

Research Article

Update on HIV Pre-Exposure Prophylaxis Awareness and Attitudes in Public Health Clinics in Southern Arizona

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Abstract

Background: HIV pre-exposure prophylaxis (PrEP) uptake is low among women and Hispanic people in the United States.

Methods: Between 11/2021 to 4/2022, questionnaires were administered to 578 adults and compared to data collected from 500 adults between 1/2018-6/2018 (Shende, 2020) attending public health clinics in Southern Arizona.

Outcomes: PrEP awareness increased from 20% in 2018 to 50% in 2021-2022 ($p < 0.001$). However, willingness to engage in PrEP decreased from 87% in 2018 to 74% in 2021-2022 and acceptance of the required activities for daily PrEP, such as visiting provider and obtaining labs every three months, also decreased from 2018 to 2021-2022 ($p < 0.001$). In both 2018 and 2021-2022, there was a higher level of PrEP awareness in participants with ≥ 2 HIV risk score than those with a < 2 HIV risk score, and those with a high perceived HIV risk compared to those who had low perceived risk. ($p < 0.001$). In 2021-2022, there was no association with PrEP awareness and sexually transmitted infections in the last six months. The preferred method of PrEP was a pill taken every 28 days.

Clinical implications: More effort needs to focus on education and acceptance of PrEP in sites that serve women, Hispanic adults, and heterosexuals.

Strengths and limitations: The strengths of this study are the large group of heterosexuals, women, and Hispanic adults who participated. There is comparable data to monitor progress, and the questionnaires were offered in Spanish and English. Data are lacking in these populations. Limitations of the study were that not all questions were answered by all participants and that there was some differences in demographics between the participants in 2018 compared to 2021-2022.

Conclusion: Continuing the search for newer methods of PrEP and novel ways to educate and distribute PrEP to underserved populations is a key component to ending HIV.

INTRODUCTION

Although preexposure prophylaxis (PrEP) is a safe, well tolerated, and efficacious method of HIV prevention [1], only 36% of the 1.2 million participants who met indications for PrEP were prescribed it in 2022 [2]. Uptake was especially low among Hispanics in whom 24% who met indications were prescribed

PrEP. Uptake was even lower among females in whom only 15% of females who met indications were prescribed PrEP. Since 2014, HIV incidence in Arizona has been higher among Hispanic adults than non-Hispanic White adults [3-5]. In 2022, although 42% of incident cases of HIV identified as Hispanic White, only 26.7% of PrEP users in Arizona were Hispanic ethnicity [6,7]. Despite a higher incidence of HIV among Hispanic adults, we found that

20% of all participants and 12% of women who attended the Pima County Health Department Family Planning and Sexually Transmitted Infection (STI) clinics had PrEP awareness when questioned in 2018 [8]. This was driven by lack of awareness rather than patient attitudes such as acceptance of required activities, costs, or embarrassment of being on PrEP.

The purpose of this study is to determine what barriers remain to increasing PrEP uptake in low-income populations by examining PrEP awareness and attitudes in 2021-2022 and then comparing PrEP awareness and attitudes with those in 2018.

MATERIALS AND METHODS

Approval was obtained from the University of Arizona Institutional Review Board. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Informed consent was obtained from all participants included in the study.

PARTICIPANTS

Between November 2021 and April 2022, 578 adults presenting to Pima County Health Department Family Planning and STI clinics completed a questionnaire about demographic characteristics, sexual and drug use activity, and PrEP awareness and attitudes. Five hundred adults had taken a similar questionnaire in 2018 (Shende et al., 2020). The questionnaires included standard questions about demographics as well as questions pertaining to sexual activity and PrEP (Table 1). Most questions were the same, but some questions were removed, modified, or added based on results of the initial study and updates in PrEP guidelines. Patients were excluded if they had a diagnosis of HIV, < 18 years of age, or did not answer the question “Before today, did you know there was a pill that can prevent HIV infection?”

Procedure

Participants answered questions in a private room with only the investigator. The questionnaire was offered in both Spanish and English. Date was entered into REDCap [9,10]. The process was similar in 2018 and 2021-2022 except that more participants in 2018 had the questionnaires read to them and the study personnel assisted with entry into the computer.

HIV Risk Score and Perceived HIV Risk

An HIV risk score was created to better define the population with one risk point being assigned for the following behaviors and characteristics:

1) condomless anal or vaginal sex in the past six months, 2) a male who indicated he had sex with either other males or TGW, 3) a diagnosis of gonorrhea (GC), chlamydia (CT), or syphilis in the past six months, 4) injection drug use, and 5) identifying as TGW. The points were summed to create an HIV risk score with the lowest score zero and the maximum score four since

Table 1: Non-demographic questions analyzed 2018 compared to 2021-2022

2018	2021-2022
Before today, did you know that there was a pill that can prevent HIV infection	Same
If I were at risk for HIV, I would be willing to take a pill every day to prevent HIV infection?	If you were at risk for HIV, would you be
be willing to visit a healthcare provider every 3 mos. to receive an HIV prevention pill?	Same
willing to have my blood drawn and urine tested for HIV and other sexually transmitted diseases?	willing to visit a healthcare provider every 3 mos. to receive counseling?
embarrassed or afraid if my family or friends knew I was taking a medication to prevent HIV?.	willing to have your blood drawn, and urine tested for HIV and other sexually transmitted infections every 3 mos.?
and knew that I might have some nausea during the first few weeks when taking the HIV prevention pill, this would prevent me from taking it?.	Same
what is the most amount of money that you would pay every 3 mos. to take an HIV prevention pill?	Not asked
Not asked	The maximum amount you would be willing to pay for your 3 mos. check-up would be:
Who are your sexual partners?	How would you prefer to take the HIV prevention medication?
Do you engage in anal sex?	In ≤ 6 mos ¹ ., who were your sex partners?
In ≤ 6 mos, have any of your sexual partners been men that have sex with men?	Not asked
In ≤ 6 mos., have you had sex with a partner you knew was infected with HIV?	In ≤ 6 mos., have you had sex without a condom with a man who has sex with other men?
Not asked.	In ≤ 6 mos., have you had sex without a condom with a partner who has HIV?
Have you had sex with anyone who you knew has used or uses injection drugs that were not prescribed by a clinician?	If yes, did the partner have an undetectable viral load?
In ≤ 6 mos, how many times have you had vaginal or anal sex without a condom?	In ≤ 6 mos., have you had sex without a condom with a partner who injects drugs?
Have you injected drugs that were not prescribed to you by a clinician?	In ≤ 6 mos., have you had vaginal or anal sex without a condom?
In ≤ 6 mos., have you injected drugs using needles, syringes, or other drug used equipment that has already been used by another person?	In ≤ 6 mos., have you used injection drugs?
What do you think your risk of getting HIV is with 1 being the lowest risk and 5 being the highest?	In ≤ 6 mos., have you shared equipment to inject drugs?
Not asked	Same
Not asked	In ≤ 6 mos., did you complete a survey about PREP at the family planning and STI clinic
Not asked	In ≤ 6 mos., have you been diagnosed with GC
Not asked	In ≤ 6 mos., have you been diagnosed with CT
Not asked	In ≤ 6 mos., have you been diagnosed with syphilis?
Not asked	Why did you come to the clinic today?

¹In ≤ 6 mos. = “In the past 6 months (2018)” or “Within the last 6 months” (2021-2022)

²GC = gonorrhea

³CT = chlamydia

an individual could not 2) be a male and 5) identify as a TGW. In addition, we did not include sex with person with HIV (PWH) because in 2018, only one participant reported sex with a PWH and HIV-RNA viral load was not asked and in 2021-2022, six participants reported sex with a PWH but all six reported that their partner's HIV RNA viral load was undetectable.

Perceived HIV risk was determined by asking participants "What do you think your risk of getting HIV is?" and the answers were on a Likert scale ranging from 1 to 5 with 1 equal to the lowest risk and 5 equal to the highest risk. To determine the correlation between the HIV risk score and perceived HIV risk, a Spearman's rank correlation coefficient was created.

Statistical analysis

The R statistical computing language version 4.2.3 was used for descriptive and inferential analyses [11]. The outcome variables were prior knowledge, willingness to take a medication to prevent HIV, preferred PrEP delivery method, willingness to visit a health care provider, willingness to have blood and urine tests, embarrassment or fear with PrEP, and most amount of money willing to pay for PrEP. The data were summarized using frequency tables and summary statistics.

By using a separate Fisher exact test for the association between each PrEP-related outcome and predictor variable with p-values from Monte Carlo simulations in tables $> 2 \times 2$, we tested the association of each PrEP-related outcome variable with gender, race, ethnicity, sexual orientation, age, health insurance status, questionnaire language, prior HIV test status, condomless sex in the last six months, perceived HIV risk, and HIV risk score (both dichotomized as < 2 vs ≥ 2), and GC, CT, or syphilis diagnosis in the last six months.

To determine the correlation between the HIV risk score and perceived HIV risk, a test of Kendall's tau rank correlation coefficient was conducted. Predictors included gender (levels male, female, non-binary/trans/other), health insurance status (levels yes, no/do not know), a combined ethnicity and questionnaire language r (levels non-Hispanic + Spanish questionnaire, non-Hispanic + English questionnaire, Hispanic + Spanish questionnaire), perceived risk (levels < 2 vs. ≥ 2), and the HIV risk score (continuous). Because of missing data due to participants not answering all the questions, we conducted sensitivity analyses using multiple imputation by chained equations to confirm results [12-14].

GC, CT, or syphilis diagnosis in the last six months by using a separate Fisher exact test for the association between each PrEP-related outcome and predictor variable with p-values from Monte Carlo simulations in tables $> 2 \times 2$.

Time-associated differences in background characteristics and PrEP awareness were conducted using Fisher exact tests with p-values from Monte Carlo simulation in tables larger than 2×2 . Age was compared between the time periods using a t-test. Prior to testing, age was transformed via the method of Box and

Cox (1964) [15]. The 2022 responses "Prefer not to respond" to any question and 2022 responses "unsure" to the maximum amount someone would pay for PrEP were excluded from the comparisons. In both time periods, the analyses involving sexual orientation, sex with a person who injects drugs, and sex with a person with HIV were conducted on participants who indicated having condomless sex in the last six.

RESULTS

Background Characteristics

The participants were 65% (2018) and 63% (2021-2022) female, 70% (2018) and 69% (2021-2022) Hispanic. Eighty-five percent were heterosexual in 2018 and 81% were heterosexual in 2021-2022 (Table 2). There were racial differences between 2018 primarily due to the large number of participants who classified themselves as "other" for race in 2018 and indicated that they were of Hispanic ethnicity. Ninety-seven percent of adults in the "other" category in 2018 were Hispanic adults who did not choose a race. Other differences between 2018 and 2021-2022 were that the mean age in 2018 was slightly younger than in 2021-2022. More participants in 2018 had no health insurance or did not know if they had health insurance. Results showed that race, age, and health insurance status were not factors influencing PrEP awareness and acceptance in either time period. There was a weak positive correlation between perceived HIV risk and HIV risk score (Kendall's tau rank correlation $\tau = 0.29$, $p < 0.0001$).

Table 2: Background characteristics

	2018	2021-2022	p value
	N=500 (%)	N=578 (%)	
Age median (range)	29.5 (18-79)	30.9(18 - 77)	0.004
Gender			
Female	325/500 (65)	367/578 (63)	0.005
Male	174/500 (35)	196/578 (34)	
TG ¹ /NB ² /NC ³ /Other	1/500 (0)	4/577 (2)	
Racial Background			
White	198/496 (40)	409/578 (71)	0
Black or African American	31/496 (6)	6/578 (11)	0.01
American Indian or Alaska Native	17/496 (3))	22/578 (4)	0.87
Asian	8/496 (2)	12/578 (2)	0.66
Other	257/496 (52)	100/578 (17)	0
Hispanic	347/499 (70)	396/578 (69)	0.74
Heterosexual		366/476 (77)	
MSM/Bisexual		110/476 (16)	
Survey Language			
English	425/500 (85)	481/578 (83)	0.45
Spanish	75/500 (15)	97/578 (17)	
Health Insurance: No/Do Not Know	267/483 (55)	269/578 (47)	0.003
PWID ⁴ ≤ 6 Months		2/578 (0)	
Condomless Vaginal/Anal Sex ≤ 6 Months	408/486 (84)	476/577 (82)	0.74
¹ Transgender			
² Non-binary			
³ Non-conforming			
⁴ People who inject drugs			

2021-2022 PrEP Awareness

Fifty percent of participants were aware of PrEP. PrEP awareness was 93% among MSM, 90% among bisexual participants, 43% among heterosexual women, 38% among heterosexual men, and 20% among lesbian women ($p < 0.001$). There was higher PrEP awareness among participants with a ≥ 2 HIV risk score (63%) than those with < 2 HIV risk score (46%) ($p < 0.001$). Also, among participants who had a moderate to high perceived HIV risk, 61% had PrEP awareness compared with 44% of participants who had a low perceived HIV risk ($p < 0.001$). PrEP awareness was highest in transgender/non-binary/non-conforming/other participants (71%) compared to 57% in males, and 4% in females ($p = 0.008$). Participants who had a prior HIV test had higher levels of PrEP awareness than those who either never had an HIV test or did not know if they had had an HIV test ($p = 0.012$). A history of gonorrhea, chlamydia, or syphilis was not associated with higher PrEP awareness. Participants who answered questions in Spanish had less PrEP awareness than those who took the English version (39% vs. 52%, respectively, $p = 0.026$). However, the only factors that remained significant in the multiple logistic regression analyses were perceived HIV risk (OR 1.60; 95% CI 1.04 – 2.46) and HIV risk score (OR 1.82; 95% CI 1.24 – 2.72) (Table 3).

PrEP Method 2021-2022

Preferred PrEP method was not asked in 2018 since there was only one method available and the direction of future methods was not as clear. In 2021-2022, the most preferred PrEP delivery method was a monthly pill, with 37% of participants overall selecting this option. Breaking down results by gender, a monthly pill was the most popular choice for both males and females (46% and 31% respectively) but tied with an implant as the second most popular choice for TGW/TGM/non-binary/non-conforming/other participants (both 21%) (Figure 1). A daily pill was the second most popular option for both females and males (26% and 27%, respectively) but was the most popular option (43%) for TGW/TGM/non-binary/non-conforming/other participants. The option of an implant was preferred by 19% of females and 13% of males. Even though females had the

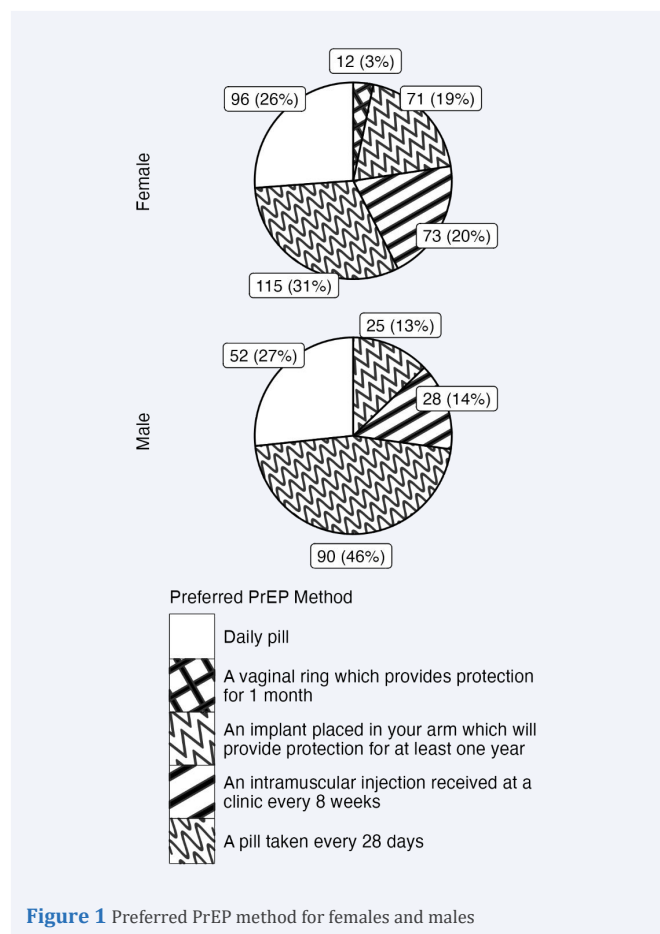


Figure 1 Preferred PrEP method for females and males

additional option of a vaginal ring, only 3% selected that as the preferred option.

Comparison of 2018 and 2021-2022

PrEP awareness changed between 2018 and 2021-2022 from 20% to 50% ($p < 0.001$) (Figure 2). When participants were analyzed based on gender, PrEP awareness rose from 36% to 57% among males ($p < 0.001$), and from 12% to 45% among female ($p < 0.001$). Participants with a higher perceived HIV risk had higher probability of having PrEP awareness in both 2018 (OR 1.76, 95% CI 1.02-3.04) and 2021-2022 (OR 1.60; 95% CI 1.04 – 2.46). In addition, participants with a higher HIV risk score had a higher probability of having PrEP awareness in 2018 (OR 5.85, 95% CI 3.45-9.90) and 2021-2022 (OR 1.82; 95% CI 1.24-2.72).

Willingness to take PrEP decreased from 87% in 2018 to 74% in 2021-2022 ($p < 0.001$), visit to a provider every three months decreased from 91% in 2018 to 71% in 2021-2022 ($p < 0.001$), and getting labs every three months decreased from 92% in 2018 to 83% in 2021-2022 ($p < 0.001$). There was no change in the percentage of participants who indicated they would not be embarrassed if family or friends knew they were on PrEP (29% in 2018 vs. 28% in 2021-2022) (Figure 3). However, there was a rise in the percentage of individuals who indicated that they were unsure if they would be embarrassed or afraid ($p < 0.001$).

Table 3: Multiple logistic regression model of PrEP awareness.

Predictor	Odds Ratio	95% CI
(Intercept)	0.36	0.16 - 0.79
Gender: Female	0.92	0.57 - 1.47
Gender: Non-Binary/Trans/Other	2.76	0.62 - 19.26
Health Insurance: No/Do Not Know	1.09	0.72 - 1.66
Ethnicity-Survey Language: Effect of Non-Hispanic Ethnicity (Among English Survey Takers)	1.22	0.78 - 1.91
Ethnicity-Survey Language: Effect of Spanish Survey (Among Hispanic Participants)	0.73	0.39 - 1.34
Perceived HIV risk ≥ 2	1.60	1.04 - 2.46
HIV Risk Score	1.82	1.24 - 2.72

Multiple logistic model of PrEP awareness including gender, a combined ethnicity and questionnaire language factor (Hispanic ethnicity and English questionnaire, non-Hispanic ethnicity and English questionnaire, Hispanic ethnicity and Spanish survey), health insurance status, and the perceived HIV risk score (dichotomized as < 2 vs. ≥ 2) and the HIV risk score.

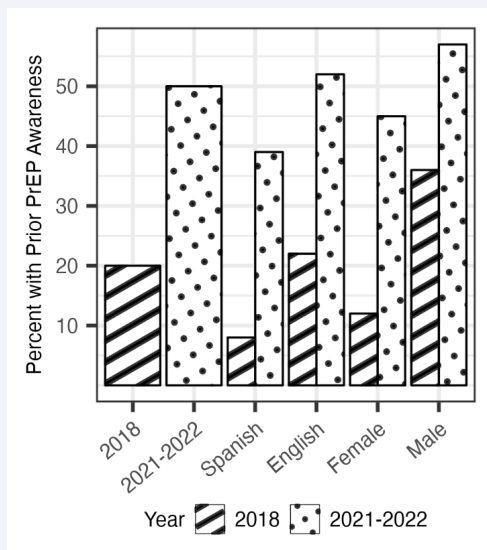


Figure 2 Comparison of PrEP awareness in 2018 with 2021-2022

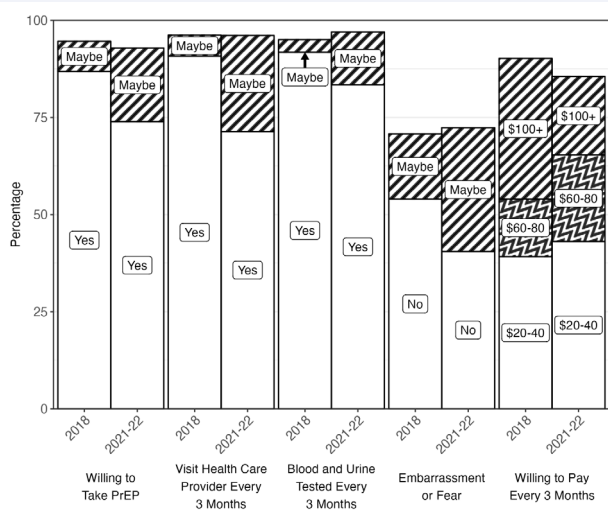


Figure 3 Comparison of PrEP attitudes in 2018 and 2021-2022

In 2018, more individuals were willing to pay at least \$20 every three months for PrEP ($p < 0.001$).

DISCUSSION

To our knowledge, this is the only study to describe changes in PrEP awareness and acceptance in a population comprised primarily of women, Hispanic adults, and heterosexuals. It showed that prior awareness of PrEP increased between 2018 and 2021-2022 from 20% to 50%. Similar to 2018, individuals with a high perceived HIV risk were more likely to be aware of PrEP. The majority of the participants in both 2018 and 2021-2022 would take medicine to prevent HIV, visit a health care provider, get laboratory tests, and pay at least \$20 every three months to take PrEP. However, the percent of participants who would take PrEP and do the required activities for daily PrEP decreased from 2018 to 2021-2022.

Although progress has been made in PrEP awareness among MSM, it is less clear that similar significant increases have occurred in awareness among heterosexuals, especially women, and those who utilize public health clinics [16-18]. Our study demonstrates that progress has been made in these hard-to-reach groups. Since 2018, nurses and nurse practitioners from the Pima County Health Department have participated in multiple PrEP in-services and web courses, put up posters, had more PrEP written material available in clinics, and joined the Pima County PrEP Coalition. In addition, a new HIV/STI program manager, hired in August 2021, initiated a PrEP program which has enrolled 200 participants as of November 30, 2023.

However, the results of our study are bittersweet since 50% of our participants still did not have PrEP awareness in 2021-2022. In addition, it is also concerning that acceptance of the activities associated with PrEP decreased since 2018. Furthermore, the current PrEP methods available, daily PrEP and an injection every two months, were less desirable than a once monthly pill that is not yet available.

There are limitations to our study. Not all questions were answered by all participants. We choose to not require all questions to be answered, except the PrEP awareness question, so as to encourage more participants to participate in the study. In addition, there were differences in methods and demographics between 2018 and 2021-2022. More participants directly entered data into the computer during the study in 2021-2022 instead of being assisted by study personnel. This reflected more familiarity with computers in 2021-2022. The demographic difference were primarily on variables that were not associated with PrEP awareness or attitudes (age, race, and insurance). Not enough participants identified as MSM, bisexual, and TGW in either 2018 or 2021-2022 to change overall results in PrEP awareness. Furthermore, the key groups being studied (women, Hispanic adults, and heterosexuals) individually showed increases in PrEP awareness.

CONCLUSION

Gaps in awareness remain in health care settings which include women, Hispanic adults and other groups without traditional risk factors for HIV. Although the creation of new PrEP methods have the potential to eliminate some of these PrEP barriers, large gaps in PrEP awareness remain, and acceptance of current and new PrEP related activities have not yet been achieved. Future studies and interventions should focus on reaching individuals who receive medical services at public health clinics which have traditionally served individuals with less access to medical care.

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