



**Awareness and Use of Pre-Exposure and Post Exposure
Prophylaxes as Occupational Health and Safety Measure
for Clinical Students at Copperbelt University Medical
School in Zambia**

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Abstract

Pre-exposure prophylaxis (PrEP.) and post-exposure prophylaxis (PEP) are additional preventative methods incorporated in a comprehensive HIV/AIDS preventative package in the Zambian health system. Despite PrEP and PEP being offered as a choice to people who are at sustained risk of HIV infection, most clinical students in sub-Saharan African medical schools continue to be disproportionately at risk of acquiring HIV during their clinical training. To avert this occupational health risk among clinical students, it is critical that awareness, access and use of these HIV preventive strategies, in Zambia and other sub-Saharan African countries be enhanced. This study therefore, examined awareness and use of PrEP and PEP among Copperbelt University Medical students in Zambia.

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A cross sectional survey was conducted among 203 medical students in their clinical years of study. The respondents were selected using stratified simple random sampling at two tertiary level public hospitals in the Copperbelt province of Zambia. Descriptive and inferential statistics were used for data analysis. Study found that 21.2% of the clinical students were exposed to HIV during their hospital practice and majority of these students were 3rd year students (24.5%), followed by the 2nd year students (23.5%) and the least proportion was 1st years (17.4%). Among those who were exposed, 76.7% reported the exposure while 23.3% did not report the exposure. The second years (20.6%) are shown to have reported most of the exposures compared to all the other classes. The majority of students (83.3%) were knowledgeable about PrEP and PEP. Sex (p value= 0.046) was the only factor that was significantly associated with knowledge of PrEP and PEP. There was no factor significantly association with utilization of PrEP and PEP, even participants' knowledge of PrEP and PEP did not influence utilization of PrEP and PEP services (p value=0.741). Therefore, reducing barriers to access and use of PrEP and PEP among clinical students is an important intervention in the process of training medical personnel in Zambia and other countries in sub-Saharan Africa.

Keywords: Copperbelt University; Pre-exposure prophylaxis and post-exposure prophylaxis; Clinical students; preventive strategies; Zambia.

1. Introduction

Worldwide, the awareness of PrEP and PEP seem to be low although willingness to utilize them is high among groups that are at risk of HIV infection such as Men who have sex with other men (MSM) [1]. In support of this, studies conducted on Nigerian University students [2] and among healthcare workers in a tertiary hospital of Haldwani, India [3] found that there is inadequate knowledge about use of PrEP and PEP among students and as an occupational health and safety measure among health workers. In a similar study medical students were reported to be unwilling to care for HIV/AIDS patients a situation which is unacceptable for future physicians [4]. The consumption of PrEP and PEP is an accepted practice worldwide. In Malaysia PrEP has been included as part of the Ministry of health strategic plan to end AIDS by 2030 [5]. In Zambia, National HIV and AIDS Strategic Framework 2017-2021 recognizes the need for pre-exposure prophylaxis (PrEP) to be provided to at-risk populations [6]. Although national guidelines on PrEP exists, Zambia has not yet provided guidance on how PrEP should be implemented and put in practice for target populations. PrEP is currently being provided by public health facilities and the mobilization of those in need is mainly done by Non-governmental Organisations (NGOs). Zambia is in the process of scaling up PrEP, applying the lessons from an ongoing pilot programme [6]. The efficacy of PEP and PrEP regimens depend on the adherence of the consumers. Literature shows that PEP can reduce the risk of HIV infection by over 80% if started soon after exposure [7]. PrEP efficacy was found to be 92% in a pharmacological study when any active drug was detected in blood, therefore daily use could potentially result in 99%–100% protection [8]. Recent evidence shows PEP uptake has been insufficient: only 57% of the people who initiated PEP have completed the full course and rates were even lower at 40% for victims of sexual assault [7]. Occupational exposure to HIV infection among health workers is a public health concern especially in situations where there are overwhelmed with a large population of patients [9]. Health care workers in the USA reported 57 occupational HIV infections [10] and another study revealed that the operating physicians sustained 90.3% sharp injuries and 39.4% mucocutaneous splashes of contamination with blood and

body fluid [11]. There is however, no information in African countries despite the risk of occupational exposure to HIV being high in such countries due to the high burden of HIV in the population. Among trainees in medical schools who are in clinical training are particularly at high risk of acquiring HIV infection due to limited experience and poor proficiency in clinical skills. Therefore, in a population highly burdened with HIV like Zambia, first year clinical students are more vulnerable and at higher risk of occupational HIV acquisition. The use of PrEP and PEP as additional preventative methods is an imperative development in the fight against HIV infection however the awareness about these methods is surprisingly low even in populations that might have strong motivation to learn about and use these methods [12]. Availability of PEP and PrEP though proven efficacious; is of no use if people are not acquainted to their existence and their use. It is for this reason that this study was conducted to measure levels of awareness and utilization of PEP and PrEP by clinical students at Copperbelt University in Zambia.

2. Materials and Methods

This cross-sectional study was conducted using an interviewer-administered questionnaire. A pilot study was conducted before administering the questionnaires. The pilot study was conducted among 30 clinical trainees who were not Copperbelt University students and the data was not included in the main study. Feedback from the pilot study was used to improve the questionnaire. The clinical practice for the medical students at Copperbelt University, Michael Sata School of Medicine takes place at the two tertiary level hospitals namely Kitwe Teaching Hospital and Ndola Teaching Hospital. Participants in the study were recruited based on the strata and sampling frame i.e. year of study and class list. The study was conducted in accordance with all relevant guidelines and regulations. Tropical Diseases Research Ethics Committee approved the study protocol. The inclusion of participants was voluntary and informed consent was obtained from every participant. The confidentiality and anonymity of respondents were also guaranteed. The sample size was estimated at 204 and participants were enrolled using stratified simple random sampling. The first two years of medical training at the Copperbelt University, Michael Chilufya Sata School of Medicine are non-clinical years and the following four years of study are spent in the clinical areas in order to learn the clinical skills. Therefore, the respondents were only clinical students in third, fourth and fifth year of study and these constituted the strata. Data was entered in the computer and cleaned in readiness for analysis. Data analysis was carried out using Statistical Package for Social Sciences (SPSS version 19, Chicago, IL). The descriptive statistics were examined and these included socio-demographic factors, levels of knowledge and utilization of PrEP and PEP, reasons for non-reporting of HIV exposure and barriers to use of the preventive strategies. Binary regression models were conducted at 95% confidence interval to determine correlates of knowledge and utilization of PrEP and PEP among medical students. Statistical significance was set at 95% confidence interval. Statistical significance was set at 95% confidence interval.

3. Results

3.1 Socio-demographic data

Table 1 is a summary of the socio-demographic characteristics of the study population. The study recorded a

response rate of 99.5% (203) and 58.1% of the participants were males. Majority were single (88.2%) and falling within the age range of 18-25. Among these students a larger proportion constituted first year clinical medicine students (42.4%), followed by second year (33.5%) and the third year clinical students (24.1%). The majority (98%) of the participants was Christians and others belonged to other religions.

Table 1: Socio-demographic characteristics

Factors		Frequency	Percent (%)
Age of participants	18-25	137	67.5
	26-40	66	32.5
	Total	203	100
Gender of participants	Male	118	58.1
	Female	85	41.9
Marital status	Married	24	11.8
	Single	179	88.2
Clinical year of study	First (1 st)	86	42.4
	Second (2 nd)	68	33.5
	Third (3 rd)	68	33.5
	Fourth (4 th)	49	24.1
Religious denomination	Christian	199	98
	Others	4	2

3.2 Knowledge about PrEP and PEP

The majority of students showed an understanding of the drugs as 88.7% and 84.2% were able to define PrEP and PEP respectively. Most students (86.7 %) knew who is eligible for the drugs and 95% were familiar with the correct place where one can get PrEP and PEP services. However a vast majority (81.8%) showed confusion and lack of knowledge on which drugs constituted PrEP and only 13.3% were able to identify drugs that make up PEP and majority (86.7%) could not identify the drugs that make up PEP. The majority of the students (88.7%) were knowledgeable about the duration of PrEP before a person is completely protected by the drugs. Most students (90.1%) were also able to correctly answer a question of how long one should take PEP drugs after exposure and 83.7% were also acquainted with the PEP protocols and what is involved in PEP management as shown in table 3. The majority of students (83.3%) were therefore knowledgeable about PrEP and PEP whereas a few students (16.7%) were not knowledgeable about PrEP and PEP. A higher proportion of clinical student in third years were more knowledgeable compared to clinical students in all the lower clinical years of study. The findings are summarized in table 2.

Table 2: Knowledge of PrEP and PEP

Knowledge	Correct Response n (%)	Wrong Response n (%)
Meaning of PrEP	180 (88.7)	23(11.3)
PrEP and PEP Eligibility	176 (86.7)	27(13.3)
Duration of PrEP	98 (48.8)	105 (51.7)
Composition of PrEP	36 (17.7)	166 (81.8)
Facilities offering PrEP and PEP services	194 (95.0)	9 (4.4)
Meaning of PEP	171 (84.2)	32 (15.5)
What is involved in PEP management	170 (83.7)	33 (16.3)
Duration of PEP	180 (88.7)	23 (11.3)
Composition of PEP	27 (13.3)	176 (86.7)
When to access PEP after an exposure	183 (90.1)	20 (9.9)

3.3 Utilization of PrEP and PEP

Table 3 is a summary of the findings regarding participants' attitude and willingness to use PrEP and PEP. On the rating of PrEP and PEP services in Zambia, 73.4% of the students thought that they were good. Although 51.7% of respondents thought PrEP and PEP were not 100% safe for use, 95.6% of participants were willing to use them when a need arises and 56.2% think that other students use PrEP and PEP while 43.8% did not. The results of the findings are shown in table 3.

Table 3: Assessment of PrEP and PEP utilization

Question	Answer	Frequency (n)	Percentage %
Rating of PrEP and PEP services in Zambia	Good	149	73.4
	Bad	54	26.6
Willingness to use PEP and PrEP	Yes	194	95.6
	No	8	3.9
Do you think PEP and PrEP are 100% safe for use	Yes	98	48.3
	No	105	51.7
Do you think other students use PrEP and PEP	Yes	114	56.2
	No	89	43.8

3.4 Exposure to HIV and Reporting the exposure

About 21.2% of the clinical students were exposed to HIV during their hospital practice and majority of these students were 3rd year students (24.5%), followed by the 2nd year students (23.5%) and the least proportion was 1st years (17.4%). Among those who were exposed, 76.7% reported the exposure while 23.3% did not report the exposure. The second years (20.6%) are shown to have reported most of the exposures compared to all the other

classes. The first clinical years (11.6%) were the least of the classes that reported exposures. The reasons for not reporting the exposure are shown in figure 1. The commonest reason raised by majority (2.46%) was that they thought they are not at risk of contracting HIV. The second group of students (0.99%) reported that they did not want to test for HIV while the other 0.99% did not know how to report and who to report to. A few 0.49% of participants reported that patient did not have signs of HIV as a reason for not reporting their exposure. The majority of the participants (95.5%) did not answer the question because they had either reported exposure or had never been exposed.

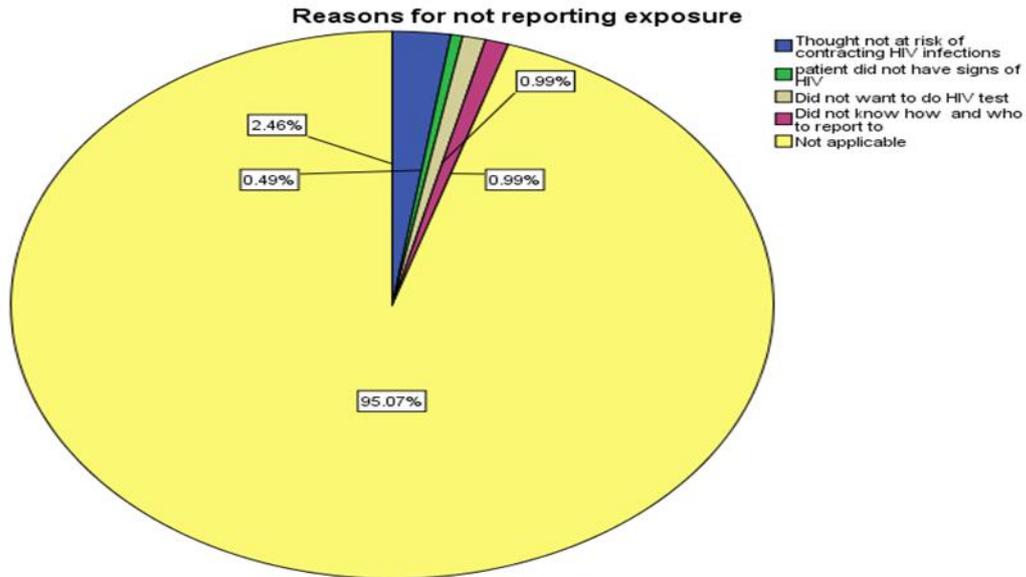


Figure 1: Reasons for not reporting the exposure

3.5 Barriers to the use of PrEP and PEP among clinical students

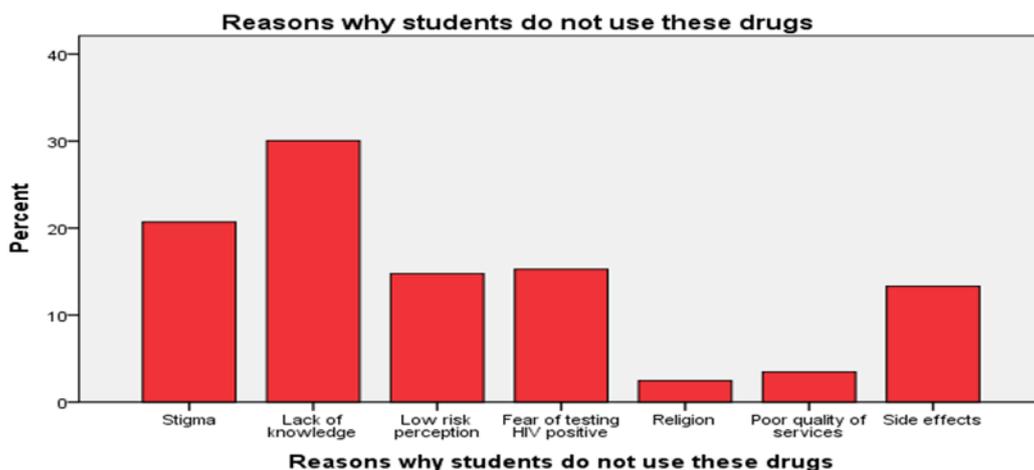


Figure 2: Reasons for students not using PrEP and PEP

Figure 2 shows a summary of the barriers to the use of PrEP and PEP by the students. Majority of students

(30%) attributed the lack of use to lack of adequate knowledge, 20.7% thought that stigma was the reason, 15.3% fear of testing for HIV while 14.8% felt that low risk perception was the reason and 13.3% were concerned about side effects. The other respondents (3.4%), thought that low quality of services and 2.5% of students reported religion as the main reason for not using PrEP and PEP as HIV preventative measures.

3.6 Correlates of knowledge and utilization of PrEP and PEP services at bivariate level

3.6.1 Correlates of knowledge of PrEP and PEP services

Table 4 shows that in the bivariate analysis, sex (p value= 0.046) was the only factor that was significantly associated with knowledge of PrEP and PEP while all the other factors age (p value=0.704), marital status (p value=0.991), clinical year of study (p value= 0.094) and religion (p value =0.655) were not significantly associated with PrEP and PEP.

Table 4: Factors associated with knowledge of PrEP and PEP at bivariate level

FACTORS		n	(%)	p-value
Age	18 – 25	137	67.5	0.704
	26 – 40	85	32.5	
Sex	Male	118	58.1	0.046
	Female	85	41.8	
Marital status	Married	24	11.8	0.991
	Single	174	88.2	
Clinical year	1st	86	42	0.094
	2nd	68	33.5	
	3rd	49	24.1	
Religion	Christian	199	98	0.094
	Others	4	2	

3.6.2 Correlates of levels of utilization of PrEP and PEP services

Table 5 is a summary of factors associated with utilization of PrEP and PEP services. The results show that there was no factor that had a significant association with utilization of PrEP and PEP, age (p value=0.702), gender (p value =0.625), marital status (p value= 0.091), clinical year of study (p value= 0.532) and religion (p value =0.655). Further analysis showed that even the participants' knowledge of PrEP and PEP did not influence utilization of PrEP and PEP services (p value=0.741).

Table 5: Factors associated with utilization of PrEP and PEP services

FACTORS		n	(%)	p-value
Age	18 – 25	137	67.5	0.702
	26 – 40	85	32.5	
Gender	Male	118	58.1	0.625
	Female	85	41.8	
Marital status	Married	24	11.8	0.091
	Single	174	88.2	
Clinical year	1st	86	42	0.532
	2nd	68	33.5	
	3rd	49	24.1	
Religion	Christian	199	98	0.795
	Moslem	4	2	
Knowledge	Knowledgeable	169	88.3	0.741
	Non-knowledgeable	34	16.7	

4. Discussion

The study assessed level of knowledge and utilization of PrEP and PEP among Copperbelt University medical students doing their clinical practice at two tertiary level hospitals namely Kitwe Teaching Hospital and Ndola Teaching Hospital. The study found that the level of knowledge about both prophylaxes was high. Majority of respondents answered correctly most questions that were meant to assess their knowledge about PEP and PrEP. This is similar to results found on a study by Lungu (2016) where most nursing students (94%) had profound knowledge about PEP prophylaxis [10]. Participants in this study showed remarkable results as majority seemed to be well acquainted with the place where they could get PEP and PrEP services and this was by far a greater percentage compared to the 10% of students found in Ajayi et.al (2018) study on Nigerian University students [2]. Also regarding awareness about the duration of PEP treatment, the study revealed that most students provided correct responses and the level of awareness was higher than the level reported by Mukherjee et.al (2013) where 46.9% of interns had correct knowledge on duration of PEP regime. This level of awareness and knowledge demonstrated can be attributed to the fact that the respondents were medical students [13]. Despite majority of respondents being cognizant of the requirement that any incidence of exposure should be reported immediately to appropriate authority, some students among those who were exposed to HIV did not report their exposure. This shows that although respondents were aware that they are at risk of HIV infection; they were not compelled to take an action to report the exposure, this is in line with the findings in another study [10]. Some of the reasons for not reporting exposures were stigma and this is in accord with the report of Ministry of health

(2015) which states that people that are at high risk of HIV infection may deny the risk as individual is unable to cope with the association of stigma [5]. Other reasons included lack of knowledge of who to report to and where to report. The study found that a lot of students showed confusion and lack of knowledge about the appropriate authority to report exposures to. Fear of testing HIV positive and patient lacking signs of HIV were also mentioned as reasons for not reporting. These are similar reasons found in the study among nursing school students on knowledge of PEP [10]. The majority of medical students were willing to use PEP and PrEP prophylaxis. Their willingness was further justified by their positive attitude towards the drugs. A lot of respondents portrayed this by rating PEP and PrEP services good. Even though majority do not think that are safe to use, they were willing to use them when a need arises. The 3rd year clinical students were the majority of students exposed and this is because they are a group of students on the forefront of hospital practice and most basic procedures were done by them and they interact more with patients compared to all the other junior clinical classes. The 3rd year clinical students were the second highest in reporting exposures after the second year students despite having the highest proportion of exposure. This could be due to the fact that despite the 2nd year clinical students not being involved in clinical care as much as the 3rd years, they were more concerned about the risk of HIV exposure during work compared to the third years. Alternatively, it could indicate that the 3rd year students could have been familiar with PrEP and PEP protocols and exposure standards but lacked an understanding and risk assessment skills. This finding is similar to studies done in Ghana, Nigeria and Ethiopia where although awareness of HIV infection was high among health care workers, this knowledge did not translate into positive attitude for the health care workers to apply the knowledge to their own lives [14]–[16]. There was no significant association between age, marital status, clinical year of study and religion to knowledge of PrEP and PEP. However there was a significant relationship between gender and level of awareness of PrEP and PEP. The males were found to be more knowledgeable than females. This could be due to the fact that majority of participants were males and according to McConnel and Mupuwaliywa (2015) males are more educated than females in Zambia [17] but this cannot apply to this study because the respondents were of the same education level. There was no significant association between age, marital status, level of education, religion, knowledge and utilization of PrEP and PEP. Although there is relatively high knowledge about PrEP and PEP among CBU medical students, there are barriers to access and appropriate use of these drugs. The barriers found included lack of knowledge which was raised up by majority of students and fear of testing for HIV. This finding is consistent with what was obtained by Maeri and colleagues who reported fear of stigma, rejection by their sexual partner and fear of ARVs as barriers [18]. This is a drawback because individuals who have once tested for HIV are more likely to be familiar with various HIV preventative methods such as PrEP and PEP [1]. Others included low risk perception, which indicates failure to implement knowledge about prophylaxis protocol in their lives. Another barrier was that the majority of students did not know who to report exposure to.

5. Conclusion

Availability of PEP and PrEP in health facilities are important occupational health and safety measures aimed at preventing the spread of HIV among medical trainees and others at risk in the health facilities. Therefore, intervention measures to build on and strengthen motivational factors in the use of PrEP and PEP among medical students, should target barriers highlighted in this study in order to scale up the use of these preventive

strategies among medical trainees in Zambia.

6. Recommendations

Though additional research is needed to evaluate the impact of previous unreported HIV exposure on clinical student's outcomes, interventions are needed to improve clinical students' adherence to important occupational health and safety measure of reporting possible HIV exposures during clinical practice. It is also recommended that teamwork knowledge among learners is encouraged, supportive work environment and better understanding of the continuum of HIV preventive plan and care be enhanced before students start clinical practice as part of their training programme. Therefore, the optimal approach to avert this occupational health risk among clinical trainees is to enhance awareness, remove identified barriers to access and use of these HIV preventive strategies, as identified in this study. This can be categorically done through a combination of interventions targeting clear information on HIV exposure reporting procedures, fighting stigma and adapting clinical practice for students to fit unique clinical settings and local culture.

7. Conflict of interest

Non

Reference

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