Knowledge and uptake of occupational post-exposure prophylaxis amongst nurses caring for people living with HIV

**Introduction**

The rise of human immunodeficiency virus (HIV) infections nowadays had greatly exposed the health care settings to frequent occupational hazards that posed an amplified challenge to health care providers. Occupational exposure to HIV in either hospital or community health care settings presents a potential risk of infection (Hamlyn & Easterbrook 2007:329). Nurses, as the forefront health care providers, are perceived to be the most susceptible group with regard to occupational health hazards and work in fear of contagion with HIV.

The prescription of antiretroviral therapy (ART) as post-exposure prophylaxis (PEP) following exposure to HIV has now become routine and it is of paramount importance that individuals with potential risk of exposure are aware of the procedures to follow and where the first point of contact should be if an incident occurs (Hamlyn & Easterbrook 2007:329). PEP is short-term antiretroviral treatment to reduce the likelihood of HIV infection after occupational exposure.

**Problem statement**

Although occupational exposure to HIV is preventable, it continues to impose risk on nurses and impact negatively on their health. Nurses caring for people living with HIV (PLWH) are at a greater risk of exposure to HIV by needle sticks, cuts, getting body fluids in their eyes or mouth and skin when bruised or affected by dermatitis. It is of paramount importance that the awareness and knowledge about OPEP be sought amongst nurses caring for PLWH. Hence, this study sought to determine the knowledge and uptake of OPEP amongst nurses caring for PLWH.
Aim of the study
The purpose of this study was to determine knowledge and uptake of OPEP amongst nurses caring for PLWH.

Background
Globally, there are approximately 3 million HIV exposures amongst health care providers every year estimating to result in 200 to 5000 HIV infections (World Health Organisation [WHO] 2006). Occupational HIV exposure impacts heavily on the already burdened workforce with increased morbidity and mortality amongst nurses who provide care to PLWH.

The standard universal precaution guidelines (WHO 2006) had been in place for the last two decades, and stipulated the provision of adequate sharps containers, the training of workers at risk and prevention of transmission of blood-borne viruses, the use of gloves and eye wear, and safer devices such as needles that sheath or retract after use. These were said to have led to a significant reduction in needle prick, infection risks and other injuries (Beekmann & Henderson 2005). The Pruss-Ustun, Rapiti and Hutin’s Report (2003) stated that the global burden of disease resulting from sharps injuries reveals a number of factors which may contribute to their occurrence, including the use of unnecessary needles, the lack of availability of safer needle devices and sharps disposal containers, the lack of access to or failure to use sharps containers immediately after a procedure, and the continued recapping of needles after use.

Hamlyn and Easterbrook (2007:334) reported that regardless of occupational exposures being preventable, this continues to impose risk on nurses and impacts negatively on their health. Nurses caring for PLWH are at a greater risk of exposing themselves to HIV by the risky engagement they are faced with in the workplace, that is needle sticks or cuts, blood or other body fluids spills or splashes in their eyes, nostrils or mouth and exposed blood or other body fluids on their chapped or scraped skin, or affected by dermatitis.

Furthermore, it is of paramount importance that awareness and knowledge about OPEP be created amongst nurses caring for PLWH. This is based on limited information about the use of universal precautions by nurses in a resource-limited country such as South Africa. Universal precautions focus specifically on the prevention of exposure to blood and body fluids. The study sought to determine the awareness, knowledge and uptake of OPEP amongst nurses caring for PLWH in Vhembe district, Limpopo province, South Africa.

Research objectives
The objectives of the study were to:

- Determine the level of exposure to HIV amongst nurses caring for PLWH.
- Determine the awareness and knowledge about OPEP.
- Determine the uptake of PEP amongst nurses exposed.
- Establish the relationship between awareness and availability of OPEP in the unit.

Definition of concepts

Occupational post-exposure prophylaxis: The prophylaxis taken when a nurse working in a health care setting is potentially exposed to material infected with HIV.

Occupational exposure: Reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials, in this case HIV, that may result from a nurse’s duties.

Literature review

Graziano (2010) defines occupational exposure as any contact with an infectious body fluid as a result of an injury with a needle or any other sharp instrument, or via mucous membranes or an existing cutaneous condition (wound, eczema, scratch, etc.). This applies to nurses caring for PLWH and patients with an unknown HIV status. Occupational exposure may place nurses at risk of HIV infection through injuries such as those involving a potentially contaminated needle or sharp instrument or chapped, abraded skin or contact with mucous membranes. A potentially infectious body fluid that comes from a person who carries an infection is termed infectious. Potentially infectious body fluids include blood, cerebrospinal fluid (CSF), synovial fluid, pleural fluid, pericardial fluid, amniotic fluid, semen, or vaginal secretions (Graziano 2010).

PEP comprises of administering a short course of ART to decrease the possibility of sero-conversion following events with high risk of exposure to HIV (National AIDS Control Organisation [NACO] 2009). The process that nurses have to follow after exposure involves first aid, counselling, risk assessment, relevant laboratory investigations with the consent of the exposed individual and source, followed by provision of a short course of ART for 28 days, and monitoring (Mathewos et al. 2013:508; NACO 2009).

PEP has been effective and able to prevent about 81% of seroconversion and is at present the only means of reducing the risk of HIV infection after exposure (Gupta et al. 2008:2). Unsafe practices such as the re-use of inadequately sterilised needles, careless handling of contaminated needles, and poor hazardous waste management, have the potential to increase the risk of acquiring blood-borne pathogens (Gupta et al. 2008:7; Sagoe-Moses et al. 2001:538). In 2005 about 3 million percutaneous occupational exposures to blood or other bodily fluids occurred in health care settings, the majority (90%) in developing countries (Gupta et al. 2008:2). The average risk of HIV transmission after a percutaneous
exposure to HIV-infected blood has been estimated to be approximately 0.3% (Hoffmann, Bucholz & Schnitzler 2013). The risk after a mucous membrane exposure is approximately 0.09%. Although episodes of HIV transmission after non-intact skin exposure have been documented, the average risk for transmission by this route has not been precisely quantified but is estimated to be less than the risk for mucous membrane exposures (Kuhar et al. 2013:877). The risk for transmission after exposure to fluids or tissues other than HIV-infected blood also has not been quantified but is probably considerably lower than for blood exposures (Kuhar et al. 2013:877). This projects that the risk of acquiring blood-borne pathogens is high in Africa, especially in South Africa most probably reflecting the high prevalence of HIV.

There have been a number of studies conducted in the African continent regarding knowledge of PEP. Some studies have reported favourable knowledge of PEP amongst health care workers (Mathewos et al. 2013; Sarah et al. 2014), but several others have found rather important knowledge gaps on PEP amongst health care workers. In Nepal, only 6% of nurses in Chitwan Medical College Teaching Hospital had good knowledge on PEP, whilst in Zimbabwe 65% of health care workers and 83% in Ethiopia had poor knowledge on PEP (Jharna, Bijay & Kalpana 2012; Monera & Ncube 2012). Furthermore, amongst the exposed respondents, 81.6% did not use PEP, with 33.8% reporting lack of knowledge on the use of PEP (Tebeje & Hailu 2010). Similarly, inadequate knowledge on PEP has been reported amongst medical doctors in a tertiary hospital in Nigeria (Esin et al. 2011). Most studies suggest that nurses are at higher risk of occupational acquisition of HIV through needle stick injuries and contact with infected body fluids (Jharna et al. 2012; Owino; Srivanichakorn & Thepthien 2013). Therefore, it is of paramount importance for nurses to have adequate knowledge on how they can protect themselves.

It was deemed of paramount importance to investigate the knowledge and uptake of PEP in a South African context given the heavy burden placed at nurses caring for PLWH given their increased health care access. This is carried out through HIV counselling and testing (HCT), prevention of mother to child transmission (PMTCT) and nurse initiated management of antiretroviral therapy (NIMART) to name a few, which are inclusive of procedures that expose nurses to infected fluids through needle pricks, fluid splash during obstetric care, and contact with an infected person’s skin when skin is cracked.

Methods
Design
A cross-sectional descriptive study was conducted in a regional hospital in Limpopo province.

Context of the study
The study was conducted at one of the regional hospitals in Vhembe district, Limpopo province. Vhembe district is predominantly rural.

Materials
The study focused on three nursing cadres (N = 233), namely enrolled nursing auxiliaries (ENA), enrolled nurses (EN) and professional nurses (PN) caring for PWLH. Purposive sampling was used in this study because of the nurses’ experience in caring for PLWH.

Data collection methods
Data collection was attained using a self-administered questionnaire. The questionnaire comprised of two sections, i.e. demographics and a seven item questionnaire which incorporates measures for exposure and PEP uptake related questions. The questionnaire was prepared by selecting relevant studies carried out by Esin et al. (2011:465), Owolabi et al. (2011:180) and Agaba et al. (2012), which were modified according to the field experiences of the researchers. The questionnaire was then pre-tested amongst 13 nurses in a hospital and further modifications were incorporated with the aid of PEP experts; however, reliability analysis was not performed. Participants were recruited from the nurses’ respective wards at the hospital. An information sheet was provided to inform them about the purpose of the study after which the questionnaires were disseminated.

Data analysis
Statistical package for social sciences (SPSS 21) was used to assemble and analyse the collected data. Frequencies and percentages were used to analyse the demographics as well as the different questions in the questionnaire and were tabulated. Linear correlation was carried out to establish possible relationship between availability of PEP and knowledge of PEP. The significance level was set at 0.01.

Ethical considerations
Ethical clearance of the study was granted by the North-West University Ethics Committee, and permission to conduct the study by the Limpopo Department of Health. The study protected the rights and dignity of the participants, and they were informed that the research was of no harm to them. Voluntary participation was encouraged and participants were informed of their right to terminate their participation at any given point if they felt uncomfortable. Written consent of all participants was sought after detailed information about the research was given to participants. The researchers ensured that all collected data were stored in a locked place and electronic data were saved in a password-protected device to which only the researchers had access. No names of the participants and hospital were divulged.

Results
Two hundred and thirty three (97%) of 240 questionnaires were returned completed and analysed. The study was inclusive of PNs (n = 109, 47%), ENs (n = 58, 25%), and ENAs (n = 66, 28%). Female nurses (n = 181, 78%) dominated the study (Table 1).
Sixty per cent of nurses (n = 136) experienced a situation at work where they were afraid they had been infected with HIV; this had happened to them once (n = 54, 23%), twice (n = 25, 11%) and more than five times (n = 21, 9%) in the past 12 months. It was revealed that 40% (n = 92) of nurses did not know what PEP is, and 22% (n = 51) did not know or were not sure if it was available in the hospital/unit they were working in. Only 68 (29%) nurses had sought PEP and the majority (n = 37, 54%) of them did not receive PEP when they needed it during their last experience.

The findings in Table 2 show that those who did not seek PEP or sought it but did not receive it, was because they did not need PEP (42%, n = 81), they did not have enough information about PEP (16%, n = 33), did not want to take an HIV test (2%, n = 3), PEP was not available (8%, n = 16), did not know where to go (12%, n = 25), and were afraid to go through the process (20%, n = 41).

Table 3 shows a significant association between the knowledge about PEP and availability of PEP (r = 0.622) in the units that nurses are working in, which suggests that the availability of PEP in the unit increases the knowledge about PEP.

**Discussion**

Nurses, as key players in the health care provision in South Africa, need education and awareness about PEP as an important factor for successful prevention of transmission of HIV within the workplace. Nurses showed to be highly exposed to HIV, and this increases their fear of contagion, as they are on a day to day basis faced with HIV patients or PLWH as well as patients with an unknown HIV status. This is in line with a Cameroonian study by Aminde et al. (2015) stating that a majority of the nurses (85%) considered themselves to be at risk of exposure to HIV at the workplace with about 68% admitting to have been exposed in the past.

**Correlation**

<table>
<thead>
<tr>
<th>Variable</th>
<th>PN (n = 109)</th>
<th>EN (n = 58)</th>
<th>ENA (n = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward allocation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPD/Casualty</td>
<td>50 (46%)†</td>
<td>0</td>
<td>22 (33%)</td>
</tr>
<tr>
<td>Medical and palliative wards</td>
<td>21 (19%)</td>
<td>27 (47%)†</td>
<td>19 (29%)</td>
</tr>
<tr>
<td>Surgical wards</td>
<td>30 (28%)</td>
<td>21 (36%)</td>
<td>24 (36%)†</td>
</tr>
<tr>
<td>ICU/OT/Private ward</td>
<td>26 (24%)</td>
<td>26 (45%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Maternity wards</td>
<td>26 (24%)</td>
<td>26 (45%)</td>
<td>2 (3%)</td>
</tr>
</tbody>
</table>

**Table 2: Responses to different questions in the questionnaire.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever had a situation at work where you have been afraid you were infected with HIV? (N = 233)</td>
<td>Yes</td>
<td>136</td>
</tr>
<tr>
<td>How many times has that happened in the last 12 months? (N = 233)</td>
<td>Never happened</td>
<td>133</td>
</tr>
<tr>
<td>Happened once</td>
<td>54</td>
<td>23</td>
</tr>
<tr>
<td>Happened twice</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>Happened five or more times</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Do you know what post-exposure prophylaxis (PEP) is? (N = 230)</td>
<td>Yes</td>
<td>138</td>
</tr>
<tr>
<td>No</td>
<td>92</td>
<td>40</td>
</tr>
</tbody>
</table>

**Table 3: Correlation coefficients of knowledge about PEP and availability of PEP.**

<table>
<thead>
<tr>
<th>Knowledge about PEP</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of PEP</td>
<td>Pearson correlation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Discussion**

This indicates that nurses’ exposure is a serious problem and has an impact in the provision of care towards PLWH, as nurses continually care for PLWH in settings where universal precautions cannot be maintained because of a lack of resources.

The majority of nurses (60%) knew about PEP and this was in line with findings by Owo et al. (2011:181) revealing that a majority of the respondents amongst health care providers working at the University of Abuja Teaching hospital (UATH), Gwagwalada, were aware of PEP. However, the major concern was the fact that 40% did not know anything about PEP. Ignorance in this area of work can have a disastrous outcome on the health of nurses (Sabane, Dixit & Durge 2011:29). It is safe to assume that this will also undermine the confidence of the nurses to deal with patients confidently and effectively (Sabane et al. 2011:29). According to Ooi, Dayan and Yee (2004), low levels of awareness and knowledge of HIV and PEP may translate to missed opportunities for access to PEP, and potential HIV infections.
Practical implications

The findings of this study are of great use to make recommendations to guideline and policy developers, who may utilise the information to develop policies, guidelines and programmes that will assist in strengthening and promoting universal precautions, and the uptake of OPEP.

Limitations

The findings of the study cannot be generalised to other regional hospitals in the province as only one regional hospital was used.

Recommendations

As a result of the research findings, the following recommendations are made.

Practice

- Emphasis on universal precaution and infection control in hospitals needs an improved approach.
- It is, therefore, a necessity that nurses caring for PLWH should be informed about PEP guidelines and policies; this includes information about potential risk of exposure, importance of early reporting following exposure, strict avoidance of exposure and readily available first aid kits.
- There is a crucial necessity for policy makers in the health sector to set in place policies, guidelines and programmes that will quickly measure up/monitor and evaluate PEP services in health care settings, so that escapable occupationally attained HIV infection can be avoided amongst our nurses.
- Organisational provision of all protective equipment must be a priority.
- PEP induction training and refresher courses are required as they form an integral part of the initial training of health PN on universal precaution measures.

Future research

- A larger study over a diversity of nurses exploring their attitude, perceptions and experiences with regard to OPEP is required.
- Epidemiologic studies on the prevalence of PEP uptake in South Africa amongst exposed nurses are required.
- Evaluate OPEP programme.

Conclusion

Not all nurses exposed to HIV are aware of PEP. It was also evident that not all exposed nurses sought PEP and those who sought PEP did not all receive it when needed. Furthermore, some nurses revealed that they never sought PEP because they did not want to go through its process, did not want to undergo the HIV test, did not know where to go for it, and did not have sufficient information on PEP. There was a significant association between availability and knowledge of PEP in the unit. Although HIV is regarded as a
chronic disease, strict preventive measures are still a priority and these measures need to be taken seriously to promote and maintain a healthy nursing workforce in South Africa.

Acknowledgements
The authors would like to acknowledge Dr U. Ramathuba for her contribution in the collection of data and thank all nurses who participated in this study. North-West University, Mafikeng Campus is acknowledged for its financial support for this study.

Competing interests
The authors declare that they have no financial or personal relationship(s) which may have inappropriately influenced them in writing this article.

Authors’ contributions
M.D.-M. (North-West University, Mafikeng Campus) was the project supervisor who supervised the study. L.M. (North-West University, Mafikeng Campus) conducted the study’s sampling, participants’ recruitment, data collection and analysis. L.M. and M.D-M. wrote the manuscript.

References
Graziano, F., 2010, Guidelines for blood borne pathogen exposure and post exposure prophylaxis in health field sites, UW Global Health Institute, Madison, WI.
Kumar, D.T., Henderson, D.N., Struble, K.A., Heneine, W., Thomas, V., Cheever, L.W. et al., 2013, ‘Updated US public health service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for post exposure prophylaxis’, Infection Control and Hospital Epidemiology 34(9), 879–892.