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Factors Influencing Adherence to HIV Post-Exposure Prophylaxis Among Healthcare Workers at AIC Kijabe Hospital

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ABSTRACT

Healthcare workers (HCWs) are at risk of HIV infection due to occupational exposure, making adherence to post-exposure prophylaxis (PEP) crucial in preventing HIV transmission. This study explored the barriers and benefits to PEP adherence among HCWs at AIC-Kijabe Hospital and identified mechanisms to improve adherence. It was a phenomenological qualitative research design that used semi-structured interviews to collect data from a purposive sample of 35 HCWs. The study was conducted in AIC-Kijabe Hospital. Data were collected through face-to-face interviews with HCWs who reported exposure to HIV and were initiated on PEP. Key informant interviews were also conducted, those of whom were Chronic Care Clinic (CCC) team members. The guide used was pilot-tested at AIC-Kijabe Naivasha Medical Centre to enhance its reliability and validity. The interviews were audio-recorded, with the consent of the participants. Deductive thematic analysis was employed to analyze the interview data. The transcribed interview was coded and categorized into themes and sub-themes. NVivo data analysis software was used to facilitate the organization and analysis process. Several barriers to PEP adherence were identified and they were based on Personal/ Individual drug-related, organizational, and interpersonal factors. Personal factors included forgetfulness, acceptance of stigma, and low-risk perception. Drug/Medicine-related were fear of side effects, and logistical challenges e.g. pill too big to swallow. Organizational/Institutional factors included process inefficiencies and institutional Stigma. Interpersonal factors like lack of social support. The perceived benefits noted by the participants included a reduction of the risk of HIV transmission to HCWs, their spouses, and patients**.** It also gave them peace of mind. Adherence to PEP was also viewed as an ethical duty and obligation. The findings underscore the importance of addressing multi-level barriers to PEP adherence among HCWs. Interventions should include educational programs to reduce stigma and improve risk perception, organizational reforms to streamline PEP access, and provision of psychological and social support for HCWs.

Keywords – *Full adherence, Health care workers and post-exposure prophylaxis*

INTRODUCTION

Human immunodeficiency virus (HIV) remains a major health challenge globally, costing the lives of approximately 39 million people worldwide(Mponela et al., 2015). Kenya is one of the most affected countries with a national prevalence rate of 4.9% which is far higher than the 0.8% global average. (Bukenya et al., 2019; *UNAIDS Global AIDS Update 2022*, n.d.). This concerning statistic emphasizes how urgent it is to address HIV-related health risks, especially among healthcare workers (HCWS) who are on the front lines of patient care.

Globally, healthcare workers face substantial occupational hazards, with an estimated 56.2% experiencing needle-stick or sharp injuries during their career: one of the primary routes for HIV exposure (Mengistu et al., 2021). In Africa, the rates of occupational exposure are equally concerning, with 58.2% of nurses, 30.8% of laboratory workers, and 23.3% of other health professionals reporting incidents(Tekalign et al., 2022).In Kenya, studies revealed that 23% to 30% of healthcare workers sustain needle-stick injuries annually (Tsega et al., 2023a,Occupational Exposure Report, 2016). Each year, this leads to approximately 3 million healthcare workers globally being unintentionally exposed to HIV, resulting in 170,000 new infections (Mill et al., 2019; Mponela et al., 2015).

To combat these occupational risks, HCWs must follow strict preventive measures and adhere to post-exposure prophylaxis (PEP) if exposed. PEP, when initiated promptly and adhered to fully, can reduce the risk of HIV transmission by over 81%(Anteneh et al., 2019; Bukenya et al., 2019). Unfortunately, adherence to PEP remains suboptimal, with global adherence to PEP among HCWs remains low, with only 56.6% fully completing the regimen (Ford et al., 2014).Variability in adherence rates is evident across different settings; for instance, a study in Gujarat, India, reported over 94% completion rate of the PEP regimen(Kumar et al., 2021) other studies from Kenya, Ghana, Tanzania, and Ethiopia reported low adherence rates of 26 %, 17.9%, 38%, and 19.1% respectively (Kimaro et al., 2018; Osoo et al., 2023; Suglo et al., 2021; Tsega et al., 2023).

Understanding the factors affecting PEP adherence is crucial to reducing occupational HIV transmission and safeguarding HCWs. Despite widespread interventions, the adherence rate remains low, emphasizing the need for locally tailored strategies. This study aims to explore the barriers, benefits, and potential mechanisms to improve PEP adherence among HCWs at AIC Kijabe Hospital.

METHODOLOGY

Study Location

The study was conducted at AIC-Kijabe Hospital in Kiambu County, Kenya, a teaching and referral mission with approximately 930 employees (Chao et al., 2015; *Kijabe Hospital Website Kenya*, n.d.).It offers postgraduate training and various health science programs, serving inpatient and outpatient needs. The Chronic Care Clinic (CCC) provides PEP services. Previous findings indicating low adherence to HIV PEP among healthcare personnel influenced the selection of this hospital (Osoo et al., 2023)

Study Design

It was a phenomenological qualitative research design (Anderson et al., 2023). This approach allows for a nuanced understanding of participants' experiences. A semi-structured interview guide with open-ended questions was developed and pilot-tested for reliability and validity. In-depth interviews facilitated detailed discussions about participants' experiences.

Study Population

The study sample population was made up of healthcare workers at AIC Kijabe Hospital, who had reported occupational exposure and initiated PEP at the facility, including both clinical and non-clinical staff. Those involved were Consultant, medical officers, nurses, lab technicians, nutritionists, and support staff

Sample Size

Based on the idea of data saturation, the sample size was determined. As per other studies, data

saturation in qualitative research typically occurs after 11-17 interviews (Guest et al., 2020). Thirty-five participants were interviewed. Healthcare workers were recruited through the chronic care clinic team who contacted individuals from a database of those who reported PEP initiation. Oral consent was obtained, and purposive sampling ensured diversity in professional background and experience levels. Written consent was subsequently secured before interviews.

Data Collection Process

Interviews were conducted face-to-face in a private setting within the hospital, lasting 30-45 minutes, and were recorded with participants' consent. Interviews were conducted in English and Kiswahili, accommodating participants' language preferences. Transcription was performed using Otter translation software and Microsoft Office 365(Voorheis et al., 2023).

Data Management and Analysis

Deductive thematic analysis identified common themes in the data. Transcripts were coded, and codes were organized into broader themes(Onwuegbuzie et al., 2010; Onwuegbuzie & Combs, 2011). Regular supervisory meetings ensured the accuracy of findings. Dedoose and NVivo data analysis software facilitated data analysis. Data security was prioritized; digital files were password-protected, while hard copies were stored securely. Personal identifiers were removed, with participants assigned unique identification numbers for data management and reporting purposes.

Ethical Consideration

The researcher adhered to the ethical guidelines, protecting study participants' privacy, anonymity, and confidentiality. Written Informed consent was obtained from all participants before conducting interviews. Ethical approval was sought from the Kijabe Hospital Institutional Scientific and Ethical Review Committee and the National Commission for Science, Technology, and Innovation (NACOSTI). License No: NACOSTI/P/24/34728 and Approval No: KH/ISERC/02718/0010/2024. The principal investigator and the research assistant also signed the data-sharing agreement form from AIC-Kijabe Hospital.

RESULTS

Perceived Barriers to Post-Exposure Prophylaxis Adherence

In this study, healthcare workers (HCWs) at AIC Kijabe Hospital identified several barriers to adherence to HIV post-exposure prophylaxis (PEP). These barriers could be divided into four categories: personal/individual, drug/medicine-related, organizational/institutional-related, and other interpersonal factors.

Table 1: Perceived Barriers to HIV Post-Exposure Prophylaxis Adherence According to the Research Participants

Personal/Individual factors (Challenges)	i. Forgetfulness ii. Acceptance stigma. iii. HIV risk perception iv. Knowledge gap
Drug/ Medicine (PEP) Related Factors	i. Side effects ii. Logistical challenges e.g. pill size
Organization/Institutional related factors	i. Process in efficiency ii. PEP Accessibility difficulty iii. Work schedules iv. Institutional stigma
Other factors/Interpersonal	i. Lack of social support ii. Societal stigma

Personal/Individual Factors

It was difficult for healthcare workers to adhere to post-exposure prophylaxis protocol. Forgetfulness was a prevalent challenge mentioned by many healthcare professional since they found it difficult to remember to take the medication because of their hectic schedules. According to participant Ten "it is simple to forget the medication because of our busy schedules". The Stigma of acceptance was another element in that most of the HCWs were worried about their coworkers' opinions because of using PEP, they believed that their colleagues could interpret it as them being HIV positive. "Taking PEP feels like a label," said participant number sixteen. "I am afraid that if others see me taking PEP, they will think I have HIV, and dealing with that kind of criticism is difficult, even when it comes from a coworker, "as mentioned by participant one.

Additionally, adherence was influenced by the perceptions of HIV risk; some healthcare workers underestimated the severity of their exposure, which resulted in inconsistent use of PEP. "I did not see the necessity to complete the entire PEP course because it was only a minor scratch," as per participant eleven.

Another factor which contributed to treatment hesitance was lack of information regarding PEP. Participants twenty-two said "I was unsure of the effectiveness and wondered if I would still contract HIV after realizing that the client from who I was exposed is HIV negative". Drug related issues like side effects also deterred many of the healthcare workers from completing the regimen, for example participant Nineteen said, "I know PEP is important, but the side effects are unbearable. I have struggled with nausea, abdominal upset, and headache, and that made me hesitant to complete the course". Another echoed this sentiment, stating "The medicine made me so sick; I felt worse than before. I couldn't even perform my duties, and I just stopped taking it a few days".

Adherence was also impacted by logistical issues like the size of pills made which made it difficult for some to adhere to the regimen. "The pills are so large, it is hard to swallow them, especially when you are already stressed. It is one of the reasons I found it difficult to stick to the regimen". As noted by Participant thirty-four.

Organization/Institutional-Related Factors

Healthcare workers adherence to post-exposure prophylaxis was highly influenced by organizational or institutional related factors. Accessing PEP was challenging due to process inefficiency at the chronic care clinic, including delays and unclear guidelines. "Getting the PEP meds during follow-up is frustrating. The delays at the clinic and not knowing exactly what to do next make it hard to keep up with the treatment" As noted by participant eighteen. Participant Three said "It takes so long to get the medication. You have to wait in line, fill out forms, and go through the same process every time, even after just seven days. It is frustrating and time-consuming. I feel like they could streamline the process more."

Adherence was further hindered by accessibility concerns, especially at night and on weekends. Participant One described the process "It took long to get the medicine at night. By the time it was ready, I had already decided it wasn't worth it" Another one added, "The process of getting PEP on one of the weekends I had forgotten to take the PEP medicine at home was as if I was searching for gold, I thought I would just go back to my house and get it, I would have taken a shorter time".

Irregular and demanding work hours complicated adherence to the medication timing. Participant number thirty-three noted "It is hard to keep up with the medication when you are working long shifts. Sometimes you are so busy that you forget to make it to the right time, or you are too exhausted to even think about it. The irregular hours make it difficult to follow the strict schedules PEP requires.

Another obstacle was institutional stigma, as healthcare professionals voiced worries about fear of judgment and concerns over confidentiality. Participant Twenty-eight said, "There is a fear that if you are seen taking PEP,

your colleagues will start gossiping or assume the worst. Plus, I worry that my information won't stay confidential, and that makes me hesitant to go through with the treatment". Another added, "I wasn't sure if my information would remain private. I was scared that my colleagues or my supervisor would think I had done something wrong like I wasn't careful enough".

Other Factors/Interpersonal Challenges

PEP non-compliances were also fueled by other interpersonal challenges like lack of social support and societal stigma. The absence of encouragement from family and colleagues led to feelings of isolation in adhering to treatment. Participant number twenty-seven said, "Once I started the treatment, there was no one checking up on me to see how I was doing, I felt like I was on my own".

Societal stigma like fear of societal judgment regarding their HIV status contributed to a reluctance to take PEP. Participant twenty-five said, "I was scared people would think I have HIV, just because I was taking PEP. The stigma is real, and I did not want anyone to know. I felt like if people found out, they would judge me, and that made me hesitant to continue with the medication."

Perceived Benefits of Adherence

This section explores the perceived benefits of adherence to HIV post-exposure prophylaxis (PEP) among HCWS AT AIC-Kijabe Hospital. The findings highlight various personal and professional advantages associated with PEP adherence, categorized into the following themes: reducing the risk of HIV transmission, peace of mind, sense of responsibility, ethical obligation, and professional responsibility.

Table 2: Perceived Benefits of PEP According to the research participants.

Reduces the risk of HIV Transmission	i. To themselves ii. To their spouse iii. To their patients
Peace of mind	i. Mental and emotional well-being
Sense of Responsibility	i. Towards their health ii. Towards the health of their spouse iii. Towards the health of their patients
Ethical obligation and professional responsibility	i. Ethical obligation ii. Professional Responsibility iii. Promoting the culture of safety.

Reduced The Risk of HIV Transmission.

Healthcare workers reported several reasons that made them adhere to HIV post-exposure prophylaxis, reducing the risk of HIV transmission was the main one. They emphasized that adherence significantly reduces their risk of contracting HIV after occupational exposure, motivating them to follow the regimen strictly. One of the participants said, "Knowing that PEP can protect me from getting HIV after an exposure is what keeps me strict with the regimen. I cannot take any chances with my health". Another participant echoed this sentiment, saying, "I wasn't going to take any chances. PEP is protective to me, so I made sure to take it seriously".

In addition to safeguarding themselves, HCWs also recognize the significance of protecting their spouses from possible exposure, especially in the aftermath of exposure. One of the HCWS said, "Taking PEP isn't just about protecting myself; it is about keeping my spouse safe too. I would not want to risk exposing them, so I make sure to stick to the treatment". Furthermore, participants emphasized their responsibility to safeguard patients, pointing out that maintaining HIV-negative status reduces the risk of transmission to those in their care. "I owe it to

my patients to stay healthy and avoid any risk of transmitting HIV. Adhering to PEP is part of my responsibility to ensure their safety" as per one of the participants ten.

Adherence to post-exposure prophylaxis alleviates anxiety and stress related to potential HIV infection, allowing HCWs to focus better on their work and personal lives. Participant Four said, "Taking PEP gives me peace of mind. Knowing I'm doing everything I can to prevent HIV helps me focus on my work without the constant worry of what might happen".

Many healthcare workers expressed a strong sense of responsibility towards their health, recognizing it as a foundation for effective caregiving. Participant thirty-three said "I knew I had to take care of myself first. If I do not say healthy, how can I take care of my patients? That is why I made sure to stick to the PEP regimen, no matter how hard it was. It is my responsibility to protect myself and others." Participant number twenty-five also said "I know I have to stay healthy, not just for myself, but for my patients and family. Taking PEP after exposure is my way of ensuring I remain strong enough to continue providing care for others. It is not just about me; it is about everyone who depends on me being there for them." The HCWs also reported that taking PEP was important for protecting their spouses. Participant Ten reported, "I was not just thinking about myself. I knew if I did not finish the PEP, I could put my spouse at risk too. That is what kept me going, I had to protect her as much as I was protecting myself." Similarly, adherence was thought to be a measure of ethical responsibility toward patients as stated by the participants. "I have a responsibility to my patients and my family to stay healthy. Following through with PEP was part of that responsibility". As noted by Participant Twelve. Participant Seventeen said "I feel like it is my responsibility to stay healthy for my patients. If I do not follow through with PEP after exposure, I am not just risking my health but also putting my patients at risk. I have to make sure I'm safe so I can continue caring for them without any fear."

To prevent injury to themselves or others, participants emphasized the ethical duty to adhere to PEP guidelines based on non-maleficence and beneficence. Participant Fourteen said, "It is not just about me; It is about doing the right thing for everyone, involved. By taking PEP, I am making sure I do not harm myself, my family, or my patients. It is a duty I have to uphold". Other healthcare also reported that adherence to PEP was an essential professional duty. Participant Twenty-nine noted "As a healthcare worker, I have to protect myself and my patients. Adhering to PEP is part of my professional responsibility. It is not just about following protocol, but ensuring that I remain fit to continue my work and protect others from any risks.". "By taking PEP seriously, I am showing my colleagues that safety comes first. It is about setting a standard so that everyone knows we need to protect ourselves and each other". As noted by participant twenty-three.

DISCUSSION

This study identified several barriers and benefits to PEP adherence, including personal factors, drug-related factors, and institutional challenges. The benefits included protection of HIV seroconversion, Peace of mind, ethical obligation, and responsibility. The findings resonate with and, in some cases, differ from those other studies conducted in various settings.

Forgetfulness and acceptance stigma were significant barriers reported by the participants. These findings align with those of Warren et al., (2018), who found that stigma and low-risk perceptions were significant barriers to PEP adherence among healthcare professionals. Similarly, Agaba et al., (2023) identified personal factors such as fear of stigma and forgetfulness as a common challenge in Nigerian Healthcare workers on PEP regimens. However, a contrary finding was reported by Muzoora et al., (2022) in Uganda, showed that healthcare workers demonstrated a high level of awareness and motivation for PEP medication adherence, despite the presence of stigma. A study in Ghana by Suglo et al., (2021) found that fear of HIV infection motivated healthcare professionals to adhere strictly to PEP, contrary to this study

that found that some of the participants were not compliant despite having a fear of HIV.

The side effects of PEP such as nausea, abdominal upset, and fatigue were prominent barriers. These findings were similar to those by Tetteh et al., (2015)non-adherence to treatment has been closely linked to the occurrence of adverse events in HIV patients and this ultimately influences treatment success but the influence of adverse events on adherence during PEP is less well studied.\n\nMethods\nFollowing the introduction of a HIV post-exposure prophylaxis program in the Korle-Bu Teaching Hospital in January 2005, the incidence of adverse events and adherence were documented in occupationally-exposed healthcare workers (HCWs at Korle Teaching Hospital in Ghana. A study at St Peter's Hospital Addis Ababa, Ethiopia by Tsega et al., (2023)such as human immunodeficiency virus (HIV also found similar findings. Even though side effects were reported widely, a study by Vardhini et al., (2020) in South India indicated logistical issues were more significant barriers than the side effects. Ameta-analysis by McCoy et al., (2015) found that while side effects were common, proper Counseling and management of side effects significantly improved adherence rate, despite the side effects, the patients should be told about expected side effects in advance.

Institutional challenges, such as inefficiencies and accessibility, were also highlighted in this study. These findings are consistent with the result from a meta-analysis by Benn et al., 2019; Buh et al., (2023) that showed that lack of availability and low process in the facility hinders adherence to PEP. This was also the same in the study in Southern Africa by Makhado et al., (2022). However, a study by Suglo et al., (2021) in Ghana found a contrary result, which found a stronger institutional support.

This study found that social support played a critical role in adherence. Participants who received support from family, spouse, and peers reported better adherence, in that those social networks consistently urged them to follow through and reminded them to take their PEP medicine. This finding is consistent with multiple studies, such as a study by Buh et al., 2023; Muzoora et al., 2022; Tetteh et al., (2015)with sub-Saharan Africa (SSA , all who highlighted the importance of social networking in fostering commitment to the PEP regimen. Vardhini et al., (2020) in South India reported that strong peer networks helped maintain a high adherence rate.

Healthcare workers at AIC Kijabe Hospital recognized various benefits of adhering to PEP. The participants emphasized the protective benefits of PEP for themselves and others, echoing findings from studies like a study by Mill et al.,(2019), which reported that HCWs who adhered to PEP were primarily motivated by the desire to prevent HIV transmission to themselves and others. Similarly a study by Aychew Legesse & Abate Reta, (2019)it intensifies the risk of the emerging drug resistant HIV strains. This study aimed to assess the level of ART adherence and to identify its predictive associated factors among people living with HIV/AIDS in Hara Town and its surroundings, North-Eastern Ethiopia.METHODS: An institutional facility based cross-sectional study was conducted from April-May 2017. A total of 454 individuals were on ART follow-up in the selected ART-clinic, and only 418 patients were recruited. Bivariate and multivariate logistic regression analyses were carried out to identify associated factors. Odds ratio and 95% Confidence Interval (CI in Ethiopia found that the primary motivator for PEP adherence was the protection it offered against HIV infection.

The mental and emotional well-being derived from PEP adherence, as well as a sense of responsibility towards one's health and others, were significant findings. The same findings were also found in a study by (Agaba et al., 2023) in Nigeria, where healthcare professionals reported that adherence to PEP provided peace of mind and reinforced their professional commitment to patients' safety. Wong et al., (2019) in Singapore also had similar findings, HCWs cited relief from anxiety as a significant outcome of PEP adherence. A strong sense of responsibility towards one's health and others

was evident among participants in this study, which resonates with the findings from Vardhini et al., (2020) in South India, which highlighted that healthcare professionals felt a strong moral and ethical responsibility to adhere to PEP, which was driven by the desire to protect themselves and their patients. Similar findings were also noted from a study by Makhado et al., (2022) in southern Africa.

Adherence to PEP as an ethical and professional Responsibility was another key benefit identified in this study. This aligns with the findings ofBukenya et al., 2019; Muzoora et al., (2022) , who reported that HCWs in Uganda felt a profound ethical obligation to adhere to PEP, viewing it as an essential part of their professional duty. The study by Tsega et al., (2023)such as human immunodeficiency virus (HIV Ethiopia also emphasized the role of professional responsibility in motivating PEP adherence, with participants citing a commitment to patient safety as a driving factor.

CONCLUSIONS

Based on the findings, the following conclusions are drawn:

i. Barriers to PEP adherence remain a significant challenge among healthcare workers at AIC Kijabe Hospital, with stigma, side effects, and institutional inefficiencies being the most prominent

ii. PEP adherence is perceived to offer considerable benefits, particularly in reducing the risk of HIV transmission and promoting mental well-being and professional responsibility.

iii. Enhancing PEP adherence will require a multifaceted approach, involving improvements in accessibility, education, psychosocial support, process efficiency, and regular follow-up

RECOMMENDATIONS

Based on the study's findings on barriers and facilitators of PEP adherence, the recommendations focus on actionable strategies to address identified challenges and enhance adherence. These included.

i. Barriers to PEP adherence should be reduced by healthcare workers participating in continuous medical education utilizing digital tools like mobile reminders and seeking psychosocial support to manage emotional challenges related to PEP.

ii. PEP adherence should be encouraged among AIC Kijabe healthcare workers because it offers considerable benefits, particularly in reducing the risk of HIV transmission and promoting mental well-being and professional responsibility.

iii. A multifaceted approach, involving improvements in accessibility, education, psychosocial support, process efficiency, and regular follow-up should be put into place.

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Competing interests

The authors declare no competing interest.

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