

**KNOWLEDGE AND ATTITUDE TOWARDS HIV
POST EXPOSURE PROPHYLAXIS (PEP) AMONG
HEALTHCARE WORKERS IN HOSPITAL
PAKAR UNIVERSITI SAINS MALAYSIA**

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POST EXPOSURE PROPHYLAXIS (PEP)
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HOSPITAL PAKAR UNIVERSITI SAINS
MALAYSIA**

by

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**Dissertation submitted in partial fulfilment of the requirements
for the degree of
Bachelor in Nursing**

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.



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LIST OF ABBREVIATIONS

| | |
|-------|--|
| PEP | Post-exposure Prophylaxis |
| HIV | Human Immunodeficiency Virus |
| AIDS | Acquired Immunodeficiency Syndrome |
| MSM | Men Sex Men |
| HCWs | Healthcare workers |
| HPUSM | Hospital Pakar Universiti Sains Malaysia |

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PENGETAHUAN DAN SIKAP TERHADAP PROFILAKSIS PASCA-PENDEDAHAN HIV DALAM KALANGAN PETUGAS KESIHATAN DI HOSPITAL PAKAR UNIVERSITI SAINS MALAYSIA (HPUSM)

ABSTRAK

Kajian ini bertujuan untuk menilai tahap pengetahuan dan sikap terhadap profilaksis pasca pendedahan (PEP) HIV dalam kalangan pekerja penjagaan kesihatan (HCW) di Hospital Pakar Universiti Sains Malaysia (HPUSM). Memandangkan HCW berisiko terdedah kepada HIV secara pekerjaan, terutamanya melalui kecederaan akibat tercucuk jarum, pemahaman mereka mengenai kesedaran dan persepsi terhadap PEP adalah penting. Kajian keratan rentas ini melibatkan 167 peserta yang dipilih melalui persampelan rawak berstrata daripada tujuh wad pesakit dalam. Data dikumpulkan menggunakan soal selidik berstruktur dan dianalisis menggunakan statistik deskriptif, ujian korelasi Pearson, dan ujian Chi-kuasa dua. Hasil kajian menunjukkan bahawa walaupun 80.2% HCW mempunyai sikap yang positif terhadap PEP, hanya 44.9% menunjukkan tahap pengetahuan yang baik, manakala majoriti 55.1% tidak mempunyai pemahaman yang mencukupi. Walaupun 76.6% pernah mendengar tentang PEP, hanya 9.6% pernah menerima latihan formal, dan 71.3% tidak pernah melihat garis panduan PEP semasa. Terdapat korelasi positif yang sederhana dan signifikan antara pengetahuan dan sikap ($r^2 = 0.292$, $p = 0.001$). Selain itu, pengetahuan menunjukkan hubungan yang signifikan dengan faktor seperti tahap pendidikan, profesion, pendedahan kepada maklumat PEP, dan tahap kefahaman terhadap garis panduan. Namun, tiada ciri sosiodemografi yang menunjukkan hubungan signifikan dengan sikap. Dapatan ini menekankan keperluan untuk meningkatkan latihan, menyediakan protokol yang lebih jelas, dan menyokong secara institusi bagi mempertingkatkan pengetahuan dan kesiapsiagaan HCW terhadap PEP.

**KNOWLEDGE AND ATTITUDE TOWARDS HIV POST EXPOSURE
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ABSTRACT

This study aimed to assess the knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers (HCWs) at Hospital Pakar Universiti Sains Malaysia (HPUSM). As HCWs are at risk of occupational exposure to HIV, especially through needle-stick injuries, understanding their awareness and perception of PEP is crucial. A cross-sectional study was conducted involving 167 participants, selected through stratified random sampling from seven inpatient wards. Data were collected using a structured questionnaire and analysed using descriptive statistics, Pearson correlation, and Chi-square tests. The results showed that while 80.2% of HCWs had a favourable attitude towards PEP, only 44.9% demonstrated good knowledge, with the majority 55.1% lacking adequate understanding. Although 76.6% had heard of PEP, only 9.6% had received formal training, and 71.3% had not encountered current PEP guidelines. A significant moderate positive correlation was found between knowledge and attitude ($r^2 = 0.292$, $p = 0.001$). Additionally, knowledge was significantly associated with factors such as educational level, profession, exposure to PEP information, and familiarity with guidelines. However, no socio-demographic characteristics were significantly associated with attitude. The findings highlight the need for improved training, clearer protocols, and greater institutional support to enhance PEP knowledge and readiness among healthcare workers.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This research proposal aims to assess the level of knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in Hospital Pakar Universiti Sains Malaysia (HPUSM). This chapter will discuss the background of the study, followed by the problem statement, research questions and objectives, the hypothesis of the study, the significance of the study and lastly, the conceptual and operational key terms used in the study.

1.2 Background of Study

The human immunodeficiency virus (HIV) causes over 34 million deaths worldwide and remains a significant public health concern. In 2014, 1.2 million people died from HIV-related causes, 36.9 million were HIV positive, and nearly 2 million contracted the virus for the first time (Adal et al., 2023). Sub-Saharan Africa is reportedly the region most badly impacted, home to an estimated 28 million infected people, and even healthcare workers (HCWs) are affected and at risk (Adal et al., 2023).

In Malaysia, a cumulative total of 131,815 HIV cases have occurred since the beginning of the epidemic (Ministry of Health Malaysia, 2023). This figure includes 30,174 reported cases of AIDS and 62,226 deaths attributed to HIV/AIDS. An estimated 86,142 individuals are currently living with HIV in Malaysia, with approximately 69,589 of them aware of their status. In 2022 alone, 3,177 new HIV infections were reported, which translates to an incidence rate of 9.7 cases per 100,000 population. This marks a significant decline of 65.8% from 2002 when new infections

peaked at 6,978 (Ministry of Health Malaysia, 2023). Figure 1.1 shows the HIV and AIDS cases that has been reported from 1986 to 2022.

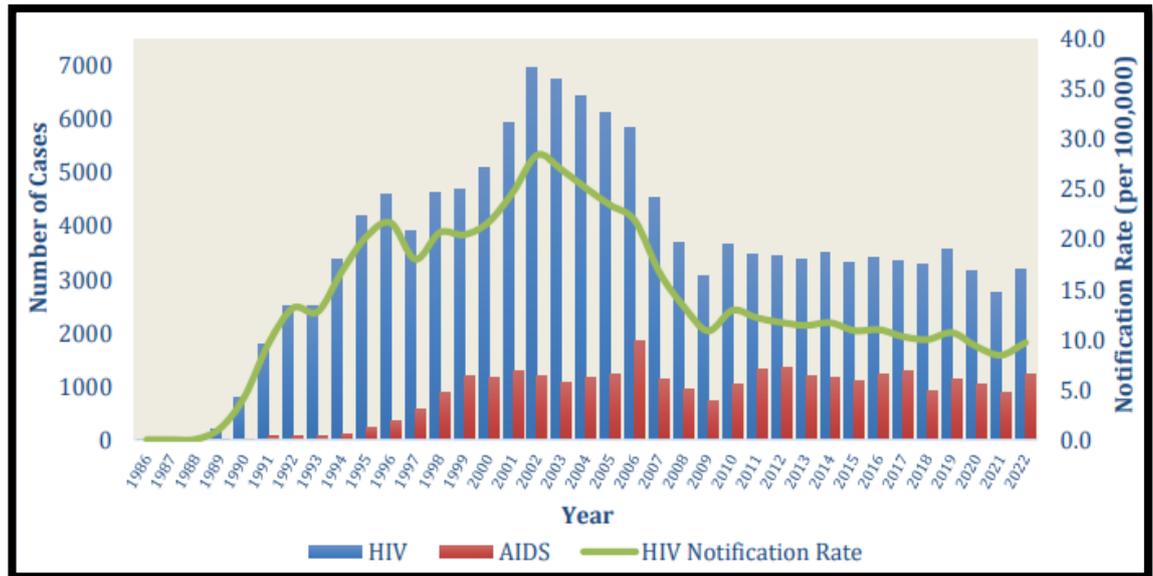


Figure 1.1 Reported HIV and AIDS, Malaysia 1986-2022 (Ministry of Health Malaysia, 2023)

Every day, thousands of healthcare workers (HCWs) worldwide are accidentally exposed to blood-borne pathogens. The World Health Organization (WHO)/International Labour Organization recommends using HIV post-exposure prophylaxis (PEP) to prevent HIV infection from workplace injuries (Sewunet et al., 2020).

Post-exposure prophylaxis (PEP) is a prophylactic treatment started immediately after exposure to a pathogen, such as a disease-causing virus in order to prevent infection and disease development (Erukeya Habib et al., 2018). Occupational exposure to blood and body fluids poses a significant risk of infection transmission among healthcare workers, including Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV), and Hepatitis C Virus (HCV). In 2005, the World Health

Organization (WHO) reported approximately 3 million percutaneous occupational exposures to bodily fluids in healthcare settings, with developing countries accounting for 90% of these cases. Since the early 1990s, antiretroviral medicines such as Tenofovir with emtricitabine and protease inhibitors, or Zidovudine with lamivudine and protease inhibitors as alternative regimens were recommended as standard PEP for occupational exposure to HIV (Anteneh et al., 2019). Table 1.1 shows the regimen category and drug regimen that have been used in PEP after the exposure to a pathogen.

Table 1.1 Regimen Category and Drug Regimen (Occupational Health Unit, 2007)

| Regimen Category | Drug Regimen |
|---|--|
| Basic Regimen: 2 NRTI | 1. Drug Regimen Zidovudine (AZT) 300mg bd and Lamivudine (3TC) 150mg bd or 2. or Combivir 1-tab bd |
| Expanded Regimen: 2 NRTI + Proteus Inhibitor | 1. Basic regimen plus Kaletra 3-tab bd for 28 days If Kaletra not available: 2. Basic regimen plus Indinavir 800mg 12 hourly with Ritonovir 100mg 12 hourly for 28 days or 3. Basic regimen plus Indinavir 800mg 8 hourly |

1.3 Problem Statement

HIV is no longer fatal in prompt-treated cases because it has turned into a chronic controllable illness. In a study by (Mansur, 2015), in developing and third-world countries, AIDS accounts for nearly 95% of cases. According to recent research, most African countries have high prevalence rates of HIV infection, which severely

limits their ability to progress (Adal et al., 2023). Health care workers in poor countries like Ethiopia are more exposed to HIV as a result of occupational exposure and are less likely to use PEP than those working in developed countries and well-equipped facilities (Sewunet et al., 2020). It makes Ethiopia is among the SSA countries with approximately 800,000 people living with HIV/AIDS along with their healthcare workers (Anteneh et al., 2019).

Lack of knowledge and attitude related to post-exposure prophylaxis (PEP) is one of the factors causing of occupational exposure towards HIV. Indeed, studies stated that there is an information gap in the healthcare setups regarding HIV PEP. A study conducted in an Indian medical college demonstrated that merely 37.6% had sufficient knowledge regarding HIV PEP and an even smaller number 20.7% had information about the right time of initiation of HIV PEP (Kishor, 2012). Furthermore, a Serbian study mentioned that 87% of HCWs had not been informed about the guidelines for HIV protection and reported that PEP protocols were not available at their workplaces (Anteneh et al., 2019). Even in a country like Serbia, which is considered an upper-middle-income country, there is insufficient knowledge regarding HIV/PEP.

Occupational injuries among HCWs represent a real challenge and it is considered as a significant public health concern related to exposure towards HIV. Assessing HCWs knowledge and attitudes of PEP can help identify their needs and next steps when exposed to HIV. HCWs lack of knowledge and attitudes towards PEP is unacceptable. With this, it is important for healthcare workers to have sufficient knowledge to protect themselves while they are in service-oriented clinical areas in healthcare institutions. This study is done to determine the level of knowledge and

attitude towards HIV PEP among HCWs in Hospital Pakar Universiti Sains Malaysia (HPUSM). This information is crucial for planning and implementing effective strategies to reduce the risk of occupational transmission among health workers, patients, and the community. Health workers' knowledge and attitudes toward PEP should be considered.

1.4 Research Questions

- 1) What is the level of knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM?
- 2) What is the level of attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM?
- 3) Is there a correlation between knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM?
- 4) Is there an association between socio-demographic characteristics with knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM?
- 5) Is there an association between socio-demographic characteristics with attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM?

1.5 Research Objectives

1.5.1 General Objective

To determine the level of knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

1.5.2 Specific Objectives

1. To identify level of knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.
2. To identify level of attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.
3. To examine the correlation between knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.
4. To examine the association between socio-demographic characteristics with knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.
5. To examine the association between socio-demographic characteristics with attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

1.6 Research Hypothesis

Null hypothesis (H_0):

There was no association between knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

There was no association between socio-demographic characteristics and knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

There was no association between socio-demographic characteristics and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

Alternative hypothesis (H_A):

There was an association between knowledge and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

There was an association between socio-demographic characteristics and knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

There was an association between socio-demographic characteristics and attitude towards HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM.

1.7 Significance of the Study

This study will address and determines the level of knowledge and attitude toward HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM. The significance of studying the knowledge and attitudes toward HIV post-exposure prophylaxis (PEP) among healthcare workers (HCWs) in HPUSM is rooted in ensuring the effective prevention of HIV transmission in healthcare settings. Current research shows that while many HCWs have heard of PEP, significant gaps remain in their understanding of when to initiate it and adherence to the treatment regimen. For instance, studies found that although a large percentage of HCWs are aware of PEP, a substantial number fail to complete the 28-day regimen due to fear of side effects or doubts about its efficacy (Mathewos et al., 2013). Improving knowledge and attitudes can enhance adherence to PEP protocols, ultimately reducing occupational exposure risks and protecting healthcare workers from HIV transmission.

Therefore, this study aids in providing a better understanding regarding HIV Post Exposure Prophylaxis (PEP) among healthcare workers, specifically at HPUSM,

as it helps to improve their attitudes toward the importance of HIV (PEP) after being exposed to bloodborne pathogens via needle stick injuries. Furthermore, the habit of reporting needle stick injuries was poor in the previous study (Anteneh et al., 2019) and needs efforts to improve. Most importantly, the effort will be through promoting the culture of reporting and by making the reporting process easy. In fact, reporting such injuries as early as possible will teach others not to commit the same problem again and generally. Hopefully, the information gathered from this study can be used to enhance their knowledge about HIV (PEP). On the other hand, this study's findings can be used as baseline data and a reference for future research.

1.8 Definitions of Operational Terms

Definitions for operational terms used in this research proposal are as shown below:

| Terms | Conceptual Definition | Operational Definition |
|------------------|---|--|
| Knowledge | Facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject (Oxford Dictionary, 2024). | This study refers to the understanding of HIV post-exposure prophylaxis (PEP) among healthcare workers in HPUSM which will be measured from the questionnaire (Adal et al., 2023). |
| Attitude | A feeling or opinion about something or someone, or a way of behaving that is cause | This study refers to the positive and negative opinions of healthcare workers HPUSM toward |

| | | |
|---|---|--|
| | by something (Cambridge Dictionary, 2024). | HIV post-exposure prophylaxis (PEP) which will be measured from the questionnaire (Adal et al., 2023). |
| Post-Exposure Prophylaxis (PEP) | Post-exposure prophylaxis (PEP) is any prophylactic treatment started immediately after exposure to a pathogen (Erukeya Habib et al., 2018). | This study refers to the ARV treatment that can be used to prevent HIV transmission as an occupational hazard. |
| Human immunodeficiency virus (HIV) | HIV/AIDS (Acquired Immuno Deficiency Syndrome) a disease that damages person's ability to fight against diseases, exposing the body to various normally innocuous infections and a few forms of cancers (Mansur, 2015). | This study refers to the a disease that can cause the transmission of the infection toward healthcare workers in HPUSM after occupational exposure, such as needle stick injuries. |
| Healthcare workers (HCWs) | Health care workers (HCWs) are persons working in a health care setting, and they are potentially exposed to infectious materials such as blood, tissue, specific body fluids, medical supplies, | This study refers to the healthcare workers in HPUSM, which consist of doctors, nurses, and healthcare assistants. |

equipment, or environmental surfaces contaminated with these substances (Mathewos et al., 2013).

| | | |
|----------------|--|--|
| Doctors | A person who has been trained in medical science, whose job is to treat people who are ill or injured (Oxford Dictionary, 2024). | This study refers to the doctors works in HPUSM and participate in this study. |
|----------------|--|--|

| | | |
|---------------|--|---|
| Nurses | A person whose job is to take care of sick or injured people, usually in a hospital (Oxford Dictionary, 2024). | This study refers to the nurses works in HPUSM and participate in this study. |
|---------------|--|---|

| | | |
|------------------------------|--|--|
| Healthcare assistants | A person whose provides personal care such as bathing, feeding and dressing and also performs support functions such as taking vital signs, making beds, transporting clients, assisting clients with activities of daily living (Teresa Webster, 2024). | This study refers to the healthcare assistants works in HPUSM and participate in this study. |
|------------------------------|--|--|

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provided a general review of the literature about knowledge and attitudes toward HIV PEP among healthcare workers. In addition, it also provided general information about the definition of HIV, post-exposure prophylaxis (PEP), and knowledge and attitudes toward HIV PEP. The details about the association between knowledge and attitudes toward HIV PEP among healthcare workers were also reviewed in this chapter. Finally, the chapter explained the conceptual framework of the Health Belief Model (HBM), which guided this study.

2.2 Human Immunodeficiency (HIV)

Human Immunodeficiency Virus (HIV) is a retrovirus that poses a significant threat to global health, primarily targeting the immune system and leading to acquired immunodeficiency syndrome (AIDS) if left untreated. Understanding the intricate details of this virus is crucial for developing effective prevention and treatment strategies.

At its core, HIV is an enveloped virus containing RNA as its genetic material. Upon entering the body, it attaches to CD4 receptors on T cells, facilitating its entry and subsequent replication within these cells. The virus integrates its RNA into the host cell's DNA, allowing it to hijack the host's cellular machinery to produce new viral particles (Maartens et al., 2014). This process is central to the virus's ability to evade the immune system and persist within the host-based Figure 2.1.

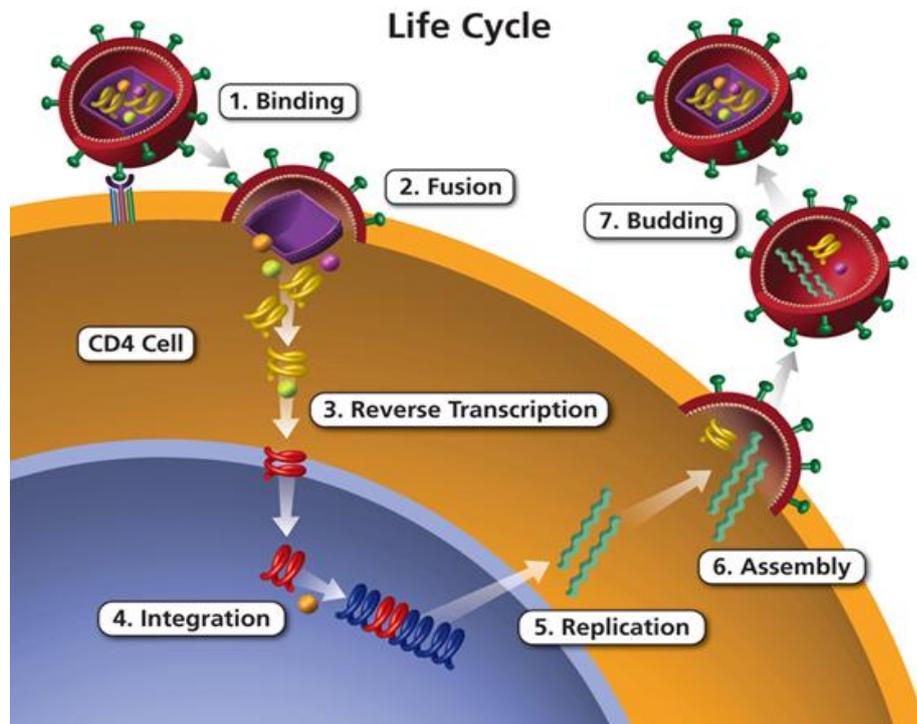


Figure 2.1 HIV Replication Process (Clinical Info, 2020)

Transmission of HIV occurs through specific bodily fluids, including blood, semen, vaginal fluids, rectal fluids, and breast milk. Common modes of transmission include unprotected sexual intercourse, sharing needles, and from mother to child during childbirth or breastfeeding (Patel et al., 2014). Figure 2.2 depicts the changes in HIV transmission in Malaysia as the heterosexual and men sex men (MSM) were set to increase from 2000 to 2022. Understanding these transmission routes is crucial for implementing targeted prevention strategies and reducing the spread of the virus.

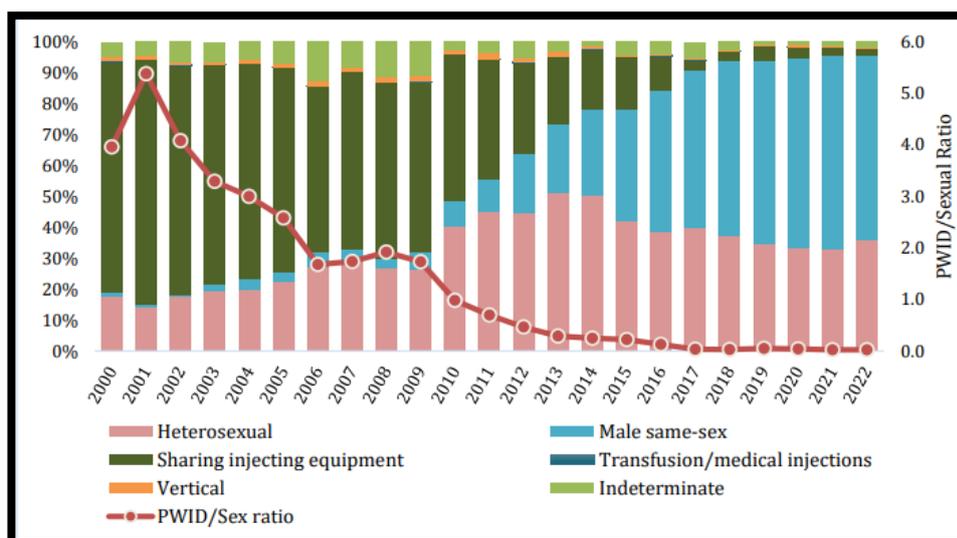


Figure 2.2 The changes in HIV transmission in Malaysia (Ministry of Health Malaysia, 2023)

Occupational exposure to HIV primarily refers to situations where healthcare workers are at risk of acquiring HIV through their professional duties. Occupational exposure to HIV is defined as any incident where healthcare workers encounter blood or other potentially infectious materials (OPIM) while performing their job duties. This includes percutaneous injuries such as needle sticks, mucous membrane exposures such as splashes to the eyes, mouth, and contact with non-intact skin. Dentists are often perceived as being at a higher risk for occupational exposure to HIV compared to other healthcare professionals (Taiwo, 2014). This perception stems from the nature of dental procedures, which frequently involve blood, saliva, and sharp instruments. Dental procedures inherently involve close contact with patients and the potential for exposure to blood and other bodily fluids. During treatments such as extractions, periodontal work, or surgeries, saliva can become contaminated with blood. This contamination can lead to concerns about the transmission of HIV, particularly if proper precautions are

not taken. A study indicated that 86.7% of oral health care workers (OHCWs) believed that dental professionals have a higher risk of HIV infection compared to other healthcare providers, despite evidence suggesting otherwise (Taiwo, 2014).

2.3 Post-Exposure Prophylaxis (PEP)

Post-exposure prophylaxis (PEP) is a critical intervention for healthcare workers (HCWs) who experience occupational exposure to HIV. PEP involves the administration of antiretroviral medications after potential exposure to HIV, aimed at reducing the risk of infection. It is most effective when initiated as soon as possible within 72 hours of exposure and continued for 28 days, providing approximately 81% protection if started promptly (Tsega et al., 2023). Despite its proven efficacy, adherence to PEP remains a significant challenge for HCWs.

Adherence to PEP regimens is alarmingly low. A study from Kenya reported a completion rate of only 26% among HCWs who initiated PEP following needle-stick injuries (Osoo et al., 2023). Factors influencing adherence included the HIV status of the source patient because it was shown that the adherence was higher when the source was known to be HIV positive 42.4% compared to when it was negative 11.8% (Osoo et al., 2023).

The National Institute of Occupational Safety and Health reported that the rate of Hepatitis B Virus (HBV) transmission to susceptible HCWs ranges from 6% to 30% after a single needlestick exposure to an HBV-infected patient. Studies examining healthcare workers exposed to Hepatitis C virus (HCV) via needlestick or other percutaneous injuries indicate that the average incidence of anti-HCV seroconversion is 1.8%, with a range from 0% to 7% per injury. Currently, there is no vaccine to prevent HCV infection, and immunoglobulin or antiviral medication is not advised as post-

exposure prophylaxis. For Human Immunodeficiency Virus (HIV) infection, the average risk of post-needlestick exposure to HIV-infected blood is 0.3% or 1 in 300 and it is generally low compared to HBV and HCV (Ministry of Health Malaysia, 2023).

Post-exposure prophylaxis (PEP) guidelines provide a structured approach to preventing HIV infection after potential exposure. There are three steps to determining the need for HIV post-exposure prophylaxis (PEP) after occupational exposure: evaluation of exposure, determination of the source's HIV status, and determination of the PEP recommendation. Figures 2.3, 2.4, and table 2.1 show the three steps of each PEP.

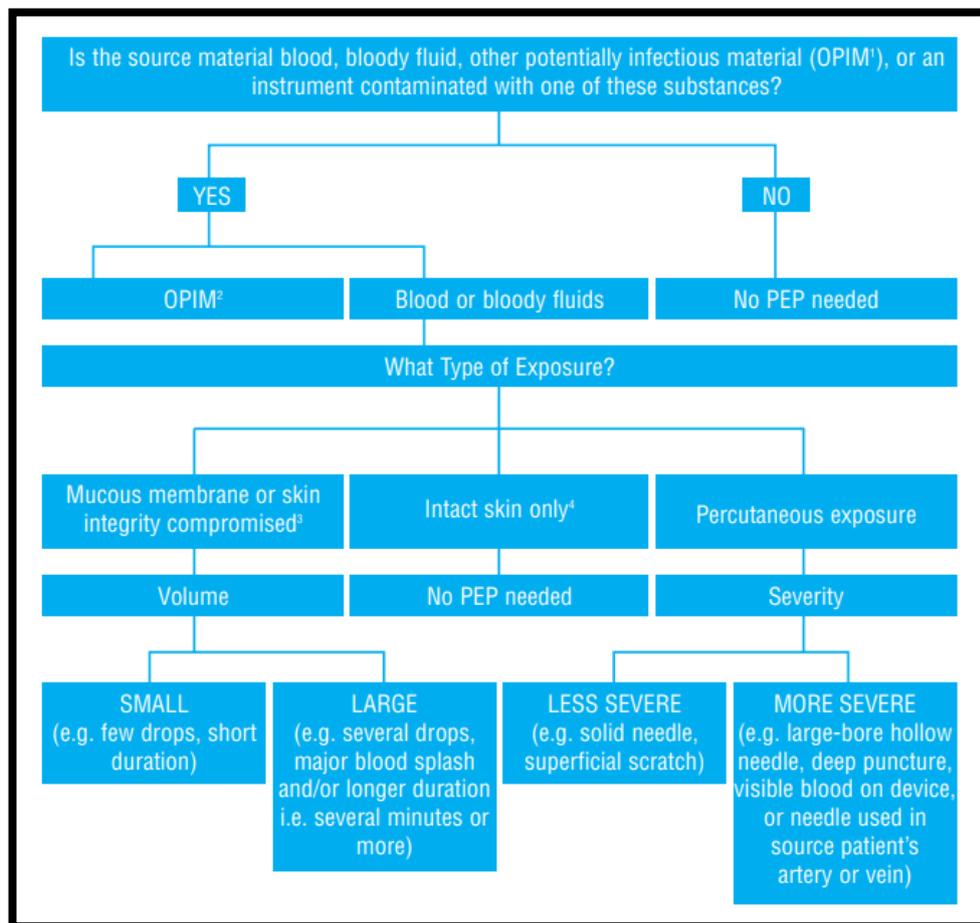


Figure 2.3 Evaluation of the Exposure (Ministry of Health Malaysia, 2023)

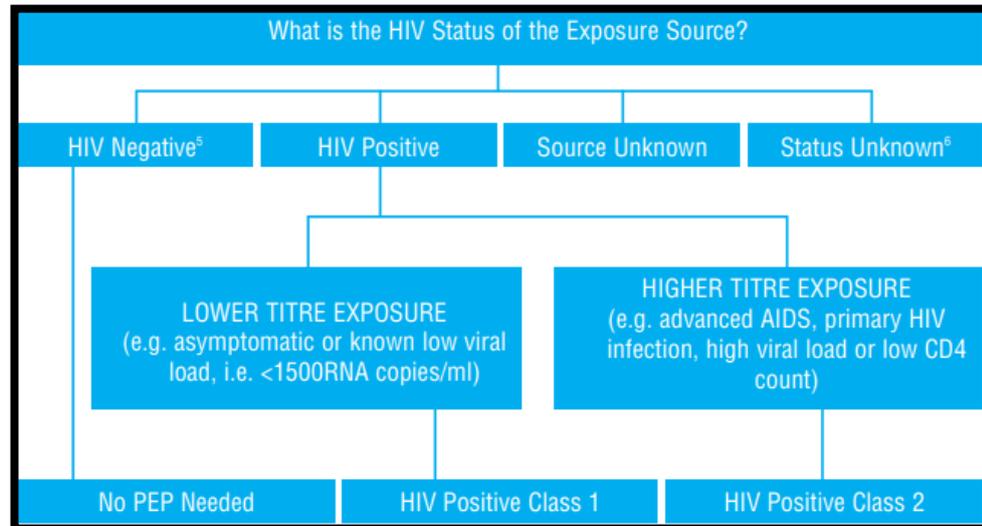


Figure 2.4 Flowchart to determine the HIV Status of the exposure source (Ministry of Health Malaysia, 2023)

Each case of exposure to other potentially infectious material (OPIM) needs to be considered individually. These body substances are generally regarded as low risk for transmission in health-care settings. Any unprotected contact with concentrated HIV in a research laboratory or production facility is considered an occupational exposure that requires clinical evaluation to determine the need for PEP. Skin integrity is considered compromised if there is evidence of chapped skin, dermatitis, abrasion, or an open wound. Contact with intact skin is typically not considered a risk for HIV transmission. On the other hand, if the exposure involves blood and the situation calls for a greater volume of exposure such as there was prolonged contact with blood the risk of HIV transmission should be considered. When treating HIV-negative patients, it is important to consider if the source patient falls within the window period. If the

patient's status cannot be determined for example due to death while waiting, it is important to assess whether the patient is at low or high-risk of getting HIV.

Table 2.1 Determine the PEP recommendation (Ministry of Health Malaysia, 2023)

| Exposure Type | HIV positive Class 1 | HIV positive Class 2 | Source of Unknown HIV Status | Unknown Source | HIV Negative |
|---------------|--------------------------------|--------------------------------|---|---|---------------------|
| Small Volume | Consider basic 2-drug PEP1 | Recommend basic 2-drug PEP | Generally, no PEP is warranted | Generally, no PEP is warranted | No PEP is warranted |
| Large Volume | Recommend basic 2-drug PEP | Recommend expanded >3-drug PEP | Generally, no PEP is warranted; however, consider basic 2-drug PEP for source with HIV risk factors | Generally, no PEP is warranted; however, consider basic 2-drug PEP in settings in which exposure to HIV infected person is likely | No PEP is warranted |
| Less Severe | Recommend basic 2-drug PEP | Recommend expanded >3 drug PEP | Generally, no PEP is warranted. Consider basic 2-drug PEP for source with HIV risk factors | Generally, no PEP is warranted. However, consider basic 2-drug PEP in settings in which exposure to HIV infected person is likely | No PEP is warranted |
| More Severe | Recommend expanded >3-drug PEP | Recommend expanded >3-drug PEP | Generally, no PEP is warranted. Consider basic 2-drug PEP for source with HIV risk actors | Generally, no PEP is warranted; However, consider basic 2-drug PEP in settings in which exposure to HIV infected person is likely | No PEP is warranted |

2.4 Knowledge of post-exposure prophylaxis (PEP)

The knowledge of HIV PEP is crucial for effective prevention strategies particularly among healthcare workers who are at higher risk of exposure. Various studies have assessed the level of knowledge, attitudes, and practices regarding PEP, revealing a mixed landscape of awareness and understanding.

Many studies indicate that a significant proportion of healthcare workers have heard of PEP. A study conducted among healthcare workers in Addis Ababa, Ethiopia, found that 91.3% of respondents were aware of PEP, with the primary sources of information being training sessions and interactions with colleagues (Adal et al., 2023). Similarly, a study in Southern Africa reported that over 60% of participants had heard of PEP, although misconceptions about its purpose and administration were prevalent (Makhado et al., 2022). However, detailed knowledge about PEP's mechanisms, guidelines, and effectiveness remains limited despite this general awareness. For example, in the same Ethiopian study, only 22.4% of respondents could accurately describe components of PEP, highlighting a significant gap in understanding (Eticha & Gemed, 2019).

Misconceptions about HIV PEP are common among healthcare workers. Many individuals may know about HIV PEP but lack clarity on critical aspects such as the appropriate timing for administration and the duration of the regimen. A study showed that while most healthcare workers recognise the importance of starting PEP within 72 hours of exposure, knowledge about the optimal window, which is ideally within 2 hours, is often lacking (Adal et al., 2023). Moreover, a study conducted in Ghana revealed that healthcare workers exhibited low levels of knowledge regarding the effectiveness of PEP, with many believing it to be 100% effective, which is misleading

(Babanawo et al., 2018). Such misconceptions can lead to inadequate responses to potential exposures and ultimately compromise patient safety.

2.5 Attitude towards post-exposure prophylaxis (PEP)

Research on the attitudes of HCWs towards post-exposure prophylaxis (PEP) for HIV reveals a generally positive outlook, although several factors influence these attitudes and their subsequent practices. Given the potential consequences of HIV transmission, understanding healthcare workers' attitudes toward PEP is essential for improving compliance and ensuring effective prevention strategies.

The attitude of HCWs towards PEP is generally positive, as evidenced by various studies. For instance, a study conducted in Dessie, Ethiopia, found that 75.2% of the 422 participants had a positive attitude toward PEP, with 89% acknowledging its benefits and 80.6% recognising the importance of having PEP guidelines available in their workplace and believing that PEP can reduce the likelihood of acquiring HIV after being exposed. However, 71.3% of individuals had no trust in PEP's effectiveness (Sewunet et al., 2020). A study conducted at Gondar University Hospital in Ethiopia revealed that an overwhelming majority of respondents 98.5% recognised the importance of PEP in preventing HIV transmission (Mathewos et al., 2013). About 88.2% of participants agreed that having PEP guidelines available in their workplace is essential. Additionally, 78.5% of respondents strongly believed that PEP could effectively reduce the likelihood of HIV infection following exposure, highlighting their confidence in the intervention's efficacy (Mathewos et al., 2013).

However, the enthusiasm for PEP is sometimes tempered by concerns regarding its side effects and the stigma associated with HIV. Some healthcare workers expressed scepticism about PEP's effectiveness, with 24.8% reporting a lack of trust in its efficacy

(Sewunet et al., 2020). This ambivalence can significantly impact adherence to PEP protocols, as fear of adverse effects may deter individuals from seeking treatment after exposure.

2.6 Correlation between Knowledge and Attitude towards HIV post-exposure prophylaxis (PEP)

The correlation between knowledge and attitudes towards HIV post-exposure prophylaxis (PEP) among healthcare workers (HCWs) is a critical area of research, especially given the ongoing risk of occupational exposure to HIV in healthcare settings. When individuals have better knowledge and understanding, they are more likely to have a positive attitude, but a high level of knowledge does not always translate into a positive attitude; the two factors are closely interlinked.

Several studies found that despite having adequate knowledge about PEP, many HCWs still displayed neutral to negative attitudes. For example, a study in Malaysia revealed that although 55% of HCWs had a high level of HIV-related knowledge, 70.8% showed neutral to negative attitudes (Hani et al., 2021). Similarly, a study at Hiwot Fana Specialized University Hospital in Ethiopia found that 83% of participants had adequate knowledge of PEP, but 43.4% had an unfavourable attitude (Eticha & Gemed, 2019).

The inconsistency between knowledge and attitude appears to have multiple causes, including fear of contracting HIV, limited training opportunities, and insufficient support systems. A study in Lagos, Nigeria found that the main reasons for not seeking PEP among exposed HCWs were lack of sufficient information 35% and fear of the process and consequences 28% (Ajibola et al., 2014). Another study in Addis Ababa, Ethiopia revealed that 68.9% of HCWs did not receive any PEP training (Adal et al., 2023).

On the other hand, a study in Ethiopia found that HCWs with positive attitudes toward PEP it is often associated with better knowledge (Mathewos et al., 2013).

2.7 Association between Socio-demographic characteristics with knowledge towards HIV post- exposure prophylaxis (PEP)

The association between socio-demographic characteristics and knowledge towards HIV post-exposure prophylaxis (PEP) among healthcare workers (HCWs) is critical for improving occupational safety and health outcomes. Recent studies provide statistical insights into how factors such as age, gender and education level influence PEP knowledge and adherence.

2.7.1 Age

Age is a significant factor affecting knowledge about PEP among HCWs. Research indicates that older healthcare workers tend to have better knowledge about PEP compared to their younger counterparts. For instance, a study in Portugal found that respondents aged 50 or older had notably low knowledge of PEP, with only 5.5% reporting knowledge of it, while younger age groups showed higher knowledge levels 16.5% among those aged 25 or under and 18.3% for those aged 26-49 (Simões et al., 2021). In another study involving medical students, the mean age was 23.2 years, with 89% having heard about PEP; however, the majority exhibited only moderate 61.7% or poor 32.5% knowledge levels. This suggests that while younger HCWs may have heard about PEP, their understanding may be superficial, highlighting the need for more in-depth training (Aminde et al., 2015).

2.7.2 Gender

Gender also plays a significant role in shaping knowledge about HIV and PEP among healthcare workers. A Malaysian study revealed that a significant majority of respondents were female (90%), while only 10% were male (Hani et al., 2021). Research indicates that male healthcare professionals typically score higher than females on assessments measuring HIV knowledge. For example, male participants scored an average of 0.72 on the HIV-Knowledge Questionnaire (HIV-KQ-18), while female participants scored only 0.58 (Talwar & Rahman, 2015). This discrepancy suggests that males may have had greater exposure to educational resources or may engage more actively with information related to HIV prevention.

2.7.3 Level of education

The level of education attained by healthcare workers is another important factor influencing their knowledge of HIV/PEP. Numerous studies have found a link between higher education levels and greater awareness of HIV transmission and prevention methods. For example, women with tertiary education were 19.5% more likely to have high-level HIV knowledge than those without formal education (Kang et al., 2024). Another study conducted in Dessie Referral Hospital, Ethiopia, it was found that 72.5% of participants had good knowledge about PEP for HIV (Sewunet et al., 2020). Notably, over 75% of the respondents had completed their bachelor's degree or were medical doctors, which likely contributed to their higher levels of knowledge compared to similar studies in other regions where educational attainment was lower (Sewunet et al., 2020).

2.7.4 Profession

Based on the study from Addis Ababa, Ethiopia, the total respondent of the physicians was 50 in total (11.6%), while the total respondent of the nurses was around 179 (57.4%) (Adal et al., 2023). There is an association between the differences in the profession and the knowledge of HIV post-exposure prophylaxis as the study showed that the physicians, including the doctors, tends to have good knowledge, with 35 (11.2%) of them having good knowledge while 15 (4.8%) of the physicians have poor knowledge. It was different when it came to nurses, as the nurses tended to have poor knowledge compared to the physicians. 80 (25.6%) of nurses have a good knowledge of HIV PEP while 99 (31.7%) have a poor knowledge of HIV PEP (Adal et al., 2023). This result is caused by the training and education as the physician typically undergoes more extensive medical training, including detailed education on infectious disease and PEP protocols, which may not be as comprehensive for the nurse.

2.7.5 Years of working experience

Years of working experience play a significant factor in shaping the level of knowledge towards HIV post-exposure prophylaxis among healthcare workers. A study conducted in Dessie Referral Hospital, Ethiopia, found that healthcare workers with more than three years of professional experience demonstrated significantly higher knowledge regarding the timing and duration for initiating PEP compared to less experienced workers (Sewunet et al., 2020). Specifically, 77.3% of participants with greater experience knew that PEP should be started within 72 hours of exposure (Sewunet et al., 2020). A study conducted in Ghana stated that healthcare workers with 2-4 years and 5-7 years of working experience tend to have good knowledge, both 54.4% and 70.4% compared to those with only less than 1 year of working experience 34% (Babanawo et al., 2018). More experienced individuals tend to have better

knowledge and understanding due to greater exposure to training opportunities and practical experiences related to occupational hazards. Addressing gaps in training and providing continuous education are essential for improving PEP knowledge across all levels of healthcare professionals.

2.8 Association between Socio-demographic characteristics with attitude towards HIV post-exposure prophylaxis (PEP)

2.8.1 Age

Young healthcare workers tend to exhibit more favourable attitudes towards HIV PEP. A study in Hiwot Fana Specialized University Hospital shows that majority of respondents consisted of young healthcare workers between the ages of 20-30 years (91%) (Eticha & Gemed, 2019). The majority of the respondents 288 (92.6%) and 250 (80.4%) agreed on the benefit of PEP and availability of PEP guidelines in their workplaces and (72%) of the respondents strongly believed that PEP can reduce the likelihood of acquiring HIV after being potentially exposed (Eticha & Gemed, 2019). Conversely, older HCWs often exhibit lower adherence rates to PEP. In a Kenyan study, adherence to the 28-day PEP regimen was found to be only 26% overall, with older HCWs being less likely to complete the regimen compared to their younger counterparts with (Osoo et al., 2023). 28 participants were informed to be completed the regimen for the younger healthcare workers while only 5 participants were informed to be completed the regimen for the older healthcare workers (Osoo et al., 2023). Most of the participants of this study consisted of the younger healthcare workers with 114 (85.7%) at the age between 18-35 years and for the older healthcare workers at the age between 36-59 years there were only 18 (13.5%) participation (Osoo et al., 2023). This