

Full Length Research Paper

Attitudes and practices among surgical staff of a tertiary hospital in Malawi towards the prevention of occupational HIV infection

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Abstract

Accepted 04 November, 2020

The prevalence of the Human Immunodeficiency Virus (HIV) remains high in sub Saharan Africa and there is a small but significant risk for surgical staff, to contract HIV over time from infected surgical patients. We conducted this study to investigate the attitudes and practices of surgical staff towards the prevention of occupational HIV infection (OHI) at a tertiary hospital in Malawi. This was a cross sectional qualitative study using a semi-structured questionnaire, administered to surgical staff (surgeons, nurses, clinical officers) to assess their attitudes and practices towards self-protection from OHI. We collected data on self-protection measures to reduce risk of HIV exposure, and practices following accidental exposure. We also conducted blinded observations of staff working in the operating theatres. Data were analyzed manually, drawing themes, and observed practices were correlated with reported behaviors. We interviewed 23 study participants and observed 3 theatre sessions which involved 15 theatre staff. Responses were mixed, participants expressed both positive and negative views. Some viewed the infectiousness of HIV from occupational exposure as too low and negligible. The effect of post-exposure prophylaxis was also underrated. Lack of resources for personal protection resulted in most staff not using self-protection materials. There were no written institutional protocols, nor guidelines to train staff on OHI. Within the field of OHI prevention, the beliefs and practice patterns of healthcare staff in this hospital in Malawi are often, but not always, in agreement with the scientific literature. The level of dissemination of information and material support that they receive from the hospital is inadequate.

Keywords: HIV, post-exposure prophylaxis, surgeons.

INTRODUCTION

Globally, 38 million people were living with the Human Immunodeficiency Virus (HIV) at the end of 2019 (World Health Organization [WHO], 2020). In Malawi the national prevalence of HIV in 2016 was 10.4% (National Statistical

Office [NSO] [Malawi], ICF Macro, 2017). A study in 2012 showed a statistically significant higher prevalence of HIV infection in patients presenting with surgical conditions, at 13% (Haac BE et al., 2013), in contrast to the 11% national HIV prevalence (National Statistical Office (NSO) and ICF Macro, 2011).

Literature shows a minimal but significant risk for health workers of contracting HIV through contact with body fluids of patients in the course of performing surgical

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procedures, also known as occupational HIV infection (OHI) (National Statistics Office [NSO], 2010; Haac BE et al., 2013). The risk of transmission is highly dependent on the viral load present in the fluid that one is exposed to; with a zero risk for exposure to fluids from an individual who is HIV infected but has undetectable viral copies in their blood (Domachowske & Suryadevara, 2020). A study in Malawi found that the majority of surgical patients (81%) have not tested for HIV infection (Haac et al, 2013). Since some of these patients may be HIV infected, it means that the surgical provider still remains at high risk of contracting HIV, should they be contaminated with blood and bodily fluids from these patients. In patients who are not on antiretroviral drugs or have not achieved adequate viral suppression, the risk of transmission from a single percutaneous needle stick or cut with a scalpel is about 0.3% (King & Strony, 2020) and 0.09% for mucous membrane exposure (Chibueze, Francesco, Saundra, Jay & Alexander, 2017). The risk becomes significant considering the cumulative risks of repeated pricks, amplified by longevity of service (Gumodoka, Favot, Berege, & Dolmans, 1997; Abadiga, Mosisa & Abate, 2020). Between 37% and 57% of surgical staff sustain at least one needle stick injury in a year (Regez, Kleipool, Speekenbrink, & Jos Frissen, 2005; Adams, Stojkovic & Leveson, 2010). A recent study from Ethiopia showed that of the nurses who sustained needlestick injuries in a year, more than half of them sustained the injuries between two and five times in the same year (Abadiga, Mosisa & Abate, 2020).

The World Health Organization recommends that surgical personnel take extra precaution when handling all patients in order to reduce OHI (Chan MF, Ho A, Day MC, 2008; Center for Disease Control and Prevention [CDC], 2014; Wyzgowski, Rosiek & Grzela, 2016). These precautions include taking a detailed medical history and physical examination before performing invasive procedures on surgical patients, use of double gloves whilst conducting surgical operations, wearing of appropriate surgical garb including footwear which bar contact with the patients' body fluids, following non-touch suturing techniques where they do not physically touch sharp objects during operations in order to avoid injury, and disposal of contaminated materials in appropriate biohazard bags or containers for discarding (Chan MF, Ho A, Day MC, 2008; Center for Disease Control and Prevention [CDC], 2014; Wyzgowski, Rosiek & Grzela, 2016). Unfortunately, due to resource limitations, hospitals in low income countries are unable to consistently provide the necessary materials, thereby putting the staff at increased risk of OHI (Gumodoka, Favot, Berege, & Dolmans, 1997).

In addition to lack of resources, human factors also play a role in increasing the risk of OHI including poor adherence to known proven safe practices, not knowing the HIV status of the patients undergoing surgical procedures (Haac et al., 2013), lack of familiarity with

locally available prevention guidelines (Chan, Ho, Day, 2008; Singh G et al., Aisien & Shobowale, 2015; Wu Q et al., 2015; Abadiga, Mosisa & Abate, 2020), and job related stress (Abadiga, Mosisa & Abate, 2020), that results in reduces compliance in OHI prevention guidelines (Wu Q,2015). A study conducted with nurses in China, reported a high incidence of injuries but the victims did not report for post exposure prophylaxis (PEP) advice, because of lack of awareness of the PEP program in the institutions, and reluctance to test for HIV (Van Oosterhout et al. 2007; Singh G et al., 2015).

According to our knowledge, these factors have not been fully studied in Africa. We conducted this study in order to explore the attitudes and practices of surgical staff towards prevention of OHI. According to our knowledge, this is the first study in Malawi to explore this topic.

MATERIALS AND METHODS

This was a mixed methods, cross-sectional qualitative study, conducted at the Queen Elizabeth Central Hospital (QECH), the largest tertiary hospital in Malawi. The study was conducted between 2013 and 2014, in the departments of surgery, obstetrics and gynecology.

According to hospital records, annually, about 20,000 surgical operations (both minor and major) are performed in these departments annually. The study participants were identified by purposive sampling of health workers in the respective departments, and these included junior doctors, doctor trainees in surgical specialties, surgeons, nurses and clinical officers. Using Tongco's principle, that at least five informants are needed for the data to be reliable (Tongco, 2007), we planned to interview five key informants from each of the above cadres. All participants provided a written informed consent. Self-administered semi-structured questionnaires were used to collect data on knowledge, approach and attitudes of surgical staff on accidental contact with patients' body fluids, and post exposure prophylaxis. Information on the participants' sources of knowledge and whether additional training at the place of work was deemed necessary was also collected. The questionnaires were pretested before using them in the study. After the participants completed the questionnaires, the research team reviewed the responses and then sought clarifications wherever necessary.

In addition to the questionnaire, we conducted blinded observations of the surgical staff whilst working in the operating theatre. The research team went into the operating theatre on 3 different days where they observed some of the participants and other staff carrying out their surgical duties. The departmental staff was made aware that they would be observed and they agreed but were not aware on the timing of the sessions to be observed. Being a teaching hospital where students join theatre sessions all the time, the presence of the

study team was not a strange thing and most likely did not alert the operating theatre staff that they were being observed.

We observed how surgical staff were managing sharps, if PPE was used appropriately (double gloving, use of goggles for the eyes, face masks, closed shoes/boots) and if there were any posters in the OT on guidelines to follow if one got exposed to body fluids. Finally we assessed the department's environment as regards to available supplies and materials (including educational materials) on safe practices on OHI prevention.

We analyzed data by summarization and categorization of related data. Coding was done manually. We identified patterns and themes and linked them from the collected data.

Ethical Consideration: Our study protocol was reviewed and approved by the College of Medicine Research Ethics Committee (COMREC) as students' research (Reference MBBS/10/14/05). Written informed consent was sought from the participants in the questionnaire component of the study and approval by the head of department and the OT nurse in-charge was obtained to conduct the observations.

RESULTS

We recruited 25 participants for the study; two did not return the questionnaires and one of the participants did not meet the study criteria. In total we analyzed responses from 22 participants. Fifteen participants (65.2%) were males, and age ranged from 22 to 60 with a mean age of 29. Only 2 of the participants (9%) had work experience in the OT spanning over 10 years. The questionnaire was open ended and participants gave their answers in writing. Their responses are mostly verbatim and are presented in Table 1. We classified the responses into 2 or 3 groups, according to whether we found them to be positive (knowledge, attitudes and practices), negative and in some cases, undecided. We present the findings also in themes, according to the areas of our inquiry (Table 1).

Theme 1: Perception of Risk of HIV Infection in Their Line of Work

On views of risk perception, 81.8% of the study population perceived that they were at a great risk of acquiring the HIV infection as they performed their surgical duties (Table 1). They attributed the increased risk to the well published high prevalence of the infection in our setting, unavailability of resources, a high percentage of surgical patients with unknown HIV status, and the nature of their work in surgery where accidental contact with the patient's body fluids is not uncommon. This perception was expressed more by the surgeons followed by trainee surgeons. One participant (4.5%) perceived the risk of contracting HIV as low and

attributed this to known literature which states that the proven risk of being infected through needle pricks is very small, much less than 0.1%, but also that the nature of the procedures they performed were minimally invasive (Table 1). Another small group of participants (13.6%) were undecided and quoting their words *"we cannot be sure of the risks because we do not have a routinely available reliable test to determine the infectivity of the patients we handle"*.

Theme 2: Perceptions on effectiveness of PEP as a Way of reducing Occupational HIV Infection after Invasive Accidents and the willingness of staff to use PEP in case of accidental contact with infected body fluids

On the use of PEP, most of the participants, (65.6 %), thought that PEP was effective and they were prepared to take it in the event of accidental exposure to HIV-contaminated fluids. They cited good experience from their peers who had been on PEP before, but they also said that they would take it for emotional assurance and also that PEP was the only sure way of avoiding infection once they have been exposed to body fluids from HIV infected patients. Participants who considered themselves at a greater risk of HIV infection in theme 1 above, were more likely to have the view that PEP is effective and were more willing to take it (Table 1). A small proportion (4.5%) believed that PEP is effective but they were not prepared to take it. Reasons included social stigma once people knew that they were taking antiretroviral drugs, but also unbearable side effects. Yet another 4.5% of the participants thought that PEP was not effective but they were prepared to take it because it was the only method available once one was exposed to fluids from HIV infected patients, whilst another 4.5% thought that PEP was ineffective and were not prepared to take it due to several reasons. The indicated that the side effects were disproportionately higher than the level of risk of infection after exposure, PEP promotes resistance of the virus to ART later in life, and they had proof from other studies that PEP does not prevent sero-conversion. Four other participants (21%) were unsure about the effectiveness of PEP and they thought that its level of protection corresponded to the type of exposure.

Theme 3: Perceptions on Training of Staff at the Institution As a Way of Occupational HIV Infection Prevention

On staff training, 90.9 % of the participants felt that local training of staff in the hospital on prevention of occupational HIV infection was necessary to serve as an update or a reminder on safe practices in HIV prevention in the surgical setting. The remaining 9.1% felt this was not necessary as the staff already covers the topic during their professional training, and also through mentorship

Table 1. Results table showing themes which were explored during the study and the respective perceptions and practices of the study participants.

Theme 1: Perception of Risk of HIV Infection in Their Line of Work

High Risk Perception (82%)

- We are working in a high HIV prevalence setting
- Most patients are acutely ill and their HIV status is unknown
- Scarcity of resources to implement safe practices
- Nature of our work puts us at high risk, we are prone to pricks and splash accidents

Very low risk perception (4.5%)

- The risk of getting HIV infection from a patient through needle prick injuries is very low “ The risk is 0.001”

Undecided on their risks (13.5%)

- No good routine tests on patients for us to know the rate of their risk to infect us

Theme 2: Perceptions on effectiveness of PEP as a Way of reducing Occupational HIV Infection After Invasive Accidents and the willingness of staff to use PEP in case of accidental contact with infected body fluids

Positive perception of PEP: effective and willing to use after an accident (65.5%)

- Good results from other people who took it.
- Only chance of preventing infection after exposure
- Gives hope emotionally after they have had an accident

Negative perceptions of PEP (13.5%)

Effective but not willing to use after an accident

- Unbearable side effects
- Social stigma when people know that they are taking antiretroviral drugs

Not effective but willing to use after an accident

- Only chance of preventing infection after exposure

Not effective and not willing to use after an accident

- Does not prevent sero-conversion.
- Can lead to mutation of the Virus which will in turn complicate the current treatment.
- Exposure dependent
- Unbearable side effects which do not match with the level of exposure which is low(e.g. in needle pricks)

Unsure about the effectiveness (21%)

- Depends on the type of exposure
- Still tested HIV negative, even after not finishing the course due to SE

Theme 3: Perceptions on Training of Staff at the Institution As a Way of Occupational HIV Infection Prevention

Positive perceptions: local training is necessary (91%)

- It should be part of orientation of new staff in the department
- It should be included in the objectives of health workers learning institutions.
- High HIV prevalence setting.
- To save as an update or reminder on the knowledge they already have on prevention of occupational

Negative perceptions: local training not necessary (9%)

- They already have the training during medical training
- No need for formal courses, discussions among seniors and juniors during their work would be enough

Theme 4: Views on HIV Testing in Preoperative Patients

Positive views: it is necessary (73%)

- Makes staff more cautious and adhere to infection prevention guidelines when patients are reactive
- Reduce time needed to test the patient's blood when accidents occur
- Gives comfort to staff when they know patient is non-reactive

Negative views: it is not necessary (27%)

- Treat every patient as HIV positive
- Infringement on patients human rights
- Accidents will still happen even if staff know the HIV status of their patients
- Stigmatization of patients if the status comes out positive

Theme 5: Knowledge on safe techniques to prevent occupational HIV infection

- Use of personal protective clothing (barrier gowns, gloves)
- Aseptic technique
- Correct handling of needles with scalpels (no re-sheathing of needles, throwing needles in sharp boxes)
- Use of double gloves

Theme 6: Practices

Safe Practices Observed

- Use of personal protective clothing (barrier gowns, gloves)
- Aseptic technique
- Correct handling of needles with scalpels (no re-sheathing of needles, throwing needles in sharp boxes)

Unsafe Practices Observed

- Use of protective goggles only observed in the operating surgeon and not the staff assisting in the operation
- In minor surgeries no goggles were used
- Old and torn posters on walls on infection prevention measures

and discussion among junior and senior staff in the departments.

Theme 4: Views on HIV Testing in Preoperative Patients

Concerning mandatory preoperative HIV testing of patients, 72.7% of the participants felt that this was necessary since practitioners would be better informed and follow safe practices more strictly when they know they are handling an HIV positive patient. They also noted that knowing the patient's HIV status before the surgery, simplifies processes once there is accidental exposure to the patient's body fluids (Table 1). On the other hand, 27.3% of the participants were of the opinion that mandatory preoperative testing was not necessary citing that safe practices are unconditional and should be adhered to whether the patient is HIV positive or not. They were also concerned that patients found to be HIV positive could be stigmatized by hospital staff.

Theme 5: Knowledge on safe techniques to prevent occupational HIV infection

All participants knew the safe practices to prevent accidental occupational exposure as listed in Table 1.

Theme 6: Practices

On the 3 days the research team made observations in the operating theatres, a total of 3 operating teams were observed: one in obstetrics and gynecology and the other 2 sessions in the surgery department. Each operating

team had at least 5 staff; the main surgeon, assistant surgeon scrub nurse, circulating nurse and a theatre assistant. Two different procedures were performed by each operating team and the teams were different for each session (day of operating). In total, at least 15 staff were observed, each being observed on 2 different surgical operations.

Our observations showed that most safe practices were observed by most of the staff and that where safe practices were omitted, it was more due to lack of resources than poor attitudes (Table 1). We did not find any information on prevention or on what to do in case of a needle stick injury, displayed in the OR notice boards.

DISCUSSION

Our results show mainly positive knowledge and attitudes to safe practices in prevention of OHI in surgical practice both before and after accidental exposure to HIV contaminated body fluids. The positive views and attitudes were influenced by the length of clinical practice and educational background. There were however some divergent negative views which cannot be ignored.

Positive attributes included appreciation of the high risk of infection based on high HIV prevalence in Malawi, willingness to take PEP, support for institutional orientation program on local practices on OHI, among others. The risk of infection through needle stick injury is real. Although data reveal that the risk of transmission from a single percutaneous needle stick or cut with a scalpel from an HIV infected individual (not on treatment or without viral load suppression) is about 0.3% ,other factors make the risk more significant. These include

longevity of service which increases the cumulative risk of OHI from repeated needle pricks, exposure to a high quantity of blood, being struck with a large bore needle, and exposure to blood of patients with high viral titers or from those patients who have just seroconverted at the time of the needle stick injury (King, Strony 2020). There was an underestimation of risk in our study, unlike the study reported by Aisien et al., where the risk of OHI was over-estimated (Aisien & Shobowale, 2015). Underestimation of risk reduces the likelihood of using PEP and staff is unlikely to use personal protective equipment effectively, as reported from China where health workers did not practice universal precaution due to their perceived low prevalence of HIV (Wu Q et al, 2015).

Knowledge on PEP demonstrated by the health workers we studied in a similar study from Nigeria (Ajibola, Akinbami, Elikwu, Odesanya & Uche, 2014) where participants had different views on the effectiveness of PEP, and this significantly influenced their decision on whether they could take PEP or not. PEP is aimed at inhibiting the replication of the initial inoculum of virus preventing establishment of chronic HIV infection (Young, Arens, Kennedy, Laurie, & Rutherford, 2007). The use of PEP has been documented to reduce the rate of HIV infection from workplace exposures by 81% (Mabwe, Kessy & Semali, 2017). Most participants argued that unbearable side effects which they observed in fellow staff on PEP, discouraged them from taking PEP. At the time of this study, the PEP regimen in Malawi was given within 72 hours of exposure and consisted a two drug combination of Zidovudine and Lamivudine taken for 28 days and has since been changed to a PEP regimen with a shorter course and more tolerable side effects, and this has since been effected.

We found that in our hospital there was no training offered to staff on OHI. Some participants were comfortable with this situation and argued that local training would be a redundancy since they were expected to know the infection prevention guidelines from their professional training. Other researchers have emphasized the importance of training staff on local protocols, especially to newly recruited staff (Scheckler et al., 1998). The Society for Healthcare Epidemiology in America emphasizes ongoing education to ensure health care workers are aware of new scientific innovations in infection control (Scheckler et al, 1998). Updating knowledge is necessary as experience shows that attitudes and practices are influenced by the level of knowledge, and that low levels of knowledge are associated with poor practices (Aisien & Shobowale, 2005; Janjua, Razaq, Chandir, Rozi & Mahmood, 2007; Abadiga, Mosisa & Abate, 2020; Kwanzaa, Clarke, Ramlal, Singh & Ocho, 2020). Additionally, we feel that local institutional training will act as a reminder to staff that the institution takes OHI prevention seriously.

The participants expressed confidence in testing patients for HIV when they are being admitted for surgical procedures. HIV negative results on the spot may be misleading as the patients may be in the window period, when they test negative although they actually have (recently acquired) HIV infection. In such a case, if the negative test in the patient results in relaxation of staff in adhering to protective measures of OHI, the risk of being infected will increase. Although hospital testing may have a role in surgical care, like reducing delays in initiation of PEP in the case of OHI, universal precautions need to be applied irrespective of a negative HIV test result in the patient. In our study, adherence to universal precautions was observed among the staff. However, use of protective eye wear was observed only in the surgeon performing the operation and not the other medical staff helping with the procedure. Like other studies, this was observed to be due to inadequate resources since most of the participants had mentioned during the interviews that they were aware of the importance of personal protective materials but these were not available for them to use (Chan, Ho Day, 2008; Sheng et al., 2008; Wu et al., 2016). In China, protective materials were available but staff did not use them based on the belief that the prevalence of HIV in their setting was too low for them to get contaminated whilst conducting their work (Sheng et al., 2008).

CONCLUSION

Within the field of OHI prevention, the beliefs and practice patterns of healthcare staff in an urban tertiary hospital in Malawi are often, but not always, in agreement with the scientific literature. The level of dissemination of information and material support that they receive from the hospital is inadequate. Institutionalization of the concept through training and provision of personal protective equipment will make the work environment safer for staff.

ACKNOWLEDGEMENTS

The College of Medicine, University of Malawi funded the conduct of this study and this publication is funded by Else Kröner Fresenius Foundation (Germany): to both we are very grateful. We would also like to thank Dr Linda-Kalilani-Phiri for sharing insight into our manuscript.

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