Special journal of the Medical Academy and other Life Sciences
Vol. 2 No. 6 (2024)

How the Use of prep (Pre-exposure Prophylaxis) Helps to Prevent HIV Infection in Malaysia.

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Abstract

Background: HIV remains a significant public health challenge in Malaysia, affecting key populations such as men who have sex with men (MSM), transgender individuals, sex workers, and people who inject drugs (PWID). Despite advancements in prevention and treatment, HIV continues to be a leading cause of morbidity and mortality. Pre-exposure prophylaxis (PrEP) has emerged as a promising biomedical intervention, utilizing antiretroviral tablets (ARVs) to significantly reduce the risk of HIV infection in HIV-negative individuals.

Methods and Materials: This study investigates the effectiveness of PrEP in preventing HIV transmission among high-risk groups in Malaysia. The research examines the mechanism of action of the two primary drugs used in PrEP—tenofovir disoproxil fumarate (TDF) and emtricitabine (FTC)—and analyzes data from various studies, including the iPrEx, Partners PrEP, PROUD, and IPERGAY studies. Additionally, it addresses the challenges of implementing PrEP in Malaysia, such as stigma, adherence issues, and integration with existing HIV services.

Results: PrEP has shown to reduce the risk of HIV infection by more than 90% when used consistently. The iPrEx study demonstrated a 44% reduction in HIV risk, increasing to 92% with consistent use. The Partners PrEP study indicated a 75% reduction, with a potential 90% decrease with strict adherence. The PROUD and IPERGAY studies reinforced these findings, showing 86% reductions in HIV risk. Despite its proven efficacy, the implementation of PrEP in Malaysia faces barriers such as stigma, prejudice, and adherence challenges.

Conclusion: PrEP is a highly effective strategy for reducing HIV transmission among high-risk populations in Malaysia. To maximize its potential impact, it is crucial to address barriers to implementation, including stigma, adherence issues, and integration with existing healthcare services. Mathematical modeling suggests that widespread PrEP use could lead to a significant decrease in new HIV infections, potentially reducing cases among MSM by 30% over a decade. Learning from successful PrEP programs in other countries, Malaysia should focus on supportive policies, community engagement, affordability, and adherence support to effectively combat the HIV epidemic.

Keywords: HIV prevention, Pre-Exposure Prophylaxis (PREP), Malaysia, Antiretroviral Therapy (Art), Public Health Strategies

Introduction

HIV continues to be a major public health threat worldwide, including in Malaysia. HIV remains the primary cause of morbidity and mortality despite pronounced advancements in prevention and treatment. Among the most promising HIV prevention strategies is pre-publicity prophylaxis or PrEP. Using antiretroviral tablets (ARVs) to reduce the risk of HIV infection in HIV-negative individuals is known as PrE, P a biomedical intervention. This study looks into the use of PrEP in Malaysia, its effectiveness, challenging implementation scenarios, and capacity impact during the HIV pandemic.

Background on HIV in Malaysia

HIV epidemic in Malaysia:

Malaysia, an upper-middle-income country in Southeast Asia, has been dealing with the HIV pandemic since the 1980s. Malaysia's Ministry of Health projects that by the end of 2022, the country will have roughly 86142 people living with HIV (PLHIV). Among the 86142 infected humans, an estimated 81% (approximately 69589 people). The pandemic in Malaysia focuses on critical demographics such as males who have sex with men (MSM), transgender persons, sex workers, and drug users (PWID - people who inject drugs). [1]

HIV Prevention Strategies in Malaysia:

Malaysia has implemented a number of HIV preventive initiatives, including public education campaigns, condom distribution programs, needle exchange programs for drug users, and antiretroviral medication for those living with HIV. Despite these precautions, the number of new HIV infections remains a worry. In this scenario, PrEP has emerged as a major method of prevention.

Understanding Pre–Exposure Prophylaxis (PrEP).

What is PrEP?

PrEP stands for pre-exposure prophylaxis. It is a way for people who do not have HIV to prevent the virus by taking a pill every day. The medicine usually used in PrEP is TDF (tenofovir disoproxil fumarate) and FTC (emtricitabine). If you take it as directed, it can lower your chances of getting HIV from sex by more than 90%.

Mechanism of Action:

TDF stands for tenofovir disoproxil fumarate, meaning this drug will not start working until you take some of it into your body. Still, then once inside, TDF changes itself into TFV (tenofovir). After that, TFV changes further still making itself more like TDP (tenofovir diphosphate), which acts against HIV copy where it looks similar enough to one piece found naturally occurring within the virus's genetic material so that this process cannot continue, thus stopping any new viruses from being produced – or at least very few. Tenofovir diphosphate mimics the natural deoxyribonucleotide, deoxyadenosine 5'-triphosphate (dATP), and inhibits reverse transcriptase. Reverse transcription strategies can be used to treat HIV infection. Chain termination: Tenofovir

diphosphate causes DNA chain growth as it forms part of the viral DNA because it lacks the 3' hydroxyl group needed to add the next nucleotide. This prevents viral DNA synthesis, causing the viral replication process to stop. [2]

Emtricitabine, additionally known as FTC, is phosphorylated in cells to form its energetic shape, emtricitabine five'-triphosphate. Emtricitabine 5'-triphosphate acts identical to tenofovir diphosphate in that it inhibits the opportunity transcriptase enzyme by competing with the herbal substrate, deoxycytidine 5'-triphosphate. Chain termination: Emtricitabine furthermore motives viral chain termination because it lacks the three-hydroxyl group of five-triphosphate, preventing viral DNA synthesis. [2]

When used together, TDF and FTC provide a synergistic effect against HIV. The dual inhibition of reverse transcriptase by two different nucleotide analogs makes it highly effective in preventing the establishment of HIV infection in the host cells. By taking PrEP consistently, individuals maintain a high enough level of these drugs in their bloodstream to protect against HIV if they are exposed to the virus. [2]

Efficacy of PrEP:

1. iPrEx study

   The iPrEx takes a look at changed into groundbreaking in its awareness of MSM and transgender girls to assess the effectiveness of PrEP in HIV prevention. The consequences were extremely wonderful: PrEP reduced the chance of contracting HIV by 44 %. If individuals constantly used PrEP and had detectable drug tiers, their chance discount extended drastically to 92%. [3]

2. Partners PrEP Study

   This research tested heterosexual couples in which one associate has HIV, and the other partner does now not have HIV. The outcomes indicated that PrEP reduced the likelihood of the HIV-terrible associate getting the virus by 75%. Those who always took PrEP ought to see a reduction in risk as excessive as 90%. [4]

3. PROUD Study

   The study showed how effective PrEP is for guys who have intercourse with guys (MSM) in normal life [5] and found that PrEP decreased HIV infections by 86%, strengthening its strong shielding effect.

4. IPERGAY Study

   This study examined an opportunity method for PrEP utilization in MSM, wherein people would take the medication earlier than and after sexual encounters in preference to on a day-to-day basis. The findings have been mind-blowing, indicating an 86% decrease in HIV threat in evaluation to those who were given a placebo. [6]

5. Real-world effectiveness

   In addition to those studies, real-life information from special observational research and implementation projects imply that PrEP is relatively powerful while used continuously. In numerous instances, adherence to the medicine routine greatly decreases the chance of

contracting HIV by greater than 90%, underscoring the significance of consistency for optimal safety.

In general, the effects spotlight the significance of continually the use of PrEP to greatly lessen the chances of having HIV.

Challenges faced in PrEP implementation

Stigma and prejudice:

Prejudice and bias against key populations, such as MSM and transgender individuals, pose predominant obstacles to the adoption of PrEP. The worry of being discriminated against in healthcare settings can save you, humans, from seeking out PrEP. [7]

Compliance and Continuation:

Maintaining strict adherence to the PrEP agenda is vital for its fulfillment. Difficulties with sticking to treatment contain side consequences, having to take tablets each day, and issues with getting access to remedies. Techniques to assist human beings keep on with their remedy, like remedy and mobile health packages, are crucial. [8]

Incorporation into Current HIV Services:

Combining PrEP with cutting-edge HIV prevention and remedy offerings is critical for an intensive response. This includes educating healthcare professionals, developing standard operational protocols, and fostering collaboration among numerous fitness initiatives. [9]

Potential impact of PrEP on the HIV epidemic in Malaysia

Modeling using mathematics and making future predictions:

Mathematical modeling research has indicated that big-scale PrEP usage ought to result in a giant decrease in new HIV cases in Malaysia. A study conducted with the aid of the Kirby Institute recommended that increasing the usage of PrEP among MSM ought to save around 30% of new infections within a decade. [10]

Case Examples from Different Nations:

Insights from Malaysia and reviews from different nations can be enjoyed. For instance, the efficacy of PrEP tasks in countries that include the US and Australia suggests the sizable influence of PrEP when completed effectively. These case studies display the importance of backing regulations concerning the network and keeping investment. [2]

Recommendations for scaling up PrEP in Malaysia

Enhancing Policies and Regulations:

To enhance the enlargement of PrEP, Malaysia needs to simplify regulatory approval strategies and set up specific pointers for PrEP distribution. This includes overcoming criminal and coverage obstacles that could obstruct key populations' entry. [12]

Improving Participation and Understanding within the Community:

Community companies want to lead in spreading attention and teaching the public about PrEP. Involving key populations in developing and implementing these campaigns ensures cultural sensitivity and effectiveness. [13]

Guaranteeing reasonable expenses and clean availability:

It is crucial to barter reduced prices for PrEP capsules and recall frequent options. Furthermore, incorporating PrEP into public health offerings can enhance the right of entry for the ones unable to come up with the money for non-public healthcare.[14]

Promoting Compliance and Continuation:

Support strategies like counseling, reminder structures, and cell fitness interventions are essential for ensuring the effectiveness of PrEP. Healthcare vendors want to acquire schooling to provide non-judgmental and supportive care.[15]

Conclusion

HIV continues to pose a considerable public health hassle in Malaysia, affecting marginalized organizations to a greater extent. Pre-publicity prophylaxis (PrEP) is now diagnosed as a very successful preventive tactic that can decrease HIV transmission by more than 90% while used constantly. Research like Partners PrEP, PROUD, and IPERGAY, as well as statistics from actual-life conditions, highlight the efficacy of PrEP in lowering the chances of contracting HIV.

In Malaysia, the huge adoption of PrEP nevertheless encounters boundaries, including social stigma, adherence troubles, and the necessity for advanced integration with contemporary HIV offerings, notwithstanding the encouraging consequences. To optimize PrEP's effectiveness against the HIV epidemic, it's far essential to cope with and conquer these boundaries. Mathematical modeling indicates that sizeable PrEP usage may result in a full-size decline in new HIV cases, with estimates displaying a 30% drop in infections amongst MSM over ten years.

Learning from hit PrEP projects in countries including America and Australia, it's evident that important elements include supportive rules, network involvement, and continuous funding. Malaysia wishes to streamline regulatory approval approaches, beautify network understanding, guarantee the affordability and accessibility of PrEP, and promote adherence using various tactics. By tackling those troubles, Malaysia can correctly make use of PrEP to lower new HIV instances and make progress toward finishing the AIDS epidemic.

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