection. In the next chapter the data analysis will be discussed in more detail and the findings will be presented by means of tables and graphs as well as a brief discussion of each of these.



## **CHAPTER 4: PRESENTATION AND INTERPRETATION**

### **4.1. Introduction**

This chapter will include the presentations and the discussions of the results of this study. The different variables of the study will be discussed according to the different parts as set out in the questionnaire. Descriptive statistics will be used to describe the data first and then the researcher will make use of inferential statistics to determine whether there are any significant correlations amongst knowledge and practice of Universal Precautions.



A total of 253(n) questionnaires were administered to the undergraduate nursing students of UWC. Most of the questionnaires were answered in full but there were some (65) that had data missing or were not completed where the question was not applicable to a particular student for example where a student answered “no” and the next question required an answer based on a “yes” response. The researcher included all 253 questionnaires in order to generalize the findings to the population and because the missing data did not interfere with the analysis.

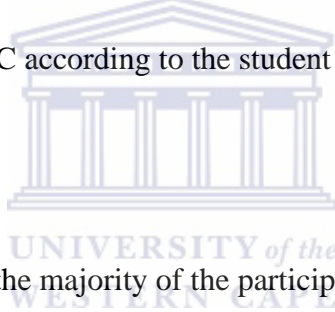
### **4.2. Demographic Data**

The part of the questionnaire that dealt with the demographic data included the following: age; gender; year level of study; exposure to any occupational exposure

(needle prick injuries, splashes in the eyes, mouth or exposure of non-intact skin to blood or other bodily fluids); whether the incident was reported and whether the participant received prophylactic treatment.

#### **4.2.1. Age, Gender and Year Level of Study**

A total of 248 participants indicated their age, while 5 participants did not indicate their age. Most of the participants (72%) fell into the 19 – 29 years old category as can be seen in table 1. This is a true reflection of the ages found in the undergraduate nursing population of UWC according to the student statistics (School of Nursing, UWC).



As can be seen in table 1, the majority of the participants were female (83%) while the male participants (17%) were the minority. This is representative of the total student population, where the majority of the students are female and the males represent the minority.

The majority of participants were second year students (45.8%, n=331), followed by the third year (30.4%, n=221) and the fourth years with (23.7%, n=170). This sample is a true reflection of the total population from which it was drawn, because the percentage of students across the different year levels in the sample reflected the same percentage across year levels in the total student population.

Variable	Categories	Frequency	Percentage
Age	19 – 29 years old	178	71.7
	30 – 39 years old	52	21.0
	40 – 49 years old	18	7.3
Gender	Male	43	17
	Female	210	83
Year level of study	Second Year	116	45.8
	Third Year	77	30.4
	Fourth Year	60	23.7

**Table 1. Age, Gender and Year Level of Study (sample size n=253)**

### 4.3. Knowledge of Universal Precautions

Part two of the questionnaire dealt with the knowledge of the participants with regard to universal precautions. Question seven asked whether the participant had heard of Universal Precautions. A total of 77.9 % (190) of the participants, over all three year levels, indicated that they had heard about Universal Precautions, while 22.1% (54) indicated they had never heard of Universal Precautions before. Questions 8 to 21 were in the form of a Lickert scale with the options “true”, “false” and “don’t know” and these results are illustrated in table 2.

<b>Statement</b>	<b>Correct Answer</b>	<b>Incorrect Answer</b>	<b>Don't know</b>
UP are applied when caring for patients with HIV and HBV only. (F)	62.2%	21.7%	16.1%
UP should be applied caring for all persons regardless of their infection status. (T)	86.8%	5.2%	8.0%
Isolation is necessary for patients with all blood-borne infections. (F)	51.5%	34.7%	13.8%
Used needles can be recapped after giving an injection. (F)	88.0%	10.8%	1.2%
Subcutaneous injuries to the health worker during intravenous injections are the most common cause of occupational infections. (T)	34.8%	18.2%	47.0%
Universal precautions are not necessary in situations that might lead to contact with saliva. (T)	16.8%	64.4%	18.8%
Health care workers with non-intact skin should not be involved in direct patient care until the condition resolves. (T)	47.2%	39.9%	12.9%
For decontamination of devices such as baumanometer (only contact with skin) washing with usual detergent is enough. (T)	53.6%	39.5%	6.9%
Blood spills should be cleaned up promptly with sodium hypochlorite. (T)	59%	14.6%	26.4%
Hands should always be washed after contact with a patient. (T)	98.8%	0.8%	0.4%
For contact with blood and body fluids during non-surgical patient care, a single pair of gloves generally provides adequate barrier protection. (T)	63.6%	32.4%	4.0%
The cleaning and disinfection of all patient-care areas is important for frequently touched surfaces, especially those closest to the patient, that are most likely to be contaminated (e.g. bed rails, bedside tables, commodes, doorknobs, sinks, surfaces and equipment in close proximity to the patient) (T)	97.2%	0.4%	2.4%
It is not necessary to wash hands after contact with a patient's intact skin (e.g., when taking a pulse or blood pressure or lifting a patient) (F)	90.0%	8.4%	1.6%
Gowns can be reused for repeated contacts with the same patient. (F)	74.8%	17.6%	7.6%

**Table 2: Knowledge of Universal Precautions ((T) True and (F) False according to the researcher)**



As seen in table 2, only 51.5 % of participants knew that isolation is not necessary for patients with all blood borne infections and only 34.8% knew that subcutaneous injuries during intravenous injections are the most common cause of occupational infection amongst health care workers.

A mere 16.8% of participants knew that Universal Precautions are not necessary in situations that might lead to contact with saliva and 47.2% agreed that health care workers with non-intact skin should not be involved with direct patient care until the condition is resolved. Another unexpected discovery was that 88% of the participants knew that used needles cannot be recapped after giving an injection.

The participant was allocated a total score for all the correct answers to the 14 statements testing their knowledge and was then given a percentage for total score for knowledge as illustrated in table 4. The minimum score was 0%, while the maximum scores were 92.9%. The mean (average) score for knowledge was 65% and the median was 64.3%, meaning that half of the data lies above and half of the data lies below 64.3%. The mode, or in other words, the most frequently occurring score was 71.4%. The standard deviation was 13% making the data quite spread out.

#### **4.4. Practice of Universal Precautions**

Part 3 of the questionnaire consisted of statements with a five point Lickert scale as illustrated in table 3. Although there were only right or wrong options the researcher

decided to make it a five point Lickert scale in order to get a more accurate understanding of the practices of participants regarding Universal Precautions.

Statement	Always	Usually	Sometimes	Seldom	Never
I assume that blood and all body fluids of patients are infectious. (A)	63.5%	13.1%	21.8%	0.8%	0.8%
I use protective equipment, for example mask, gown and eye wear for a procedure depending on my observation of the patient. (N)	36.3%	21.1%	31.0%	7.2%	4.4%
I immediately dispose of a used needle in a sharps container. (A)	94.4%	3.6%	1.6%	0%	0.4%
I wear gloves when there is a risk of being contaminated with the blood or body fluid of a patient. (A)	92.8%	4.8%	1.6%	0.8%	0%
Washing with soap and water for 5 minutes is my first step after contact with infective material. (N)	66.8%	20.0%	7.6%	3.6%	2.0%
I apply universal precautions in situations that might lead to contact with sweat. (N)	32.3%	24.6%	25.4%	8.4%	9.3%
If I have a wound, I wear gloves before caring for patients. (A)	88.1%	7.5%	3.2%	0.8%	0.4%
I apply universal precautions in situations that might lead to contact with vaginal discharge. (A)	91.7%	4.0%	1.9%	1.2%	1.2%
I wash my hands after handling a specimen, regardless of the diagnosis of the patient. (A)	92.1%	4.3%	2.4%	0.8%	0.4%
I cautiously avoid injury from used needles. (A)	93.6%	4.8%	0.8%	0.4%	0.4%
I wash my hands after removing gloves. (A)	73.6%	13.6%	11.6%	0.8%	0.4%
I wear a gown during procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated. (A)	52.6%	16.6%	19.0%	5.5%	6.3%

**Table 3: Practice of Universal Precautions. (Correct answer: (A) Always (N) Never)**

While 63.5% of the participants assumed that blood and all bodily fluids of patients are infectious, only 4.4% of the participants “never wear protective equipment depending on their observation of the patient”. The results for the statement regarding the correct disposal of needles and the wearing of gloves were acceptable, with scores of 94.4% and 92.8% respectively.

Only 2% of the participants indicated that they “never wash their hands for 5 minutes after being exposed to infectious material”. The CDC guidelines do not state the need to wash hands for 5 minutes, only that hands should be washed thoroughly under running water.

Only 9.3% of the participants never “apply Universal Precautions in situations that might lead to contact with sweat”. The CDC guidelines state that it is not necessary to use universal precautions in such situations (DHQP, 1999).

As with knowledge, participants were allocated a total score for the correct answers and given a percentage for practice, as seen in table 4. The minimum score was 0% and the maximum score was 91.7%. The mean or the average score for practice was 63% with the median being 66.7%. Thus half of the participants scored more and half of the participants scored less than 66.7%. The most frequently occurring score (mode) was 66.7%. The data was also quite spread out with a standard deviation of 14%.

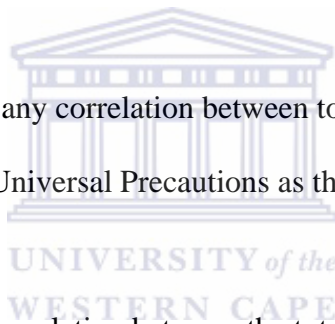
<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>Mode</b>	<b>Std. Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Knowledge in percentage	65	64.3	71.4	13	.0	92.9
Practice of UP in percentage	63	66.7	66.7	14	.0	91.7

**Table 4. The Total Scores for Knowledge and Practice in Percentage.**

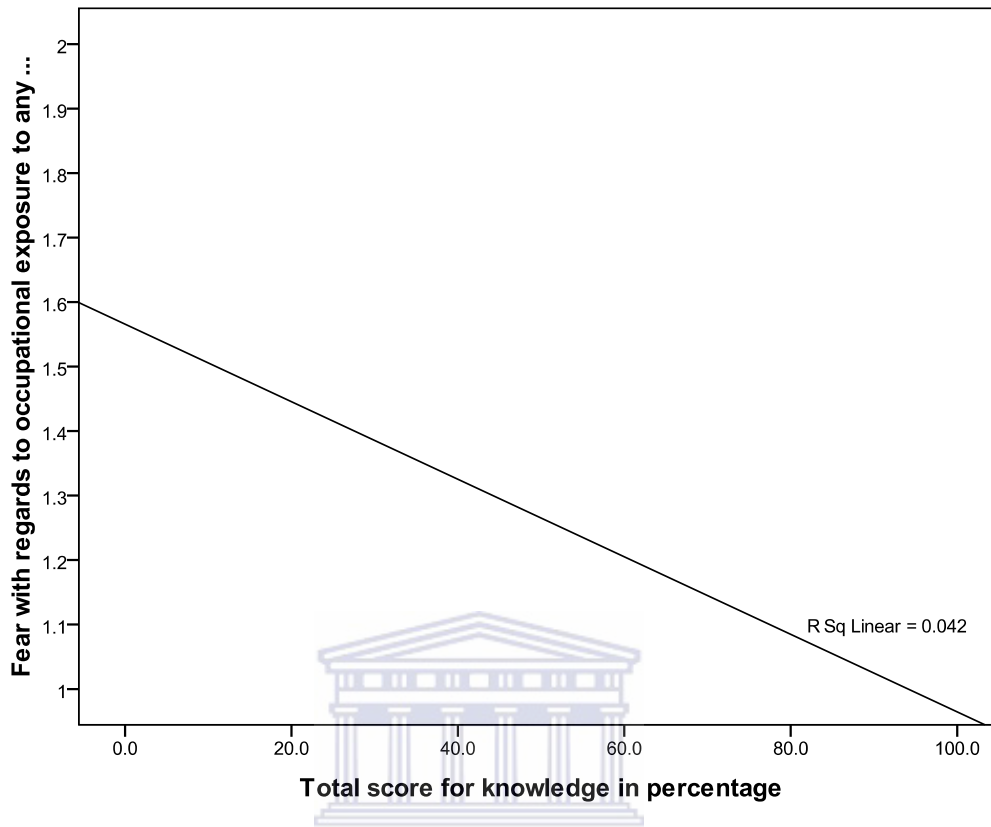
#### **4.5. Correlations**

The researcher computed cross tabulation with Chi-Square to see whether there were statistically significant correlations between knowledge of universal precautions and practice of universal precautions.

There does not seem to be any correlation between total score for knowledge and total score for practice of Universal Precautions as the p value equals 0.287.



The researcher found the correlation between the total scores for knowledge and fear very interesting. This correlation was not part of the objectives, but the researcher decided to include it anyway due to the significance of the finding. There is a negative relationship between the two, meaning that as the score for knowledge increases the level of fear decreases (see Figure 1. below).



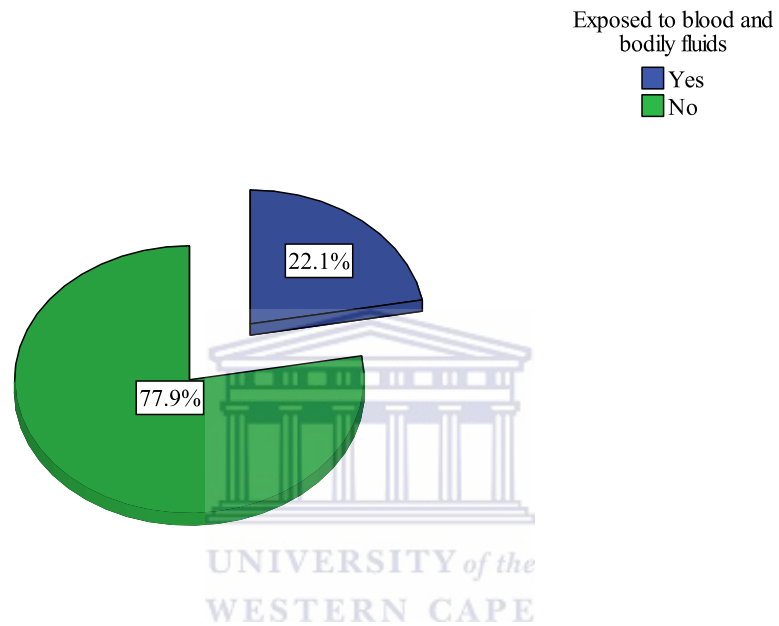
**Figure 1: Correlation Between Total Score for Knowledge and Fear of Occupational Exposure.**

The Chi-square value between the two variables illustrated in figure 1 is 0.006, making it significant at the 0.01 level.

#### **4.6. Exposure to Blood and Bodily Fluids and Reporting of Incident**

Students were asked whether they had ever been exposed to any blood or bodily fluids during their clinical placements. These exposures included, for example, needle stick injuries, blood or other bodily fluids having been spattered in the eye or mouth or open sores on the skin that had come into contact with a patients' blood or other bodily fluids. As figure 2 illustrates, a total of 22.1 % (56) participants indicated that

they did have an occupational exposure of some sort during their clinical placements while 77.9 % (197) indicated that they did not. The number of participants who answered yes to this question (22.1%) is alarming and even more so because some incidents were not reported.



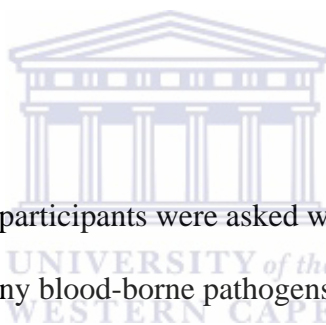
**Figure 2: Exposure to Blood and Bodily Fluids**

Of the 22.1% (56) of participants who suffered an occupational exposure, only 54.5% (30), as shown in table 5, reported the incident to either the clinical supervisor or the sister in charge of the ward or facility. One of the participants did not indicate whether or not he or she reported the incident. That means that 45.5% (25) did not report the incident at all.

Response	Reported the incident	Received prophylactic treatment
Yes	54.5%	63.3%
No	45.5%	36.7%

**Table 5: Percentage who Reported the Incident and Received Prophylactic Treatment**

Only 63.3% (19) of the participants, out of the 54.5% who reported the incident, received prophylactic treatment. The questionnaire did not ask for a reason why students did not receive prophylaxis and this gap has been identified for further research.

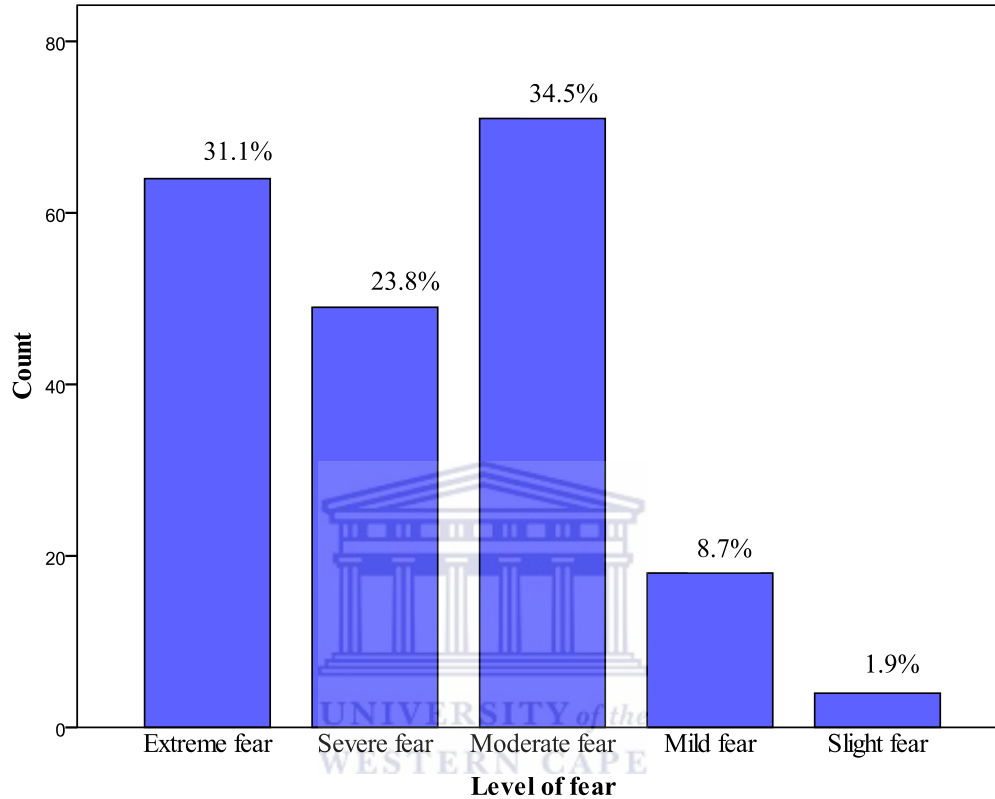


#### **4.7. Fear**

Part 4 dealt with fear. The participants were asked whether they had a fear of occupational exposure to any blood-borne pathogens. A total of 82.4 % (206) indicated they did have a fear, while 17.6% (44) indicated that they did not have a fear. The students that indicated that they did have a fear were also requested to indicate their level of fear on a five point Lickert scale ranging from “extreme fear” to “slight fear”.

It can be seen in figure 3 that more than half of the participants have a “moderate” to “extreme fear” of occupational exposure to blood-borne pathogens. More than a third of the participants have “severe” to “extreme fear”. As seen in figure 3, both the median and the mode were “moderate fear”, signifying that half of the data fell below

and half of the data fell above “moderate fear”. The most frequently occurring fear is that of “moderate fear”.



**Figure 3: Level of Fear Regarding Occupational Exposure to Blood Borne Pathogens.**

The last question asked the participants to list all the factors contributing to their fear. This open-ended question was analyzed by means of content analysis. The contributing factors highlighted by the participants were categorized and five themes emerged. Some verbatim responses are used to give examples within the themes.



#### **4.7.1 Infection with Communicable Diseases**

The majority of the participants indicated a fear of becoming infected with HIV or other communicable diseases. One of the participants said being *“Infected by HIV, Infected by contagious diseases, Infected by TB.”* Another contributing factor that was raised by many of the participants was the HIV rate and that the status of many patients is unknown. *“The factors that most scare me is the country’s pandemic with the HIV infection rate. The fact that most people don’t even know their status...With the socio economic status of our country many people lack education and health care.”* Another participant wrote: *“So many patient(s) come to the hospital and we don’t know what is wrong with them but we have to care for them. So many people are HIV positive and they don’t have to tell us as health care worker.”* Included in this category was the seroconversion rate of nurses: *“The high rate nurses are infected by (through) own neglecting of precautions.”* and *“Because a lot of nurses are now RVD+ because of blood (needle pricks) in hospitals.”* These are the beliefs of the students and not reality. As stated in chapter 1 the risk of HIV infection is 0.3%.

#### **4.7.2 Impact of Infection**

Many of the participants also identified the impact HIV infection might have on their lives as another contributing factor. One participant wrote: *“I do not want to have any blood borne pathogens in my body especially HIV/AIDS. I have seen many people dying of this disease and I never want to go through it. I have a family and do not want to infect(ed) them, especially my husband.”* Another participant wrote: *“Reduce*

*my life span, suffering when sick due to infection, having children fatherless after death, burden to the gover(n)ment for medication used.*” Other examples of factors in this category included side effects of medication, stigmatization, hospitalization, loss of income, “still young and need to still have a family” and fear of death.

Three of the participants indicated that they feared an immune system that is weak or low. Four of the participants indicated a fear of contracting leukaemia. One indicated skin disorders. One participant wrote: *“Also the partner can think that you are cheating when you get any type of these disease(s).”* Another student wrote: *“Being a student and non (not) having insurance cover to medical hazard exposure.”*

#### **4.7.3 Poor Practice of UP**

Many of them also indicated poor practice of universal precautions as a contributing factor, as one indicated: *“Used needles not dispose. I leave needles on (the) bed.”*

Another participant wrote: *“Getting ill from any exposure or me being careless.”*

Other factors in this category included: performing invasive procedures, unpredictable behaviour of patients when performing invasive procedures, forgetting universal precautions in emergencies, accidental occupational exposure even when using universal precautions.

Although many indicated poor practice of universal precautions as a contributing factor, only some indicated a lack of knowledge as a contributing factor. Some

examples are: “*lack of knowledge at times.*” and “*incomplete understanding of what it (UP) encompasses.*”

#### **4.7.4 Lack of Equipment**

Many of the participants identified the lack of equipment as a contributing factor, as indicated in the following two responses: “*Sometimes (there are) no gloves in (the) ward, limited sterile equipment. Being held accountable if use(ing) many gloves for various pt’s (patients).*” and “*lack of equipment, sharps containers often full.*”

#### **4.7.5 Behaviour of Staff**

Some also highlighted the behaviour of staff members as another contributing factor to their fear. One participant wrote: “*Neglecence (Negligence) on behalf of permanent staff in relation to the appropriate behaviour and management of universal precautions.*” Another response was: “*Staff being reckless, sisters shouting at the students and this sometimes leads to anxiety and end up mixing (confusing) things.*”

The factors raised are real issues that confront students on a daily basis in their clinical placements and will be discussed in more detail in chapter 5.

#### **4.8. Summary**

The findings of the study were reported in this chapter. What is interesting to note is that a total of 22.1% of participants indicated that they had suffered some sort of

occupational exposure to blood borne pathogens and that out of these 22.1%, only 54.5% reported the incident. Out of the 54.5% who reported the incident, only 63.3% received prophylactic treatment.

There was no correlation between the total score for knowledge and the total score for practice. The next chapter will include the discussions regarding these findings, conclusions and recommendations based on the findings of the study.



## **CHAPTER 5: CONCLUSIONS**

### **5.1. Introduction**

The final chapter will consist of a discussion of the salient points and how these compare to the literature available. The relevance of the study and possible implications will also be presented in this chapter. In addition, recommendations for further research will be suggested.

### **5.2. Knowledge and Practice with Regards to Universal Precautions**

The first objective of this study was to determine the knowledge and practice of nursing students with regards to universal precautions. The mean score for knowledge in this study was 65% with the maximum possible score of 100%. This indicates that there is a low level of understanding of universal precautions and this score corresponds with the findings of a study done by Chan et al. (2002).

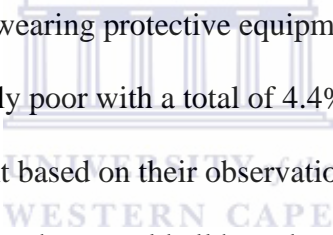
A score of 100% would be a good score and above 80% would be acceptable for knowledge and practice of UP. A student needs to have 100% knowledge in order to protect him or herself adequately against occupational exposure. One cannot be expected to practice safely without the knowledge. The researcher acknowledges the fact that accidents do happen even though all necessary precautions are taken, however, research has shown that the incidence of occupational exposure can be

decreased if there is sufficient knowledge and compliance with universal precautions. This will be discussed later in the chapter. Knowledge of universal precautions is crucial to any health care worker in order to adequately protect the health of his/her self and that of his/her patients. The researcher did not look at collective year level scores, but at individual student scores to make a judgment of what constitutes good, acceptable or low (poor) level of knowledge and or practice of UP.

Other studies that had similar findings included Motamed et al (2006) and Tavalacci, Ladner, Bailly, Merle, Pitrou, & Czernichow (2008). In contrast to the low level of understanding of universal precautions in the afore-mentioned studies, a study done in Korea amongst nursing and medical students done by Kim, Kim, Chung and Kim (2001) resulted in a mean score for knowledge of 89.27%. This is an acceptable level of knowledge according to the researcher. A literature review done by Gammon and Gould (2005) found that the knowledge of universal precautions is insufficient in various studies done worldwide.

The mean score for practice of universal precautions in this study was 63%, which, according to the standards set by the researcher on page 57, is low. This corresponds to a study done by Sadoh, Fawole, Sadoh, Oladimeji and Sotiloye (2006) where they found the practice of universal precautions to be suboptimal.

The practices of wearing gloves when there is a risk of occupational exposure was acceptable, with 92.8% indicating that they always wear gloves when there is a risk of contamination with blood and bodily fluids. In terms of the safe disposal of used needles, 94.4% had good practices. The results for “washing of hands after handling specimens” were good in comparison to the results for “washing of hands after removing gloves” which were only 73.6%. These findings seem to correspond with those of Askarian and Malekmakan (2006), Motamed et al (2006), Bamigboye & Adesanya (2006) and Sadoh et al. (2006).

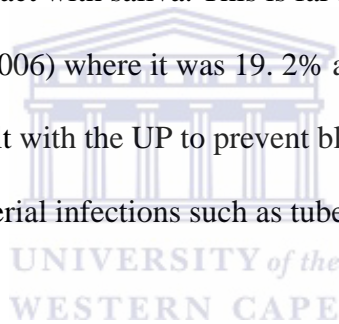


Practices with regards to “wearing protective equipment based on the observation of the patients” were extremely poor with a total of 4.4% indicating that they never “wear protective equipment based on their observation of the patient alone.” The researcher would expect that they would all have known never to “wear protective equipment based on the observation of the patient alone”. By observation alone, one cannot determine whether the patient has an infection or not. Therefore, one is putting oneself at risk if all patients are not regarded as being potentially infected, when there is a risk of being exposed to blood and bodily fluids.

The researcher would also have expected that 100% of the participants would assume that blood and bodily fluids of patients are infectious and not just 63.5%. This could be that students are not cautious of the fact that blood or bodily fluids may be infectious.

The fact that only 52.6% of the participants indicated that they wear gowns in situations where contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated may be attributed to the fact that gowns are not readily available in most facilities. However, this was not asked in the study. The researcher should have anticipated this and rephrased the question to read “If gowns were readily available ...”

Only 9.3% knew that it is not necessary to apply universal precautions to situations where they come into contact with saliva. This is far less than the findings of the study by Motamed et al (2006) where it was 19.2% at hospital A and 60.3% at hospital B. This study dealt with the UP to prevent blood- borne infections and not barrier protection for bacterial infections such as tuberculosis.



In their literature review, Gammon and Gould (2005) also found the compliance to universal precautions to be low globally. Based on these findings the researcher can therefore safely deduce that the knowledge and practice of universal precautions of undergraduate nursing students at the University of the Western Cape is inadequate. Not all intervening factors are taken into account here, for example the work environment, availability of equipment and modeling of the wrong practices of staff. With regards to these intervening variables, it is therefore necessary to study the impact of work environment and existing practices, which students model in relation to the practice of UP. In terms of the programme at the School of Nursing, this means

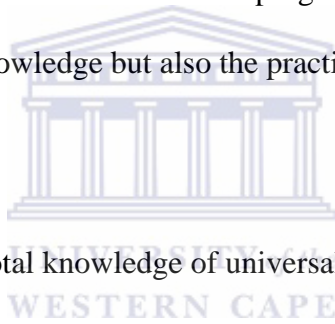


that the existing educational module with regards to Universal Precautions is inadequate as far as the students' knowledge is concerned. The curriculum needs to include a more structured educational programme with regards to Universal Precautions.

### **5.3. Correlation Between Knowledge and Practice**

The second objective of this study was to determine the correlation between the knowledge of universal precautions and the practice of universal precautions. As seen in chapter 4, there was no significant correlation between the total score for knowledge and the total score for practice in this study. This means that there is no significant relationship between knowledge and practice of universal precautions. If there had been a correlation between the two, the practice of universal precautions would have increased as the level of knowledge increased. This is contrary to what Motamed et al. (2006) found in their study, but corresponds with the findings of Chan, et al. (2002) who also found no significant correlation in their study. This finding is based on the self-reporting of practice and if other methods were used, for example direct observation in the facilities, it might yield a different finding. Other factors must also be considered in future research for relationships among them, for example gender and practice of UP or year level and fear.

The researcher expected that there would be a correlation between knowledge and practice. As discussed in the rationale for the study, the researcher indicated the need to determine whether the students knowledge of UP was poor and therefore their practice was poor as a possible reason for the incidence of occupational exposure amongst students at the School of Nursing. However, based on the findings of the study the researcher can deduce that in this particular study there is no relationship between the two variables. This means that to increase the knowledge of universal precautions amongst nursing students would not necessarily lead to an increase in the practice of universal precautions. Intervention programmes therefore should not only focus on increasing the knowledge but also the practice of universal precautions.



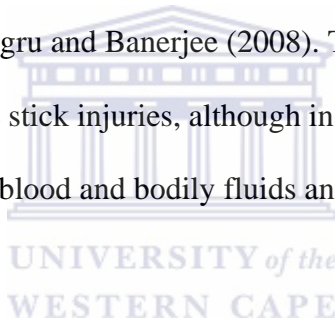
The correlation between total knowledge of universal precautions and fear is interesting, although this was not one of the objectives of the study. The fact that there was a negative relationship between the two serves as evidence that in order to alleviate the fear of students towards universal precautions it is important to equip them with sufficient knowledge of universal precautions.

#### **5.4. Underreporting of Occupational Exposure**

The study found that there was indeed underreporting of occupational exposure to blood and bodily fluids to the School of Nursing. This was the third objective of the study. Although 22.1 % (56) of the participants indicated that they had suffered some

sort of occupational exposure, only 54.5 % (30) reported the incident and only 63.3 % (19) of those who reported the incident had received prophylactic treatment. These findings were similar to the findings of other studies that looked at the underreporting of occupational exposures (Askew, 2007; Deisenhammer et al., 2006; Osborn et al., 1999; Patterson et al., 2003; Rosenthal et al, 1999).

The fact that 45.5 % (25) of the undergraduate nursing students did not report the occupational exposure falls within the range given by researchers for unreported incidents, according to Singru and Banerjee (2008). This range is between 40% and 70% for unreported needle stick injuries, although in this study the focus was on all occupational exposures to blood and bodily fluids and not just on needle stick injuries.



Thus, it can be safely concluded that there is indeed underreporting of occupational exposures to the School of Nursing and that these students consequently do not get the opportunity to be treated correctly according to the protocol for occupational exposure.

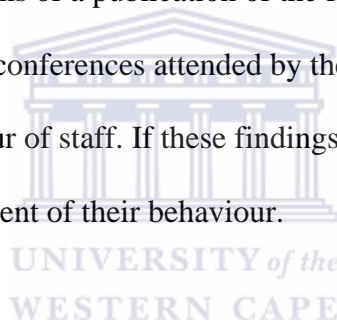
## **5.5. Fear of Occupational Exposure**

The fourth objective of this study was to determine the possible fear of nursing students with regards to occupational exposure to blood-borne pathogens. Figure 2 (chapter 4) shows that students do have a fear with regards to occupational exposure and that the majority of the participants have a moderate to severe fear.

Those participants who indicated that they have a fear of occupational exposure amounted to 82.4 % (206) which is similar to the 85.7% found in the study done by Aga and Mekonnon (2004). Of the total number of participants who indicated that they have a fear, 89.4% indicated a moderate to severe fear. This was more than the 58.1 % students who were “extremely to very concerned” in the study done by Askarian and Malekmakan (2006) but similar to the 87 % of medical students in the study by Patterson et al (2003).

The fact that there was a significant correlation between total knowledge and fear towards occupational exposure confirms the findings of Aga and Mekonnon (2004), where they reported that there seems to be some sort of relationship between student fears and their knowledge of universal precautions.

The factors raised by the participants that contribute to their fear of occupational exposure need to be addressed in order to try and alleviate their fear to such a degree that students will become safe and competent practitioners. Most of the factors can be addressed by educational programmes and also by equipping students with critical thinking skills to enable them to think “outside the box”. This will allow them to come up with safe alternatives, for example, in the event of shortage of equipment. The shortage of equipment is a problem that needs to be addressed by the government services. A way to address this would be to inform these services of the findings of this study not only by means of a publication of the findings, but also by means of presenting the findings at conferences attended by the various stakeholders. The same holds true for the behaviour of staff. If these findings are not communicated to them, there will be no improvement of their behaviour.



Ethical issues which stemmed from the findings of this study need to be addressed. The researcher recommends therefore that ethical issues be addressed as recommended by the researcher throughout this chapter. These recommendations are in response to practice, education and further research.

## **5.6. Limitations**

The researcher initially planned to collect data in the first semester. The first year students would then not have met the inclusion criteria as mentioned in chapters 1

and 3. Due to some delay in getting the proper permissions and piloting the study, data collection only took place in the second semester. The researcher decided to go ahead with only the second to fourth years due to time constraints for the completion of the mini-thesis. This can therefore be viewed as a limitation of the study.

This study examined the students' knowledge and students' self-reported practice of universal precautions and the correlation between the two variables. There are a lot more correlations that could be looked at, for example, between genders or year levels and knowledge or practice.



The impact of other intervening factors, for example work environment and practices of staff, were not investigated in this study and can therefore be a limitation to the study as the knowledge and more specifically practice of UP are influenced by these factors.

The participants were only asked *if* they had suffered an occupational exposure to blood or bodily fluids and not *when* they suffered these occupational exposures. This could have given an indication on whether there was in fact underreporting in 2007 and 2008 and whether the occupational exposures were really on the decrease according to the reported cases. It could also have given an indication of the year

level in which most of the occupational exposures happened, in order to focus more intently on the year level identified. This is important given that the invasive procedures are carried out by second and third year students. The researcher recommends that future research should include the question of when and in what year level occupational exposure occurred in order to deduce whether there is underreporting and in which year level occupational exposure is the highest.

The questionnaire also did not ask for reasons for not reporting the incidents. The reasons for not reporting could be addressed in order to improve the reporting rate and the use of prophylaxis. It also did not ask the reasons for not receiving prophylactic treatment if the incident had been reported. If, for example, this was because the supervisor did not refer the student for prophylactic treatment, it would indicate that educational programmes concerning the correct protocol for occupational exposure are needed for the supervisors as well as the students. Further research on the under-reporting of occupational exposure is recommended.

### **5.7. Recommendations**

Specific recommendations in terms of research and practice were done throughout the chapter, but the researcher wants to expand on the recommendation for education. As can be seen in the discussion throughout this chapter, educational programmes regarding universal precautions are needed or need to be intensified and better

structured as suggested by various other studies (Bamigboye & Adesanya, 2006; Chan, et al., 2002; Motamed et al., 2006; Ndikom & Onibokun, 2007). These educational programmes should not only focus on supplying students with knowledge of universal precautions but should also focus on behaviour modification to improve the practice of universal precautions. Behavior modification is a treatment approach, which uses positive or negative reinforcement to replace undesirable behaviors with more desirable ones (Behavior modification, n.d.).

These programmes should be offered across all the year levels to continuously reinforce knowledge through practice and should also be incorporated within the clinical teaching and facilitation of students in the clinical setting. More emphasis should be given to clinical teaching and learning with specific reference to strengthening critical thinking, for example through case studies and simulation in the practice of nursing. More stringent mechanisms should be built in throughout the teaching (for example reinforcement), learning (for example modeling) and assessment of clinical skills (for example inclusion of UP into evaluation tools) to emphasize those critical factors which will differentiate good from poor practice of universal precautions when managing patients. It has been proven that reinforcement leads to behaviour modification (Woolfolk, 1992).



Based on the discussions under limitations, the researcher would also recommend that further studies with regards to universal precautions, underreporting and fear be done in order to get a clearer understanding of them. The researcher would recommend that these studies be done qualitatively rather than quantitatively because of the fact that they would then focus more on the perceptions of students.

## **5.8. Conclusion**

It is evident that, amongst undergraduate nursing students at the University of the Western Cape, there are insufficient levels of knowledge and practice of universal precautions. The majority of the students indicated a fear with regards to occupational exposure. One would have imagined that because the majority of the students had a fear of occupational exposure, they would have had a higher score for the practice of universal precautions. This was not the case in this study. However, it did prove that there is a relationship between knowledge and fear and therefore students need educational programmes not only to equip them with sufficient knowledge of universal precautions but also to bring about behaviour modification in order to improve the practice of students. This can be achieved with positive reinforcement for compliance to UP in the clinical field, both by the clinical supervisor and staff that interact with the students.

## References

Aga, F., & Mekonnen, H. (2004). Knowledge of universal precautions and fears of occupational exposure to HIV/AIDS among student nurses and midwives in Ethiopia. *Africa Journal of Nursing and Midwifery* , 56-60.

Askarian, M., & Malekmakan, L. (2006). The prevalence of needle stick injuries in medical, dental, nursing and midwifery students at the university teaching hospitals of Shiraz, Iran. *Indian Journal of Medical Sciences*, p.NA. Retrieved July 15, 2008, from via Gale.

Askew, S. M. (2007). Occupational exposures to blood and body fluid: A study of Medical Students and Health Professions students in Virginia. *AAoHn JoUrNAL* , 361-371. Retrieved July 17, 2008, from ProQuest.

Bamigboye, A. P., & Adesanya, A. T. (2006). Knowledge and Practice of Universal Precautions among Qualifying Medical and Nursing Students: A Case of Obafemi Awolowo University Teaching Hospitals Complex, ILE-IFE. *Research Journal of Medicine and Medical Sciences* , 112–116. Retrieved August 20, 2008, from INSInet Publication.

*Behavior modification*. (n.d.). Retrieved February 24, 2010, from Encyclopedia of Mental Disorders: <http://www.minddisorders.com/A-Br/Behavior-modification.html>

Benson, C. A., Kaplan, J. E., Masur, H., Pau, A., & Holmes, K. K. (2004 , December 17). *Treating Opportunistic Infections Among HIV-Infected Adults and Adolescents* .

Retrieved October 11, 2009, from CDC:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5315a1.htm>

Bless, C., & Higson-Smith, C. (1995). *Fundamentals of Social Research Methods An African Perspective*. (3<sup>rd</sup> ed.). Cape Town: Juta & Co. (Pty) Ltd.

Brink, H., van der Walt, C., & van Rensburg, G. (2008). *Fundamentals of Research Methodology for Health Care Professionals*. Cape Town: Juta & Co. (Pty) Ltd.

Burns, N., & Grove, S. K. (2003). *Understanding Nursing Research*. (3<sup>rd</sup> ed.). Pennsylvania: W.B. Saunders Company.

Centers for Disease Control and Prevention. (1991). *Recommendations for Preventing Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Patients During Exposure-Prone Invasive Procedures*. Retrieved October 11, 2009, from AIDS Education Global Information System:

<http://www.aegis.com/default.asp?req=http://www.aegis.com/PUBS/mmwr/1991/RR4008.html>

Chan, R., Alexander, M., Chan, E., Chan, V., Ho, B., Lai, C., Lam, P., Shit, F. & Yiu, I. (2002). Nurses' knowledge of and compliance with universal precautions in an acute care hospital. *International Journal of Nursing Studies*, 157–163. Retrieved September 29, 2008, from Wiley Interscience.

Colosi, L. (2006). *Designing an Effective Questionnaire*. Retrieved February 27, 2007, from

<http://www.parenting.cit.cornell.edu/documents/Designing%20an%20Effective%20Questionnaire.pdf>

*Data Analysis- Quantitative Analysis- What It Is.* (n.d.). Retrieved May 29, 2007, from University of the West of England, Bristol, Faculty of Health and Social Care: <http://hsc.uwe.ac.uk/dataanalysis/quantWhat.asp>

*Definition of CD4 cell.* (1997, October 09). Retrieved November 04, 2009, from Mondofacto Online Medical Dictionary: <http://www.mondofacto.com/facts/dictionary?query=CD4+cells&action=look+it+up>

Deisenhammer, S., Radon, K., & Reichert, J. (2006). Needlestick injuries during medical training. *Journal of Hospital Infection*, 263-267. Retrieved September 29, 2009, from Elsevier.

Delpont, C. S. (2005). Quantitative data-collection methods. In A. S. de Vos, H. Strydom, C. B. Fouche, & C. S. Delpont, *Research at grass roots for the social sciences and human service professions. (3rd ed.)* (p. 175). Pretoria: Van Schaik Publishers.

De Vos, A. S., Strydom, H., Fouche, C. B., & Delpont, C. S. (2005). *Research at grass roots for the social sciences and human service professions. (3rd ed.)*. Pretoria: Van Schaik Publishers.

Division of Healthcare Quality Promotion (DHQP). (1999, February 5). *Universal Precautions for Prevention of Transmission of HIV and Other Bloodborne Infections.*

Retrieved September 11, 2008, from Centres for Disease Control and Prevention:

[http://www.cdc.gov/ncidod/dhqp/bp\\_universal\\_precautions.html](http://www.cdc.gov/ncidod/dhqp/bp_universal_precautions.html)

Gammon, J., & Gould, D. (2005). Universal precautions A review of knowledge, compliance and strategies to improve practice. *Journal of Research in Nursing* , 529–547. Retrieved October 01, 2008, from Sagepub

HIV and AIDS and STD Directorate. (1999). *Management of Occupational Exposure to the Human Immunodeficiency Virus (HIV)*. Retrieved September 13, 2008, from Department of Health: <http://www.doh.gov.za/aids/docs/management.html>

HIV/STI UNIT . (n.d.). *Advocacy & Activity Guide for HIV/AIDS*. Retrieved September 11, 2008, from World Health Organization:

[http://www.wpro.who.int/NR/rdonlyres/986C9723-13B5-425F-B1ED-CD159344E088/0/Advocacy\\_and\\_Activity\\_Guide.pdf](http://www.wpro.who.int/NR/rdonlyres/986C9723-13B5-425F-B1ED-CD159344E088/0/Advocacy_and_Activity_Guide.pdf)

Hutin, Y. J., Hauri, A. M., & Armstrong, G. L. (2003). Use of injections in healthcare settings worldwide, 2000: Literature review and regional estimates. *BMJ* , 1075.

Retrieved September 23, 2008, from

<http://www.bmj.com/cgi/reprint/327/7423/1075.pdf>

Kim, K.-M., Kim, M.-A., Chung, Y.-S., & Kim, N.-C. (2001). Knowledge and performance of the universal precautions by nursing and medical students in Korea. *American Journal of Infection Control* , 295-300. Retrieved July 12, 2009, from Pubmed.

Kruger, D. J., de Vos, A. S., Fouche, C. B., & Venter, L. (2005). Quantitative data analysis and interpretation. In A. S. de Vos, H. Strydom, C. B. Fouche, & C. S. Delpont, *Research at Grass roots for the social sciences and Human service professions. (3rd ed.)* (pp. 241-242). Pretoria: Van Schaik Publishers.

Leedy, P. D., & Ormrod, J. E. (2005). Sampling Designs. In *Practical research: Planning and design* (pp. 199-207). Upper Saddle River, N. J.: Pearson.

McMillan, J. H., & Schumacher, S. (1997). Chapter 7. Data Collection Techniques. In *Research in education: A conceptual introduction* (pp. 234-275). New York: Longman.

Mortada, M. E., & Nettleman, M. (n.d.). *Hepatitis B (HBV)*. Retrieved November 04, 2008, from MedicineNet.com: [http://www.medicinenet.com/hepatitis\\_b/article.htm](http://www.medicinenet.com/hepatitis_b/article.htm)

Motamed, N., BabaMahmoodi, F., Khalilian, A., Peykanheirati, M., & Nozari, M. (2006). Knowledge and practices of health care workers and medical students towards universal precautions in hospitals in Mazandaran Province. *Eastern Mediterranean Health Journal* , 653 - 661. Retrieved August 25, 2008, from Academic OneFile.

Mouton, J. (2001). How to succeed in your master's and doctoral studies :a South African guide and resource book. Pretoria: Van Schaik.

Ndikom, C. M., & Onibokun, A. (2007). Knowledge and behaviour of nurse/midwives in the prevention of vertical transmission of HIV in Owerri, Imo

State, Nigeria: a cross-sectional study. *BMC Nursing* . Retrieved September 26, 2008, from BioMed Central.

Osborn, E., Papadakis, M., & Gerberding, J. (1999). Occupational exposures to body fluids among medical students: A seven year longitudinal study. *American Society of Internal Medicine* , 45 - 51. Retrieved March 13, 2009, from Annals of Internal Medicine.

Patterson, J. M., Novak, C. B., Mackinnon, S. E., & Ellis, R. A. (2003). Needlestick injuries among medical students. *Am J Infect Control* , 226-230. Retrieved July 12, 2009, from Elsevier.

Patton, M. Q. (1987). *How to use Qualitative Methods in Evaluation*. California: SAGE Publications.

Prevention of Mother To Child Transmission of HIV- PMTCT OVERVIEW. (2008). Maternal Nutrition, Infant & Young Child Feeding in the Context of PMTCT of HIV Training Course.

*Questionnaire Design General Considerations*. (2007). Retrieved March 9, 2007, from StatPac: [http://www.statpac.com/surveys/questionnaire\\_design.htm](http://www.statpac.com/surveys/questionnaire_design.htm)

*Questionnaire Design*. (n.d.). Retrieved March 9, 2007, from [http://www.cc.gatech.edu/classes/cs6751\\_97\\_winter/Topics/quest-design](http://www.cc.gatech.edu/classes/cs6751_97_winter/Topics/quest-design)

Rosenthal, E., Pradier, C., Keita-Perse, O., Altare, J., Dellamonica, P., & Cassuto, J. (1999). Needlestick injuries among French medical students. *Journal of the American Medical Association* , 1660. Retrieved September 13, 2008, from JAMA.

Sadoh, W. E., Fawole, A. O., Sadoh, A. E., Oladimeji, A., & Sotiloye, O. S. (2006). Practice of Universal Precautions among Healthcare Workers. *JOURNAL OF THE NATIONAL MEDICAL ASSOCIATION* , 722–726. Retrieved August 13, 2009, from Pubmed Central.

*Sample Size Calculator*. (2008). Retrieved November 14, 2008, from Survey System: <http://www.surveysystem.com/sscalc.htm#two>

*Sampling*. (2006). Retrieved February 25, 2010, from Research Methods Knowledge Base: <http://www.socialresearchmethods.net/kb/sampling.php>

Schneider, Z., Whitehead, D., Elliott, D., Lobiondo-Wood, G., & Haber, J. (2007). *Nursing & midwifery research 3rd edition*. Australia: Elsevier.

Shiao, J. S., Mclaws, M. L., Huang, K. Y., & Guo, Y. L. (2002). Student nurses in Taiwan at high risk for needlestick injuries. *Ann Epidemiol* , 197-201. Retrieved August 13, 2009, from PubMed.

Singru, S., & Banerjee, A. (2008). Occupational exposure to blood and body fluids among health care workers in a teaching hospital in Mumbai, India. *Indian Journal of Community Medicine* , 26. Retrieved July 15, 2008, from via Gale.



Smith, A. J., Cameron, S. O., Bagg, J., & Kennedy, D. (2001). Management of needlestick injuries in general dental practice. *Br Dent J* , 645-650. Retrieved August 20, 2008, from PubMed.

*SPSS FAQ: What does Cronbach's alpha mean?* (n.d.). Retrieved September 24, 2008, from Introduction to SAS. UCLA: Academic Technology Services, Statistical Consulting Group: <http://www.ats.ucla.edu/stat/sas/notes2/>

Strydom, H. (2005). Sampling and sampling methods. In A. S. de Vos, H. Strydom, C. B. Fouche, & C. S. Delpont, *Research at Grass roots for the social sciences and human service professions. (3rd ed.)* (p. 198). Pretoria: Van Schaik Publishers.

Tavolacci, M.-P., Ladner, J., Bailly, L., Merle, V., Pitrou, I., & Czernichow, P. (2008). Prevention of Nosocomial Infection and Standard Precautions: Knowledge and Source of Information Among Healthcare Students. *INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY* , 642– 647. Retrieved October 07, 2009, from PubMed.

Thomas, D. L., Gruninger, S. E., Siew, C., Joy, E. D., & Quinn, T. C. (1996). Occupational risk of hepatitis C infections among general dentists and oral surgeons in North America. *Am J Med* , 41-45. Retrieved August 20, 2008, from PubMed.

Woolfolk, A. E. (1992). *Educational Psychology*. USA: Prentice Hall.

## Appendix 1: E-mail granting permission from Professor Motamed.

**Re: URGENT**

Thursday, January 29, 2009 1:37 PM

From:

[This sender is DomainKeys verified](#)

"niloofar motamed" <nilo1351@yahoo.com>

[View contact details](#)

To:

"Lindy van der Berg" <lindyvanderberg@yahoo.com>

Dear Mrs. Lindy van der Berg

I apologize for delay. I read your questionnaire. It is ok. you can use it. I have 2 comments:

a. In Q no 24. I think it is better to use LIKERT scale as follows: very much-much-do not know-little-very little (maybe I do not write the right word but I mean it should be 5 choices )

b. I think it is better that in Q no 25, at first you list some factors for responder and he/she indicate them. at the end of question you can ask them to write any other factor he/she thinks.

best wishes

Niloofar Motamed, MD, MPH

Assistant Professor of Community Medicine

Department of Community Medicine, Boushehr Medical School, Boushehr Medical

University, Moallem Street, Boushehr, Iran.

## Appendix 2: Letter of approval of proposal

**OFFICE OF THE DEAN  
DEPARTMENT OF RESEARCH  
DEVELOPMENT**

Private Bag X17, Bellville 7535  
South Africa  
Telegraph: UNIBELL  
Telephone: +27 21 959-2948/2949  
Fax: +27 21 959-3170  
Website: www.uwc.ac.za

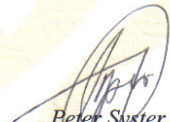
11 March 2009

**To Whom It May Concern**

I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and the ethics of the following research project by:  
Mrs. L van der Berg (School of Nursing)

Research Project: Determining the knowledge and practice of nursing students at UWC with regard to universal precautions and their fear to occupational expose to blood borne pathogens

Registration no: 09/1/35

  
Peter Syster  
Research Development  
University of the Western Cape



**UNIVERSITY of the  
WESTERN CAPE**

A place of quality, a place to grow, from hope to action through knowledge

**Appendix 3: E-mail for permission to use students as participants and to conduct the study.**

**From:** Renfrew Christie  
**To:** VAN DER BERG, LINDY SHERYLDENE  
**CC:** Christie, Renfrew; Daniels, Felicity; Syster, Peter  
**Date:** Thursday - February 19, 2009 11:13 AM  
**Subject:** Re: Permission to conduct research study and to use students as participants

Dear Lindy  
all the chd applications should also have gone to SR for ethics clearance. Either yours did or it didn't but that is the route. I do not normally have time to chase down among the hundreds whether yours has: your faculty office should tell you. If it got ethics clearance then you have to negotiate with the individual lecturers and students for their agreement.  
yours sincerely  
Renfrew Christie

Professor Renfrew Christie, B Com Hons (Econ) (SA), BA Hons , MA (Cape Town), D Phil (Oxon),  
Fellow of the Royal Society of South Africa,  
Member of the Academy of Science of South Africa,  
Dean of Research, University of the Western Cape  
Private Bag X17, Bellville 7535, South Africa  
E-Mail: rchristie@uwc.ac.za  
Phone : 27.21.9592949 (w), Fax : 27.21.9593170 (w)  
Mobile : 27.82.457.9186  
Home : 2 Glade Road, Rondebosch 7700, South Africa  
Phone : 27.21.6864722 [h]

>>> LINDY SHERYLDENE VAN DER BERG 18/02/2009 10:59 >>>  
Dear Professor Christie,

I am currently a registered masters student at the School of Nursing at UWC. My proposal was passed at the end of last year by the Higher Degrees Committee. I am hereby requesting your permission to conduct my research study at UWC and to use the undergraduate nursing students as my participants.

I would like to pilot and commence with my data collection in order to submit my mini-thesis for examination for the September Graduation, if possible. I would therefor greatly appreciate a speedily response.

I have attached a copy of the proposal for your perusal. My supervisor and myself are currently finalizing the questionnaire. If you would like to see the questionnaire, I will gladly e-mail the final questionnaire to you.

Thanking you in advance,  
Lindy van der Berg  
Student nr: 9 777 373

## Appendix 4: Information sheet



### UNIVERSITY OF THE WESTERN CAPE SCHOOL OF NURSING

Private Bag X17 BELLVILLE 7535 South Africa  
Telephone: (021) 959-2271 Fax: (021) 959-2679

This information sheet is your reference in terms of the ethical considerations of this study in which you will be a voluntary participant. All of the following information will have been explained by the researcher on the day when the questionnaire would have been administered but if there is any uncertainty or course of concern please contact the researcher, Lindy van der Berg, at the following contact number:

Cell nr: 072 236 8398 or E-mail: [9777373@uwc.ac.za](mailto:9777373@uwc.ac.za).

1. This study is conducted for research purposes only and will not cause any harm whatsoever to the participant.
2. Participants were randomly selected but participation in the study is voluntarily.
3. If you decide to participate in the study, you will need to sign a consent form. Information regarding the study will be explained to you before you sign the consent so that you will be able to give informed consent.
4. Confidentiality is assured by the fact that your name will not be recorded anywhere.
5. You have the right to withdraw at any time during the study and will not be bounded by the consent that you have signed.
6. Please take note of the fact that there are absolutely no risks, benefits, rewards, remuneration involved in the study.
7. Follow-up assistance is offered, where you can go for voluntary counselling and

testing at the Student Health Centre on campus should you feel the need to do so.

8. If you want feedback on the study you may contact the researcher at the contact details above, because feedback will not be provided to participants specifically.

**Thank you for participating.**

X

---

Lindy van der Berg  
Mrs



**Appendix 5: Consent Form**

**UNIVERSITY OF THE WESTERN CAPE**

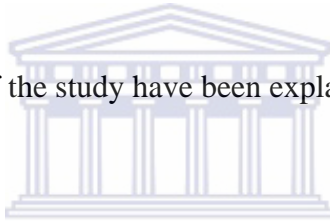
**SCHOOL OF NURSING**



Private Bag X17 BELLVILLE 7535 South Africa  
Telephone: (021) 959-2271 Fax: (021) 959-2679

I, \_\_\_\_\_, hereby consent to take part in this research study, voluntarily and not due to any pressure from the researcher or any other person exerted on me.

The ethical implications of the study have been explained to me and I understand all of it fully.



I further more understand that this study is solely for research purposes and will not have any impact whatsoever on me as a person or as a student in the nursing profession.

Signed at: \_\_\_\_\_ on the \_\_\_\_\_.

Participant: \_\_\_\_\_.

Researcher: \_\_\_\_\_.

Witness: \_\_\_\_\_.

## Appendix 6: Questionnaire



UNIVERSITY OF THE WESTERN CAPE

SCHOOL OF NURSING

Private Bag X17 BELLVILLE 7535 South Africa

Telephone: (021) 959-2271 Fax: (021) 959-2679

**Questionnaire on the knowledge, practice and attitudes of nursing students at UWC with regards to universal precautions.**

**Researcher: Lindy van der Berg**

**Cellular number: 072 2368398**

**Please answer the following questions. Should you need clarity on the questions, please feel free to ask the researcher.**

### Part 1:

1. What is your age in years?

\_\_\_\_\_



**Please answer the following questions with an X in the appropriate block:**

2. What is your gender?

Male	Female
------	--------





3. In what year level of study are you?

Second year	
Third year	
Fourth year	

4. Have you ever been exposed to any blood or bodily fluids during your clinical placements? ( for example through a needle stick injury, blood or other bodily fluids spatter in the eye or mouth, or open sores on the skin that came into contact with the patients' blood and other bodily fluids)

Yes	No
-----	----

5. If yes, have you reported the incident to your immediate supervisor (sister-in-charge or clinical supervisor)?

Yes	No
-----	----

6. If answer is yes to question 5, did you receive prophylactic treatment?

Yes	No
-----	----

**Part 2:**

7. Have you ever heard of Universal precautions (UP)?

Yes	No
-----	----

Please indicate, with an X in the appropriate block, whether you think each of the following statements are true or false.

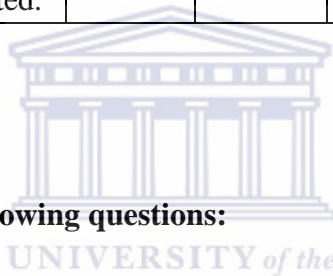
Statement	True	False	Don't know	
8. UP are applied when caring for patients with HIV and HBV only.				
9. UP should be applied caring for all persons regardless of their infection status.				
10. Isolation is necessary for patients with all blood-borne infections.				
11. Used needles can be recapped after giving an injection.				
12. Subcutaneous injuries to the health worker during intravenous injections are the most common cause of occupational infections.				
13. Universal precautions are not necessary in situations that might lead to contact with saliva.				
14. Health care workers with non-intact skin should not be involved in direct patient care until the condition resolves.				
15. For decontamination of devices such as baumanometer (only contact with skin) washing with usual detergent is enough.				
16. Blood spills should be cleaned up promptly with sodium hypochlorite.				
17. Hands should always be washed after contact with a patient.				
18. For contact with blood and body fluids during non-surgical patient care, a single pair of gloves generally provides adequate barrier protection.				
19. The cleaning and disinfection of all patient-care areas is important for frequently touched surfaces, especially those closest to the patient, that are most likely to be contaminated (e.g., bedrails, bedside tables, commodes, doorknobs, sinks, surfaces and equipment in close proximity to the patient)				
20. It is not necessary to wash hands after contact with a patient's intact skin (e.g., when taking a pulse or blood pressure or lifting a patient)				
21. Gowns can be reused for repeated contacts with the same patient.				

**Part 3:**

**Please indicate, with an X in the appropriate block, which of the following statements apply to you.**

<b>Statement</b>	<b>Always</b>	<b>Usually</b>	<b>Sometimes</b>	<b>Seldom</b>	<b>Never</b>	
22. I assume that blood and all body fluids of patients are infectious.						
23. I use protective equipment, for example mask, gown and eye wear for a procedure depending on my observation of the patient.						
24. I immediately dispose of a used needle in a sharps container.						
25. I wear gloves when there is a risk of being contaminated with the blood or body fluid of a patient.						
26. Washing with soap and water for 5 minutes is my first step after contact with infective material.						
27. I apply universal precautions in situations that might lead to contact with sweat.						
28. If I have a wound, I wear gloves before caring for patients.						
29. I apply universal precautions in situations that might lead to contact with vaginal discharge.						

Statement	Always	Usually	Sometimes	Seldom	Never	
30. I wash my hands after handling a specimen, regardless of the diagnosis of the patient.						
31. I cautiously avoid injury from used needles.						
32. I wash my hands after removing gloves.						
33. I wear a gown during procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated.						



**Part 4:**

**Please answer the following questions:**

34. Do you have a fear with regards to occupational exposure to any blood borne pathogens?

Yes	No
-----	----

35. If you answered yes to the above question, please indicate your level of fear by marking the appropriate block with an X.

Extreme fear	Severe fear	Moderate fear	Mild fear	Slight fear
--------------	-------------	---------------	-----------	-------------

36. If you answered yes to question 34, please list all the factors that you feel contribute to your fear.

- \_\_\_\_\_  
\_\_\_\_\_
- \_\_\_\_\_  
\_\_\_\_\_
- \_\_\_\_\_  
\_\_\_\_\_
- \_\_\_\_\_  
\_\_\_\_\_



**Thank you for participating in this study and all of the best for your studies ahead!**

