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Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City

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Factors Affecting HIV PrEP Willingness

Original Article

Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City

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Factors Affecting Willingness to Use HIV PrEP

Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City

Abstract

Background: To improve upon the implementation and utilization of HIV PrEP programs, factors affecting HIV PrEP willingness must be investigated. This study aims to determine not only the willingness to use HIV PrEP but also to establish whether awareness and attitude affect this.

Methods: This study used a cross-sectional survey research design to examine the awareness, attitude, and willingness to use HIV PrEP in Davao City. Participants were at least 18 years of age, currently living in Davao City, and a permanent resident of the city. The survey was adapted from multiple studies and was determined to be valid and reliable. Statistical analysis included descriptive and inferential statistics like correlation, linear regression, and structural modelling.

Results: 53.10% of all respondents were fully aware of HIV PrEP, while 27.13% were partially aware. The study found the mean attitude and willingness to be 4.21 ± 0.972 and 4.08 ± 0.685 , respectively. There was a significant difference in the awareness when grouped according to gender identity ($X^2=24.428$; $p\text{-value}=.002$) and highest education attained ($X^2=15.919$; $p\text{-value}=.044$). Being fully aware positively affected willingness to use HIV PrEP by indirectly contributing positively to attitude towards HIV PrEP ($\beta=0.263$; $p\text{-value}=.012$).

Conclusion: Generally, the results were found to be favorable. However, some respondents are hesitant to use HIV PrEP if it is not a hundred percent effective and unable to adhere to it. The results imply a need for action programs involving various multidisciplinary stakeholders

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to ensure the community possesses full awareness, positive attitudes, and increased willingness to use HIV PrEP.

Keywords: HIV/AIDS, Prevention, Education, Public Health, Multi-disciplinary, Philippines, Epidemiology

Strengths and Limitations of the Study

- This is the one of the first, if not the first, survey done in Davao City that investigated the awareness, attitude, and willingness to use HIV PrEP among its residents.
- The survey instrument used was adapted from previous studies but have undergone reliability testing to ensure it is appropriate for use.
- Stratified random sampling was used to ensure the data is representative of the respondents in the city.
- Gender identity and sexual preference was merged but further studies should be more comprehensive and separate these to provide more insights.
- A limitation of this study is that awareness was measured using two general “yes/no” questions and cannot measure how much residents actually know about HIV PrEP.

INTRODUCTION

With the rise of HIV/AIDS in the country, biomedical interventions like HIV Pre-Exposure Prophylaxis (PrEP) have become important in the prevention of the said disease. HIV PrEP, with sufficient adherence, has been proven safe and effective in preventing HIV transmission [1]. Despite PrEP launching in 2017 [2], the literature surrounding its utilization and its discrepancies like awareness, attitude, and willingness to use among the people in Davao City are scant.

The Davao Region has consistently been high in HIV incidence. A news article reported that in February 2023 alone, Davao City was one of the top four regions with the highest HIV cases [3]. In May 2023 as well, the region was recorded as the fifth with the highest number of HIV incidences [4]. From January to August of the year 2023, the total number of HIV cases in the region was 700 [5]. Lastly, there have been 6,736 cases of HIV in the region from 1993 to August 2023 [6]. Of that total number, 4,654 cases were from Davao City [5].

Because of the increasing rise in HIV, the Davao Region has been assured enough antiretroviral medicines and dynamic treatment facilities [6]. The region has three treatment facilities - two in Davao City and one in Tagum City. The Southern Philippines Medical Center and the City Health Office through the Reproductive Health and Wellness Center are treatment facilities in Davao City. At the same time, the Davao Regional Medical Center is the treatment hub in Tagum City. There have also been plans to increase the number of treatment facilities, making one in every province [6].

Despite that, there is not enough research and investigation highlighting the awareness and acceptability of Davaoños regarding HIV PrEP use and access, while related literature in the Philippines shows some variation. A study in Metro Manila showed that one in two transgender Filipinas were unaware of HIV PrEP but were interested in knowing more about

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it [7]. Meanwhile, a study done in Cebu and NCR found that HIV PrEP awareness and interest were high in men who have sex with men [8]. A study in the Philippines has also shown that PrEP initiation is low, which leads to suboptimal outcomes of other HIV-related services like online-based HIV self-testing [9]. These findings indicate the importance of the current study, and addressing PrEP awareness may enhance its utilization and access [10].

Clearly, a knowledge gap needs to be addressed to better implement PrEP programs and other prevention strategies. This is where the current study positions itself. Understanding the awareness and acceptance of Davaoeños will shed light on PrEP discrepancy, including its utilization and accessibility. It will allow key stakeholders to determine the willingness of the community to use HIV PrEP and how awareness and attitude can affect this. Ultimately, this research can be of benefit to health promotion campaigns targeted towards prevention of HIV/AIDS.

MATERIALS AND METHODS

Research Design

The methodological framework and design of this study followed a quantitative, cross-sectional survey design. A quantitative research design involves generating and using numerical data that answer specific research questions by employing statistical techniques for inference [11]. Additionally, a cross-sectional design was used because data collection was done at a single point in time on a large sample to get a “screenshot” of the parameters and constructs of interest [12]. Cross-sectional designs are usually used in public health for monitoring the prevalence of health outcomes, describing population characteristics, and understanding health determinants [13]. Because this study aims to establish different social constructs like attitude, awareness, and willingness to use HIV PrEP, a survey research design is practical.

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Research Locale & Respondents

The research locale of this study was the city capital of Region XI - Davao City. Davao City has a population of 1,776,949 in 2020 [14]. Additionally, the city also has three congressional districts with 11 administrative districts - Poblacion, Talomo, Buhangin, Bunawan, Agdao, Paquibato, Baguio, Calinan, Marilog, Toril, Tugbok [15].

The general population of Davao City was the respondents of this study. For the inclusion, the respondents should be a permanent resident and currently living in Davao City during the time of data collection, should be aged at least 18 years old, and should have the mental capacity to answer the survey. Exclusion criteria include those mentally challenged individuals who are not able to answer the survey, pre-pubescent individuals, adults older than 60 years old, and individuals who do not live in Davao City during the time of collection.

Because the current study collected data from the general population of the research locale, a representative sample was most appropriate. The sampling method to be used is stratified random sampling. The administrative districts of Davao City will be the basis for the strata. The sample size will be calculated using the Raosoft® sample size calculator (<https://raosoft.com/samplesize.html>).

Research Instrument

The research instrument used in this study was a structured survey questionnaire. The survey was composed of four sections – demographics, awareness, attitudes, and willingness to use HIV PrEP. Before the second section, a brief description of HIV PrEP was included so that regardless of awareness, respondents are introduced to and informed of the nature of HIV PrEP. The survey will take less than 30 minutes to finish. To ensure that the potential participants easily understood the questionnaire, the questionnaire was prepared in two languages - English and Filipino.

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Only select demographic characteristics were collected to ensure that sensitivity and privacy were upheld. For this reason, only age, gender identity, location (administrative district residing), highest education obtained, and marital status were collected in the survey's first section.

The questions in the succeeding sections were adapted from previous studies in literature. From a previous study, awareness of HIV PrEP was established if respondents answered yes to two yes-or-no questions or either of these two [16]. The first question asked respondents if they had heard of HIV PrEP prior to the study, and the follow-up question asked whether they had heard of a program for taking antiretroviral drugs to prevent the contraction of HIV. However, the current research categorized respondents as fully aware if they answered yes to both questions, partially aware if either of the two were answered with yes, and not aware if both questions were answered with no. Furthermore, the respondents were also asked whether they were offered HIV PrEP before. Then, participants were asked from among a set of choices which channel was the source of their awareness.

The researcher adapted questions for attitude from the study of Mueses-Marín et al. (2021). In assessing willingness to use HIV PrEP, the researcher adapted from the study conducted by Holt et al. (2012), but an item was removed because it did not fit the context of the current study. There are a total of five statements for attitude and six statements for willingness to use. Additionally, both sections of the questionnaire used a 5-point Likert scale to assess the respondents' agreement with these items.

The final survey was validated and tested for reliability and consistency. The researcher requested content validation from three experts. These experts are from the College of Pharmacy and Chemistry - one is an expert in research, one in pharmacy practice, and one in statistics. Then, the questionnaire was pilot-tested to 12 participants to obtain

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reliability data. The pilot test revealed good reliability ($\alpha = 0.854$) for attitude and acceptable reliability ($\alpha = 0.734$) for willingness to use.

Data Gathering Procedures

Before actual data collection, the researcher sought approval from relevant stakeholders. Specifically, the researcher sought permission from the city mayor’s office of Davao City since the target respondents are the general population of the said city. Furthermore, the study underwent a research ethics review from the University of the Immaculate Conception Research Ethics Committee. After obtaining permission and ethical clearance, the actual data collection commenced.

An informed consent form precedes the survey and must have been approved by the respondents before allowing access to the questionnaire. Those who did not agree to participate could not access the survey. The survey period ran for three months to ensure the target sample was obtained. Afterwards, the researcher conducted data cleanup. Once this was done, the researcher proceeded to statistical analysis and inference.

Statistical Analysis

In this study, a multitude of statistical tests and tools were used that were descriptive or inferential. To carry out these tests, the researcher used JASP v 0.18.3, an open-access and capable statistical software. Statistical tests conducted included mean, frequencies, percentages, Pearson’s correlation, Spearman’s rank correlation, ANOVA, Chi-square test, and mediation analysis through JASP Process (beta) module.

RESULTS

Table 1 below shows the demographic characteristics of the sample. Of the 385 targeted respondents, only 258 (67.01%) respondents responded. In descending order, the most frequent age group was found to be 18 to 24 years old (50.78%), 25 to 34 years old

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(41.09%), 35 to 44 years old (6.58%), and more than or equal to 45 years old (1.55). Straights make up 45.74% of the respondents, followed by bisexuals (28.68%), gays (19.77%), others (3.88%), and transexuals (1.94%). Respondents were mainly from Poblacion (34.50%), Buhangin (22.87%), and Talomo (19.38%). The highest education attained by most respondents was college level (65.50%), high school level (24.03%), and graduate education (6.59%). Most of the respondents were single (91.86%), with some married (4.26%) and eloped (3.88%).

Furthermore, Table 1 also shows the respondents' awareness, their main source of information, and the distribution of attitude and willingness to use HIV PrEP according to demographics and their statistical significance. 137 respondents (53.10%) were found to be fully aware of HIV PrEP; 70 respondents (27.13) were partially aware, and the rest (19.77) were unaware. The three sources of information with the highest percent frequencies were social media (36.82%), peer discussion (23.26), and government clinics (15.89%). Furthermore, only 78 respondents (30.23%) reported being offered PrEP before the survey.

Table 2 below shows the distribution of awareness when grouped according to demographics and its statistical significance. Through the Chi-square test, only gender identity ($X^2=24.428$; $p\text{-value}=0.002$) and highest educational attainment ($X^2=15.919$; $p\text{-value}=0.044$) were found to be significant. The rest of the demographic profiles were found to be non-significant. When taking the proportion of respondents that are aware and grouped according to gender identity, 94.12% of the gays were aware, while bisexuals and straights were only 85.14% and 71.19% aware, respectively. When grouped according to highest education attained, highest percent of being aware was observed from graduate education (94.12%), college level (82.25%), vocational (77.78%), high school level, (72.58%), and elementary level (0.00%). When taking a closer look at those who are aware compared to the total population of their respective gender identity, gays still had a higher percent proportion

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of being fully aware (76.47%) compared to bisexuals (54.05%) and straights (41.53%). Furthermore, individuals found to have attained graduate education remain to have the highest percentage of being fully aware (88.24%) followed by vocational (55.56%) and college level (52.07%) respective of their group population.

Table 3 shows the attitude and willingness to use HIV PrEP among the respondent Davaoeños. The mean attitude score was found to be 4.21 with a standard deviation of 0.686, while the mean willingness score was found to be 4.08 with a standard deviation of 0.685. When conducting a closer inspection of the attitude statements, we see that statement 2 had the highest mean (mean=4.47; SD=0.804) while statement 4 had the lowest mean (mean=3.81; SD=0.988). Among the statements assessing willingness to use, statements 1 and 2 were the highest (mean=4.44), while statement 6 was the lowest (mean=3.52; SD=1.251).

Tables 4 and 5 are results of inferential statistics that establishes the relationship the variables have with each other. Table 4 shows the correlation between the variables under investigation. Only awareness and attitude did not correlate significantly (p-value=.060). Furthermore, correlating awareness to willingness to use ($\rho=0.214$; p-value<.000) and attitude to willingness to use ($r=0.640$; p-value<.000) showed significant p-values. Furthermore, awareness (standardized beta = 0.111; p-value=.022) and attitude (standardized beta = 0.625; p-value<.000) were found to be significant predictor variables to the outcome variable, willingness to use.

When investigating, the direct and mediating effects of the results are presented in Table 6. The total effect of being partially aware on willingness was found to be insignificant (p-value=0.634), but the total effect of being fully aware on willingness was found to be significant (p=.005). Through Preacher and Hayes approach, the mediating effect of attitude on willingness was found to be significant for both being partially aware (estimate=0.284; p-

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value=.016) and fully aware (estimate=0.263; p-value=.016). Lastly, direct effects of awareness to willingness to use HIV PrEP were not found to be significant, indicating a complete mediation relationship. Figure 1 shows the paths of the variables.

DISCUSSIONS

The current study provides information on the awareness, attitude, and willingness to use HIV PrEP among residents of Davao City. Additionally, this study also shows the relationships that these constructs have with each other. While many studies have investigated HIV PrEP awareness, attitude, and willingness to use among high-risk individuals, this study focused more on the general population in Davao City. The findings provide valuable insights as a basis for health promotion campaigns, policy development, and other action programs intended for the management and prevention of HIV/AIDS, particularly for the improvement of HIV PrEP programs.

Demographics show that the respondents were mainly teens aged 18 to 24 years old followed by adults aged 25 to 34 years old. Surprisingly enough, many of the respondents identify as straight. This would indicate that there is interest in HIV PrEP among heterosexual individuals in the city. Currently, HIV PrEP in Davao City is emphasized more for queer and at-risk individuals. These at-risk individuals include men who have sex with men, people who inject drugs, transgender individuals, and other vulnerable groups [19]. Furthermore, PrEP is offered only through a government-owned primary HIV/AIDS facility. Those at-risk individuals may avail of PrEP free of charge, but those otherwise would have to buy out of pocket since it isn't covered by healthcare insurance [19].

This study also shows the awareness of Davaoeños regarding HIV PrEP. The findings show that more than half of the respondents were fully aware of HIV PrEP. This finding corroborates a similar study in Cebu and Manila [8]. Furthermore, the main sources of

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information among those who are aware included social media, peer discussion, and government clinics. Social media has also been found to be the primary source of information in another study [20]. Furthermore, the results of this study showing awareness through peer discussion corroborate with that of Restar et al., indicating high awareness was associated with having friends who discussed PrEP [7,8]. Despite that, the findings also show individuals who are partially aware and those who are not aware of HIV PrEP. The three main sources of information found in this study can be optimized even more to ensure a wider reach and more efficient delivery of information to provide not only awareness of HIV PrEP but also comprehensive knowledge about HIV PrEP in the community.

When analyzed if respondents who are fully or partially aware are affected or equally distributed by demographics, we see a significant difference in awareness of the respondents based on gender identity and highest educational attainment. Findings indicate that gays have more awareness than the rest, owing to a higher proportion of being fully aware relative to their group population. The high awareness noted in this study may be a result of homosexuals having more perceived risk of contraction because of riskier behaviors and seeking more sexual sensations, and other factors like personal beliefs, emotional history, relationships and social roles [21–23]. The findings also indicate that straights have the least awareness relative to their group population. This finding resonates with previous literature indicating low awareness among heterosexual individuals [24–27]. Furthermore, a higher frequency of awareness was observed from individuals with higher educational attainment. This finding resonates with studies showing PrEP awareness is associated with higher education [28–30].

Regarding attitude, the mean score was found to be 4.28±0.872, which can be described as very high. This means that the respondents show a very good attitude towards HIV PrEP. Among the statements that assessed attitude, statement 2 (*I think that people who*

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take HIV PrEP are responsible) was found to be the highest. This would indicate that the respondents possess low stigma towards people taking HIV PrEP and see such individuals as responsible for their health. This finding contradicts studies that showed stigmatizing attitudes toward PrEP use because of being stereotyped into promiscuity and other conspiracy beliefs, being rejected for such stereotyping, and additional HIV stigma that may have transferred to PrEP use [31,32]. It can be postulated from this finding that there is little stigma regarding HIV and PrEP in Davao City, but more investigation and research are needed to substantiate this claim.

In relation to attitude, statement 4 (*It would be no trouble for me to take HIV PrEP every day*) was found to have the lowest mean score among the statements under attitude. Although this score can still be interpreted as high, this result would mean that some respondents may perceive problems in adherence and persistence when initiating and sustaining PrEP. This finding is similar to that of Shamu et al. (2021), but the current study does not show whether this adherence challenge differed by sex in the same way observed in that study.

Willingness to use HIV PrEP among the residents of Davao City can be described as high level. This means that Davaoeños are willing to seek and use HIV PrEP given the opportunity and with enough access. This finding corroborates a previous study indicating respondents were interested in taking PrEP [8]. This finding is even more evident with statements 1 (*I am willing to take PrEP to prevent getting HIV*) and 2 (*I am willing to take pills before and after sex if it would prevent me getting HIV*) garnering the highest scores under this construct. However, statement 6 (*I would take PrEP even if it wasn't 100% effective*), being interpreted as high, was found to have the lowest mean score among the statements assessing willingness. This would indicate hesitation among the respondents in using PrEP if it isn't a hundred percent effective. Evidence does suggest that the effectiveness

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of HIV PrEP is lower compared to estimates from clinical studies [33], and educational campaigns should still highlight the importance of PrEP and its contribution to reduced HIV incidence.

No significant difference was observed when comparing the attitude and willingness of the respondents based on demographic profile. This meant that age, location, education, gender identity and sexual preference did not affect the attitude and willingness to use HIV PrEP among the respondents in Davao City. Future research can investigate other demographic characteristics (like socioeconomic background, profession, sexual risk behaviors, and social or cultural factors) and establish if the same statistical outcome can still be observed.

The current study also establishes the relationship between awareness, attitude, and willingness to use HIV PrEP. Through correlation statistics, attitude to willingness was found to have a strong correlation. Furthermore, awareness and willingness were also correlated significantly. Through linear regression, as shown in Table 5, we also find that both awareness and attitude were key predictors of willingness to use. It can be inferred that awareness of HIV PrEP and positive attitudes positively predict one's willingness to use it.

Mediation analysis provides a more comprehensive path relation between the constructs. It provides a basis for hypothesizing whether willingness to use HIV PrEP is directly affected by awareness or is mediated by attitude. Table 6 shows that awareness of HIV PrEP has an insignificant direct effect on willingness to use HIV PrEP. However, being fully aware has a significant indirect effect on willingness to use HIV PrEP and is mediated by attitude towards HIV PrEP ($\beta=0.263$; $p=.012$). Furthermore, being partially aware also has a significant indirect effect on willingness ($p\text{-value}=.016$), but the total effect of being partially aware were found to be insignificant ($p\text{-value}=.634$). The findings mean that there is a full mediation effect between being fully aware and willingness to use HIV PrEP that is

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found to be statistically significant – those who are fully aware show a more positive attitude, and because of this positive attitude, there is more willingness to use HIV PrEP. Furthermore, attitude accounts for around 58.06% of the variation in willingness because of being fully aware. The full mediation pathway observed in this study resonates with another study, indicating no direct path between PrEP-related information and motivation to willingness to use PrEP [34]. Furthermore, this finding resonates with studies showing direct associations and indirect effects of awareness and attitude to willingness to use HIV PrEP [16,35].

The findings of this study indicate various implications for improving HIV PrEP programs in Davao City and the Philippines. First, there is a need to start targeting educational campaigns among straight individuals while simultaneously sustaining efforts for queer and at-risk people. It is possible that, as a majority in the population, straights can influence social norms and cultural beliefs, contributing to reduced stigma and increased attitudes. Much of the current efforts for health promotion campaigns for HIV prevention and management are working owing to more fully aware individuals observed in this study. Furthermore, one key finding in this study is that even just awareness can positively impact attitude and in turn, willingness to use HIV PrEP indicating that efforts for educational campaigns should be sustained, and more innovations to deliver accurate information to the rest of the citizens should be considered. Furthermore, misconceptions about the efficacy of HIV PrEP and hesitance to initiation must also be targeted by these educational campaigns and also in counselling sessions. Action programs should also target attitude, seeing that it mediates willingness to use. Incorporating lessons to increase positive attitudes in academic institutions, as part of sex education or in other health-related subjects both at secondary and tertiary levels, may be beneficial.

Despite the results and findings of this study, a couple of limitations should be pointed out. Knowing the awareness, attitude, and willingness to use HIV PrEP among

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Davaoeños based on gender identity and sexual orientation is limited in the current study. This is because both gender identity and sexual preference have been merged into one sub-section. For a more inclusive and comprehensive understanding of this demographic, future research must separate gender identity from sexual orientation. Future research can identify if there are sex-related discrepancies in the awareness, attitude, and willingness to use HIV PrEP in the city. Additionally, this study is limited with the inferences that can be made regarding how much the respondents actually know about PrEP. The current study only measured awareness using a yes/no question of the respondents and not specific knowledge towards HIV and HIV prophylaxis.

CONCLUSION

This study has shown that Davaoeños are aware of HIV PrEP and possess a very high level of attitude and a high level of willingness to use it. Furthermore, willingness to use HIV PrEP was found to be affected by being fully aware of it through the mediation of one’s attitude towards HIV PrEP. Although there are individuals who hesitate towards HIV PrEP because of misconceptions like its perceived effectiveness and perceived challenge in adherence, this calls for the need for targeted educational campaigns and health promotion activities. There needs to be a multi-disciplinary action program involving various stakeholders like the government, non-profit organizations, academe, and the rest of the community to ensure full awareness, positive attitudes, and increased willingness to use HIV PrEP. The results of the current study can be used as a basis for the crafting and developing policies, programs, and interventions geared towards enhancing the utilization of HIV PrEP in Davao City.

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Conflict of Interest: Author declares no conflict of interest.

Informed Consent: Informed consents were collected from all participants in this study.

Ethical Approval: This study was submitted to the Research Ethics Committee of the University of the Immaculate Conception for ethical review with the protocol code EX-40-02-24. Upon review, the study was deemed to be responsible and ethically accountable and was given ethical clearance on March 07, 2024.

Data Availability Statement: Data are available and will be shared on reasonable request to the corresponding author.

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TABLES

Table 1. Demographic Profile of the Respondents and Significant Difference (ANOVA)

Demographic Profile	Frequency (%)	Attitude		Willingness	
		Mean	F	Mean	F
Age			0.135		0.923
18 – 24 years old	131 (50.78)	4.23		4.06	
25 – 34 years old	106 (41.09)	4.19		4.10	
35 – 44 years old	17 (6.58)	4.24		4.19	
>45 years old	4 (1.55)	4.05		3.58	
Gender Identity			1.800		1.767
Gay	51 (19.77)	4.43		4.18	
Bisexual	74 (28.68)	4.22		4.18	
Straight	118 (45.74)	4.12		3.97	
Transexual	5 (1.94)	4.2		3.83	
Others	10 (3.88)	4.14		4.25	
Location			0.267		0.551
Poblacion	89 (34.50)	4.21		4.12	
Talomo	50 (19.38)	4.23		4.06	
Buhangin	59 (22.87)	4.19		3.97	
Bunawan	13 (5.04)	4.22		4.10	
Agdao	16 (6.20)	4.08		4.15	
Baguio	1 (0.39)	4.00		4.33	
Calinan	8 (3.49)	4.16		3.91	
Toril	13 (5.04)	4.40		4.33	
Tugbok	8 (3.10)	4.35		4.06	

Factors Affecting Willingness to Use HIV PrEP

Highest Education			2.040	1.530
Elementary	1 (0.39)	4.60	4.83	
High School	62 (24.03)	4.27	4.16	
Vocational	9 (3.49)	3.64	3.95	
College	169 (65.50)	4.20	4.02	
Graduate Education	17 (6.59)	4.39	4.35	
Marital Status			0.162	0.257
Single	237 (91.86)	4.21	4.07	
Married	11 (4.26)	4.29	4.21	
Living Together	10 (3.88)	4.12	4.13	
Separated/annulled	0 (0.00)			
Widowed	0 (0.00)			
Awareness to HIV PrEP				
Fully Aware	137 (53.10)			
Partially Aware	70 (27.13)			
Not Aware	51 (19.77)			
Have been offered PrEP				
before	78 (30.23)			
Yes	180 (69.77)			
No				
Source of Information				
News & Television	11 (4.26)			
Radio	2 (0.78)			
Social Media	95 (36.82)			
Peer discussion	60 (23.26)			

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Factors Affecting Willingness to Use HIV PrEP

Printed posters	1 (0.39)
Government clinics	41 (15.89)
Others: School	1 (0.39)

Note. Significant differences at p-values <.05 in attitude and willingness to use HIV PrEP when grouped according to demographics are denoted by an asterisk ().

Table 2. Significant Difference in Awareness When Grouped According to Demographic Profile (Pearson Chi-square Test)

Demographic Profile	Awareness			X ²	p-value
	NA	PA	FA		
Age				11.273	.080
18 – 24 years old	32	42	57		
25 – 34 years old	14	24	68		
35 – 44 years old	4	3	10		
>45 years old	1	1	2		
Gender Identity				24.428	.002*
Gay	3	9	39		
Bisexual	11	23	40		
Straight	34	35	49		
Transexual	2	0	3		
Others	1	3	6		
Location				20.226	.210
Poblacion	20	26	43		

Factors Affecting Willingness to Use HIV PrEP

Talomo	9	7	34		
Buhangin	11	21	27		
Bunawan	1	6	6		
Agdao	4	6	6		
Baguio	0	0	1		
Calinan	0	2	7		
Toril	4	1	8		
Tugbok	2	1	5		
Highest Education				15.919	.044*
Elementary	1	0	0		
High School	17	16	29		
Vocational	2	2	5		
College	30	51	88		
Graduate Education	1	1	15		
Marital Status				7.808	.099
Single	47	66	124		
Married	4	3	4		
Living Together	0	1	9		

Note. NA=Not Aware; PA=Partially Aware; FA=Fully Aware; P-values <.05 and are statistically significant are denoted by an asterisk ().

Table 3. Attitude and Willingness to Use HIV PrEP Among the Respondents

Statement	Mean	SD
1. I believe PrEP is effective at preventing HIV.	4.30	0.829

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Factors Affecting Willingness to Use HIV PrEP

2. I think that people who take HIV PrEP are responsible.	4.47	0.804
3. I believe taking HIV PrEP is safe for use.	4.21	0.861
4. It would be no trouble for me to take HIV PrEP every day.	3.81	0.988
5. I believe the government makes certain that drugs like HIV PrEP are safe for use.	4.28	0.872
Mean Attitude Score	4.21	0.686
1. I am willing to take PrEP to prevent getting HIV.	4.44	0.808
2. I am willing to take pills before and after sex if it would prevent me getting HIV.	4.44	0.827
3. I am willing to take a pill everyday if it would prevent me from getting HIV.	4.30	0.966
4. I would never need to take PrEP. (Reverse Coded)	3.88	1.25
5. I would be willing to pay for laboratory tests needed while taking PrEP.	3.88	1.094
6. I would take PrEP even if it wasn't 100% effective.	3.52	1.251
Mean Willingness Score	4.08	0.685

Table 4. Correlation between Awareness, Attitude, and Willingness to Use HIV PrEP

Variables	<i>r / rho</i>	p-value	Inference
Awareness – Attitude	0.117	.060	Not Significant
Awareness – Willingness to Use	0.214	<.000	Significant
Attitude – Willingness to Use	0.640	<.000	Significant

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Table 5. Predictor relationship of Awareness and Attitude on Willingness to Use using Multiple Linear Regression

Variables	β	t	p-value	Inference
Awareness	0.111	2.300	.022	Significant
Attitude	0.625	13.012	<.000	Significant

*Note. β =standardized beta coefficient; R=0.649; R²=0.422; F=93.006; p=<.000

Table 6. Direct and Mediation Effects of Awareness and Attitude on Willingness to Use HIV PrEP

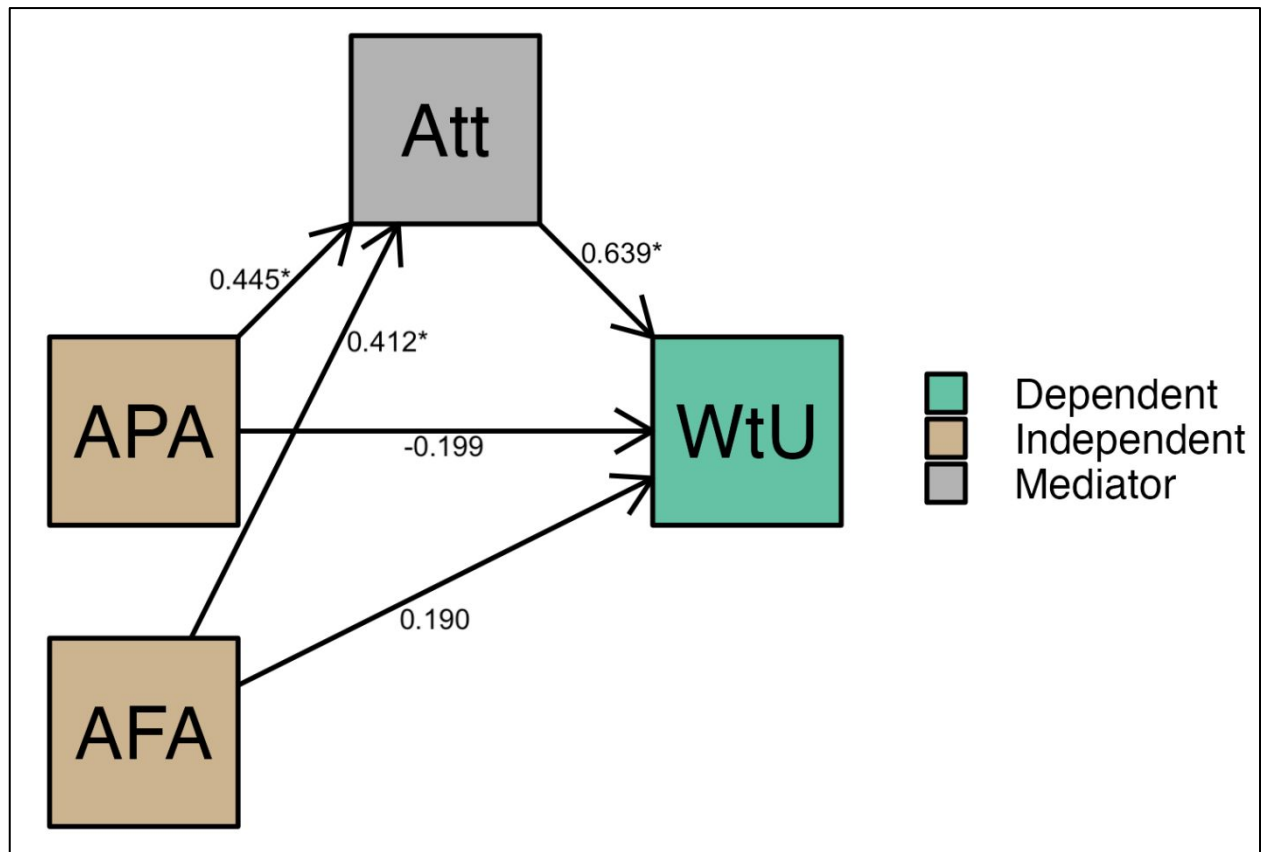
Effect	Path	β	p-value
Total	Partially Aware → Willingness	0.086	.634
Total	Fully Aware → Willingness	0.453	.005*
Direct	Partially Aware → Willingness	-0.199	.154
Direct	Fully Aware → Willingness	0.199	.126
Indirect	Partially Aware → Attitude → Willingness	0.284	.016*
Indirect	Fully Aware → Attitude → Willingness	0.263	.012*

Note. Significant causal effects are denoted by an asterisk (); R²=0.438

Figure 1. Path Diagram of the Direct and Indirect Effects of the Predictor Variables

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Note. APA=Awareness – Partially Aware; AFA= Awareness – Fully Aware; Att=Attitude; WtU=Willingness to Use; Significant path relations are distinguished by an asterisk (*).

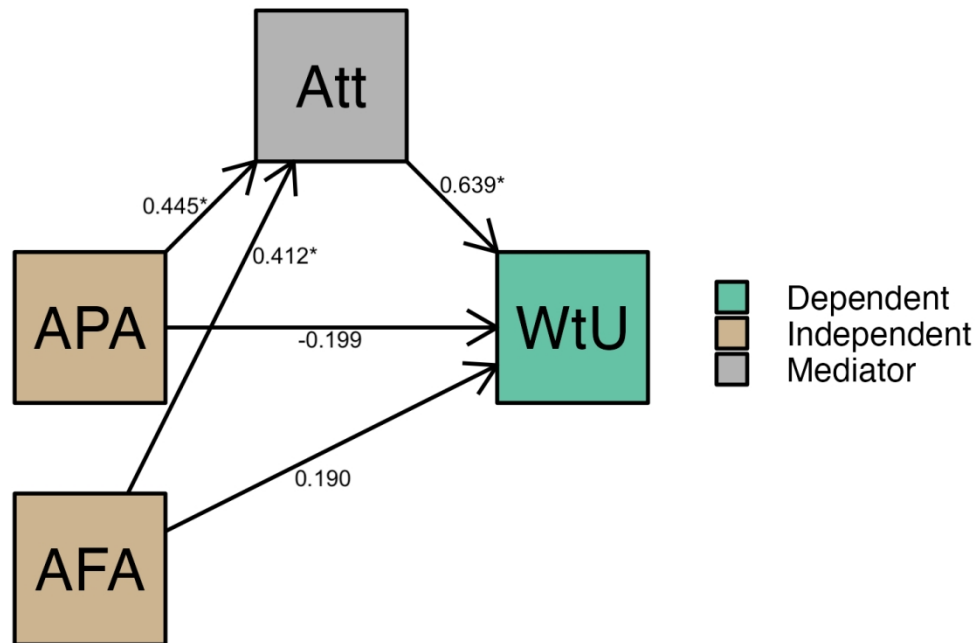


Figure 1. Path Diagram of the Direct and Indirect Effects of the Predictor Variables

169x169mm (225 x 225 DPI)

BMJ Open

A Cross-Sectional Study Measuring the Level and Relationship of Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City, Philippines

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Factors Affecting Willingness to Use HIV PrEP

A Cross-Sectional Study Measuring the Level and Relationship of Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City, Philippines

Abstract

Objectives: To improve upon the implementation and utilization of HIV PrEP programs, factors affecting HIV PrEP willingness must be investigated. This study aims to determine not only the willingness to use HIV PrEP but also to establish whether awareness and attitude affect this.

Design: This study used a cross-sectional survey research design to examine the awareness, attitude, and willingness to use HIV PrEP in Davao City. The survey was adapted from multiple studies and was validated and pilot tested. Statistical analysis included descriptive and inferential statistics like correlation, linear regression, and structural modelling.

Settings: This research was conducted at Davao City, Philippines. This is one of the regions in the country with high HIV incidence. Survey was done from March to June 2024.

Participants: Participants were at least 18 years of age, currently living in Davao City, and a permanent resident of the city.

Results: A total of 258 respondents were gathered in this study of which, 53.10% of all respondents were fully aware of HIV PrEP, while 27.13% were partially aware. The study found the mean attitude and willingness to be 4.21 ± 0.972 and 4.08 ± 0.685 , respectively. There was a significant difference in the awareness when grouped according to gender identity ($X^2=24.428$; $p\text{-value}=0.002$) and highest education attained ($X^2=15.919$; $p\text{-value}=0.044$). Being fully aware positively affected willingness to use HIV PrEP by indirectly contributing positively to attitude towards HIV PrEP ($\beta=0.180$; $p\text{-value}=0.012$).

Conclusion: Generally, the awareness, attitude, and willingness to use HIV PrEP is high. However, some respondents are hesitant to use HIV PrEP if it is not a hundred percent

Factors Affecting Willingness to Use HIV PrEP

effective and unable to adhere to it. The results imply a need for action programs involving various multidisciplinary stakeholders to ensure the community possesses full awareness, positive attitudes, and increased willingness to use HIV PrEP.

Keywords: HIV/AIDS, Prevention, Education, Public Health, Multi-disciplinary, Philippines, Epidemiology

Strengths and Limitations of the Study

- The survey was done online through social media posts which provides to potential respondents their voluntary participation, anonymity, privacy and comfort,
- The survey instrument used was adapted from previous studies but have undergone reliability testing to ensure it is appropriate for use.
- Stratified random sampling was used to ensure the data is representative of the respondents in the city.
- Gender identity and sexual preference was merged but further studies should be more comprehensive and separate these to provide more insights.
- A limitation of this study is that awareness was measured using two general “yes/no” questions and cannot measure how much residents know about HIV PrEP.

Factors Affecting Willingness to Use HIV PrEP

INTRODUCTION

With the rise of HIV/AIDS in the country, biomedical interventions like HIV Pre-Exposure Prophylaxis (PrEP) has become important in the prevention of HIV contraction and infection. HIV PrEP, with sufficient adherence, has been proven safe and effective in preventing HIV transmission [1]. Despite PrEP launching in 2017 [2], the literature surrounding its utilization and its discrepancies like awareness, attitude, and willingness to use among the people in Davao City are scant.

To put it into context, the Davao Region has consistently been high in HIV incidence. A news article reported that in February 2023 alone, Davao City was one of the top four regions with the highest HIV cases [3]. Additionally, the region was recorded as the fifth with the highest number of HIV incidences based on the HIV/AIDS Registry of the Philippines collected by the Epidemiology Bureau of the Department of Health in May 2023 [4]. Lastly, there have been 6,736 cases of HIV in the region from 1993 to August 2023 [5]. Of that total number, 4,654 cases were from Davao City [6].

Because of the increasing rise in HIV, the Davao Region has been assured enough antiretroviral medicines and dynamic treatment facilities [5]. The region has three treatment facilities - two in Davao City and one in Tagum City. The Southern Philippines Medical Center and the City Health Office through the Reproductive Health and Wellness Center are treatment facilities in Davao City. At the same time, the Davao Regional Medical Center is the treatment hub in Tagum City. There have also been plans to increase the number of treatment facilities, making one in every province [5].

Despite that, there is not enough research and investigation highlighting the awareness and acceptability of Davaoeños regarding HIV PrEP use and access, while related literature in the Philippines shows some variation. A study in Metro Manila showed that one in two transgender Filipinas were unaware of HIV PrEP but were interested in knowing more about

Factors Affecting Willingness to Use HIV PrEP

it [7]. Meanwhile, a study done in Cebu and NCR found that HIV PrEP awareness and interest were high in men who have sex with men [8]. A study in the Philippines has also shown that PrEP initiation is low, which leads to suboptimal outcomes of other HIV-related services like online-based HIV self-testing [9]. These findings indicate the importance of the current study, and addressing PrEP awareness may enhance its utilization and access [10].

Clearly, a knowledge gap must be addressed in order to implement PrEP programs and other prevention strategies better. This is where the current study positions itself. The aim of this study is to measure the level of awareness, attitude, and willingness to use HIV PrEP among the people in Davao City, Philippines. Furthermore, the relationship between these three constructs shall also be established. Understanding the awareness and attitude of Davaoeños will shed light on PrEP discrepancy, including its utilization and accessibility. It will allow key stakeholders like policy makers and health agencies to determine the willingness of the community to use HIV PrEP and how awareness and attitude can affect this. Ultimately, this research can be of benefit to health promotion campaigns targeted towards prevention of HIV/AIDS.

MATERIALS AND METHODS

Research Design

The research design utilized in this study was a quantitative, cross-sectional survey design. A quantitative research design involves generating and using numerical data that answer specific research questions by employing statistical techniques for inference [11]. Additionally, a cross-sectional design was used because data collection was done at a single point in time on a large sample to get a “screenshot” of the parameters and constructs of interest [12]. Cross-sectional designs are usually used in public health for monitoring the

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prevalence of health outcomes, describing population characteristics, and understanding health determinants [13].

Research Locale & Respondents

The research locale of this study was the city capital of Region XI - Davao City. Davao City has a population of 1,776,949 in 2020 [14]. Additionally, the city also has three congressional districts with 11 administrative districts - Poblacion, Talomo, Buhangin, Bunawan, Agdao, Paquibato, Baguio, Calinan, Marilog, Toril, Tugbok [15].

The general population of Davao City was the respondents of this study. For the inclusion, the respondents should be a permanent resident and currently living in Davao City during the time of data collection, should be aged at least 18 years old. Exclusion criteria include those mentally challenged individuals who are physically unable to answer the survey, pre-pubescent individuals, adults older than 60 years old, and individuals who do not live in Davao City during the time of collection.

Because the current study collected data from the general population of the research locale, a representative sample was most appropriate. The sampling method to be used is stratified random sampling. The population of Davao City is based on the 2020 Census of Population and Housing of the Philippine Statistics Authority. The total population was 1,776,949 [16]. The sample size was calculated using the Raosoft® sample size calculator (<https://raosoft.com/samplesize.html>). Then, stratification was done based on the 11 administrative districts of Davao City.

Research Instrument

The research instrument used in this study was a structured survey questionnaire. The survey was composed of four sections – demographics, awareness, attitudes, and willingness to use HIV PrEP. Before the second section, a brief description of HIV PrEP was included so

Factors Affecting Willingness to Use HIV PrEP

that regardless of awareness, respondents are introduced to and informed of the nature of HIV PrEP. The survey will take less than 30 minutes to finish. The questionnaire was prepared in two languages to ensure that the potential participants easily understood the questionnaire languages—English and Filipino.

Only select demographic characteristics were collected to ensure that sensitivity and privacy were upheld. For this reason, only age, gender identity, location (administrative district residing), highest education obtained, and marital status were collected in the survey's first section.

The questions in the succeeding sections were adapted from previous studies in the literature. From a previous study, awareness of HIV PrEP was established if respondents answered yes to two yes-or-no questions or either of these two [17]. The first question asked respondents if they had heard of HIV PrEP prior to the study, and the follow-up question asked whether they had heard of a program for taking antiretroviral drugs to prevent the contraction of HIV. However, the current research categorized respondents as fully aware if they answered yes to both questions, partially aware if either of the two were answered with yes, and not aware if both questions were answered with no. Furthermore, the respondents were also asked whether they were offered HIV PrEP before. Then, participants were asked from among a set of choices which channel was the source of their awareness.

The researcher adapted questions for attitude from the study of Mueses-Marín et al. (2021). In assessing willingness to use HIV PrEP, the researcher adapted from the study conducted by Holt et al. (2012) , but an item was removed because it did not fit the context of the current study. There are a total of five statements for attitude and six statements for willingness to use. Additionally, both sections of the questionnaire used a 5-point Likert scale to assess the respondents' agreement with these items.

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The final survey was validated and tested for reliability and consistency. The researcher requested content validation from three experts. These experts are from the College of Pharmacy and Chemistry - one is an expert in research, one in pharmacy practice, and one in statistics. Then, the questionnaire was pilot tested to 12 participants to obtain reliability data. The pilot test revealed good reliability ($\alpha = 0.854$) for attitude and acceptable reliability ($\alpha = 0.734$) for willingness to use. A copy of the survey is attached as supplementary material (Supplementary 1)

Data Gathering Procedures

Before actual data collection, the researcher sought approval from relevant stakeholders. Specifically, the researcher sought permission from the city mayor's office of Davao City since the target respondents are the general population of the said city. Furthermore, the study underwent a research ethics review from the University of the Immaculate Conception Research Ethics Committee. After obtaining permission and ethical clearance, the actual data collection commenced.

Data collection was done online. Google Forms was used as the platform for surveying. Multiple social media posts were done in Facebook, Instagram, LinkedIn, and X (formerly Twitter) to invite potential respondents. The link to access the Google Forms survey was already included in these posts. To ensure that Davaoeños were targeted, the researcher used targeted audience services of these social media platforms. An informed consent form precedes the survey and must have been approved by the respondents before allowing access to the questionnaire. Those who did not agree to participate could not access the survey. The survey period ran for three months (March to June 2024) to ensure the target sample was obtained.

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Data Analysis

After data collection, the researcher conducted data cleanup. Once this was done, the researcher proceeded to statistical analysis and inference. In this study, a multitude of statistical tests and tools were used that were descriptive or inferential. To carry out these tests, the researcher used JASP v 0.18.3, an open-access and capable statistical software. Statistical tests conducted included descriptives and inferential. Mean, standard deviations, frequencies, and percentages were used to describe data. Pearson’s correlation, Spearman’s rank correlation, ANOVA, Chi-square test, and mediation analysis through JASP Process (beta) module were used to establish the relationship of the variables.

Patient and Public Involvement

The researcher has taken into consideration the public involvement of this research. Because the Davaoeños were target respondents, the researcher has requested approval from the city government and an authorization letter was issued. Throughout the conduct of this research, the author has worked with a government-owned HIV-dedicated treatment hub in Davao City - the Reproductive Health and Wellness Center (RHWC). Furthermore, the results were also shared to RHWC.

RESULTS

Table 1 below shows the demographic characteristics of the sample. Of the 385 targeted respondents, only 258 (67.01%) respondents responded. Table 1 also shows the respondents' awareness and the distribution of attitude as well as willingness to use HIV PrEP according to demographics and their statistical significance. 137 respondents (53.10%) were found to be fully aware of HIV PrEP; 70 respondents (27.13) were partially aware, and the rest (19.77) were unaware. The three sources of information (Table 1 of Supplementary 2)

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with the highest percent frequencies were social media (36.82%), peer discussion (23.26), and government clinics (15.89%). Furthermore, only 78 respondents (30.23%) reported being offered PrEP before the survey as shown in Table 1 of Supplementary 2.

The distribution of awareness when grouped according to demographics and its statistical significance has been shown in Table 2. Through the Chi-square test, only gender identity ($X^2=24.428$; $p\text{-value}=0.002$) and highest educational attainment ($X^2=15.919$; $p\text{-value}=0.044$) were found to be significant. The rest of the demographic profiles were found to be non-significant. When taking the proportion of respondents that are aware and grouped according to gender identity, 94.12% of the gays were aware, while bisexuals and straights were only 85.14% and 71.19% aware, respectively. When grouped according to highest education attained, highest percent of being aware was observed from graduate education (94.12%), college level (82.25%), vocational (77.78%), high school level, (72.58%), and elementary level (0.00%). When taking a closer look at those who are aware compared to the total population of their respective gender identity, gays still had a higher percent proportion of being fully aware (76.47%) compared to bisexuals (54.05%) and straights (41.53%). Furthermore, individuals found to have attained graduate education remain to have the highest percentage of being fully aware (88.24%) followed by vocational (55.56%) and college level (52.07%) respective of their group population.

The mean attitude score was found to be 4.21 with a standard deviation of 0.686 and a median of 4.00, while the mean willingness score was found to be 4.08 with a standard deviation of 0.685 and median of 4.17 (shown in Table 3). When conducting a closer inspection of the attitude statements, we see that statement 2 had the highest mean (mean=4.47; SD=0.804) while statement 4 had the lowest mean (mean=3.81; SD=0.988). Among the statements assessing willingness to use, statements 1 and 2 were the highest (mean=4.44), while statement 6 was the lowest (mean=3.52; SD=1.251). The response

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distribution for attitude and willingness to use HIV PrEP has also been included in the supplementary materials (Figure 1 and 2 of Supplementary 2).

Results of inferential statistics that establishes the relationship the variables have with each other have also been reported. Table 4 shows the correlation between the variables under investigation. Only awareness and attitude did not correlate significantly (p-value=.060). Furthermore, correlating awareness to willingness to use ($\rho=0.214$; p-value<.000) and attitude to willingness to use ($r=0.640$; p-value<.000) showed significant p-values. Aside from that, awareness (standardized beta = 0.111; p-value=.022) and attitude (standardized beta = 0.625; p-value<.000) were found to be significant predictor variables to the outcome variable, willingness to use.

When investigating, the direct and mediating effects of the results are presented in Table 6. The total effect of being partially aware on willingness was found to be insignificant (estimate=0.059; p-value=0.634), but the total effect of being fully aware on willingness was found to be significant (estimate=0.310; p=.005). Through Preacher and Hayes approach, the mediating effect of attitude on willingness was found to be significant for both being partially aware (estimate=0.195; p-value=.016) and fully aware (estimate=0.180; p-value=.016). Lastly, direct effects of awareness to willingness to use HIV PrEP were not found to be significant, indicating a complete mediation relationship. Figure 1 shows the paths of the variables.

DISCUSSIONS

The current study provides information on the awareness, attitude, and willingness to use HIV PrEP among residents of Davao City. While many studies have investigated HIV PrEP awareness, attitude, and willingness to use among high-risk individuals, this study focused more on the general population in Davao City. Demographics show that the

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respondents were mainly teens aged 18 to 24 years old followed by adults aged 25 to 34 years old. Surprisingly enough, many of the respondents identify as straight. This would indicate that there is interest in HIV PrEP among heterosexual individuals in the city.

Currently, HIV PrEP in Davao City is emphasized more for queer and at-risk individuals including men who have sex with men, people who inject drugs, transgender individuals, and other vulnerable groups [20]. Furthermore, PrEP is offered only through a government-owned primary HIV/AIDS facility. Those at-risk individuals may avail of PrEP free of charge, but those otherwise would have to buy out of pocket since it isn't covered by healthcare insurance [20].

This study also shows the awareness of Davaoeños regarding HIV PrEP. The findings show that more than half of the respondents were fully aware of HIV PrEP. This finding corroborates a similar study in Cebu and Manila [8]. Furthermore, the main sources of information among those who are aware included social media, peer discussion, and government clinics. Social media has also been found to be the primary source of information in another study [21]. Despite that, the findings also show individuals who are partially aware and those who are not aware of HIV PrEP. The three main sources of information found in this study can be optimized even more to ensure a wider reach and more efficient delivery of information to provide not only awareness of HIV PrEP but also comprehensive knowledge about HIV PrEP in the community.

When analyzed if respondents who are fully or partially aware are affected or equally distributed by demographics, we see a significant difference in awareness of the respondents based on gender identity and highest educational attainment. Findings indicate that gays have more awareness than the rest, owing to a higher proportion of being fully aware relative to their group population. The high awareness noted in this study may be a result of homosexuals having more perceived risk of contraction because of riskier behaviors and

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seeking more sexual sensations, among other factors like personal beliefs, emotional history, relationships and social roles [22–24]. The findings also indicate that straights have the least awareness relative to their group population. This finding resonates with previous literature indicating low awareness among heterosexual individuals [25–28]. Furthermore, a higher frequency of awareness was observed from individuals with higher educational attainment. This finding resonates with studies showing PrEP awareness is associated with higher education [29–31].

Regarding attitude, the mean score can be described as very high level. This means that the respondents show a very good attitude towards HIV PrEP. Among the statements that assessed attitude, statement 2 (*I think that people who take HIV PrEP are responsible*) was found to have the highest mean and median. This would indicate that the respondents possess low stigma towards people taking HIV PrEP and see such individuals as responsible for their health. This finding contradicts studies that showed stigmatizing attitudes toward PrEP use because of being stereotyped into promiscuity and other conspiracy beliefs, being rejected for such stereotyping, and additional HIV stigma that may have transferred to PrEP use [32,33]. However, it can be pointed out that these studies have been done outside of the Philippines and as such, it can be postulated that the situation is different in Davao City and in the country. Still, more investigation and research are needed to substantiate this claim.

In relation to attitude, statement 4 (*It would be no trouble for me to take HIV PrEP every day*) was found to have the lowest mean score among the statements under attitude. Although this score can still be interpreted as high, this result would mean that some respondents may perceive problems in adherence and persistence when initiating and sustaining PrEP. This finding is similar to that of Shamu et al. (2021), but the current study does not show whether this adherence challenge differed by sex in the same way observed in that study.

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Willingness to use HIV PrEP among the residents of Davao City can be described as high level. This means that Davaoeños are willing to seek and use HIV PrEP given the opportunity and with enough access. This finding corroborates a previous study indicating respondents were interested in taking PrEP [8]. However, statement 6 (*I would take PrEP even if it wasn't 100% effective*), was found to have the lowest mean score among the statements assessing willingness. This would indicate hesitation among the respondents in using PrEP if it isn't a hundred percent effective. Evidence does suggest that the effectiveness of HIV PrEP is lower compared to estimates from clinical studies [34], but educational campaigns should still highlight the importance of PrEP and its contribution in reducing HIV incidence.

The current study also establishes the relationship between awareness, attitude, and willingness to use HIV PrEP. Through correlation statistics, attitude to willingness was found to have a strong correlation. Furthermore, awareness and willingness were also correlated significantly. Through linear regression, as shown in Table 5, we also find that both awareness and attitude were key predictors of willingness to use. It can be inferred that awareness of HIV PrEP and positive attitudes positively predict one's willingness to use it.

Mediation analysis provides a more comprehensive path relation between the constructs. It provides a basis for hypothesizing whether willingness to use HIV PrEP is directly affected by awareness or is mediated by attitude. Table 6 shows that awareness of HIV PrEP has an insignificant direct effect on willingness to use HIV PrEP. However, being fully aware has a significant indirect effect on willingness to use HIV PrEP and is mediated by attitude towards HIV PrEP ($\beta=0.180$; $p=.012$). Furthermore, being partially aware also has a significant indirect effect on willingness ($p\text{-value}=.016$), but the total effect of being partially aware were found to be insignificant ($p\text{-value}=.634$). The findings mean that there is a full mediation effect between being fully aware and willingness to use HIV PrEP that is

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found to be statistically significant – those who are fully aware show a more positive attitude, and because of this positive attitude, there is more willingness to use HIV PrEP. The full mediation pathway observed in this study resonates with another study, indicating no direct path between PrEP-related information and motivation to willingness to use PrEP [35]. Furthermore, this finding resonates with studies showing direct associations and indirect effects of awareness and attitude to willingness to use HIV PrEP [17,36].

The findings of this study indicate various implications for improving HIV PrEP programs in Davao City and the Philippines. First, there is a need to start targeting educational campaigns among straight individuals while simultaneously sustaining efforts for queer and at-risk people. It is possible that, as a majority in the population, straights can influence social norms and cultural beliefs, contributing to reduced stigma and increased attitudes. Much of the current efforts for health promotion campaigns for HIV prevention and management are working owing to more fully aware individuals observed in this study. Furthermore, one key finding in this study is that even just awareness can positively impact attitude and in turn, willingness to use HIV PrEP indicating that efforts for educational campaigns should be sustained, and more innovations to deliver accurate information to the rest of the citizens should be considered. Furthermore, misconceptions about the efficacy of HIV PrEP and hesitance to initiation must also be targeted by these educational campaigns and in counselling sessions. Action programs should also target attitude, seeing that it mediates willingness to use. Incorporating lessons to increase positive attitudes in academic institutions, as part of sex education or in other health-related subjects both at secondary and tertiary levels, may be beneficial.

Limitations

Despite the results and findings of this study, a couple of limitations should be pointed out. Knowing the awareness, attitude, and willingness to use HIV PrEP among

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Davaoños based on gender identity and sexual orientation is limited in the current study. This is because both gender identity and sexual preference have been merged into one subsection. For a more inclusive and comprehensive understanding of this demographic, future research must separate gender identity from sexual orientation. Future research can identify if there are sex-related discrepancies in the awareness, attitude, and willingness to use HIV PrEP in the city. Additionally, this study is limited with the inferences that can be made regarding how much the respondents actually know about PrEP. The current study only measured awareness using a yes/no question of the respondents and not specific knowledge towards HIV and HIV prophylaxis.

CONCLUSION

This study has shown that Davaoños are aware of HIV PrEP and possess a very high level of attitude and a high level of willingness to use it. Furthermore, willingness to use HIV PrEP was found to be affected by being fully aware of it through the mediation of one's attitude towards HIV PrEP. Although there are individuals who hesitate towards HIV PrEP because of misconceptions like its perceived effectiveness and perceived challenge in adherence, this calls for the need for targeted educational campaigns and health promotion activities. The findings provide valuable insights as a basis for health promotion campaigns, policy development, and other action programs intended for the management and prevention of HIV/AIDS, particularly for the improvement of HIV PrEP programs.

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Conflict of Interest: Author declares no conflict of interest.

Informed Consent: Informed consents were collected from all participants in this study.

Ethical Approval: This study was submitted to the Research Ethics Committee of the University of the Immaculate Conception for ethical review with the protocol code EX-40-02-24. Upon review, the study was deemed to be responsible and ethically accountable and was given ethical clearance on March 07, 2024.

Data Availability Statement: Data are available and will be shared on reasonable request to the corresponding author.

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TABLES

Table 1. Demographic Profile of the Respondents and Significant Difference (ANOVA)

Demographic Profile	Frequency (%)	Attitude		Willingness	
		Mean	F	Mean	F
Age			0.135		0.923
18 – 24 years old	131 (50.78)	4.23		4.06	
25 – 34 years old	106 (41.09)	4.19		4.10	
35 – 44 years old	17 (6.58)	4.24		4.19	
>45 years old	4 (1.55)	4.05		3.58	
Gender Identity			1.800		1.767
Gay	51 (19.77)	4.43		4.18	
Bisexual	74 (28.68)	4.22		4.18	
Straight	118 (45.74)	4.12		3.97	
Transexual	5 (1.94)	4.2		3.83	
Others	10 (3.88)	4.14		4.25	
Location			0.267		0.551
Poblacion	89 (34.50)	4.21		4.12	
Talomo	50 (19.38)	4.23		4.06	
Buhangin	59 (22.87)	4.19		3.97	
Bunawan	13 (5.04)	4.22		4.10	
Agdao	16 (6.20)	4.08		4.15	
Baguio	1 (0.39)	4.00		4.33	
Calinan	9 (3.49)	4.16		3.91	
Toril	13 (5.04)	4.40		4.33	
Tugbok	8 (3.10)	4.35		4.06	

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Highest Education		2.040	1.530
Elementary	1 (0.39)	4.60	4.83
High School	62 (24.03)	4.27	4.16
Vocational	9 (3.49)	3.64	3.95
College	169 (65.50)	4.20	4.02
Graduate Education	17 (6.59)	4.39	4.35
Marital Status		0.162	0.257
Single	237 (91.86)	4.21	4.07
Married	11 (4.26)	4.29	4.21
Living Together	10 (3.88)	4.12	4.13
Separated/annulled	0 (0.00)		
Widowed	0 (0.00)		
Awareness to HIV PrEP			
Fully Aware	137 (53.10)		
Partially Aware	70 (27.13)		
Not Aware	51 (19.77)		

Note. Significant differences at p-values <.05 in attitude and willingness to use HIV PrEP when grouped according to demographics are denoted by an asterisk ().

Factors Affecting Willingness to Use HIV PrEP

Table 2. Significant Difference in Awareness When Grouped According to Demographic Profile (Pearson Chi-square Test)

Demographic Profile	Awareness			X ²	p-value
	NA	PA	FA		
Age				11.273	.080
18 – 24 years old	32	42	57		
25 – 34 years old	14	24	68		
35 – 44 years old	4	3	10		
>45 years old	1	1	2		
Gender Identity				24.428	.002*
Gay	3	9	39		
Bisexual	11	23	40		
Straight	34	35	49		
Transsexual	2	0	3		
Others	1	3	6		
Location				20.226	.210
Poblacion	20	26	43		
Talomo	9	7	34		
Buhangin	11	21	27		
Bunawan	1	6	6		
Agdao	4	6	6		
Baguio	0	0	1		
Calinan	0	2	7		
Toril	4	1	8		

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Factors Affecting Willingness to Use HIV PrEP

Tugbok	2	1	5		
Highest Education				15.919	.044*
Elementary	1	0	0		
High School	17	16	29		
Vocational	2	2	5		
College	30	51	88		
Graduate Education	1	1	15		
Marital Status				7.808	.099
Single	47	66	124		
Married	4	3	4		
Living Together	0	1	9		

Note. NA=Not Aware; PA=Partially Aware; FA=Fully Aware; P-values <.05 and are statistically significant are denoted by an asterisk ().

Factors Affecting Willingness to Use HIV PrEP

Table 3. Attitude and Willingness to Use HIV PrEP Among the Respondents

Statement	Mean±SD	Median
1. I believe PrEP is effective at preventing HIV.	4.30±0.829	4.00
2. I think that people who take HIV PrEP are responsible.	4.47±0.804	5.00
3. I believe taking HIV PrEP is safe for use.	4.21±0.861	4.00
4. It would be no trouble for me to take HIV PrEP every day.	3.81±0.998	4.00
5. I believe the government makes certain that drugs like HIV PrEP are safe for use.	4.28±0.872	4.00
Mean Attitude Score	4.21±0.686	4.20
1. I am willing to take PrEP to prevent getting HIV.	4.44±0.808	5.00
2. I am willing to take pills before and after sex if it would prevent me getting HIV.	4.44±0.827	5.00
3. I am willing to take a pill everyday if it would prevent me from getting HIV.	4.30±0.966	5.00
4. I would never need to take PrEP. (Reverse Coded)	3.88±1.25	4.00
5. I would be willing to pay for laboratory tests needed while taking PrEP.	3.88±1.094	4.00
6. I would take PrEP even if it wasn't 100% effective.	3.52±1.251	4.00
Mean Willingness Score	4.08±0.685	4.17

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Factors Affecting Willingness to Use HIV PrEP

Table 4. Correlation between Awareness, Attitude, and Willingness to Use HIV PrEP

Variables	<i>r / rho</i>	p-value	Inference
Awareness – Attitude	0.117	.060	Not Significant
Awareness – Willingness to Use	0.214	<.000	Significant
Attitude – Willingness to Use	0.640	<.000	Significant

Table 5. Predictor relationship of Awareness and Attitude on Willingness to Use using Multiple Linear Regression

Variables	β	t	p-value	Inference
Awareness	0.111	2.300	.022	Significant
Attitude	0.625	13.012	<.000	Significant

*Note. β =standardized beta coefficient; $R=0.649$; $R^2=0.422$; $F=93.006$; $p<.000$

Table 6. Direct and Mediation Effects of Awareness and Attitude on Willingness to Use HIV PrEP

Effect	Path	β	p-value
Total	Partially Aware → Willingness	0.059	.634
Total	Fully Aware → Willingness	0.310	.005*
Direct	Partially Aware → Willingness	-0.136	.154
Direct	Fully Aware → Willingness	0.130	.126
Indirect	Partially Aware → Attitude → Willingness	0.195	.016*
Indirect	Fully Aware → Attitude → Willingness	0.180	.012*

Note. Significant causal effects are denoted by an asterisk (); $R^2=0.438$

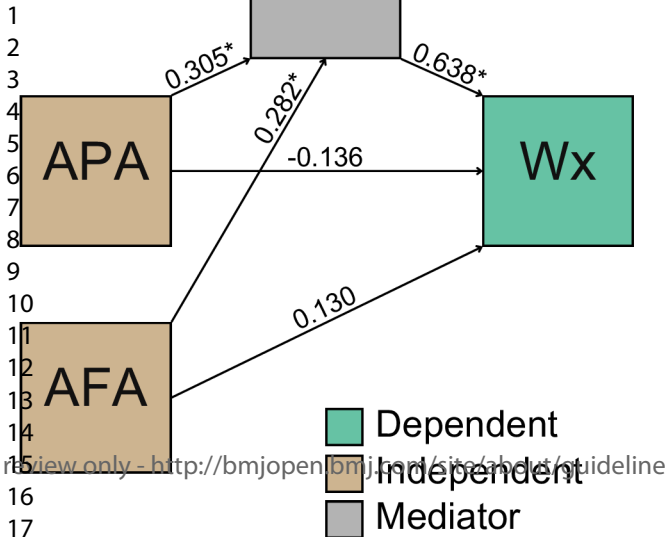
Factors Affecting Willingness to Use HIV PrEP

Figure 1. Path Diagram of the Direct and Indirect Effects of the Predictor Variables

Note. APA=Awareness – Partially Aware; AFA= Awareness – Fully Aware; Ax=Attitude; Wx=Willingness to Use; Significant path relations are distinguished by an asterisk (*).

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SURVEY TOOL
English Version

Section I. Demographic Profile

Instructions: This part of the questionnaire will extract your demographic characteristics. Please answer truthfully.

Age	
Gender Identity	<div><input type="checkbox"/> Gay - a person who is attracted, emotionally and/or physically, to someone of the same gender</div> <div><input type="checkbox"/> Bisexual - a person who is attracted to both men and women</div> <div><input type="checkbox"/> Straight - a person who is attracted to the opposite sex</div> <div><input type="checkbox"/> Trans - a person whose gender identity and/or gender expression do not match their assigned sex at birth</div> <div><input type="checkbox"/> Others (Please specify):</div>
Location	<div><input type="checkbox"/> Poblacion</div> <div><input type="checkbox"/> Talomo</div> <div><input type="checkbox"/> Buhangin</div> <div><input type="checkbox"/> Bunawan</div> <div><input type="checkbox"/> Agdao</div> <div><input type="checkbox"/> Paquibato</div> <div><input type="checkbox"/> Baguio</div> <div><input type="checkbox"/> Calinan</div> <div><input type="checkbox"/> Marilog</div> <div><input type="checkbox"/> Toril</div> <div><input type="checkbox"/> Tugbok</div>
Highest Educational Attainment	<div><input type="checkbox"/> Elementary</div> <div><input type="checkbox"/> High School</div> <div><input type="checkbox"/> Vocational</div> <div><input type="checkbox"/> College</div> <div><input type="checkbox"/> Graduate Education (Doctoral and Masters)</div>
Marital Status	<div><input type="checkbox"/> Single</div> <div><input type="checkbox"/> Married or living together</div> <div><input type="checkbox"/> Separated or annulled</div> <div><input type="checkbox"/> Widowed</div>

Before proceeding with the survey. Please read the excerpt below:

Pre-exposure Prophylaxis (PrEP) is a highly effective HIV prevention method for high-risk individuals, available in daily or on-demand doses. While it doesn't guard against other STDs, additional preventive measures like condoms are advised during sex. PrEP, administered through a daily pill, is widely used globally, especially beneficial for those at elevated risk, like drug users. Despite possible side effects such as diarrhea, nausea, headache, fatigue, and stomach pain, PrEP is deemed safe and highly efficient when taken as directed.

Section II. Awareness to HIV PrEP

Instructions: In this section, your awareness towards HIV will be collected. Answer the questions truthfully.

Have you heard of HIV PrEP prior to this survey?	Yes No
Have you ever heard of a program that takes antiretroviral medicines to prevent contraction of HIV in HIV-negative individuals?	Yes No
Have you ever been offered HIV PrEP before?	Yes No
If you have heard of HIV PrEP, select which of the following choices are your source of information?	<input type="checkbox"/> Newspapers <input type="checkbox"/> Television <input type="checkbox"/> Radio <input type="checkbox"/> Social Media <input type="checkbox"/> Peer discussion <input type="checkbox"/> Printed posters <input type="checkbox"/> Government clinics

Section III. Attitude towards HIV PrEP use

Instructions: This section of the survey will present you statements related to your attitude towards HIV PrEP use. Please rate these statements according to your agreement. Use the choices below as your guide:

- 1. strongly disagree
- 2. disagree
- 3. neutral
- 4. agree
- 5. strongly agree

Item	5	4	3	2	1
I believe PrEP is effective at preventing HIV.					
I think that people who take HIV PrEP are responsible.					
I believe taking HIV PrEP is safe for use.					
It would be no trouble for me to take HIV PrEP every day.					
I believe the government makes certain that drugs like HIV PrEP are safe for use.					

Section IV. Willingness to use HIV PrEP

Instructions: This section of the survey will present you statements related to your willingness to use HIV PrEP. Please rate these statements according to your agreement. Use the choices below as your guide:

- 1. strongly disagree
- 2. disagree
- 3. neutral
- 4. agree
- 5. strongly agree

Item	5	4	3	2	1
I am willing to take PrEP to prevent getting HIV.					
I am willing to take pills before and after sex if it would prevent me getting HIV.					
I am willing to take a pill everyday if it would prevent me from getting HIV.					
I am not willing to take PrEP. (reversed)					
I would be willing to pay for laboratory tests needed while taking PrEP.					
I would take PrEP even if it wasn't 100% effective.					

Additional Statistical Data

Table 1. Additional Descriptive Statistics Pertaining to Awareness

Variable	Frequency
Have been offered PrEP before	
Yes	78 (30.23)
No	180 (69.77)
Source of Information	
News & Television	11 (4.26)
Radio	2 (0.78)
Social Media	95 (36.82)
Peer discussion	60 (23.26)
Printed posters	1 (0.39)
Government clinics	41 (15.89)
Others: School	1 (0.39)

Figure 1. Distribution of Responses to Attitude To HIV PrEP items

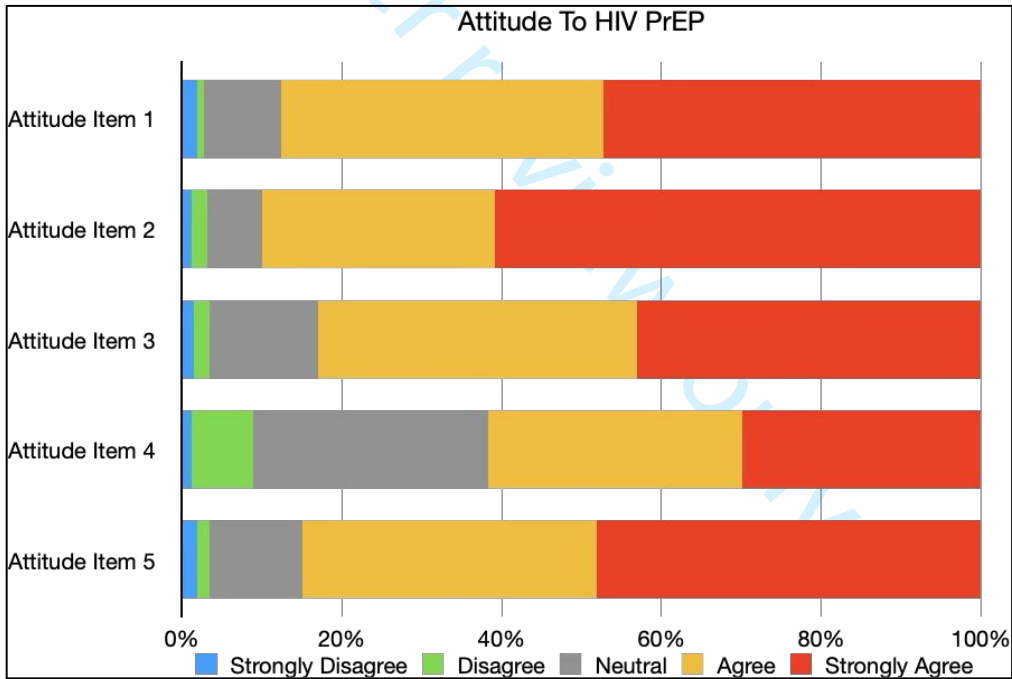
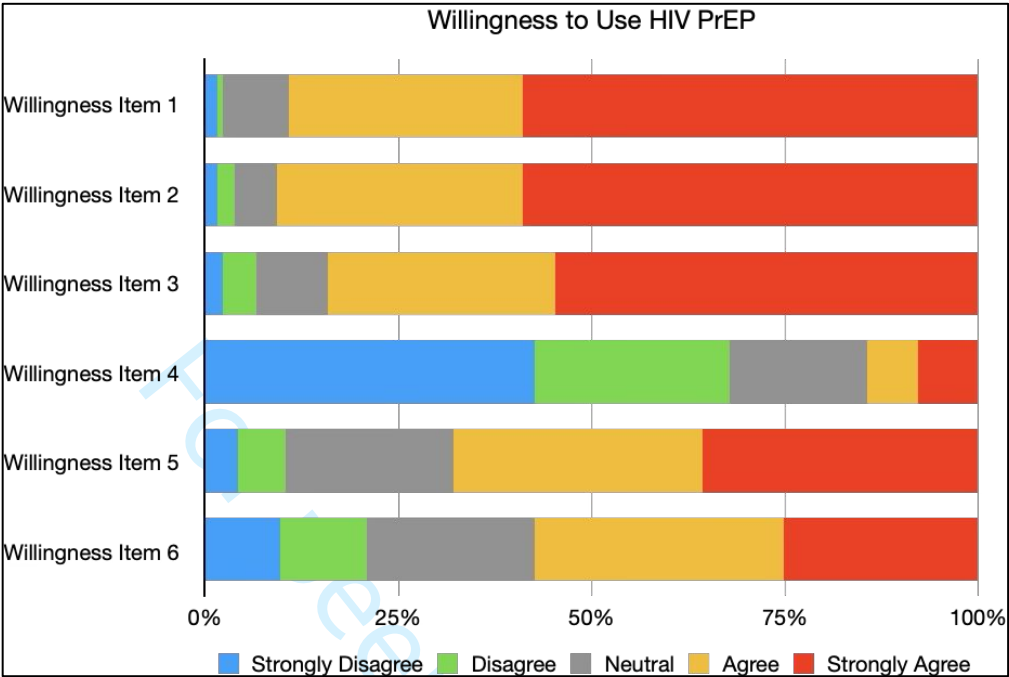


Figure 2. Distribution of Responses to Willingness to Use HIV PrEP Items



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A Cross-Sectional Study Measuring the Level and Relationship of Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City, Philippines

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Factors Affecting Willingness to Use HIV PrEP

A Cross-Sectional Study Measuring the Level and Relationship of Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City, Philippines

Abstract

Objectives: To improve upon the implementation and utilization of HIV pre-exposure prophylaxis (PrEP) programs, factors affecting HIV PrEP willingness must be investigated. This study aims to determine not only the willingness to use HIV PrEP but also to establish whether awareness and attitude affect this.

Design: This study used a cross-sectional survey research design to examine the awareness, attitude, and willingness to use HIV PrEP in Davao City. The survey was adapted from multiple studies and was validated and pilot tested. Statistical analysis included descriptive and inferential statistics like correlation, linear regression, and structural modelling.

Settings: This research was conducted at Davao City, Philippines. This is one of the regions in the country with high HIV incidence. Survey was done from March to June 2024.

Participants: Participants were at least 18 years of age, currently living in Davao City, and a permanent resident of the city.

Results: A total of 258 respondents were gathered in this study of which, 53.10% of all respondents were fully aware of HIV PrEP, while 27.13% were partially aware. The study found the mean attitude and willingness to be 4.21 ± 0.972 and 4.08 ± 0.685 , respectively. There was a significant difference in the awareness when grouped according to gender identity ($X^2=24.428$; $p\text{-value}=0.002$) and highest education attained ($X^2=15.919$; $p\text{-value}=0.044$). Being fully aware positively affected willingness to use HIV PrEP by indirectly contributing positively to attitude towards HIV PrEP ($\beta=0.180$; $p\text{-value}=0.012$).

Conclusion: Generally, the awareness, attitude, and willingness to use HIV PrEP is high. However, some respondents are hesitant to use HIV PrEP if it is not a hundred percent

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effective and unable to adhere to it. The results imply a need for action programs involving various multidisciplinary stakeholders to ensure the community possesses full awareness, positive attitudes, and increased willingness to use HIV PrEP.

Keywords: HIV/AIDS, Prevention, Education, Public Health, Multi-disciplinary, Philippines, Epidemiology

Strengths and Limitations of the Study

- The survey was done online through social media posts which provides to potential respondents their voluntary participation, anonymity, privacy and comfort,
- The survey instrument used was adapted from previous studies but have undergone reliability testing to ensure it is appropriate for use.
- Stratified random sampling was used to ensure the data is representative of the respondents in the city.
- Gender identity and sexual preference was merged but further studies should be more comprehensive and separate these to provide more insights.
- A limitation of this study is that awareness was measured using two general “yes/no” questions and cannot measure how much residents know about HIV PrEP.

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INTRODUCTION

With the rise of HIV/AIDS in the country, biomedical interventions like HIV Pre-Exposure Prophylaxis (PrEP) have become important in the prevention of HIV contraction and infection. HIV PrEP, with sufficient adherence, has been proven safe and effective in preventing HIV transmission [1]. Despite PrEP launching in 2017 [2], the literature surrounding its utilization and its discrepancies in awareness, attitude, and willingness to use among the people in Davao City are scant.

To put it into context, the Davao Region has consistently been high in HIV incidence. According to the Epidemiology Bureau of the Department of Health, the Davao Region was one of the top four regions with the highest HIV cases [3]. Additionally, the region was recorded as the fifth with the highest number of HIV incidences based on the HIV/AIDS Registry of the Philippines in May 2023 [4]. Lastly, there have been 6,736 cases of HIV in the region from 1993 to August 2023 [5].

Because of the increasing rise in HIV, the Davao Region has been assured enough antiretroviral medicines and dynamic treatment facilities [5]. The region has three treatment facilities - two in Davao City and one in Tagum City. The Southern Philippines Medical Center and the City Health Office through the Reproductive Health and Wellness Center are treatment facilities in Davao City, the region's capital city. At the same time, the Davao Regional Medical Center is the treatment hub in Tagum City. There have also been plans to increase the number of treatment facilities, making one in every province [5].

Despite that, there is not enough research and investigation highlighting the awareness and acceptability of Davaoeños regarding HIV PrEP use and access. At the same time, related literature in other regions in the Philippines shows some variation. A study in Metro Manila showed that one in two transgender Filipinas were unaware of HIV PrEP but were interested in knowing more about it [6]. Meanwhile, a study done in Cebu and National Capital Region

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found that HIV PrEP awareness and interest were high in men who have sex with men [7]. A study in the Philippines has also shown that PrEP initiation is low, which leads to suboptimal outcomes of other HIV-related services like online-based HIV self-testing [8]. These findings indicate the importance of the current study in Davao City, and addressing PrEP awareness, attitude, and willingness may enhance its utilization and access [9].

Clearly, a knowledge gap must be addressed to implement PrEP programs and other prevention strategies better. This is where the current study positions itself. This study aims to measure the level of awareness, attitude, and willingness to use HIV PrEP among the people in Davao City, Philippines. Furthermore, the relationship between these three variables and other factors that could affect these variables shall also be established. Understanding the awareness and attitude of Davaoeños will shed light on PrEP discrepancy, including its utilization and accessibility. It will allow key stakeholders like policymakers and health agencies to determine the willingness of the community to use HIV PrEP and how awareness and attitude can affect this. Ultimately, this research can be of benefit to health promotion campaigns targeted towards prevention of HIV/AIDS.

MATERIALS AND METHODS

Research Design

The research design utilized in this study was a quantitative, cross-sectional survey design. A quantitative research design involves generating and using numerical data that answer specific research questions using statistical inference techniques [10]. Additionally, a cross-sectional design was used because data collection was done at a single point in time on a large sample to get a “screenshot” of the parameters and constructs of interest [11]. Cross-sectional designs are usually used in public health to monitor the prevalence of health outcomes, describe population characteristics, and understand health determinants [12].

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Research Locale & Respondents

The research locale of this study was the city capital of Region XI - Davao City. Davao City had a population of 1,776,949 in 2020 [13]. Additionally, the city also has three congressional districts with 11 administrative districts - Poblacion, Talomo, Buhangin, Bunawan, Agdao, Paquibato, Baguio, Calinan, Marilog, Toril, Tugbok [14].

The general population of Davao City was the respondents of this study. For the inclusion, the respondents should be a permanent resident and currently living in Davao City during the data collection, aged at least 18 years old. Exclusion criteria include those mentally challenged individuals who are physically unable to answer the survey, pre-pubescent individuals, adults older than 60 years old, and individuals who do not live in Davao City during the time of collection.

Because the current study collected data from the general population of the research locale, a representative sample was most appropriate. The sampling method to be used is stratified random sampling. The population of Davao City is based on the 2020 Census of Population and Housing of the Philippine Statistics Authority. The total population was 1,776,949 [15]. A sample size of 385 was calculated using the Raosoft® sample size calculator (<https://raosoft.com/samplesize.html>) with 95% confidence interval. Then, stratification was done based on the 11 administrative districts of Davao City.

Research Instrument

The research instrument used in this study was a structured survey questionnaire. The survey was composed of four sections – demographics, awareness, attitudes, and willingness to use HIV PrEP. Before the second section, a brief description of HIV PrEP was included so that regardless of awareness, respondents are introduced to and informed of the nature of HIV PrEP. The survey will take less than 30 minutes to finish. The questionnaire was prepared in

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two languages (English and Filipino) to ensure that the potential participants easily understood what was being asked and to increase survey comprehension.

Only select demographic characteristics were collected to ensure that sensitivity and privacy were upheld. For this reason, only age, gender identity, location (administrative district residing), highest education obtained, and marital status were collected in the survey's first section.

The questions in the succeeding sections were adapted from previous studies in the literature. From an earlier study, awareness of HIV PrEP was established if respondents answered yes to two yes-or-no questions or either of these two [16]. The first question asked respondents if they had heard of HIV PrEP prior to the study, and the follow-up question asked whether they had heard of a program for taking antiretroviral drugs to prevent the contraction of HIV. However, the current research categorized respondents as fully aware if they answered yes to both questions, partially aware if either of the two were responded to with yes, and not aware if both questions were answered with no. Furthermore, the respondents were also asked whether they were offered HIV PrEP before. Then, participants were asked from among a set of choices which channel was the source of their awareness.

The researcher adapted questions for attitude from the study of Mueses-Marín et al. (2021). In assessing willingness to use HIV PrEP, the researcher adapted from the survey conducted by Holt et al. (2012), but an item was removed because it did not fit the context of the current study. There are five statements for attitude and six statements for willingness to use. Additionally, both sections of the questionnaire used a 5-point Likert scale to assess the respondents' agreement with these items.

The final survey was validated and tested for reliability and consistency. The researcher requested content validation from three experts. These experts are from the College of Pharmacy and Chemistry - one is an expert in research, one in pharmacy practice,

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and one in statistics. Then, the questionnaire was pilot-tested on 12 participants to obtain reliability data. The pilot test revealed good reliability ($\alpha = 0.854$) for attitude and acceptable reliability ($\alpha = 0.734$) for willingness to use. A copy of the survey is attached as supplementary material (Supplementary 1)

Data Gathering Procedures

Before actual data collection, the researcher sought approval from relevant stakeholders. Specifically, the researcher sought permission from the city mayor's office of Davao City since the target respondents are the city's general population. Furthermore, the study underwent a research ethics review from the University of the Immaculate Conception Research Ethics Committee. After obtaining permission and ethical clearance, the actual data collection commenced.

Data collection was done online. Google Forms was used as the survey platform. Multiple social media posts were done on Facebook, Instagram, LinkedIn, and X (formerly Twitter) to invite potential respondents. The link to access the Google Forms survey was already included in these posts. To ensure that Davaoeños were targeted, the researcher used targeted audience services of these social media platforms. Google Forms can limit to one response per email so that multiple participation is mitigated. An informed consent form precedes the survey and must have been approved by the respondents before allowing access to the questionnaire.

Furthermore, names were not collected throughout the survey to ensure anonymity and privacy and to mitigate social desirability bias among potential respondents. Those who did not agree to participate could not access the survey. The survey period ran for three months (March to June 2024) to ensure the target sample was obtained.

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Data Analysis

After data collection, the researcher conducted data cleanup. Once this was done, the researcher proceeded to statistical analysis and inference. In this study, a multitude of descriptive and inferential statistical tests and tools were used. The researcher used JASP v 0.18.3, an open-access and capable statistical software, to conduct these tests. Mean, median, standard deviations, frequencies, and percentages were used to describe data. Then, an initial assessment of the relationship between awareness, attitude, and willingness to use was determined through Pearson’s correlation, Spearman’s rank correlation, and linear regression. Then, mediation analysis through the JASP Process (beta) module was used to identify causal relationships between the constructs. Additionally, ANOVA and Chi-square test were used to determine demographic variability among the constructs of interest.

Patient and Public Involvement

The researcher has taken into consideration the public involvement of this research. Because the Davaoños were target respondents, the researcher has requested approval from the city government and an authorization letter was issued. Throughout the conduct of this research, the author has worked with a government-owned HIV-dedicated treatment hub in Davao City - the Reproductive Health and Wellness Center (RHWC). Furthermore, the results were also shared to RHWC.

RESULTS

Table 1 below shows the demographic characteristics of the sample. Of the 385 targeted respondents, only 258 (67.01%) participants responded. Half of the respondents were 18 to 24 years old, and a huge chunk of these respondents identify as straight (45.74%). Furthermore, many of the respondents were located in Poblacion (34.50%), Buhangin (22.87%), and Talomo (19.38%).

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In terms of respondents' awareness, 137 respondents (53.10%) were fully aware of HIV PrEP, while only 27.13 percent were partially aware. The three sources of information (Table 1 of Supplementary 2) with the highest percent frequencies were social media (36.82%), peer discussion (23.26), and government clinics (15.89%). Furthermore, only 78 respondents (30.23%) reported being offered PrEP before the survey, as shown in Table 1 of Supplementary 2.

Elaborating deeper on the respondents' awareness, significant differences have been noticed when grouped according to demographics, as shown in Table 2. Through the Chi-square test, only gender identity ($X^2=24.428$; $p\text{-value}=0.002$) and highest educational attainment ($X^2=15.919$; $p\text{-value}=0.044$) were significant. When taking the proportion of respondents that are aware and grouped according to gender identity, 94.12% of the gays were aware, while bisexuals and straights were only 85.14% and 71.19% aware, respectively. When taking a closer look at those who are aware compared to the total population of their respective gender identity, gays still had a higher percent proportion of being fully aware (76.47%) compared to bisexuals (54.05%) and straights (41.53%). Furthermore, individuals found to have attained graduate education remain to have the highest percentage of being fully aware (88.24%) followed by vocational (55.56%) and college level (52.07%) respective of their group population.

The level of attitude and willingness to use HIV PrEP among the respondents were found to be very high (mean= 4.21 ± 0.868 ; median=4.20) and high (4.08 ± 0.685 ; median=4.17), respectively (shown in Table 3). When examining the attitude statements, we see that statement 2 had the highest mean (mean=4.47; SD=0.804) while statement 4 had the lowest mean (mean=3.81; SD=0.988). Among the statements assessing willingness to use, statements 1 and 2 were the highest (mean=4.44), while statement 6 was the lowest (mean=3.52; SD=1.251). The response distribution for attitude and willingness to use HIV

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PrEP has also been included in the supplementary materials (Figures 1 and 2 of Supplementary 2).

Results of inferential statistics that establish the relationship the variables have with each other have also been reported. The relationship between the variables was initially assessed before mediation analysis. Awareness and attitude towards HIV PrEP were found to be not only significantly correlated with willingness to use PrEP but were also significant predictors of it (Tables 2 and 3 of Supplementary Material 2).

When investigating, the direct and mediating effects of the results are presented in Table 4. The total effect of being partially aware on willingness was insignificant (estimate=0.059; p-value=0.634), but the total effect of being fully aware on willingness was significant (estimate=0.310; p=.005). The mediating effects of attitude on willingness were found to be significant for both being partially aware (estimate=0.195; p-value=.016) and fully aware (estimate=0.180; p-value=.016). Lastly, direct effects of awareness to willingness to use HIV PrEP were not found to be significant, indicating a complete mediation relationship. Figure 1 shows the paths of the variables.

DISCUSSIONS

The current study provides information on the awareness, attitude, and willingness to use HIV PrEP among residents of Davao City. While many studies have investigated HIV PrEP awareness, attitude, and willingness to use among high-risk individuals, this study focused more on the general population in Davao City. Surprisingly enough, many of the respondents identify as straight. This may indicate that there is interest in HIV PrEP among heterosexual individuals in the city.

Currently, HIV PrEP in Davao City is emphasized more for queer and at-risk individuals, including men who have sex with men, people who inject drugs, transgender

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individuals, and other vulnerable groups [19]. Furthermore, PrEP is offered only through a government-owned primary HIV/AIDS facility. Those at-risk individuals may avail themselves of PrEP free of charge, but those otherwise would have to buy it out of pocket since it isn't covered by healthcare insurance [19].

This study also shows the awareness of Davaoeños regarding HIV PrEP. The findings show that more than half of the respondents were fully aware of HIV PrEP. This finding corroborates a similar study in Cebu and Manila [7]. Furthermore, the main sources of information among those who are aware include social media, peer discussion, and government clinics. Social media has also been found to be the primary source of information in another study [20]. The three main sources of information found in this study can be optimized even more to ensure a broader reach to those partially or even unaware of HIV PrEP and to deliver information in the community efficiently.

When analyzing if respondents who are fully or partially aware are affected or equally distributed by demographics, we see a significant difference in respondents' awareness based on gender identity and highest educational attainment. Findings indicate that gays have more awareness than the rest, owing to a higher proportion of being fully aware relative to their group population. The high awareness noted in this study may be a result of homosexuals having more perceived risk of contraction because of riskier behaviors and seeking more sexual sensations, among other factors like personal beliefs, emotional history, relationships and social roles [21–23]. The findings also indicate that straights have the least awareness relative to their group population. This finding resonates with previous literature indicating low awareness among heterosexual individuals [24–27].

Furthermore, a higher frequency of awareness was observed from individuals with higher educational attainment. This finding resonates with studies showing PrEP awareness is associated with higher education [28–30]. The findings would indicate that straight

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individuals have more interest in HIV PrEP because they have a lower level of awareness and that the use of social media, efforts by government clinics, and discussion among peers may be beneficial in increasing their awareness.

Regarding attitude, the mean score can be described as very high level. This means that the respondents show a very good attitude towards HIV PrEP. Among the statements that assessed attitude, statement 2 (*I think that people who take HIV PrEP are responsible*) was found to have the highest mean and median. This would indicate that the respondents possess low stigma towards people taking HIV PrEP and see such individuals as responsible for their health. This finding contradicts studies that showed stigmatizing attitudes toward PrEP use because of being stereotyped into promiscuity and other conspiracy beliefs, being rejected for such stereotyping, and additional HIV stigma that may have transferred to PrEP use [31,32]. However, it can be pointed out that these studies have been done outside of the Philippines. As one of the most LGBTQ-friendly countries in Southeast Asia, it can be postulated from the findings that the situation is different in Davao City and the country. Still, more investigation and research are needed to substantiate this claim.

In relation to attitude, statement 4 (*It would be no trouble for me to take HIV PrEP every day*) was found to have the lowest mean score among the statements under attitude. Although this score can still be interpreted as high, this result would mean that some respondents may perceive problems in adherence and persistence when initiating and sustaining PrEP. This finding is similar to that of Shamu et al. (2021), but the current study does not show whether this adherence challenge differed by sex in the same way observed in that study.

Willingness to use HIV PrEP among the residents of Davao City can be described as high level. This means that Davaoeños are willing to seek and use HIV PrEP given the opportunity and with enough access. This finding corroborates a previous study indicating

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respondents were interested in taking PrEP [7]. However, statement 6 (*I would take PrEP even if it wasn't 100% effective*) was found to have the lowest mean score among the statements assessing willingness. This would indicate hesitation among the respondents in using PrEP if it isn't a hundred percent effective. Evidence does suggest that the effectiveness of HIV PrEP is lower compared to estimates from clinical studies [33]. However, educational campaigns should still highlight the importance of PrEP and its contribution to reducing HIV incidence.

The current study also establishes the relationship between awareness, attitude, and willingness to use HIV PrEP and has been included in Supplementary Material 2. Initial analyses have shown that respondents who have higher attitudes strongly tend to have higher level of willingness to use HIV PrEP. The same is true for awareness and willingness, although of weak correlation. Through linear regression, it can be inferred that awareness of HIV PrEP and increased positive attitudes towards it positively predict one's willingness to use it. Correlation and linear regression were important considerations in proceeding with mediation analysis as this would allow the researcher to establish significant relationships before elaborating further.

Mediation analysis provides a more comprehensive path relation between the constructs. It provides a basis for hypothesizing whether willingness to use HIV PrEP is directly affected by awareness alone or is mediated by attitude. Table 4 shows that awareness of HIV PrEP has an insignificant direct effect on willingness to use HIV PrEP. This means that awareness alone does not affect the willingness of respondents to use HIV PrEP. However, being fully aware has a significant indirect effect on willingness to use HIV PrEP and is mediated by attitude towards HIV PrEP ($\beta=0.180$; $p=.012$). The findings mean that there is a full mediation effect between being fully aware and willingness to use HIV PrEP that is found to be statistically significant – those who are fully aware show a more positive

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attitude. Because of this increased positive attitude, there is more willingness to use HIV PrEP. The full mediation pathway observed in this study resonates with another study, indicating no direct path between PrEP-related information and motivation to willingness to use PrEP [34]. Furthermore, this finding resonates with studies showing direct associations and indirect effects of awareness and attitude to willingness to use HIV PrEP [16,35].

The findings of this study indicate various implications for improving HIV PrEP programs in Davao City and the Philippines. First, there is a need to start targeting educational campaigns among straight individuals while simultaneously sustaining efforts for queer and at-risk people. It is possible that, as a majority in the population, straights can influence social norms and cultural beliefs, contributing to reduced stigma and increased attitudes. Much of the current efforts for health promotion campaigns for HIV prevention and management are working owing to more fully aware individuals observed in this study. Furthermore, one key finding in this study is that even just awareness can positively impact attitude and, in turn, willingness to use HIV PrEP, indicating that efforts for educational campaigns should be sustained, and more innovations to deliver accurate information to the rest of the citizens should be considered.

Furthermore, misconceptions about the efficacy of HIV PrEP and hesitance to initiation must also be targeted by these educational campaigns and in counselling sessions. Action programs should also target attitude, seeing that it mediates willingness to use. Incorporating lessons to increase positive attitudes in academic institutions, as part of sex education or in other health-related subjects both at secondary and tertiary levels, may be beneficial.

Limitations

Despite the results and findings of this study, a couple of limitations should be pointed out. Generalizability is only limited to residents of Davao City, and future research

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may investigate whether the same findings hold true in other cities and regions in the Philippines. Furthermore, the response rate is low compared to the target, indicating a nonresponse bias that could limit generalizability. Future research may address this by implementing other data collection forms.

Knowing the awareness, attitude, and willingness to use HIV PrEP among Davaoeños based on gender identity and sexual orientation is limited in the current study. This is because gender identity and sexual preference have been merged into one sub-section. Additionally, the respondents' sexes were not collected. Future studies need to differentiate between sex, gender, and sexual preference for a more nuanced analysis of their effects towards awareness, attitude, and willingness to use.

Additionally, this study is limited to the inferences that can be made regarding how much the respondents actually know about PrEP. The current study only measured awareness using yes/no questions to the respondents to mitigate survey burden among them. Future research may investigate specific knowledge towards HIV and HIV prevention.

CONCLUSION

This study has shown that Davaoeños are aware of HIV PrEP and possess a very high level of attitude and a high level of willingness to use it. Furthermore, willingness to use HIV PrEP was found to be affected by being fully aware of it through the mediation of one's attitude towards HIV PrEP. Although there are individuals who hesitate towards HIV PrEP because of misconceptions like its perceived effectiveness and perceived challenge in adherence, this calls for the need for targeted educational campaigns and health promotion activities. The findings provide valuable insights as a basis for health promotion campaigns, policy development, and other action programs intended for the management and prevention of HIV/AIDS, particularly for the improvement of HIV PrEP programs. Future research may

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also investigate socioeconomic, cultural, and behavioral factors that can influence attitude and willingness to use HIV PrEP.

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Informed Consent: Informed consents were collected from all participants in this study.

Ethical Approval: This study was submitted to the Research Ethics Committee of the University of the Immaculate Conception for ethical review with the protocol code EX-40-02-24. Upon review, the study was deemed to be responsible and ethically accountable and was given ethical clearance on March 07, 2024.

Data Availability Statement: Data are available and will be shared on reasonable request to the corresponding author.

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TABLES

Table 1. Demographic Profile of the Respondents and Significant Difference (ANOVA)

Demographic Profile	Frequency (%)	Attitude		Willingness	
		Mean	F	Mean	F
Age			0.135		0.923
18 – 24 years old	131 (50.78)	4.23		4.06	
25 – 34 years old	106 (41.09)	4.19		4.10	
35 – 44 years old	17 (6.58)	4.24		4.19	
>45 years old	4 (1.55)	4.05		3.58	
Gender Identity			1.800		1.767
Gay	51 (19.77)	4.43		4.18	
Bisexual	74 (28.68)	4.22		4.18	
Straight	118 (45.74)	4.12		3.97	
Transexual	5 (1.94)	4.2		3.83	
Others	10 (3.88)	4.14		4.25	
Location			0.267		0.551
Poblacion	89 (34.50)	4.21		4.12	
Talomo	50 (19.38)	4.23		4.06	
Buhangin	59 (22.87)	4.19		3.97	
Bunawan	13 (5.04)	4.22		4.10	

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Agdao	16 (6.20)	4.08	4.15
Baguio	1 (0.39)	4.00	4.33
Calinan	9 (3.49)	4.16	3.91
Toril	13 (5.04)	4.40	4.33
Tugbok	8 (3.10)	4.35	4.06
Highest Education		2.040	1.530
Elementary	1 (0.39)	4.60	4.83
High School	62 (24.03)	4.27	4.16
Vocational	9 (3.49)	3.64	3.95
College	169 (65.50)	4.20	4.02
Graduate Education	17 (6.59)	4.39	4.35
Marital Status		0.162	0.257
Single	237 (91.86)	4.21	4.07
Married	11 (4.26)	4.29	4.21
Living Together	10 (3.88)	4.12	4.13
Separated/annulled	0 (0.00)		
Widowed	0 (0.00)		
Awareness to HIV PrEP			
Fully Aware	137 (53.10)		
Partially Aware	70 (27.13)		
Not Aware	51 (19.77)		

Note. Significant differences at p-values <.05 in attitude and willingness to use HIV PrEP when grouped according to demographics are denoted by an asterisk ().

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Table 2. Significant Difference in Awareness When Grouped According to Demographic Profile (Pearson Chi-square Test)

Demographic Profile	Awareness			X ²	p-value
	NA	PA	FA		
Age				11.273	.080
18 – 24 years old	32	42	57		
25 – 34 years old	14	24	68		
35 – 44 years old	4	3	10		
>45 years old	1	1	2		
Gender Identity				24.428	.002*
Gay	3	9	39		
Bisexual	11	23	40		
Straight	34	35	49		
Transsexual	2	0	3		
Others	1	3	6		
Location				20.226	.210
Poblacion	20	26	43		
Talomo	9	7	34		
Buhangin	11	21	27		
Bunawan	1	6	6		
Agdao	4	6	6		
Baguio	0	0	1		
Calinan	0	2	7		
Toril	4	1	8		

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Tugbok	2	1	5		
Highest Education				15.919	.044*
Elementary	1	0	0		
High School	17	16	29		
Vocational	2	2	5		
College	30	51	88		
Graduate Education	1	1	15		
Marital Status				7.808	.099
Single	47	66	124		
Married	4	3	4		
Living Together	0	1	9		

Note. NA=Not Aware; PA=Partially Aware; FA=Fully Aware; P-values <.05 and are statistically significant are denoted by an asterisk ().

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Table 3. Attitude and Willingness to Use HIV PrEP Among the Respondents

Statement	Mean±SD	Median
1. I believe PrEP is effective at preventing HIV.	4.30±0.829	4.00
2. I think that people who take HIV PrEP are responsible.	4.47±0.804	5.00
3. I believe taking HIV PrEP is safe for use.	4.21±0.861	4.00
4. It would be no trouble for me to take HIV PrEP every day.	3.81±0.998	4.00
5. I believe the government makes certain that drugs like HIV PrEP are safe for use.	4.28±0.872	4.00
Mean Attitude Score	4.21±0.686	4.20
1. I am willing to take PrEP to prevent getting HIV.	4.44±0.808	5.00
2. I am willing to take pills before and after sex if it would prevent me getting HIV.	4.44±0.827	5.00
3. I am willing to take a pill everyday if it would prevent me from getting HIV.	4.30±0.966	5.00
4. I would never need to take PrEP. (Reverse Coded)	3.88±1.25	4.00
5. I would be willing to pay for laboratory tests needed while taking PrEP.	3.88±1.094	4.00
6. I would take PrEP even if it wasn't 100% effective.	3.52±1.251	4.00
Mean Willingness Score	4.08±0.685	4.17

Factors Affecting Willingness to Use HIV PrEP

Table 4. Direct and Mediation Effects of Awareness and Attitude on Willingness to Use HIV PrEP

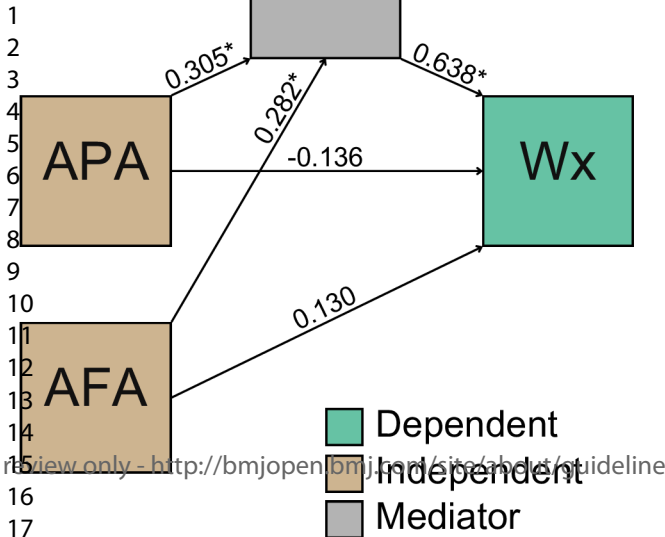
Effect	Path	β	p-value
Total	Partially Aware → Willingness	0.059	.634
Total	Fully Aware → Willingness	0.310	.005*
Direct	Partially Aware → Willingness	-0.136	.154
Direct	Fully Aware → Willingness	0.130	.126
Indirect	Partially Aware → Attitude → Willingness	0.195	.016*
Indirect	Fully Aware → Attitude → Willingness	0.180	.012*

Note. Significant causal effects are denoted by an asterisk (); R²=0.438

Figure 1. Path Diagram of the Direct and Indirect Effects of the Predictor Variables

Note. APA=Awareness – Partially Aware; AFA= Awareness – Fully Aware; Ax=Attitude; Wx=Willingness to Use; Significant path relations are distinguished by an asterisk (*).

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SURVEY TOOL
English Version

Section I. Demographic Profile

Instructions: This part of the questionnaire will extract your demographic characteristics. Please answer truthfully.

Age	
Gender Identity	<div><input type="checkbox"/> Gay - a person who is attracted, emotionally and/or physically, to someone of the same gender</div> <div><input type="checkbox"/> Bisexual - a person who is attracted to both men and women</div> <div><input type="checkbox"/> Straight - a person who is attracted to the opposite sex</div> <div><input type="checkbox"/> Trans - a person whose gender identity and/or gender expression do not match their assigned sex at birth</div> <div><input type="checkbox"/> Others (Please specify):</div>
Location	<div><input type="checkbox"/> Poblacion</div> <div><input type="checkbox"/> Talomo</div> <div><input type="checkbox"/> Buhangin</div> <div><input type="checkbox"/> Bunawan</div> <div><input type="checkbox"/> Agdao</div> <div><input type="checkbox"/> Paquibato</div> <div><input type="checkbox"/> Baguio</div> <div><input type="checkbox"/> Calinan</div> <div><input type="checkbox"/> Marilog</div> <div><input type="checkbox"/> Toril</div> <div><input type="checkbox"/> Tugbok</div>
Highest Educational Attainment	<div><input type="checkbox"/> Elementary</div> <div><input type="checkbox"/> High School</div> <div><input type="checkbox"/> Vocational</div> <div><input type="checkbox"/> College</div> <div><input type="checkbox"/> Graduate Education (Doctoral and Masters)</div>
Marital Status	<div><input type="checkbox"/> Single</div> <div><input type="checkbox"/> Married or living together</div> <div><input type="checkbox"/> Separated or annulled</div> <div><input type="checkbox"/> Widowed</div>

Before proceeding with the survey. Please read the excerpt below:

Pre-exposure Prophylaxis (PrEP) is a highly effective HIV prevention method for high-risk individuals, available in daily or on-demand doses. While it doesn't guard against other STDs, additional preventive measures like condoms are advised during sex. PrEP, administered through a daily pill, is widely used globally, especially beneficial for those at elevated risk, like drug users. Despite possible side effects such as diarrhea, nausea, headache, fatigue, and stomach pain, PrEP is deemed safe and highly efficient when taken as directed.

Section II. Awareness to HIV PrEP

Instructions: In this section, your awareness towards HIV will be collected. Answer the questions truthfully.

Have you heard of HIV PrEP prior to this survey?	Yes No
Have you ever heard of a program that takes antiretroviral medicines to prevent contraction of HIV in HIV-negative individuals?	Yes No
Have you ever been offered HIV PrEP before?	Yes No
If you have heard of HIV PrEP, select which of the following choices are your source of information?	<input type="checkbox"/> Newspapers <input type="checkbox"/> Television <input type="checkbox"/> Radio <input type="checkbox"/> Social Media <input type="checkbox"/> Peer discussion <input type="checkbox"/> Printed posters <input type="checkbox"/> Government clinics

Section III. Attitude towards HIV PrEP use

Instructions: This section of the survey will present you statements related to your attitude towards HIV PrEP use. Please rate these statements according to your agreement. Use the choices below as your guide:

- 1. strongly disagree
- 2. disagree
- 3. neutral
- 4. agree
- 5. strongly agree

Item	5	4	3	2	1
I believe PrEP is effective at preventing HIV.					
I think that people who take HIV PrEP are responsible.					
I believe taking HIV PrEP is safe for use.					
It would be no trouble for me to take HIV PrEP every day.					
I believe the government makes certain that drugs like HIV PrEP are safe for use.					

Section IV. Willingness to use HIV PrEP

Instructions: This section of the survey will present you statements related to your willingness to use HIV PrEP. Please rate these statements according to your agreement. Use the choices below as your guide:

- 1. strongly disagree
- 2. disagree
- 3. neutral
- 4. agree
- 5. strongly agree

Item	5	4	3	2	1
I am willing to take PrEP to prevent getting HIV.					
I am willing to take pills before and after sex if it would prevent me getting HIV.					
I am willing to take a pill everyday if it would prevent me from getting HIV.					
I am not willing to take PrEP. (reversed)					
I would be willing to pay for laboratory tests needed while taking PrEP.					
I would take PrEP even if it wasn't 100% effective.					

Additional Statistical Data

Table 1. Additional Descriptive Statistics Pertaining to Awareness

Variable	Frequency
Have been offered PrEP before	
Yes	78 (30.23)
No	180 (69.77)
Source of Information	
News & Television	11 (4.26)
Radio	2 (0.78)
Social Media	95 (36.82)
Peer discussion	60 (23.26)
Printed posters	1 (0.39)
Government clinics	41 (15.89)
Others: School	1 (0.39)

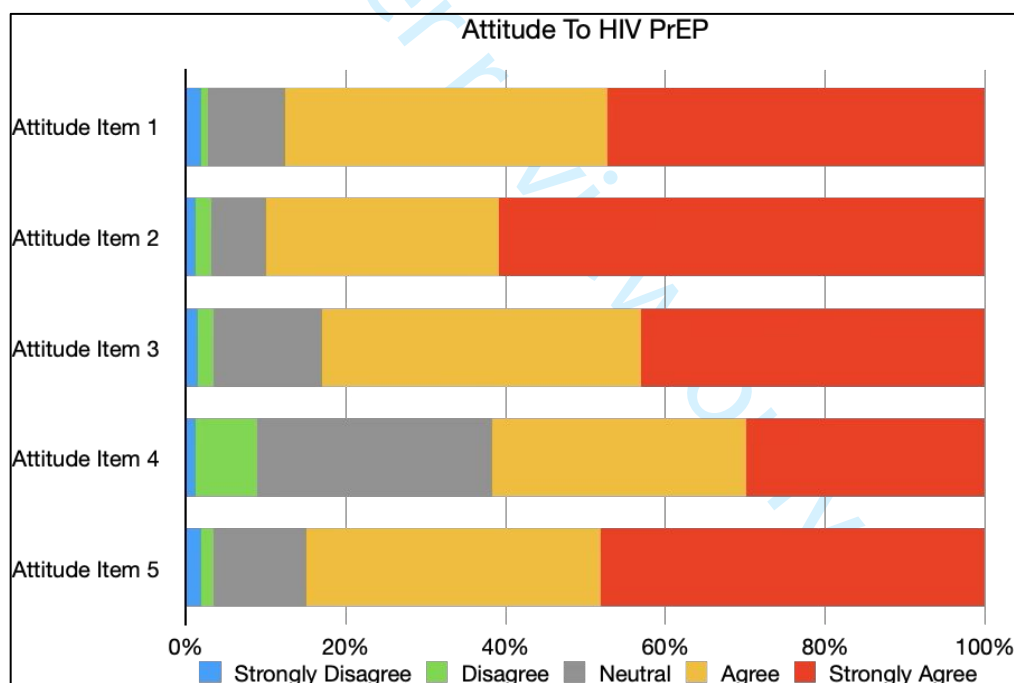
Figure 1. Distribution of Responses to Attitude To HIV PrEP items

Figure 2. Distribution of Responses to Willingness to Use HIV PrEP Items

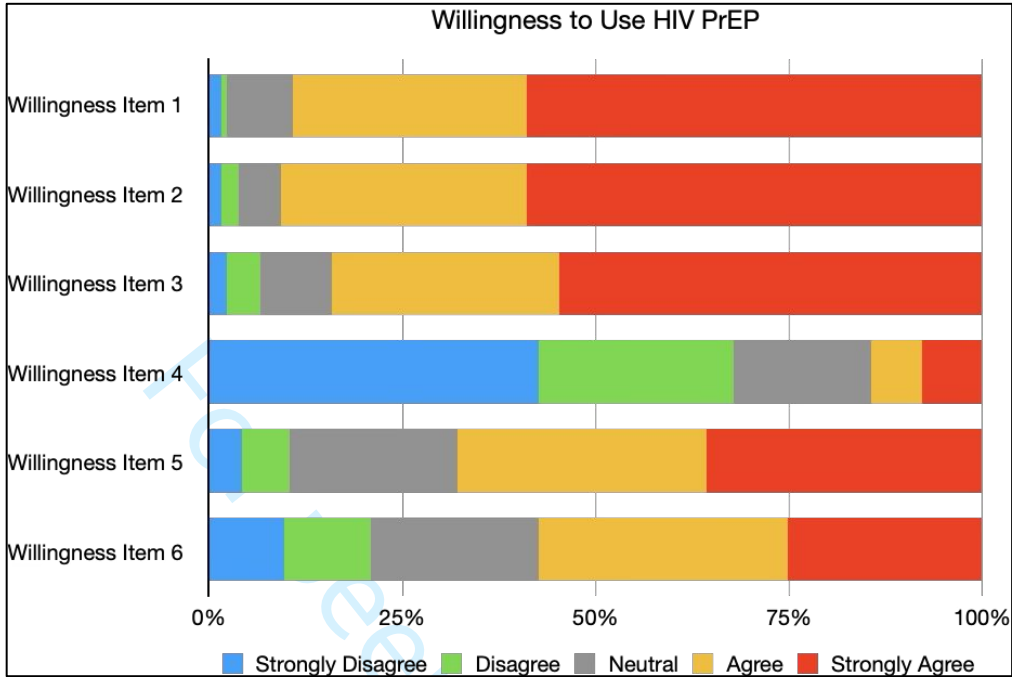


Table 2. Correlation between Awareness, Attitude, and Willingness to Use HIV PrEP

Variables	<i>r / rho</i>	p-value	Inference
Awareness – Attitude	0.117	.060	Not Significant
Awareness – Willingness to Use	0.214	<.000	Significant
Attitude – Willingness to Use	0.640	<.000	Significant

Table 3. Predictor relationship of Awareness and Attitude on Willingness to Use using Multiple Linear Regression

Variables	β	t	p-value	Inference
Awareness	0.111	2.300	.022	Significant
Attitude	0.625	13.012	<.000	Significant

*Note. β =standardized beta coefficient; $R=0.649$; $R^2=0.422$; $F=93.006$; $p<.000$

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A Cross-Sectional Study Measuring the Level and Relationship of Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City, Philippines

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Factors Affecting Willingness to Use HIV PrEP

A Cross-Sectional Study Measuring the Level and Relationship of Awareness, Attitude, and Willingness to Use HIV Pre-Exposure Prophylaxis in Davao City, Philippines

Abstract

Objectives: To improve upon the implementation and utilization of HIV pre-exposure prophylaxis (PrEP) programs, factors affecting HIV PrEP willingness must be investigated. This study aims to determine not only the willingness to use HIV PrEP but also to establish whether awareness and attitude affect this.

Design: This study used a cross-sectional survey research design to examine the awareness, attitude, and willingness to use HIV PrEP in Davao City. The survey was adapted from multiple studies and was validated and pilot tested. Statistical analysis included descriptive and inferential statistics like correlation, linear regression, and structural modelling.

Settings: This research was conducted at Davao City, Philippines. This is one of the regions in the country with high HIV incidence. Survey was done from March to June 2024.

Participants: Participants were at least 18 years of age, currently living in Davao City, and a permanent resident of the city.

Results: A total of 258 respondents were gathered in this study of which, 53.10% of all respondents were fully aware of HIV PrEP, while 27.13% were partially aware. The study found the mean attitude and willingness to be 4.21 ± 0.972 and 4.08 ± 0.685 , respectively. There was a significant difference in the awareness when grouped according to identity category ($X^2=24.428$; $p\text{-value}=0.002$) and highest education attained ($X^2=15.919$; $p\text{-value}=0.044$). Being fully aware positively affected willingness to use HIV PrEP by indirectly contributing positively to attitude towards HIV PrEP ($\beta=0.180$; $p\text{-value}=0.012$).

Conclusion: Generally, the awareness, attitude, and willingness to use HIV PrEP is high. However, some respondents are hesitant to use HIV PrEP if it is not a hundred percent

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effective and unable to adhere to it. The results imply a need for action programs involving various multidisciplinary stakeholders to ensure the community possesses full awareness, positive attitudes, and increased willingness to use HIV PrEP.

Keywords: HIV/AIDS, Prevention, Education, Public Health, Multi-disciplinary, Philippines, Epidemiology

Strengths and Limitations of the Study

- The survey was done online through social media posts which provides to potential respondents their voluntary participation, anonymity, privacy and comfort,
- The survey instrument used was adapted from previous studies but have undergone reliability testing to ensure it is appropriate for use.
- Stratified random sampling was used to ensure the data is representative of the respondents in the city.
- Gender identity and sexual preference was merged but further studies should be more comprehensive and separate these to provide more insights.
- A limitation of this study is that awareness was measured using two general “yes/no” questions and cannot measure how much residents know about HIV PrEP.

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INTRODUCTION

With the rise of HIV/AIDS in the country, biomedical interventions like HIV Pre-Exposure Prophylaxis (PrEP) have become important in the prevention of HIV contraction and infection. HIV PrEP, with sufficient adherence, has been proven safe and effective in preventing HIV transmission [1]. Despite PrEP launching in 2017 [2], the literature surrounding its utilization and its discrepancies in awareness, attitude, and willingness to use among the people in Davao City are scant.

To put it into context, the Davao Region has consistently been high in HIV incidence. According to the Epidemiology Bureau of the Department of Health, the Davao Region was one of the top four regions with the highest HIV cases [3]. Additionally, the region was recorded as the fifth with the highest number of HIV incidences based on the HIV/AIDS Registry of the Philippines in May 2023 [4]. Lastly, there have been 6,736 cases of HIV in the region from 1993 to August 2023 [5].

Because of the increasing rise in HIV, the Davao Region has been assured enough antiretroviral medicines and dynamic treatment facilities [5]. The region has three treatment facilities - two in Davao City and one in Tagum City. The Southern Philippines Medical Center and the City Health Office through the Reproductive Health and Wellness Center are treatment facilities in Davao City, the region's capital city. At the same time, the Davao Regional Medical Center is the treatment hub in Tagum City. There have also been plans to increase the number of treatment facilities, making one in every province [5].

Despite that, there is not enough research and investigation highlighting the awareness and acceptability of Davaoeños regarding HIV PrEP use and access. At the same time, related literature in other regions in the Philippines shows some variation. A study in Metro Manila showed that one in two transgender Filipinas were unaware of HIV PrEP but were interested in knowing more about it [6]. Meanwhile, a study done in Cebu and National Capital Region

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found that HIV PrEP awareness and interest were high in men who have sex with men [7]. A study in the Philippines has also shown that PrEP initiation is low, which leads to suboptimal outcomes of other HIV-related services like online-based HIV self-testing [8]. These findings indicate the importance of the current study in Davao City, and addressing PrEP awareness, attitude, and willingness may enhance its utilization and access [9].

Clearly, a knowledge gap must be addressed to implement PrEP programs and other prevention strategies better. This is where the current study positions itself. This study aims to measure the level of awareness, attitude, and willingness to use HIV PrEP among the people in Davao City, Philippines. Furthermore, the relationship between these three variables and other factors that could affect these variables shall also be established. Understanding the awareness and attitude of Davaoeños will shed light on PrEP discrepancy, including its utilization and accessibility. It will allow key stakeholders like policymakers and health agencies to determine the willingness of the community to use HIV PrEP and how awareness and attitude can affect this. Ultimately, this research can be of benefit to health promotion campaigns targeted towards prevention of HIV/AIDS.

MATERIALS AND METHODS

Research Design

The research design utilized in this study was a quantitative, cross-sectional survey design. A quantitative research design involves generating and using numerical data that answer specific research questions using statistical inference techniques [10]. Additionally, a cross-sectional design was used because data collection was done at a single point in time on a large sample to get a “screenshot” of the parameters and constructs of interest [11]. Cross-sectional designs are usually used in public health to monitor the prevalence of health outcomes, describe population characteristics, and understand health determinants [12].

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Research Locale & Respondents

The research locale of this study was the city capital of Region XI - Davao City. Davao City had a population of 1,776,949 in 2020 [13]. Additionally, the city also has three congressional districts with 11 administrative districts - Poblacion, Talomo, Buhangin, Bunawan, Agdao, Paquibato, Baguio, Calinan, Marilog, Toril, Tugbok [14].

The general population of Davao City was the respondents of this study. For the inclusion, the respondents should be a permanent resident and currently living in Davao City during the data collection, aged at least 18 years old. Exclusion criteria include those mentally challenged individuals who are physically unable to answer the survey, pre-pubescent individuals, adults older than 60 years old, and individuals who do not live in Davao City during the time of collection.

Because the current study collected data from the general population of the research locale, a representative sample was most appropriate. The sampling method to be used is stratified random sampling. The population of Davao City is based on the 2020 Census of Population and Housing of the Philippine Statistics Authority. The total population was 1,776,949 [15]. A sample size of 385 was calculated using the Raosoft® sample size calculator (<https://raosoft.com/samplesize.html>) with 95% confidence interval and a 5% margin of error. Then, stratification was done based on the 11 administrative districts of Davao City.

Research Instrument

The research instrument used in this study was a structured survey questionnaire. The survey was composed of four sections – demographics, awareness, attitudes, and willingness to use HIV PrEP. Before the second section, a brief description of HIV PrEP was included so that regardless of awareness, respondents are introduced to and informed of the nature of HIV

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PrEP. The survey will take less than 30 minutes to finish. The questionnaire was prepared in two languages (English and Filipino) to ensure that the potential participants easily understood what was being asked and to increase survey comprehension.

Only select demographic characteristics were collected to ensure that sensitivity and privacy were upheld. For this reason, only age, gender identity, location (administrative district residing), highest education obtained, and marital status were collected in the survey's first section.

The questions in the succeeding sections were adapted from previous studies in the literature. From an earlier study, awareness of HIV PrEP was established if respondents answered yes to two yes-or-no questions or either of these two [16]. The first question asked respondents if they had heard of HIV PrEP prior to the study, and the follow-up question asked whether they had heard of a program for taking antiretroviral drugs to prevent the contraction of HIV. However, the current research categorized respondents as fully aware if they answered yes to both questions, partially aware if either of the two were responded to with yes, and not aware if both questions were answered with no. Furthermore, the respondents were also asked whether they were offered HIV PrEP before. Then, participants were asked from among a set of choices which channel was the source of their awareness.

The researcher adapted questions for attitude from the study of Mueses-Marín et al. (2021). In assessing willingness to use HIV PrEP, the researcher adapted from the survey conducted by Holt et al. (2012), but an item was removed because it did not fit the context of the current study. There are five statements for attitude and six statements for willingness to use. Additionally, both sections of the questionnaire used a 5-point Likert scale to assess the respondents' agreement with these items.

The final survey was validated and tested for reliability and consistency. The researcher requested content validation from three experts. These experts are from the

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College of Pharmacy and Chemistry - one is an expert in research, one in pharmacy practice, and one in statistics. Then, the questionnaire was pilot-tested on 12 participants to obtain reliability data. The pilot test revealed good reliability ($\alpha = 0.854$) for attitude and acceptable reliability ($\alpha = 0.734$) for willingness to use. A copy of the survey is attached as supplementary material (Supplementary 1)

Data Gathering Procedures

Before actual data collection, the researcher sought approval from relevant stakeholders. Specifically, the researcher sought permission from the city mayor's office of Davao City since the target respondents are the city's general population. Furthermore, the study underwent a research ethics review from the University of the Immaculate Conception Research Ethics Committee. After obtaining permission and ethical clearance, the actual data collection commenced.

Data collection was done online. Google Forms was used as the survey platform. Multiple social media posts were done on Facebook, Instagram, LinkedIn, and X (formerly Twitter) to invite potential respondents. The link to access the Google Forms survey was already included in these posts. To ensure that Davaoeños were targeted, the researcher used targeted audience services of these social media platforms. Google Forms can limit to one response per email so that multiple participation is mitigated. An informed consent form precedes the survey and must have been approved by the respondents before allowing access to the questionnaire.

Furthermore, names were not collected throughout the survey to ensure anonymity and privacy and to mitigate social desirability bias among potential respondents. Those who did not agree to participate could not access the survey. The survey period ran for three months (March to June 2024) to ensure the target sample was obtained.

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Data Analysis

After data collection, the researcher conducted data cleanup. Once this was done, the researcher proceeded to statistical analysis and inference. In this study, a multitude of descriptive and inferential statistical tests and tools were used. The researcher used JASP v 0.18.3, an open-access and capable statistical software, to conduct these tests. Mean, median, standard deviations, frequencies, and percentages were used to describe data. Then, an initial assessment of the relationship between awareness, attitude, and willingness to use was determined through Pearson’s correlation, Spearman’s rank correlation, and linear regression. Then, mediation analysis through the JASP Process (beta) module was used to identify causal relationships between the constructs. Additionally, ANOVA and Chi-square test were used to determine demographic variability among the constructs of interest.

Patient and Public Involvement

The researcher has taken into consideration the public involvement of this research. Because the Davaoeños were target respondents, the researcher has requested approval from the city government and an authorization letter was issued. Throughout the conduct of this research, the author has worked with a government-owned HIV-dedicated treatment hub in Davao City - the Reproductive Health and Wellness Center (RHWC). Furthermore, the results were also shared to RHWC.

RESULTS

Table 1 below shows the demographic characteristics of the sample. Of the 385 targeted respondents, only 258 (67.01%) participants responded. Half of the respondents were 18 to 24 years old, and a huge chunk of these respondents identify as straight (45.74%). Furthermore, many of the respondents were located in Poblacion (34.50%), Buhangin (22.87%), and Talomo (19.38%) which are shown in Table 4 of Supplementary 2.

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In terms of respondents' awareness, 137 respondents (53.10%) were fully aware of HIV PrEP, while only 27.13 percent were partially aware. The three sources of information (Table 1 of Supplementary 2) with the highest percent frequencies were social media (36.82%), peer discussion (23.26), and government clinics (15.89%). Furthermore, only 78 respondents (30.23%) reported being offered PrEP before the survey, as shown in Table 1 of Supplementary 2.

Elaborating deeper on the respondents' awareness, significant differences have been noticed when grouped according to demographics, as shown in Table 2. Through the Chi-square test, only gender identity ($X^2=24.428$; $p\text{-value}=0.002$) and highest educational attainment ($X^2=15.919$; $p\text{-value}=0.044$) were significant. When taking the proportion of respondents that are aware and grouped according to gender identity, 94.12% of the respondents who were homosexuals were aware, while bisexuals and heterosexuals were only 85.14% and 71.19% aware, respectively. When taking a closer look at those who are aware compared to the total population of their respective gender identity, homosexuals still had a higher percent proportion of being fully aware (76.47%) compared to bisexuals (54.05%) and heterosexuals (41.53%). Furthermore, individuals found to have attained graduate education remain to have the highest percentage of being fully aware (88.24%) followed by vocational (55.56%) and college level (52.07%) respective of their group population.

The level of attitude and willingness to use HIV PrEP among the respondents were found to be very high (mean= 4.21 ± 0.868 ; median=4.20) and high (4.08 ± 0.685 ; median=4.17), respectively (shown in Table 3). When examining the attitude statements, we see that statement 2 had the highest mean (mean=4.47; SD=0.804) while statement 4 had the lowest mean (mean=3.81; SD=0.988). Among the statements assessing willingness to use, statements 1 and 2 were the highest (mean=4.44), while statement 6 was the lowest (mean=3.52; SD=1.251). The response distribution for attitude and willingness to use HIV

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PrEP has also been included in the supplementary materials (Figures 1 and 2 of Supplementary 2).

Results of inferential statistics that establish the relationship the variables have with each other have also been reported. The relationship between the variables was initially assessed before mediation analysis. Awareness and attitude towards HIV PrEP were found to be not only significantly correlated with willingness to use PrEP but were also significant predictors of it (Tables 2 and 3 of Supplementary Material 2).

When investigating, the direct and mediating effects of the results are presented in Table 4. The total effect of being partially aware on willingness was insignificant (estimate=0.059; p-value=0.634), but the total effect of being fully aware on willingness was significant (estimate=0.310; p=.005). The mediating effects of attitude on willingness were found to be significant for both being partially aware (estimate=0.195; p-value=.016) and fully aware (estimate=0.180; p-value=.016). Lastly, direct effects of awareness to willingness to use HIV PrEP were not found to be significant, indicating a complete mediation relationship. Figure 1 shows the paths of the variables.

DISCUSSIONS

The current study provides information on the awareness, attitude, and willingness to use HIV PrEP among residents of Davao City. While many studies have investigated HIV PrEP awareness, attitude, and willingness to use among high-risk individuals, this study focused more on the general population in Davao City. Surprisingly enough, many of the respondents identify as heterosexuals. This may indicate that there is interest in HIV PrEP among straight individuals in the city.

Currently, HIV PrEP in Davao City is emphasized more for queer and at-risk individuals, including men who have sex with men, people who inject drugs, transgender

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individuals, and other vulnerable groups [19]. Furthermore, PrEP is offered only through a government-owned primary HIV/AIDS facility. Those at-risk individuals may avail themselves of PrEP free of charge, but those otherwise would have to buy it out of pocket since it isn't covered by healthcare insurance [19].

This study also shows the awareness of Davaoños regarding HIV PrEP. The findings show that more than half of the respondents were fully aware of HIV PrEP. This finding corroborates a similar study in Cebu and Manila indicating consistency among these major locations in the Philippines [7]. Furthermore, the main sources of information among those who are aware include social media, peer discussion, and government clinics. Social media has also been found to be the primary source of information in another study [20]. The three main sources of information found in this study can be optimized even more to ensure a broader reach to those partially or even unaware of HIV PrEP and to deliver information in the community efficiently.

When analyzing if respondents who are fully or partially aware are affected or equally distributed by demographics, we see a significant difference in respondents' awareness based on gender identity and highest educational attainment. Findings indicate that gay people have more awareness than the rest, owing to a higher proportion of being fully aware relative to their group population. The high awareness noted in this study may be a result of homosexuals having more perceived risk of contraction because of riskier behaviors and seeking more sexual sensations, among other factors like personal beliefs, emotional history, relationships and social roles [21–23]. The findings also indicate that straight people have the least awareness relative to their group population. This finding resonates with previous literature indicating low awareness among heterosexual individuals [24–27].

Furthermore, a higher frequency of awareness was observed from individuals with higher educational attainment. This finding resonates with studies showing PrEP awareness is

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associated with higher education [28–30]. The findings would indicate that heterosexual individuals have more interest in HIV PrEP because they have a lower level of awareness and that the use of social media, efforts by government clinics, and discussion among peers may be beneficial in increasing their awareness.

Regarding attitude, the mean score can be described as very high level. This means that the respondents show a very good attitude towards HIV PrEP. Among the statements that assessed attitude, statement 2 (*I think that people who take HIV PrEP are responsible*) was found to have the highest mean and median. This would indicate that the respondents possess low stigma towards people taking HIV PrEP and see such individuals as responsible for their health. This finding contradicts studies that showed stigmatizing attitudes toward PrEP use because of being stereotyped into promiscuity and other conspiracy beliefs, being rejected for such stereotyping, and additional HIV stigma that may have transferred to PrEP use [31,32]. However, it can be pointed out that these studies have been done outside of the Philippines. As one of the most LGBTQ-friendly countries in Southeast Asia, it can be postulated from the findings that the situation is different in Davao City and the country. Still, more investigation and research are needed to substantiate this claim.

In relation to attitude, statement 4 (*It would be no trouble for me to take HIV PrEP every day*) was found to have the lowest mean score among the statements under attitude. Although this score can still be interpreted as high, this result would mean that some respondents may perceive problems in adherence and persistence when initiating and sustaining PrEP. This finding is similar to that of Shamu et al. (2021), but the current study does not show whether this adherence challenge differed by sex in the same way observed in that study.

Willingness to use HIV PrEP among the residents of Davao City can be described as high level. This means that Davaoeños are willing to seek and use HIV PrEP given the

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opportunity and with enough access. This finding corroborates a previous study indicating respondents were interested in taking PrEP [7]. However, statement 6 (*I would take PrEP even if it wasn't 100% effective*) was found to have the lowest mean score among the statements assessing willingness. This would indicate hesitation among the respondents in using PrEP if it isn't a hundred percent effective. Evidence does suggest that the effectiveness of HIV PrEP is lower compared to estimates from clinical studies [33]. However, educational campaigns should still highlight the importance of PrEP and its contribution to reducing HIV incidence.

The current study also establishes the relationship between awareness, attitude, and willingness to use HIV PrEP and has been included in Supplementary Material 2. Initial analyses have shown that respondents who have higher attitudes strongly tend to have higher level of willingness to use HIV PrEP. The same is true for awareness and willingness, although of weak correlation. Through linear regression, it can be inferred that awareness of HIV PrEP and increased positive attitudes towards it positively predict one's willingness to use it. Correlation and linear regression were important considerations in proceeding with mediation analysis as this would allow the researcher to establish significant relationships before elaborating further.

Mediation analysis provides a more comprehensive path relation between the constructs. It provides a basis for hypothesizing whether willingness to use HIV PrEP is directly affected by awareness alone or is mediated by attitude. Table 4 shows that awareness of HIV PrEP has an insignificant direct effect on willingness to use HIV PrEP. This means that awareness alone does not affect the willingness of respondents to use HIV PrEP. However, being fully aware has a significant indirect effect on willingness to use HIV PrEP and is mediated by attitude towards HIV PrEP ($\beta=0.180$; $p=.012$). The findings mean that there is a full mediation effect between being fully aware and willingness to use HIV PrEP

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that is found to be statistically significant – those who are fully aware show a more positive attitude. Because of this increased positive attitude, there is more willingness to use HIV PrEP. The full mediation pathway observed in this study resonates with another study, indicating no direct path between PrEP-related information and motivation to willingness to use PrEP [34]. Furthermore, this finding resonates with studies showing direct associations and indirect effects of awareness and attitude to willingness to use HIV PrEP [16,35].

The findings of this study indicate various implications for improving HIV PrEP programs in Davao City and the Philippines. While there have been studies in the country, understanding the context in Davao City may improve existing HIV PrEP programs and contribute to replicating successful strategies in similar urban centers across the country. The findings in awareness shows an ongoing challenge in public health education as there remains a portion of the sample that are partially and even unaware of HIV PrEP. On top of that, many of those unaware sampled in the city were found to be heterosexual individuals. The findings shows that there is a need to start targeting educational campaigns among straight individuals while simultaneously sustaining efforts for queer and at-risk people. It is possible that, as a majority in the population, straights can influence social norms and cultural beliefs, contributing to reduced stigma and increased attitudes.

One key finding in this study is that even just awareness can positively impact attitude and, in turn, willingness to use HIV PrEP. As such, efforts for educational campaigns should be sustained and more innovations to deliver accurate information through social media should be considered. This study has also shown positive attitudes toward PrEP, particularly in the respondents' perception of responsibility among users, indicating potential for destigmatizing its use. Increased efforts and initiation to incorporating lessons aimed at increasing positive attitudes in academic institutions, as part of sex education or in other health-related subjects both at secondary and tertiary levels, may be beneficial. Increasing

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positive attitudes through health promotion campaigns will contribute to willingness to use as based on its mediating relationship.

Additionally, there still remains misconceptions about HIV PrEP. Specifically, the findings show that there are still concerns about the efficacy of HIV PrEP and hesitance to initiation. Educational campaigns and counselling sessions must also target these misconceptions emphasizing real-world benefits and provide adherence support.

Limitations

Despite the results and findings of this study, a couple of limitations should be pointed out. Generalizability is only limited to residents of Davao City, and future research may investigate whether the same findings hold true in other cities and regions in the Philippines. Furthermore, the response rate is low compared to the target, indicating a nonresponse bias that could limit generalizability. Future research may address this by implementing other data collection forms.

Knowing the awareness, attitude, and willingness to use HIV PrEP among Davaoeños based on gender identity and sexual orientation is limited in the current study. This is because gender identity and sexual preference have been merged into one sub-section. Additionally, the respondents' sexes were not collected. Future studies need to differentiate between sex, gender, and sexual preference for a more nuanced analysis of their effects towards awareness, attitude, and willingness to use.

Additionally, this study is limited to the inferences that can be made regarding how much the respondents actually know about PrEP. The current study only measured awareness using yes/no questions to the respondents to mitigate survey burden among them. Future research may investigate specific knowledge towards HIV and HIV prevention.

CONCLUSION

Factors Affecting Willingness to Use HIV PrEP

This study has shown that Davaoños are aware of HIV PrEP and possess a very high level of attitude and a high level of willingness to use it. Furthermore, willingness to use HIV PrEP was found to be affected by being fully aware of it through the mediation of one’s attitude towards HIV PrEP. Although there are individuals who hesitate towards HIV PrEP because of misconceptions like its perceived effectiveness and perceived challenge in adherence, this calls for the need for targeted educational campaigns and health promotion activities. The findings provide valuable insights as a basis for health promotion campaigns, policy development, and other action programs intended for the management and prevention of HIV/AIDS, particularly for the improvement of HIV PrEP programs. Future research may also investigate socioeconomic, cultural, and behavioral factors that can influence attitude and willingness to use HIV PrEP.

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Conflict of Interest: Author declares no conflict of interest.

Informed Consent: Informed consents were collected from all participants in this study.

Ethical Approval: This study was submitted to the Research Ethics Committee of the University of the Immaculate Conception for ethical review with the protocol code EX-40-02-24. Upon review, the study was deemed to be responsible and ethically accountable and was given ethical clearance on March 07, 2024.

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Factors Affecting Willingness to Use HIV PrEP

Data Availability Statement: Data are available and will be shared on reasonable request to the corresponding author.

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Factors Affecting Willingness to Use HIV PrEP

TABLES

Table 1. Demographic Profile of the Respondents and Significant Difference (ANOVA)

Demographic Profile	Frequency (%)	Attitude		Willingness	
		Mean	F	Mean	F
Age			0.135		0.923
18 – 24 years old	131 (50.78)	4.23		4.06	
25 – 34 years old	106 (41.09)	4.19		4.10	
35 – 44 years old	17 (6.58)	4.24		4.19	
>45 years old	4 (1.55)	4.05		3.58	
SOGI			1.800		1.767
Homosexuals	51 (19.77)	4.43		4.18	
Bisexuals	74 (28.68)	4.22		4.18	
Heterosexuals	118 (45.74)	4.12		3.97	
Transgenders	5 (1.94)	4.2		3.83	
Others	10 (3.88)	4.14		4.25	
Highest Education			2.040		1.530
Elementary	1 (0.39)	4.60		4.83	
High School	62 (24.03)	4.27		4.16	
Vocational	9 (3.49)	3.64		3.95	
College	169 (65.50)	4.20		4.02	
Graduate Education	17 (6.59)	4.39		4.35	
Awareness to HIV PrEP					
Fully Aware	137 (53.10)				
Partially Aware	70 (27.13)				
Not Aware	51 (19.77)				

Factors Affecting Willingness to Use HIV PrEP

Note. SOGI = Sexual Orientation and Gender Identity; Significant differences at p-values <.05 in attitude and willingness to use HIV PrEP when grouped according to demographics are denoted by an asterisk (*).

For peer review only

Factors Affecting Willingness to Use HIV PrEP

Table 2. Significant Difference in Awareness When Grouped According to Demographic Profile (Pearson Chi-square Test)

Demographic Profile	Awareness			X ²	p-value
	NA	PA	FA		
Age				11.273	.080
18 – 24 years old	32	42	57		
25 – 34 years old	14	24	68		
35 – 44 years old	4	3	10		
>45 years old	1	1	2		
SOGI				24.428	.002*
Homosexuals	3	9	39		
Bisexuals	11	23	40		
Heterosexuals	34	35	49		
Transgenders	2	0	3		
Others	1	3	6		
Highest Education				15.919	.044*
Elementary	1	0	0		
High School	17	16	29		
Vocational	2	2	5		
College	30	51	88		
Graduate Education	1	1	15		

Note. SOGI = Sexual Orientation and Gender Identity; NA=Not Aware; PA=Partially Aware; FA=Fully Aware; P-values <.05 and are statistically significant are denoted by an asterisk (*).

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Factors Affecting Willingness to Use HIV PrEP

Table 3. Attitude and Willingness to Use HIV PrEP Among the Respondents

Statement	Mean±SD	Median
1. I believe PrEP is effective at preventing HIV.	4.30±0.829	4.00
2. I think that people who take HIV PrEP are responsible.	4.47±0.804	5.00
3. I believe taking HIV PrEP is safe for use.	4.21±0.861	4.00
4. It would be no trouble for me to take HIV PrEP every day.	3.81±0.998	4.00
5. I believe the government makes certain that drugs like HIV PrEP are safe for use.	4.28±0.872	4.00
Mean Attitude Score	4.21±0.686	4.20
1. I am willing to take PrEP to prevent getting HIV.	4.44±0.808	5.00
2. I am willing to take pills before and after sex if it would prevent me getting HIV.	4.44±0.827	5.00
3. I am willing to take a pill everyday if it would prevent me from getting HIV.	4.30±0.966	5.00
4. I would never need to take PrEP. (Reverse Coded)	3.88±1.25	4.00
5. I would be willing to pay for laboratory tests needed while taking PrEP.	3.88±1.094	4.00
6. I would take PrEP even if it wasn't 100% effective.	3.52±1.251	4.00
Mean Willingness Score	4.08±0.685	4.17

Factors Affecting Willingness to Use HIV PrEP

Table 4. Direct and Mediation Effects of Awareness and Attitude on Willingness to Use HIV PrEP

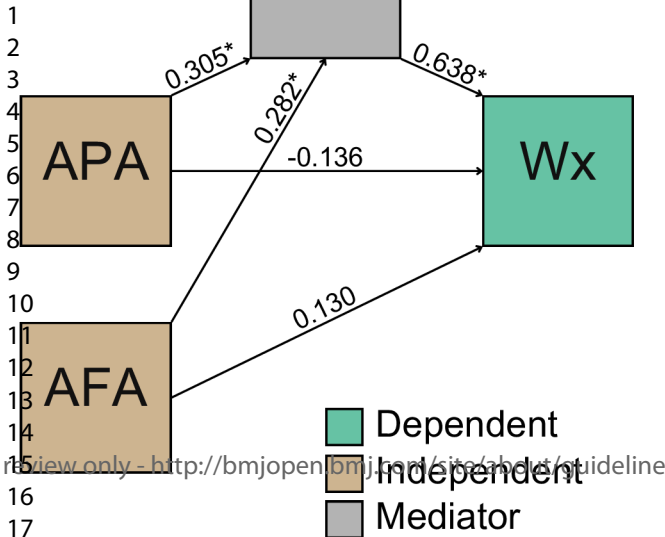
Effect	Path	β	p-value
Total	Partially Aware \rightarrow Willingness	0.059	.634
Total	Fully Aware \rightarrow Willingness	0.310	.005*
Direct	Partially Aware \rightarrow Willingness	-0.136	.154
Direct	Fully Aware \rightarrow Willingness	0.130	.126
Indirect	Partially Aware \rightarrow Attitude \rightarrow Willingness	0.195	.016*
Indirect	Fully Aware \rightarrow Attitude \rightarrow Willingness	0.180	.012*

Note. Significant causal effects are denoted by an asterisk (); $R^2=0.438$

Figure 1. Path Diagram of the Direct and Indirect Effects of the Predictor Variables

Note. APA=Awareness – Partially Aware; AFA= Awareness – Fully Aware; Ax=Attitude; Wx=Willingness to Use; Significant path relations are distinguished by an asterisk (*).

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SURVEY TOOL
English Version

Section I. Demographic Profile

Instructions: This part of the questionnaire will extract your demographic characteristics. Please answer truthfully.

Age	
Gender Identity	<div><input type="checkbox"/> Gay - a person who is attracted, emotionally and/or physically, to someone of the same gender</div> <div><input type="checkbox"/> Bisexual - a person who is attracted to both men and women</div> <div><input type="checkbox"/> Straight - a person who is attracted to the opposite sex</div> <div><input type="checkbox"/> Trans - a person whose gender identity and/or gender expression do not match their assigned sex at birth</div> <div><input type="checkbox"/> Others (Please specify):</div>
Location	<div><input type="checkbox"/> Poblacion</div> <div><input type="checkbox"/> Talomo</div> <div><input type="checkbox"/> Buhangin</div> <div><input type="checkbox"/> Bunawan</div> <div><input type="checkbox"/> Agdao</div> <div><input type="checkbox"/> Paquibato</div> <div><input type="checkbox"/> Baguio</div> <div><input type="checkbox"/> Calinan</div> <div><input type="checkbox"/> Marilog</div> <div><input type="checkbox"/> Toril</div> <div><input type="checkbox"/> Tugbok</div>
Highest Educational Attainment	<div><input type="checkbox"/> Elementary</div> <div><input type="checkbox"/> High School</div> <div><input type="checkbox"/> Vocational</div> <div><input type="checkbox"/> College</div> <div><input type="checkbox"/> Graduate Education (Doctoral and Masters)</div>
Marital Status	<div><input type="checkbox"/> Single</div> <div><input type="checkbox"/> Married or living together</div> <div><input type="checkbox"/> Separated or annulled</div> <div><input type="checkbox"/> Widowed</div>

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Before proceeding with the survey. Please read the excerpt below:

Pre-exposure Prophylaxis (PrEP) is a highly effective HIV prevention method for high-risk individuals, available in daily or on-demand doses. While it doesn't guard against other STDs, additional preventive measures like condoms are advised during sex. PrEP, administered through a daily pill, is widely used globally, especially beneficial for those at elevated risk, like drug users. Despite possible side effects such as diarrhea, nausea, headache, fatigue, and stomach pain, PrEP is deemed safe and highly efficient when taken as directed.

Section II. Awareness to HIV PrEP

Instructions: In this section, your awareness towards HIV will be collected. Answer the questions truthfully.

Have you heard of HIV PrEP prior to this survey?	Yes No
Have you ever heard of a program that takes antiretroviral medicines to prevent contraction of HIV in HIV-negative individuals?	Yes No
Have you ever been offered HIV PrEP before?	Yes No
If you have heard of HIV PrEP, select which of the following choices are your source of information?	<input type="checkbox"/> Newspapers <input type="checkbox"/> Television <input type="checkbox"/> Radio <input type="checkbox"/> Social Media <input type="checkbox"/> Peer discussion <input type="checkbox"/> Printed posters <input type="checkbox"/> Government clinics

Section III. Attitude towards HIV PrEP use

Instructions: This section of the survey will present you statements related to your attitude towards HIV PrEP use. Please rate these statements according to your agreement. Use the choices below as your guide:

- 1. strongly disagree
- 2. disagree
- 3. neutral
- 4. agree
- 5. strongly agree

Item	5	4	3	2	1
I believe PrEP is effective at preventing HIV.					
I think that people who take HIV PrEP are responsible.					
I believe taking HIV PrEP is safe for use.					
It would be no trouble for me to take HIV PrEP every day.					
I believe the government makes certain that drugs like HIV PrEP are safe for use.					

Section IV. Willingness to use HIV PrEP

Instructions: This section of the survey will present you statements related to your willingness to use HIV PrEP. Please rate these statements according to your agreement. Use the choices below as your guide:

- 1. strongly disagree
- 2. disagree
- 3. neutral
- 4. agree
- 5. strongly agree

Item	5	4	3	2	1
I am willing to take PrEP to prevent getting HIV.					
I am willing to take pills before and after sex if it would prevent me getting HIV.					
I am willing to take a pill everyday if it would prevent me from getting HIV.					
I am not willing to take PrEP. (reversed)					
I would be willing to pay for laboratory tests needed while taking PrEP.					
I would take PrEP even if it wasn't 100% effective.					

Additional Statistical Data

Table 1. Additional Descriptive Statistics Pertaining to Awareness

Variable	Frequency
Have been offered PrEP before	
Yes	78 (30.23)
No	180 (69.77)
Source of Information	
News & Television	11 (4.26)
Radio	2 (0.78)
Social Media	95 (36.82)
Peer discussion	60 (23.26)
Printed posters	1 (0.39)
Government clinics	41 (15.89)
Others: School	1 (0.39)

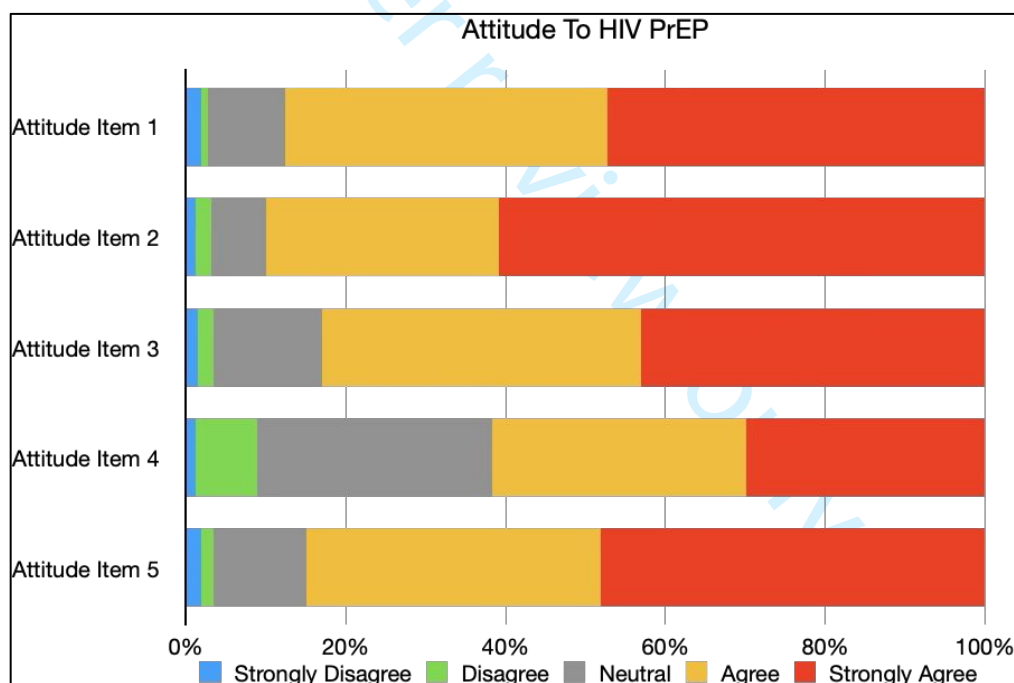
Figure 1. Distribution of Responses to Attitude To HIV PrEP items

Figure 2. Distribution of Responses to Willingness to Use HIV PrEP Items

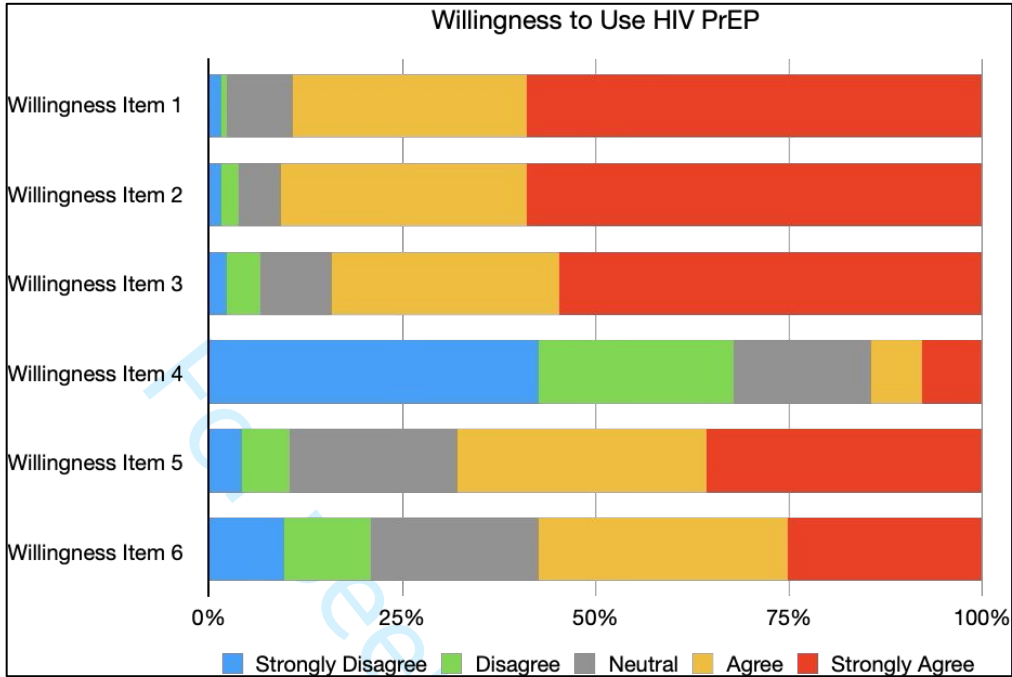


Table 2. Correlation between Awareness, Attitude, and Willingness to Use HIV PrEP

Variables	<i>r / rho</i>	p-value	Inference
Awareness – Attitude	0.117	.060	Not Significant
Awareness – Willingness to Use	0.214	<.000	Significant
Attitude – Willingness to Use	0.640	<.000	Significant

Table 3. Predictor relationship of Awareness and Attitude on Willingness to Use using Multiple Linear Regression

Variables	β	t	p-value	Inference
Awareness	0.111	2.300	.022	Significant
Attitude	0.625	13.012	<.000	Significant

*Note. β =standardized beta coefficient; $R=0.649$; $R^2=0.422$; $F=93.006$; $p<.000$

Table 4. Demographic Profile of the Respondents and Significant Difference (ANOVA)

Demographic Profile	Frequency (%)	Attitude		Willingness	
		Mean	F	Mean	F
Age			0.135		0.923
18 – 24 years old	131 (50.78)	4.23		4.06	
25 – 34 years old	106 (41.09)	4.19		4.10	
35 – 44 years old	17 (6.58)	4.24		4.19	
>45 years old	4 (1.55)	4.05		3.58	
SOGI			1.800		1.767
Homosexuals	51 (19.77)	4.43		4.18	
Bisexuals	74 (28.68)	4.22		4.18	
Heterosexuals	118 (45.74)	4.12		3.97	
Transgenders	5 (1.94)	4.2		3.83	
Others	10 (3.88)	4.14		4.25	
Location			0.267		0.551
Poblacion	89 (34.50)	4.21		4.12	
Talomo	50 (19.38)	4.23		4.06	
Buhangin	59 (22.87)	4.19		3.97	
Bunawan	13 (5.04)	4.22		4.10	
Agdao	16 (6.20)	4.08		4.15	
Baguio	1 (0.39)	4.00		4.33	
Calinan	9 (3.49)	4.16		3.91	
Toril	13 (5.04)	4.40		4.33	

Tugbok	8 (3.10)	4.35	4.06
Highest Education		2.040	1.530
Elementary	1 (0.39)	4.60	4.83
High School	62 (24.03)	4.27	4.16
Vocational	9 (3.49)	3.64	3.95
College	169 (65.50)	4.20	4.02
Graduate Education	17 (6.59)	4.39	4.35
Marital Status		0.162	0.257
Single	237 (91.86)	4.21	4.07
Married	11 (4.26)	4.29	4.21
Living Together	10 (3.88)	4.12	4.13
Separated/annulled	0 (0.00)		
Widowed	0 (0.00)		
Awareness to HIV PrEP			
Fully Aware	137 (53.10)		
Partially Aware	70 (27.13)		
Not Aware	51 (19.77)		

Note. Significant differences at p-values <.05 in attitude and willingness to use HIV PrEP when grouped according to demographics are denoted by an asterisk ().

Table 5. Significant Difference in Awareness When Grouped According to Demographic Profile (Pearson Chi-square Test)

Demographic Profile	Awareness			X ²	p-value
	NA	PA	FA		
Age				11.273	.080
18 – 24 years old	32	42	57		
25 – 34 years old	14	24	68		
35 – 44 years old	4	3	10		
>45 years old	1	1	2		
SOGI				24.428	.002*
Homosexuals	3	9	39		
Bisexuals	11	23	40		
Heterosexuals	34	35	49		
Transgenders	2	0	3		
Others	1	3	6		
Location				20.226	.210
Poblacion	20	26	43		
Talomo	9	7	34		
Buhangin	11	21	27		
Bunawan	1	6	6		
Agdao	4	6	6		
Baguio	0	0	1		
Calinan	0	2	7		

Toril	4	1	8		
Tugbok	2	1	5		
Highest Education				15.919	.044*
Elementary	1	0	0		
High School	17	16	29		
Vocational	2	2	5		
College	30	51	88		
Graduate Education	1	1	15		
Marital Status				7.808	.099
Single	47	66	124		
Married	4	3	4		
Living Together	0	1	9		

Note. NA=Not Aware; PA=Partially Aware; FA=Fully Aware; P-values <.05 and are statistically significant are denoted by an asterisk ().