HIV Post-Exposure Prophylaxis Use and Associated Factors among Health Professionals of Governmental Health Institutions in Mekelle Town, Tigray Ethiopia, Cross-Sectional Study

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Abstract

Background: Infection with Human Immunodeficiency Virus is a serious public health problem, costing the lives of many people including health workers. Health care workers practicing in developing countries like Ethiopia are more exposed to HIV following occupational exposure and less likely to use post exposure prophylaxis. Ethiopia has developed guidelines on the prevention of infection in health institutions in July 2004 and also employed the use of post exposure prophylaxis since the implementation of free antiretroviral in January 2005.

Objective: The main aim of this study was to assess prevalence of PEP service use among health professionals in Mekelle town.

Methodology: A health institution based cross sectional study design involving 190 health professionals was employed using a structured self administered questionnaire. Sampling technique was based on the population proportion to size, then to select a study unit systematic random sampling was used, SPSS version 16.00 was used for data entry and analysis. Proportions and percentages were used for descriptions of data.

Result: The study revealed that occupational exposure to blood, non bloody body fluids, needle stick injuries and mucocutaneous were 82.5%, 74.9%, 49.1% and 42.7% respectively. Among the exposed health professionals 19.6% use PEP. The main reasons for not using PEP was source patient HIV test result negative (65.5%), followed by negligence (25%). For those who started PEP all of them get HIV testing before commencing PEP and 80% of them completed in 4 weeks, 20% discontinue the PEP due to adverse effects of the drugs. Training of health professionals on PEP had statistically significant association with PEP utilization (AOR=2.864, 95% CI=1.152-7.122).

Conclusion: The finding of this result indicated that occupational exposures were common among health professionals. The use of PEP among exposed health professionals was low. Providing training for all health professionals on infection prevention, including PEP is recommended to lower the occupational exposure and to enhance the use of PEP.

Keywords: Occupational exposure; Health professionals; Post exposure prophylaxis; Mekelle

Introduction

HIV infection is a pandemic, serious public health problem, as of December 2007, 33 million people were estimated to be living with HIV/AIDS. Of the 33 million, 22.5 million were living in sub-Saharan Africa alone, where the adult prevalence rate is 5.0 percent [1,2]. It is estimated that 4.4% (range 0.8% to 18.5%) of all HIV infections amongst HCWs are due to occupational injuries. It is further estimated that at least half of these cases occur in sub-Saharan Africa [3,4].

The adoption of standard universal precaution and use of personal protective equipments (PPEs) led to a significant reduction in occupational exposures over the last two decades. Despite these precautions, occupational exposures are still occurring and the use of PEP is paramount [5]. Prophylaxis were primarily used after occupational exposures of health care workers to HIV-infected blood and body fluids, usually through needle stick injuries or contact with splashes blood or body fluids [3,6,7].

Occupational exposure to HIV is probably the most serious causes of highest level anxiety amongst health professionals in many countries including in Ethiopia. Ethiopia is one of the hardest hit countries by HIV/AIDS epidemics with the national HIV prevalence 2.4% of adults [1,8].

Occupational infection from body fluid borne pathogens is the most serious health risk faced by healthcare workers. Of 35 million healthcare workers worldwide, the World Health Organization (WHO) estimated that approximately 3 million experiences percutaneous injuries each year. Most of these exposures occur in developing countries, where the prevalence of body fluid borne pathogens in the general population is high and access to protective equipment is limited [9].

Exposures that place a health care worker at potential risk of HIV infection are percutaneous injuries (a needle stick or cut with a sharp object) or contact of mucous membrane or non intact skin (exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, tissue, or other potentially infectious body fluids. HIV transmission following skin puncture from a needle or a sharp object that was contaminated

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with blood from a person with documented HIV infection is \( \sim 0.3\% \), and after a mucous membrane exposure is 0.09% [9,10].

After exposure, HIV replicates within dendritic cells of the skin and mucous before spreading through the lymphatic vessels and develops into systemic infection. This delay in the systemic spread gives an opportunity for PEP using designed to block replication of HIV [11]. Even though the maximum delay for initiation of treatment to prevent infection is not known in human. The CDC recommendations are to offer prophylaxis up to 24 to 36 hours after exposure (No consideration of PEP beyond 72 hours) [2,11,12].

The drugs used for PEP can be 2 (low risk exposure) or 3 (for high risk exposure) anti retroviral therapy (ART) for 28 days. Conditions like blood come into contact with cuts on the skin, exposure to a large volume of blood or potentially infectious fluids or blood contamination from terminally ill patients or early seroconversion phase of HIV, injury with a hollow needle and deep and extensive injury are considered as high risk exposure [4-8].

The low risk exposure is considered a small volume of blood, blood contamination from asymptomatic HIV positive patients, injury with solid needle, superficial injury, glove use during exposure and mucocutaneous exposures. The health professionals at high risk of occupational exposure include physicians, health officers, nurses, midwives and laboratory technicians. When used properly PEP reduces the rate of HIV infection from exposure by 79-81% [1,2,11,12].

Health care workers practicing in poor countries like Ethiopia are more exposed to HIV occupational exposure and less likely to use PEP than those working in developed countries [4]. A research done on the assessment of HIV post-exposure prophylaxis use among health workers of governmental health institutions in Jimma zone, Oromiya region, southwest Ethiopia by Bosena Tebeje, in 2010 showed that 142 (81.6%) of those exposed reported that they did not use PEP [1]. This research will, therefore, try to explore the existing magnitude of occupational exposure to HIV and use of PEP among those exposed to health professionals in Mekelle town.

HIV post exposure prophylaxes are a form of secondary HIV prevention that may reduce the incidence of HIV infections. Occupational HIV PEP is an accepted form of therapy for health care workers exposed to HIV through their jobs. Since its inception, the medical profession has been vulnerable to occupational exposure to infectious diseases. With the emergence of HIV infection and its relentless global spread, health care workers are increasingly being exposed to patients who are HIV positive or have frank AIDS. Despite the use of universal precautions, accidental occupational exposure to blood or potentially infectious materials does occur [13].

The risk for occupational exposure to HIV has been well characterized in the developed world, but limited information is available about this transmission risk in resource-constrained settings facing the largest burden of HIV infection. In addition, the feasibility and utilization of post-exposure prophylaxis programs in these settings are unclear [5].

Ethiopia as one of the resource constrained countries, the magnitude of occupational exposure and utilization of PEP among health professional is not known. Specifically, in Mekelle published studies showed that the clear picture of occupational exposure and HIV PEP use in the workplace does not exist. This study is therefore undertaking to assess the level of occupational exposure and knowledge, attitude, practice; and factors associated with HIV PEP use among health professionals working in governmental health institutions in Mekelle town. Finally to come up with recommendations to enable responsible bodies to design, integrate and to take appropriate measure. It will also help as an input for the subsequent large scale researches.

**Methods**

**Study area and period**

The study was undertaken in Mekelle town from July 23 to August 03 2012. Mekelle is the capital city of Tigray and found around 780 km away the capital city Addis Ababa. The current total population of Mekelle is estimated to be 264,907 (2011). According to the existing health service delivery system, the town has 4 governmental, 4 private hospitals, and 9 health centers, 22 private clinics, 6 rural drug venders, 35 drug shops 4 pharmacies and 9 whole sellers. There are about 806 health professionals from these 83 physicians, 24 health officers, 482 nurses, 60 laboratory technicians and 38 midwives working in these health centers and hospitals.

An institution based cross sectional study design was employed between July 23 to August 03 2012.

The study population was health professionals who were currently working in two hospitals and three health centers, which provide ART in the town and directly involved in the care of patients (Physicians, health officers, nurses, midwives and laboratory technicians) in hospitals and health centers of the study area.

The inclusion criteria were all health professionals working in the study area who have a potential to be exposed to HIV high risk conditions in their day to day professional activities; and the exclusion criteria are health professionals in whom their day to day activity doesn't make them to be at high risk of HIV due to occupational exposure.

The sample size was determined using single proportion formula; with a P value taken from previous studies in the local context in Bahirdar town, 2010; which was 19% [11]. Since the source population was less than 10,000 a finite population correction formula was used; therefore, the final sample size was 190. To identify the study subject a systematic random sampling was applied to each health facility. From the list of all the source populations, Kth value was calculated; then every Kth person was included in the study. To select the first study subject Lottery method was used.

Data collection was conducted using a structured self administered questionnaire. Before the actual data collection began, pretest was done in Quia hospital and Quia health center in 5% of the sample. After data collection was completed, each questionnaire was checked for completeness, missing values and unrelated responses. The coded data were entered into the computer using Epi-Info and cleaning were performed, then the cleaned data was exported to SPSS version16.0 for analyses.

Ethical clearance was obtained from Mekelle University, college of health science Ethical Review Committee and Tigray Health Bureau. The letter was written to medical director of Mekelle hospital and head of the health centers to obtain their consent. Necessary explanation about the purpose of the study and its procedures was done to the respondent and their consent was also obtained from each respondent. To ensure confidentiality, anonymity was used and they were informed to withdraw at any time if inconvenient.

**Results**

**Socio-demographic characteristics of the study population**

The study was conducted on 190 health care professionals with a

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Health professional's exposure to HIV risk conditions

Among the 84 needle stick injuries, 69 (82.1%) had 1-3 times in their lifetime, 13 (15.47%) had 4-6 times in their lifetime and 2 (2.3%) had 7-10 times stick injuries in their lifetime. Based on the last year history of exposure 48 (28.07%) of the respondents had at least one needle stick injury.

The most common reason for sustaining the recent injury was due to patient sudden movement 21 (43.7%), during recapping 13 (27%), during sharp collection eight (16.6%) and due to other causes seven (14.6%) (Table 2).

Immediate Measures taken after needle stick injury and mucous membrane exposure

Different measures were taken by health professional immediately following exposure. Washing with soap and water was the most common measure taken 47 (55.9%) followed by squeezing for more bleeding 10 (11.9%).

Respondents answered different measure after body fluid exposure to their eye, mouth and nose. The majority 61 (83.56%) considered immediate washing with water and soap 61 (83.56%), visiting VCT immediately after exposure five (6.8%) (Table 2).

Knowledge of health professionals about HIV PEP

Almost all of the respondents 167 (97.7%) knew the presence of PEP drugs that are given following accidental occupational exposure to HIV, 160 (93.3%) of the respondents answered that HIV testing is important before commencing PEP drugs against HIV. 53 (31%) of the respondents replied that either two or three PEP drugs can be used based on level of exposure. 93 (54.4%) of the respondents answered that the maximum time limit to initiate HIV PEP is 72 hours and 140 (81.9%) of the respondents answered that 28days is the time duration for PEP.

In general 98 (57.3%) of the respondents had good knowledge 71 (41.5%) had fair knowledge and 2 (1.2%) had poor knowledge about PEP (Table 4).

Training of professionals on PEP and availability of PEP at work places

Among the respondents 53 (31%) have trained on PEP. 118 (69%) don't take any training on PEP, 73 (42.7%) of the respondents replied that they have guidelines and protocols on how to use PEP after exposure, 98 (57.3%) they don't have guidelines and protocols of PEP.

117 (68.4%) of the respondents respond that PEP is available at working hour, 23 (13.5%) answered that PEP is not available at workings hours, 31 (18.1%) don't know the availability of PEP.

72 (42.1%) of the respondents respond that PEP was available on weekend days and 58 (33.9%) respond that PEP not available at weekend days. The remaining 41 (24%) don't know the availability of PEP at weekend days.

PEP use among health professionals

Regarding exposure to the risk of acquiring HIV/AIDS 158 (92%) of the 171 health professionals exposed to HIV risk conditions. However, only 31 (19.6%) of the 158 exposed use PEP. The main reason reported for not using PEP were source patient HIV test result negative 76 (65.5%), negligence 29 (25%) and unaware of the existence of PEP six (5.1%) (Table 5).

Health professionals' exposure to HIV risk conditions

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For those who received PEP 31 (100%) they receive HIV counseling and testing before they start PEP. 12 (38.7%) of those started PEP they start the first PEP with less than 6 hours, 6 (19.4%) started with 7-12 hours, 12 (38.7%) started with 13-24 hours, one (3.2%) respond that he or she started the first PEP 25-48 hours. The mean time to initiate PEP among the respondents was 13.35 hours. 25 (80.6%) of those who started PEP completed their treatment, 6 (19.4%) discontinued their PEP. 5 (83.3%) of those who discontinued are due to adverse effect of the drugs and 1 (16.7%) was due to source patient turned to be HIV negative.

29 (93.5%) of those received PEP get HIV testing at 3 and 6 months after completion of the PEP on these 28 become negative and one become HIV positive.

Factors associated with utilization of PEP

Factors associated with Post exposure prophylaxis use were assessed...
PEP utilization in Mekelle town. Bivariate analysis of socio demographic & behavioral factors associated with PEP utilization (AOR=2.864, 95% CI 1.152-7.122). On other variables, the analysis did not show an association with PEP utilization (AOR=2.969, 95% CI= 1.336-6.597).

Multivariate logistic regression analysis was also done to see the association of PEP utilization (COR=2.969, 95% CI= 1.336-6.597). The odds of PEP utilization were 3times higher among those who trained on PEP when compared with those who were not trained on PEP (COR=2.969, 95% CI= 1.336-6.597). The Bivariate analysis was performed using chi square (x²) test. NB ♣ statistically significant with finding in the Jimma zone Oromia region south west Ethiopia (44.3%, 39.1%) respectively this may be due to low population, comparable sample size, lower service and lower mean age of the respondents but high needle and sharp injury as compared to this research. However the estimated rate of needle stick injury in this study was lower as compared to WHO estimation for developing countries (2.10 injuries per person per year). The most common reason for sustaining needle stick injuries in this study was due to patient sudden movement (43.7%) followed by recapping 27%. Despite the current national infection prevention recommendation, not to recap needle it is still a common practice.

This study also detected high level of exposure to blood and body fluids (82.5%, 74.9%) respectively as compared to a research done Harari regional state and Dire Dawa administrative (28.8%, 20.2%) respectively and a research finding in Jimma zone Oromia region south west Ethiopia (44.3%, 39.1%) this may be due to low service year of the respondents of these area as compared to study's design in the Pune India study [15].

This study assessed prevalence of occupational exposure to HIV, post exposure prophylaxis use among health professionals and factors associated with utilization of PEP in Mekelle town.

The Bivariate analysis was performed using chi square (x²) test. Accordingly, no independent variable was statistically significant (P<0.05) except training on PEP. The odds of PEP utilization were 3times higher among those who trained on PEP when compared with those who were not trained on PEP (COR=2.969, 95% CI= 1.336-6.597).

Multivariate logistic regression analysis was also done to see the association among variables. According to the multivariate logistic regression analysis result, ever trained on PEP was found to have significant association with PEP utilization (AOR=2.864, 95% CI 1.152-7.122). On other variables, the analysis did not show an association (Table 7).

Discussion

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Discussion

This study assessed prevalence of occupational exposure to HIV, post exposure prophylaxis use among health professionals and factors associated with utilization of PEP in Mekelle town.
The use of PEP among the exposed health professionals in this study is 19.6% it is in line with previous studies done in Ethiopia [1] and to a research done in the UK on PEP for HIV knowledge and experience of junior doctors [14]. But it is lower than a research finding on high risk for occupational exposure to HIV and utilization of PEP in Pune, India (72%) among the exposed [15] and HIV prone occupational exposures epidemiology and factors associated with initiation of post-exposure prophylaxis in London (79.8%) among the exposed [16-25]. The difference may be probably different in type of exposure in these the type exposures were needle stick injuries while in this study the type exposures were needle stick, exposure to blood and body fluids. And in this study health professionals started PEP after test result of the source patient. But in those studies after significant exposure they started PEP and they wait for test results of the source patient.

For those who started PEP all of them had HIV counseling and testing before commencing PEP. This is true with the Ethiopian national guideline on management of occupational exposure against HIV.

According to national infection prevention, WHO and CDC recommendations PEP treatment as much as possible should be initiated immediately after exposure within 1-2 hours. Despite of these recommendations the mean time to initiate PEP drugs in this study was 13.35 hours.

80.6% of those started PEP completed their drugs. 19.4% of those who started discontinue the drugs due to adverse effects of the drugs. But this is lower than a drug discontinuation due to adverse effects of the drugs found in a teaching hospital, Pune India [15] and research report from PEP for HIV knowledge and experience of junior doctors in the UK. But this finding is in line with the estimation of CDC (17-47%) proportion of health professionals taking PEP after occupational exposure to HIV positive sources didn't complete a full 4 week course of therapy because of an inability to tolerate the drugs [6].

Concerning the post PEP HIV test result 93.3% were negative only one (3.448%) was positive. As already known PEP is not 100% effective. The protective capacity of PEP drugs when taken properly is 80%. So this finding is consistent with of estimation of protection capacity of PEP [12].

Results of both Bivariate and multivariate analysis confirmed that PEP utilization was significantly associated with training of health professionals on PEP (AOR=2. 864, 95% CI 1.152-7.122). But no other research findings that show the impact of training on PEP utilization?

Conclusions

From the findings of the study the following conclusions were summarized.

- Occupational exposures were common among health professionals in the study area;

- Occupational exposures to blood, body fluids, to needle stick and sharp injuries and mucocutaneous were 82.5%, 74.9%, 49.1% and 42.7% respectively.

The recapping of the needle was still a common practice; 27% of the needle stick injuries were due to recapping

• Some unnecessary measures were taken by health professionals after needle stick or sharp injuries; 11.9% of the injuries squeezed the site for more bleeding

• The utilization of PEP among the exposed health professionals was low.

• According to this finding certain number of health professionals could not get PEP drugs for exposures that occur during duty time

• The mean time to initiate the first PEP drug after exposure was 13.35 hours

• 25% of the exposed respondents were negligent to seek PEP the study

Recommendations

Based on the findings summarized under the conclusion, the following recommendations were forwarded.

1. Health facilities may strengthen and integrate infection with routine services through providing training to all health professionals so as to decrease the high occupational exposures.

2. Health facilities are expected to have the standard protocol for infection prevention to avoid unnecessary practices such as recapping of needle and squeezing for more bleeding.

3. To increase the utilization of PEP, all health professionals are better to be trained on PEP.

4. Health facilities are expected to be the center of available PEP drugs all the time.

5. To be on the safe side after exposure, PEP is better to be started immediately.

6. The government could introduce Health insurance for health professionals.

7. Further study with designs out of cross-sectional study design is recommended.

References


2. Management of healthcare workers exposed to HIV.


