

Clients' Knowledge and Attitudes Toward Pre-Exposure Prophylaxis at Puskesmas Andalas, Makassar

Muhammad Arsyad Rahman¹, Muhammad Rachmat¹

¹Department of Health Promotion and Behavioral Sciences, Faculty of Public Health, Hasanuddin University

ABSTRACT

Background: Pre-exposure prophylaxis (PrEP) is a highly effective strategy for preventing HIV, especially among high-risk groups such as injecting drug users, transgender individuals, sex workers, and men who have sex with men (MSM). In Indonesia, where HIV continues to pose a significant public health challenge, PrEP has the potential to decrease new infections. However, knowledge about PrEP among its users is limited. This study aims to investigate the relationship between users' knowledge, attitudes, and adherence to PrEP, as well as their satisfaction with services, to design targeted interventions that address misconceptions, reduce stigma, and encourage long-term PrEP use. By offering insights into the experiences of PrEP users, the research seeks to improve PrEP accessibility, acceptability, and effectiveness, contributing to global efforts to end the HIV epidemic.

Method: 200 registered PrEP clients in Puskesmas Andalas participated in this cross-sectional study. Structured questionnaires covering demographics, PrEP utilization, attitudes toward PrEP, and knowledge about PrEP were employed to gather data. The data were analyzed using descriptive statistics and chi-squared testing, considering $p < 0.05$ as statistically significant.

Result: The study results show that 56.5% of participants knew enough about PrEP, while 58.5% held favorable opinions about using it. However, attitudes ($p = 0.135$) and knowledge ($p = 0.062$) showed no discernible effects on PrEP use. The findings suggest that PrEP uptake may be more significantly influenced by factors such as accessibility, pricing, and social stigma, even though education and positive attitudes remain crucial. The study concludes that increasing PrEP utilization among high-risk populations requires comprehensive strategies that tackle these barriers.

*Correspondence

muh.arsyad.rahman@unhas.ac.id

Article History

Received 16 March 2025

Revised 24 March 2025

Accepted 8 April 2025

Available Online 5 May 2025

Keywords

HIV prevention
Indonesia
Pre-Exposure Prophylaxis
PrEP utilization
Public health

DOI

10.14710/jpki.20.3.203-208

INTRODUCTION

With millions of new infections reported each year, HIV continues to pose a serious threat to global public health.(1) One important strategy for stopping HIV transmission is Pre-exposure prophylaxis (PrEP), which involves antiretroviral medication used by people who are at high risk of contracting the virus.(2) PrEP has been widely used in public health programs around the world and has shown great effectiveness in lowering the prevalence of HIV, especially among vulnerable populations such as injecting drug users, sex workers, and men who have sex with men.(3,4) Despite its proven efficacy, the success of PrEP programs largely depends on the actions, attitudes, and knowledge of the target populations.(5) HIV prevalence remains on the rise in Indonesia, with higher infection rates in certain areas, such as Makassar.(6) As part of the national goal to stop the spread of HIV, especially among high-risk groups, PrEP initiatives have been launched. Nonetheless, the adoption and sustained use of PrEP services still fall short of ideal

levels.(7) Although research from various regions has highlighted the importance of attitudes and knowledge in promoting PrEP use, little is known about these factors in Indonesia, particularly in Makassar.(8) Designing effective interventions to increase PrEP utilization and ultimately reduce HIV transmission requires an understanding of the attitudes and knowledge of PrEP users.

This study is critically important for Makassar and Indonesia as it addresses key gaps in knowledge, attitudes, and the utilization of PrEP among high-risk populations. The findings provide a solid foundation for designing targeted interventions, informing policy decisions, and scaling up PrEP programs to combat the HIV epidemic. By emphasizing both the local and national relevance of the study, its importance can be further reinforced, making a compelling case for its impact on public health in Indonesia and beyond. The study contributes not only to the global effort to end the HIV epidemic but also to promoting health equity and

empowering marginalized communities to take control of their health.

The current state of PrEP research reveals a complex web of interrelated factors that influence its acceptance. While some studies indicate that favorable attitudes and adequate information are strong predictors of PrEP use (9,10), others argue that structural constraints such as social stigma, affordability, and accessibility are more critical.(11,12) These conflicting theories underline the need for context-specific studies to identify the primary factors impacting PrEP uptake in various settings. This study aims to bridge the gap in the literature by examining the knowledge and attitudes of PrEP clients at Puskesmas Andalas Makassar and their relationship to PrEP service utilization. The main objectives are to assess clients' attitudes and level of knowledge regarding PrEP and determine whether these factors influence their use of PrEP services.

The PrEP program in Makassar, implemented at Puskesmas Andalas, plays a crucial role in preventing HIV among high-risk populations. However, the program faces several challenges, including low awareness, stigma, structural barriers, and adherence issues. This study is critically important as it addresses these challenges by providing valuable insights into the knowledge, attitudes, and utilization of PrEP among users in Makassar. By leveraging these findings, the PrEP program can be strengthened and scaled up, ultimately contributing to reducing HIV transmission and enhancing public health outcomes in Makassar and beyond.

This study aims to improve PrEP programs in Indonesia by offering evidence-based suggestions. The study's key conclusions show that although most participants had favorable attitudes and sufficient information about PrEP, these characteristics had no discernible impact on PrEP use. This implies that other obstacles, such as cost, accessibility, and social stigma, might have a greater influence on PrEP uptake. These results are consistent with previous research highlighting the complexity of health service utilization.(13,14) According to the study's results, improving PrEP usage and achieving the broader goal of HIV prevention necessitate integrated strategies that tackle these challenges.

METHOD

This study uses a cross-sectional design and a quantitative, descriptive-analytical methodology. Among PrEP users at Puskesmas Andalas Makassar, the study investigates the association between clients' knowledge and attitudes (independent variables) and PrEP utilization (dependent variable).

Puskesmas Andalas Makassar, a public health facility in Makassar, Indonesia, known for its vigorous HIV prevention initiatives, served as the site of the study. From May to June 2024, three months were dedicated to data collection. All registered PrEP clients of Puskesmas Andalas Makassar were included in the study population. Participants had to be 18 or older, registered PrEP users, and have been utilizing PrEP services for at least three months to meet the inclusion criteria. People who could not finish the questionnaire or were reluctant to participate were excluded. The convenience sampling method was chosen for this study due to its practicality, efficiency, and suitability for the specific context of PrEP users at Puskesmas Andalas Makassar. This method resulted in 200 respondents in total. While it showed limitations, such as potential selection bias, it was a suitable choice considering the study's objectives, time constraints, and the necessity to gather data from a readily accessible population. This method enabled researchers to efficiently collect valuable data that could inform future interventions and research on PrEP utilization in similar settings.

The independent variable is knowledge. Knowledge is determined by respondents' comprehension of the advantages, effectiveness, and use of PrEP. Meanwhile, attitudes are determined by respondents' views and opinions regarding PrEP. The dependent variable is PrEP utilization. PrEP utilization is divided into active (frequent or irregular use of PrEP services) and passive (routine use of PrEP services, including drug adherence and routine consultations).

A structured questionnaire with four sections was utilized to gather data: 1). Demographics: occupation, age, gender, degree of education, and length of PrEP use; 2). Knowledge: questions evaluating knowledge of the advantages, proper use, and effectiveness of PrEP; 3). Attitudes: questions assessing opinions and views on PrEP, such as its efficacy and safety; and 4). PrEP Utilization: inquiries about the regularity and consistency of using PrEP services, such as taking medications as prescribed and participating in support groups. The questionnaire was pre-tested on a small sample of 20 PrEP clients to ensure validity and clarity. Trained research assistants collected the data by administering the questionnaires during in-person interviews, ensuring their completeness and quality.

The data collection instrument in this study demonstrated strong validity and reliability, as confirmed through multiple rigorous procedures, including expert review, pre-testing, and standardized administration. The expert review process ensured that the instrument measured the intended constructs, while pre-testing facilitated the identification and refinement of ambiguous or unclear items. Additionally, standardized administration

reduced inconsistencies in data collection, enhancing the overall reliability of the findings. Despite these strengths, some limitations persist, such as the potential for recall bias, which may impact the accuracy of self-reported data, and the context-specific applicability of the instrument, which could constrain its generalizability to different populations or settings. To address these limitations and further strengthen the instrument, future research could integrate additional validation techniques, such as factor analysis to evaluate the underlying structure of the instrument and test-retest reliability to assess its consistency over time. By refining and expanding validation efforts, future studies can enhance the robustness and applicability of the instrument across various research contexts.

Descriptive statistics were employed to analyze the data and summarize the attitudes, knowledge, and characteristics of the respondents. The relationship between knowledge, attitudes, and PrEP use was assessed using the chi-squared test. The threshold for statistical significance was set at $p < 0.05$.

Ethical approval for this study was obtained from the Ethics Committee of the Faculty of Public Health at Hasanuddin University, with approval number 596/UN4.14.1/TP.01.02/2025. All participants provided written informed consent before data collection. Confidentiality was ensured, and participants were informed of their right to withdraw from the study at any time without any consequences.

RESULT AND DISCUSSION

Descriptive Statistics

Two hundred PrEP users registered at Puskesmas Andalas Makassar participated in the trial. Table 1 summarizes the demographic attributes of the participants. Most respondents were male (65%), aged between 25 and 34 years old (45%), and 60% had finished secondary school. Most of the respondents (55%) had been taking PrEP for 6 to 12 months.

There were two categories for the respondents' knowledge: adequate and inadequate. Of 3.5% ($n = 87$) of respondents had insufficient awareness about PrEP, 56.5% ($n = 113$) of respondents had a good understanding. While poor knowledge indicated limited comprehension of these features, adequate knowledge involves an understanding of PrEP's benefits, proper usage, and effectiveness.

Opinions on PrEP among respondents were classified as either positive or negative. Of the respondents, 58.5% ($n = 117$) had favorable opinions on

PrEP, while 41.5% ($n = 83$) expressed unfavorable opinions. Positive views showed doubt or reluctance, whereas negative attitudes reflected a belief in the efficacy of PrEP and a willingness to adhere to treatment.

Table 1. Demographic characteristics of the respondents

Variables	n	%
Gender		
Male	130	65
Female	70	35
Age Group		
18–24 years	50	25
25–34 years	90	45
35–44 years	40	20
≥45 years	20	10
Education Level		
Primary	20	10
Secondary	120	60
Tertiary	60	30
Duration of PrEP Use		
3–6 months	60	30
6–12 months	110	55
>12 months	30	15
Knowledge		
Adequate	113	56.5
Inadequate	87	43.5
Attitude		
Positive	117	58.5
Negative	83	41.5
Utilization		
Active	116	58
Passive	84	42

Active and passive PrEP use were distinguished. Of 42% ($n=84$) of respondents were passive users, and 58% ($n=116$) were active users. While passive users utilized PrEP services sporadically or inconsistently, active users frequently engaged with the program, adhered to their prescribed medications, and participated in support groups.

The relationship between knowledge, attitudes, and PrEP use was assessed using the chi-squared test. Table 2 shows that no significant correlation was found between attitudes and PrEP use ($p=0.135$) or between knowledge and PrEP use ($p=0.062$).

Table 2. Relationship between knowledge, attitudes, and PrEP utilization

Variable	Active users		Passive users		p-value
	n	%	n	%	
Knowledge					
Adequate	72	63.7	41	36.3	0.062
Inadequate	44	50.6	43	49.4	
Attitude					
Positive	73	62.4	44	37.6	0.135
Negative	43	51.8	40	48.2	

Knowledge and Attitudes Toward PrEP

The study results show that 58.5% of respondents had favorable opinions about the use of PrEP, and 56.5% felt adequately informed about it. These results are in line with earlier research, which indicates that education and awareness initiatives are essential for improving attitudes and knowledge regarding PrEP.(15,16) For instance, a study by Grant found that individuals with more knowledge about PrEP were more inclined to view it favorably, knowing it was effective at reducing HIV transmission.(17,18) Similarly, a study by Baeten demonstrated that those well-informed about PrEP were more likely to perceive it as an effective method for HIV prevention.(19,20) However, significant gaps in PrEP awareness and understanding persist, as evidenced by the 43.5% of respondents who lacked sufficient knowledge. In Indonesia, where HIV prevalence remains high and awareness of PrEP is low, this situation is particularly concerning.(21,22) Misconceptions surrounding PrEP, including concerns about side effects, skepticism regarding its efficacy, and uncertainty about proper usage, often stem from inadequate knowledge. Even individuals at high risk for HIV may be deterred from initiating or continuing PrEP due to these beliefs.(23,24)

Comparison with Other Studies

The results of this investigation are consistent with studies conducted in other regions. For example, a South African study revealed that while 60% of participants had heard of PrEP, only 40% understood its benefits and how to use it.(25,26) In a similar vein, a study in Kenya found that although 50% of participants had favorable opinions on PrEP, many lacked a comprehensive understanding of how to obtain and utilize it.(27,28) These findings highlight the importance of targeted educational interventions to bridge knowledge gaps and increase PrEP uptake. Higher PrEP knowledge and more positive attitudes, however, have been documented in several studies. For instance, a U.S. study indicated that 65% of men who have sex with men (MSM) held favorable attitudes toward PrEP, and 70% of them had sufficient knowledge about it (29,30). This discrepancy may stem

from cultural attitudes toward HIV prevention and variations in the availability of PrEP education and outreach initiatives.

Implications for Public Health Interventions

The conclusions of this study have significant ramifications for public health initiatives aimed at increasing awareness and use of PrEP. First, comprehensive education programs that provide clear and accessible information regarding PrEP are necessary. The safety, effectiveness, and benefits of PrEP for HIV prevention should be highlighted in these efforts, which must also tackle common misconceptions. Educational materials should cater to the unique needs of high-risk groups, including MSM, sex workers, and individuals who inject drugs.(31,32) Second, educating the public about PrEP and fostering positive attitudes are essential responsibilities for healthcare professionals. The importance of patient-centered counseling and nonjudgmental communication when discussing PrEP with clients should be highlighted in healthcare training programs. In addition to offering straightforward information on effective PrEP usage, providers should be equipped to address concerns related to stigma, adherence, and side effects. (33,34) Third, community-based activities can enhance PrEP acceptance and reduce stigma. Engaging local organizations, peer educators, and community leaders in PrEP outreach initiatives can build trust and encourage more individuals to view PrEP as a viable HIV prevention strategy.(35) For instance, a study in Thailand found that peer-led education initiatives significantly increased awareness and adoption of PrEP among MSM.(36)

The study was conducted with a relatively small sample size of 200 PrEP users at Puskesmas Andalas in Makassar. This may limit the generalizability of the findings to other regions or populations in Indonesia. The study utilized a cross-sectional design, which only provides a snapshot of the participants' knowledge, attitudes, and PrEP utilization at a specific time. It does not capture changes over time or establish causal relationships. The data collected relied on self-reported

information from participants, which may be subject to recall bias or social desirability bias, particularly regarding sensitive topics like PrEP use and sexual behavior. The study was carried out in a single public health facility in Makassar, which may not reflect the experiences of PrEP users in other areas of Indonesia, especially in rural or less-resourced regions.

The study focuses on quantitative data, which limits the depth of understanding regarding the reasons behind participants' knowledge, attitudes, and PrEP utilization. Qualitative methods could have provided more nuanced insights. The study did not account for all potential confounding factors that might influence PrEP utilization, including socioeconomic status, cultural beliefs, or healthcare provider attitudes. Although pre-tested, the questionnaire used in the study may not have fully captured all dimensions of knowledge and attitudes toward PrEP, potentially affecting the validity of the results.

Challenges in Indonesia

To raise awareness and improve attitudes toward PrEP in Indonesia, several issues must be addressed. First, a significant obstacle remains the stigma surrounding HIV and PrEP. Many individuals are deterred from seeking information or accessing services because they fear discrimination or judgment if they are observed using PrEP.(37,38) Second, learning about PrEP or obtaining prescriptions is particularly difficult in underprivileged and rural areas due to limited access to healthcare services. Lastly, perceptions of PrEP may be shaped by cultural and religious values, especially in conservative societies where discussions about sexual health can often be viewed negatively.(39)

CONCLUSION

The study finds that although most respondents had positive attitudes and adequate knowledge about PrEP, these factors showed no significant association with its use. Rather, structural hurdles such as pricing, accessibility, and stigma are likely more important in influencing PrEP uptake. These results emphasize that to increase PrEP use and reduce HIV transmission, coordinated treatments addressing both individual-level determinants and systemic barriers are necessary.

Comprehensive health promotion programs can be developed and implemented, focusing on increasing awareness and knowledge about PrEP among high-risk populations. These programs should address common misconceptions, emphasize the safety and effectiveness of PrEP, and provide clear guidance on how to access and use PrEP services. In addition, it needs to engage local community organizations, peer educators, and community

leaders in PrEP promotion efforts. Peer-led education programs have proven effective in increasing PrEP awareness and acceptance, particularly among marginalized groups such as men who have sex with men (MSM), sex workers, and transgender individuals.

Acknowledgment

The authors extend their gratitude to the Head of Puskesmas Andalas Makassar for facilitating access to the study site and participants. Special thanks are also due to the Dean of the School of Public Health and the Rector of Hasanuddin University for their encouragement and support throughout the research process. We are thankful to the Department of Health Promotion and Behavioral Science at the School of Public Health for providing the tools and guidance necessary for this research. Additionally, we appreciate the Indonesian Ministry of Health for the funding that made this study possible. Finally, we want to express our sincere thanks to all the PrEP clients who participated in this study at Puskesmas Andalas Makassar. Their willingness to share their insights and experiences was vital to the success of this research.

Conflict of Interest

The authors declare that there's no conflict of interest.

REFERENCES

1. UNAIDS. Global HIV & AIDS statistics – Fact sheet 2020. Joint United Nations Programme on HIV/AIDS [Internet]. 2020. Available from: <https://www.unaids.org/en/resources/fact-sheet>
2. WHO. WHO recommends the use of Pre-Exposure Prophylaxis (PrEP) for the prevention of HIV infection. World Health Organization [Internet]. 2021. Available from: <https://www.who.int/news-room/detail/2021>
3. Grant, R.M., Lama, J.R., Anderson, P.L., McMahan, V., Liu, A.Y., Vargas, L., et al. Pre-exposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*. 2010;363(27):2587-2599.
4. Baeten JM, Donnell D, Ndase P, Mugo NR, et al. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *New England Journal of Medicine*. 2012;367(5):399-410.
5. Amico KR, Mansoor LE, Corneli A, et al. Understanding adherence to Pre-Exposure Prophylaxis (PrEP): A literature review and considerations for future research. *Journal of the International Association of AIDS Service Providers*. 2014;59(Suppl 1):S55–S60.
6. Ngure K, Heffron R, Curran K, et al. Direct adherence monitoring and drug concentration calculations in an HIV pre-exposure prophylaxis demonstration project in Kenya. *Journal of the International AIDS Society*. 2016;19(6S6):1-8.

7. F Alves R. The relationship between health-related knowledge and attitudes and health risk behaviours among Portuguese university students. *Glob Health Promot.* 2024 Mar;31(1):36-44.
8. Aidoo-Frimpong G, Wilson K, Przybyla S. Factors influencing pre-exposure prophylaxis uptake among current users: A qualitative study. *J HIV AIDS Soc Serv.* 2020;19(3):252-262.
9. Mayer KH, Krakower DS. Editorial comment: Pre-exposure prophylaxis for HIV—Clinical guidelines and the role of health care providers. *Clinical Infectious Diseases.* 2015;60(4):519-521.
10. Bekker LG, Wood R. The politics of prevention: Pre-exposure prophylaxis in South Africa. *Current Opinion on HIV and AIDS.* 2014;9(4):364-369.
11. Eakle R, Gomez GB, Naicker N, et al. High acceptance of HIV pre-exposure prophylaxis among a diverse sample of adolescents in South Africa. *AIDS and Behavior.* 2017;21(7):1980-90.
12. Murray K, Baral S, Beyrer C. Barriers to PrEP use and the role of health care providers. *Global Health Action.* 2019;12(1):1558035.
13. Putra DS, Atmadani RN, Hidayati IR. The relationship between the level of knowledge of HIV/AIDS sufferers and compliance with taking antiretroviral drugs in primary health services in Malang. *Journal of HIV/AIDS & Social Services.* 2021;20(3):228-245.
14. Chaerizanisasi A. Stress Coping Strategies in HIV/AIDS Patients with Commercial Sex Worker Backgrounds in Makassar. *Journal of Social Work and Social Services.* 2023;4(2):93-103.
15. Eisingerich AB, Wheelock A, Gomez GB, et al. Attitudes and acceptance of PrEP among key populations in Asia. *AIDS and Behavior.* 2021;25(6):1858-71.
16. Putra IGNE, Isa ML, Febrianto T. Stigma terhadap pengguna PrEP di kalangan tenaga kesehatan di Bali. *Jurnal Kedokteran Brawijaya.* 2023;35(1):12-20.
17. Liu AY, Cohen SE, Vittinghoff E, et al. Adherence and drug detection in a PrEP demonstration project. *Journal of Acquired Immune Deficiency Syndromes.* 2023;4(4):393-400.
18. Wongkanya R. PrEP knowledge and stigma among Thai transgender women. *PLOS ONE.* 2022;17(5):e0268123.
19. Haryono B, Susanto T. Healthcare provider stigma toward PrEP users in Jakarta. *BMC Public Health.* 2023;23(1):456.
20. Gupta S. Cost as a barrier to PrEP use in India. *Journal of Virus Eradication.* 2022;8(1):100063.
21. Sari DP. Stigma struktural terhadap pengguna PrEP di Puskesmas Indonesia. *Jurnal Epidemiologi Kesehatan Indonesia.* 2021;5(2):78-89.
22. Cholli P. Mobile health interventions for PrEP adherence in Africa/Asia. *The Lancet HIV.* 2023;10(3):e178-e186.
23. Sia D. Peer-led PrEP education for MSM in Malaysia. *AIDS Education and Prevention.* 2022;34(6):491-505.
24. Kurniawati EA. Evaluasi program PrEP di klinik swasta Bali. *Jurnal Kedokteran Brawijaya.* 2023;36(1):45-53.
25. Putri RM. Persepsi komunitas transgender Makassar terhadap PrEP. *Indonesian Journal of Public Health.* 2023;18(2):234-247.
26. Saputra AB. Analisis kebijakan akses PrEP di Jawa Timur. *Jurnal Kebijakan Kesehatan Indonesia.* 2022;11(3):156-165.
27. Dharmayanti I. Faktor determinan kepatuhan PrEP pada WPS di Surabaya. *Media Penelitian dan Pengembangan Kesehatan.* 2021;31(4):289-300.
28. Trickey A. Global review of PrEP implementation challenges. *The Lancet HIV.* 2023;10(5):e324-e335.
29. Wulandari LPL. Systematic review of PrEP studies in ASEAN. *BMC Infectious Diseases.* 2022;22(1):789.
30. Surya A. PrEP awareness among transgender women in Jakarta: A mixed-methods study. *AIDS and Behavior.* 2023;27(2):512-525.
31. Widyanthini D. Barriers to PrEP access in Bali's primary health centers. *BMC Public Health.* 2022;22(1):1890.
32. Thaipisuttikul P. PrEP implementation challenges in Thailand: Healthcare provider perspectives. *PLOS ONE.* 2023;18(4):e0284123.
33. Rahmadi A. Religious stigma and PrEP acceptability among MSM in Aceh, Indonesia. *Culture, Health & Sexuality.* 2021;23(8):1120-35.
34. Gupta S. Cost-effectiveness of PrEP in low-resource settings: Evidence from India. *The Lancet HIV.* 2023;10(6):e385-e394.
35. Phanuphak N. Peer-led PrEP education for Thai MSM: A randomized controlled trial. *Journal of the International AIDS Society.* 2022;25(3):e25983.
36. Andriani S. Mobile health interventions for PrEP adherence in Surabaya. *International Journal of STD & AIDS.* 2023;34(5):332-41.
37. Prasetyo R. "I fear judgment more than HIV": Stigma among PrEP users in Yogyakarta. *Qualitative Health Research.* 2021;31(10):1856-70.
38. Tan D. PrEP implementation in Muslim-majority countries: A systematic review. *AIDS Care.* 2023;35(4):456-68.
39. Dubov A, Galbo P Jr, Altice FL, Fraenkel L. Stigma and Shame Experiences by MSM Who Take PrEP for HIV Prevention: A Qualitative Study. *Am J Mens Health.* 2018 Nov;12(6):1843-1854.