Factors influencing Needle Pricks Stick Injuries among Dental Health Training Students. A Case Study at International Paramedical School, Maya Wakiso District .

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Abstract

Background:
NSI is the wound or cut caused by the needles that unintentionally tear/puncture the skin that may result in exposure to contaminated blood and body fluids. Nursing workers are at high risk of exposure to Bloodborne germs i.e. HIV and HBV. The specific objectives were; to assess the knowledge of dental training students, to assess for factors influencing needle stick injuries among dental training students, and to determine the prevalence of needle stick injuries among dental training students at International Paramedical School, Maya, Wakiso District.

Methodology:
This was a descriptive and cross-sectional study employing both qualitative and quantitative methods of data collection using structured questionnaires. A sample size of 80 participants was used. Data was analyzed and presented in form of frequency tables, pie charts, and bar graphs.

Results:
The study findings were as follows; 76.7% knew what a needle stick injury is, 57.8% agreed with the fact that needle prick injuries are a danger to health, and HIV and Hepatitis B were the most commonly known diseases that can be transmitted by needle prick injuries and 17.5% had ever learned about standard precautions for needle stick injuries.76(95%) had ever had needle stick injuries, most males (61.3%) had needle sticks injury

Conclusion:
There was fair knowledge, which still needs to be improved, males get more NSIs compared to females, and most injuries are got during recapping of needles and suturing.

Recommendation:
The students should report every case of needle stick injuries so that appropriate actions can be taken

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1 Background of the study:

Currently, needle stick injuries and sharpness are one of the most important occupational hazards among dental training students globally. According to the world health organization, more than two million occupational exposures to sharp injuries occurred among 300 dental training students annually. Needlestick injuries and sharps increased the risk of over 20 types of infectious diseases among dental training students(Elisabetta Rapiti, 2015).

According to the Centers for Disease Control and Prevention (CDC) and European Agency for Safety and Health at Work (EU-OSHA) reports, there were more than 385,000 and 1,000,000 needle stick in-

jury cases that occurred annually among dental students in the United States and Europe, respectively. WHO statistics also showed that needlestick injuries and sharps caused 16,000, 66,000, and 1,000 cases of HCV, HBV, and HIV per year among dental training students, respectively(Salehoddin Bouya, 2020).

The prevalence of various infectious diseases in Africa due to needle stick injuries and sharps among dental students was not a single and integrated phenomenon, rather was affected by several factors, such as vaccination rates among dental training students, access to appropriate work protection equipment, and post-exposure prophylaxis (PEP), and compliance with precautionary infection control standards. Additionally, the prevalence of needle stick injury was not the same among all dental students(Abbas Balouchi, 2020).

A national study conducted in Saudi Arabia in 2017 referred to needle stick injury as the main cause of percutaneous injuries in more than 71% of reported cases among dental students Moreover the results of annual surveys, even in developed countries such as the United States, showed that despite the different strategies implemented, there was still an increasing incidence of needle stick injuries and sharps among dental training students (Mohammed S., 2021)

Despite the heavy burden of HIV/AIDS and other blood-borne infections, few studies investigated needle stick injuries in sub-Saharan Africa. A cross-sectional study was conducted at Mulago national referral hospital In Kampala, Uganda to assess the occurrence of and risk factors of needle stick and sharps health workers and students, and the results stated that 57% of the dental training students experienced at least one needle stick injury in the last year. Only 18% had not experienced any such injury in their carrier and school times respectively. The rate of needle stick injury was 4.2 per person in a year. multiple logistic regression analysis showed that the most important risk factor for needle stick injuries was lack f training on such injuries and other reasons

Previous reviews had examined the prevalence of NSIs only in a specific ward or only at the national level or have investigated needle stick-related prevention and cost burden dimensions. Therefore the aim of this study was to determine the factors influencing needle pricks and sharps injuries among dental training students. The specific objectives were; to assess the knowledge of dental training students, to assess for factors influencing needle stick injuries among dental training students, and to determine the prevalence of needle stick injuries among dental training students at International Paramedical School, Maya, Wakiso District.

2 Methodology

The study was conducted at International Paramedical Institute, Maya. This is a medical school in Mpigi District that offers studies in different medical courses such as Clinical Medicine, Laboratory training, Pharmacy, Medical records, and Public Health Dentistry. It is located in Nantwala village, parish, Sub County. It currently held a population of 700 students and public health dentistry had a population of 54.

Research design

I used a mixed research design. A quantitative research design was used to ascertain the prevalence of needlestick injuries in the students whereas a Qualitative research design was used to determine and evaluate the ergonomic factors that caused needle stick injuries among the dental students.

Study population.

International Paramedical Institute had a population of about 700people; of these, the ones doing Public Health Dentistry are 54.

Target population.

My target population was the students of dental that have at least attended a placement from any hospital or dental clinic at IPI with the school identity card.

Sample size determination.

IPI has a population of about 700 people. I Considered the total population (N) which were the dental students at IPI having their school identity cards and had at least attended a dental placement from any hospital or dental clinic, then the sample size (n) was estimated using the mugenda and mugenda formula (1996) as shown below;

Whereby:

N=study population

n=sample size of the study population

e=sample error (percentage error=0.05)

1=A constant

Then; N=80

e=0.05

n=?

n= 80

Inclusion and Exclusion Criteria.

Inclusion criteria.

All dental students at IPI regardless of the year of study that had ever attended a dental placement practice and had consented were considered in this study.

Exclusion criteria.

All students who were not offering Public Health Dentistry as a course, those who had not consented to participate in this study, and public health dental students who had not gone for any dental attachment at any hospital or dental clinic were excluded.

Sampling procedure.

The researcher was collecting the data for five days and on each day five respondents were selected by numbered five small pieces of paper, one — five (1-5), folded with blank pieces of paper which summed up the number of students available. The respondent who picked the numbers and was doing Public health dentistry and had consented was allowed to participate in the study.

Data collection method.

A purposive sampling method was used whereby all dental students of IPI were randomly selected but only those who had consented were interviewed using interview guides. Data was collected from the respondents using interview guides which were filled by the researcher and some research assistants.

Data analysis and presentation.

The analysis of data was done and presented using pie charts and bar graphs which represented statistical data collected from the respondents.

Data collection tool.

Used an interview guide and checklist which was consistent with the researcher's specific objectives

Data collection procedure.

I presented to the Principal, Registrar, and Head of department Dental an introductory letter from IPI to permit me to collect the necessary data. My research proposal was also handed over to the in charge. The in-charge then allowed me to collect the data according to my research objectives.

Piloting the study.

I piloted my study after designing my data collection tool. I did this for a clear presentation of the feasibility of carrying out my research as per the designed framework.

Quality control.

I pre-tested my research tool. This was to ensure that the questions were easily understandable and that any error that was detected in the tool was corrected. I then identified my research assistants who perused the tool to make them acquainted with it and minimize errors due to inadequate knowledge on how to use the tool.

Testing for validity.

The interview guide was discussed by colleagues before submitting it to the supervisor for approval.

Testing the reliability.

The interview guide was subjected to pretesting.

Data analysis and presentation.

Analyzed and presented the data in the following ways

Editing.

This was done after data collection. The completed guides were thoroughly checked taking note of the relationship between the given answers limited errors and promoted completeness, accuracy, uniformity, and consistency, the respondents' data was edited.

Coding.

The data was then summarized into representative forms. The related responses to the particular question were classified into meaningful patterns and summarized. This was to ensure that out of the International Paramedical Institute population of about 700 people only the ones doing Public Health Dentistry were 54.

Classification of Data.

Data were arranged into groups or a class based on common characteristics whereby data found with similar characteristics was placed in one class such that the entire data got divided into a number of classes.

Presentation of Data.

This was the process of displaying or showing the researched findings for consumption by other stakeholders. This was done by tabulation, graphics, and charts for further analysis.

Interpretation of data.

The presented data was used as a basis for drawing conclusions or inferences and explaining their significance after careful analysis of the data collected.

Ethical considerations.

Ethical issues were considered when conducting the study which ensured confidentiality, privacy, and anonymity of the respondents. They proceeded as follows:

a) Permission was sought from the institutional research committee

b) An introductory letter was requested and obtained from the Principal of IPI to conduct the study.

c) Verbal or written consent was sought from the respondents after an explanation of the purpose of the study.

d) Before interviewing the respondents, I assured them that the information collected will be kept confidential and that it was to be used for academic purposes only.

Dissemination of findings.

The study findings were disseminated as follows;

a) Uganda Allied Health Examinations Board

b) Office of the District Health Officer

c) International Paramedical Institute, Maya

d) Research supervisor

3 Results

4Social demographic characteristics of the respondents.

The research showed that of the total respondents (80), 49(61.3%) were males and 31(38.7%) were females. The respondents' ages were as follow: 18 - 25 years 54(67.5%), 26-35years 24(30.0%), above 35 years 2(2.5%).Also out of the 80 respondents, 12(15.0%) were married while 68(85.0%) were single. On the religious background of the respondents, 24(30.0%) were catholic, 6(7.5%) were protestant, 12(15.0%) were Muslim while 38(47.5%) the respondents were born again.

Given this objective of the study, the majority of the respondents correctly knew what a needle prick injury is, 61 (76.7%) while 19 (23.3%) didn't know. 46 (57.8%) knew that NPIs are a danger to health, and 34 (42.2%) did not agree. Most of the respondents, 62 (77.5%) said HIV and Hep B can be transmitted by NPIs, 10 (12.5%) said HIV and Hep B and malaria are transmitted by NPIs, and 8 (10.8%) were not sure. According to the respondents, recapping needles, 48 (60.0%), is the major cause of NSIs followed by collision with another health care worker, 6 (7.5%), the patient moved and jarred device5 (6.3%), and also unsafe collection and disposal, 21 (26.2%).

Only a minority of the respondents; 14 (17.5%) had ever learned about standard precautions for needle stick injuries while the rest; 66 (82.5%) had never. This is reflected in figure 1 below. Based on the standard precautions, the majority; 74 (92.5%) listed less than 3 personal protective equipment and only 6 (7.5%) listed at least three personal protective equipment.

4 Prevalence and risk factors for needle stick injuries

Results revealed that of the 80 respondents, 76(95%) had ever had needle stick injuries while 04(05%) has never had a needle stick injury.

Of all who got the injuries, 18(23.7%) had only one, 27(35.5%) got two injuries, 20(26.7%) got three injuries, and 10(13.3%) got more than 3 injuries.

56(74.7%) of the respondents reported the injury to the persons responsible while 19(25.3%) of the respondents didn't report it.

The study found out that 95% of the respondents had safety boxes while 05% didn't have adequate safety boxes in their workplaces.

71(88.8%) of the respondents did not have safety precautions at their workplaces while 09 (11.2%) had safety precautions at their workplaces.

Respondents were asked about the incidences which lead to needle stick injuries and results revealed that most people had got injuries during suturing, recapping a needle, and during needle disposal.

The respondents were asked to give reasons for the high incidence of the needle prick injuries and some of the answers given are below: -

Lack of skill in a particular procedure

Long hours of working

Lack of standard operating procedures

Shortage of safety boxes

5 Discussions

This part discusses the result of the research in the context of the literature review and provides implications of the findings.

Knowledge about needle stick injuries

The objective of the study was to assess the knowledge of dental training students at International Paramedical School, Maya, Wakiso District, about needle stick injuries. The results of the study revealed that in a study by Mary Zia, needle stick harm was characterized by percutaneous harm therefore 90.5% knew the definition of needle stick injury (Mary, 2017). In this study majority of the respondents; 61 (76.7%) knew what a needle stick

Table 1. A table showing the social demographic characteristics of the study population

PARAMETER	FREQUENCY	PERCENTAGE
sex		
Male	49	61.3
Female	31	38.7
Total	**80**	**100.0**
Age		
18-25	54	67.5
26-35	24	30.0
Above 35	2	2.5
Total	**80**	**100.0**
Marital status		
Married	12	15.0
Single	68	85.0
Total	**80**	**100.0**
Religion		
Catholic	24	30.0
Protestant	6	7.5
Muslim	12	15.0
Born again	38	47.5
Total	**80**	**100.0**

Table 2. Showing the knowledge of respondents on NSIs

Variable	Category	Frequency	Percentage
Know what a needle stick injury is.	Yes	61	76.7
	No	19	23.3
Needle prick injuries are a danger to health	Yes	46	57.8
	No	34	42.2
Total		**80**	**100.0**
Diseases that can be transmitted by needle prick injuries	HIV and Hep B	62	77.5
	HIV, Hep B and malaria	10	12.5
	None of the above	00	0
	Not sure	8	10.8
Total		**80**	**100.0**
Major cause of needle stick injuries	Recapping	48	60.0
	Collision with another health care worker	6	7.5
	Patient moved and jarred device	5	6.3
	Unsafe collection and disposal	21	26.2
Total		**80**	**100.0**

Table 3. showing knowledge of standard precautions for needle stick injuries and personal protect equipment used as per the standard precautions

Variable	Category	Frequency (n=80)	Percentage
Ever learnt about standard precautions for needle stick injuries	Yes	14	17.5
	No	66	82.5
List any personal protect equipment used as per the standard precautions	3 or more	6	7.5
	Less than 3	74	92.5
Total		**80**	**100.0**

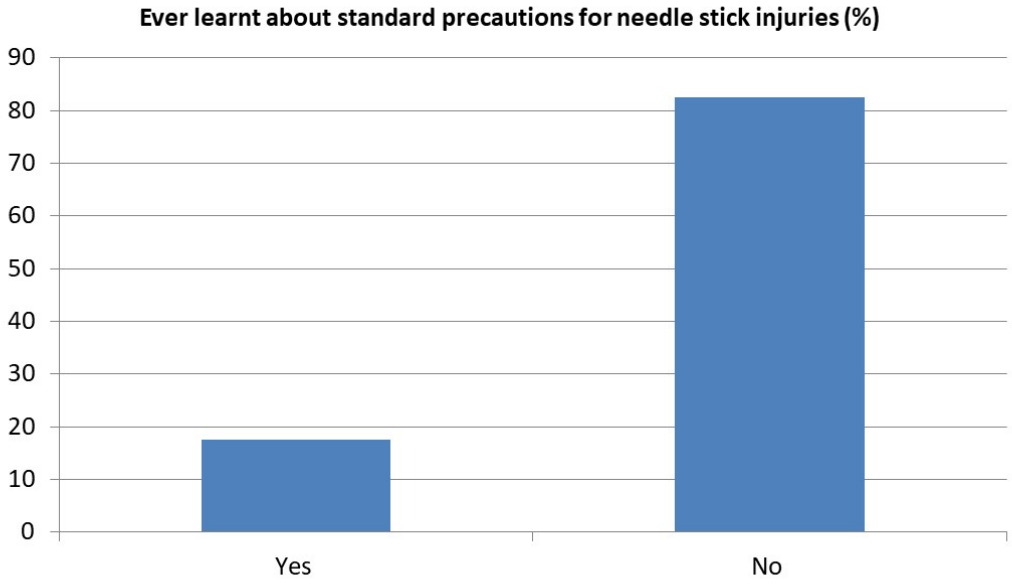

Figure 1. A bar graph showing knowledge about standard precautions for needle stick injuries

Table 4. Showing number of the needle sticks injuries that the respondents got.

Number of injuries	Frequency	Percentage
One	18	23.7%
two	27	35.5%
Three	20	26.7%
Four and above	10	13.3%
Total	**76**	**100.0**

Table 5. A table showing the response of the respondents on the causes of needle sticks injuries.

Question	Answers	Frequency (n=80)
Things common with needle injuries	Recapping a needle	**65**
	Suturing	**57**
	Discarding a needle	**54**
	tiredness	**38**
Total	**80**	**100.0**

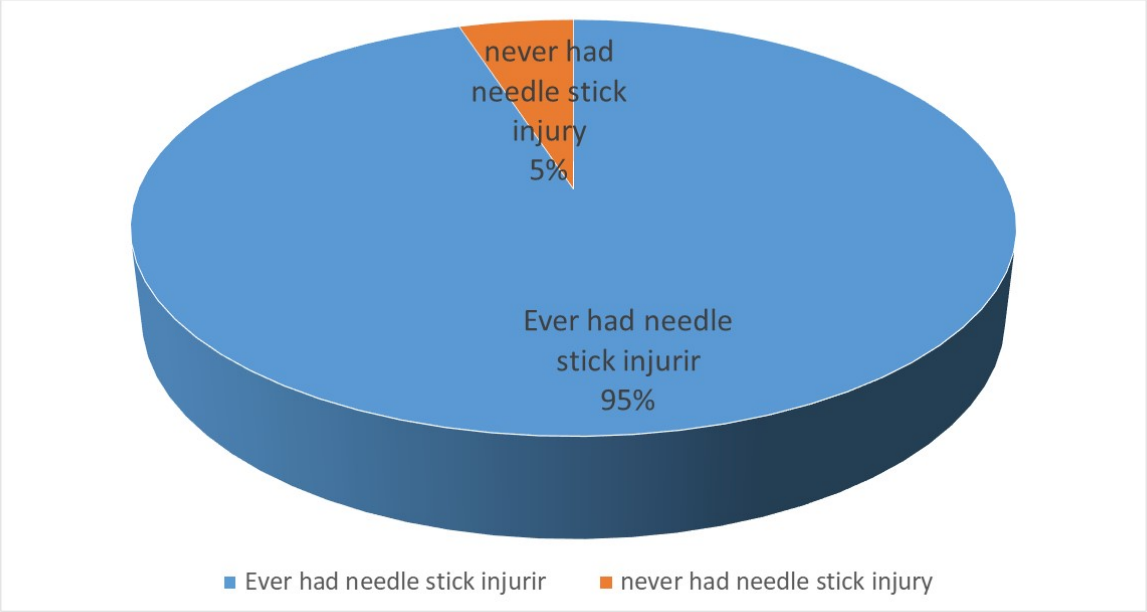

Figure 2. a Pie chart showing the rate of needle sticks injuries.

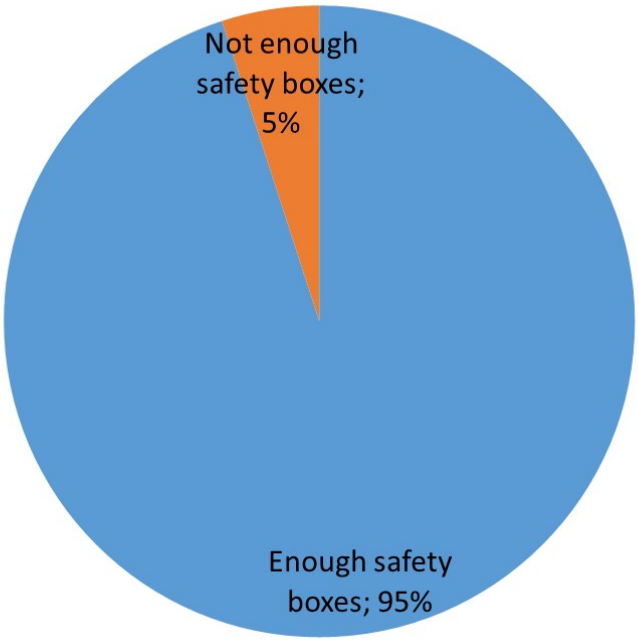

Figure 3. A pie chart showing the proportion of safety boxes in the work areas of the respondents.

injury is. This indicates that respondents had good knowledge about needle stick injuries; this may be because one ought to have such knowledge as a medical student, obtained either from lectures or personal revision

More than half of the respondents; 46 (57.8%) agreed with the fact that needle prick injuries are a danger to health. This shows that this majority would appropriately react when they get needle stick injuries probably may be due to good knowledge about how infectious body fluids are. The blood as the most infectious body fluid that can transmit infections through occupational exposure. This implies that medical students should be availed with full information in any way possible about the risks incurred in needle prick injuries.

HIV and Hep B were the most commonly known diseases that can be transmitted by needle prick injuries; 62 (77.5%), therefore most correctly knew the diseases transmitted by needle prick, unlike in a study (Kalyania, 2021) where knowledge about the transmission risks of HIV, hepatitis B and C through a needle stick injury with a contaminated needle was poor. Similarly in a study, in a study by Kulkarni et al, the knowledge of the study participants was high regarding standard precautions, as 70.5% (n = 189) of the participants were able to identify all of the components of knowledge about the transmission risks of HIV, hepatitis B, and C through a needle stick injury with a contaminated needle was poor (Khubrani, 2017).

The act of recapping was revealed to be the major cause of needle prick injuries. This reflects what a study by Christy Vijay, Allen Joe, and Naveen Ramesh revealed; when the knowledge of recapping a needle was analyzed it was noticed that 93 (84.5%) of the individuals knew that a needle should not be recapped but only 84 (76.4%) of them did not recap the needle. This indicates that individuals knew the causes of NSIs.

Only a minority of the respondents; 14 (17.5%) had ever learned about standard precautions for needle stick injuries and only 6 (7.5%) could list at least three personal protective equipment. This indicates that the risk of sustaining needle prick injuries was high due to a lack of the appropriate knowledge to minimize the risk.

Prevalence and risk factors for needle stick injuries

The study revealed that the majority of respondents (95%) have ever had a needle stick injury. This is could be a result of a lack of knowledge and skill about the procedure performed and non-adherence to standard precautions. Similarly, a study done by (Sharma et al, 2010) found that more people have ever had needle stick injuries. However, a study done by (Solomon Assen, 2020) found that only 28.3 % of the respondents had ever had needle stick injuries. This implies that needle stick injuries are common.

Results showed that most of the respondents got needle stick injuries during recapping the used needle and suturing. Thus most of the injuries are linked to inexperience and not following the safety precautions.

The study found out that most of the respondents did not report the needle prick injuries to the persons responsible.

A study done by (Solomon Assen et al, 2020) found that no safety instructions in the work areas have a greater risk for these injuries thus safety precautions at workplaces play a vital role in needle stick injury yet this study found out that the majority of respondents (88.8%) did not have instructions at their workplaces.

The study found out that most of the respondents who got a needle stick injuries were males (61.3%) compared to 38.7% females as well as a study done by (Solomon Assen et al, 2020) revealed that the incidence of needlestick injuries is common in male than female thus gender is one of the risk factors for needle stick injuries.

6 Conclusions

The study specifically sought to assess the knowledge of dental training students, to assess for factors influencing needle stick injuries among dental training students, and to determine the prevalence of needle stick injuries among dental training students at International Paramedical School, Maya, Wakiso District. The study established that 76.7% knew what a needle stick injury is, 57.8% agreed with the fact that needle prick injuries are a danger to health, HIV and Hepatitis B were the most commonly known diseases that can be transmitted by needle prick injuries and 17.5% had ever learned about standard precautions for needle stick injuries, 76(95%) had ever had needle stick injuries,

56(74.7%) of the respondents reported the injury to the persons responsible while 19(25.3%) of

the respondents didn't report.95% of the respondents had safety boxes while 05% didn't have adequate safety boxes in their workplaces, most males (61.3%) had needle sticks injury compared to 38.7% females, most people had injuries during suturing, recapping a needle, during needle disposal.

Given these findings, there was fair knowledge, which still needs to be improved, most people have ever gotten needle stick injury, some people don't report needle stick injury after injury, most people get the needle stick injury during suturing, recapping a needle and needle disposal, men get needle stick injury more than women.

Recommendation

Greater collaborative efforts are needed to prevent NSIs and their consequences. Such efforts are best accomplished through a comprehensive program that addresses institutional, behavioral, and device-related factors that contribute to the occurrence of NSIs. Critical to this effort is the elimination of needle use where safe and effective alternatives are available and the continuing development, evaluation, and use of needle devices with safety features. All such approaches must include serious initial and ongoing training efforts.

Accurately tracking NSIs is critical. Establishment of surveillance that could be used to identify potential risk factors associated with NSIs, such as high-risk occupations, settings, or procedures, and detects the emergence of new problems. Surveillance systems could be used also to track whether interventions put into place significantly help reduce injuries.

The school administrators should buy and put in place many safety boxes so that used needles and sharps are placed are put where they are supposed to be.

The students should report every case of needle stick injuries so that appropriate actions can be taken.

The dental clinic should have safety operating procedures put in place to minimize the incidence of needle stick injury.

The school administrators should organize a health education session to create awareness of needlestick injuries and their dangers

Students should be allowed to perform the procedures which they are well versed with.

A study to find out why needle stick injury is common among males should be carried out so that appropriate actions should be taken.

7 Limitations during the study.

a) Uncooperative respondents: One of the difficulties was some respondents who were not willing to open up and give their information.

b) Unfavorable weather conditions.

c) Time limitation as the syllabus was cut short and time-bound was not available

8 Acknowledgement

First and foremost, I would like to thank the Almighty God for the gift of life, health, protection, guidance, and wisdom he has always preserved in me. Without Him, I would not have made it this far in the quest for academic achievement.

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9 List of Abbreviations

- DHO: District Health Officer
- EAs: Early Adolescents
- MOH: Ministry of Health
- UAHEB: Uganda Allied Health Examinations Board
- NPI: Needle Prick Injury
- IPI: International Paramedical Institute, Maya
- NSIs: Needle stick injuries
- CDC: Centers for Disease Control and Prevention
- HCWs Health care workers
-

10 Definitions of Terms

Adolescent; A person aged 10 to 19 years

Attitude; the position r way of carrying oneself towards a given activity

Consent; to express willingness or to give permission

Knowledge; the act of knowing something

Practice; habit or behavior of doing something

Services; An event in which an entity takes the responsibility that something desirable happens on behalf of another entity.

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