Using the andersen healthcare utilization model to assess willingness to screen for prep in pharmacy-based settings among cisgender sexually minoritized men: results from the 2020 american men's internet survey

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Abstract

Background Pre-exposure prophylaxis (PrEP) to prevent HIV is severely underutilized among sexually minoritized men (SMM). Inequitable access to PrEP-prescribing facilities and providers is a critical barrier to PrEP uptake among SMM. Integrating HIV prevention services, such as PrEP screening, into pharmacy-based settings is a viable solution to addressing HIV inequities in the US. We aimed to examine willingness to obtain PrEP screening in a pharmacy and its associated correlates, leveraging Andersen's Healthcare Utilization Model (AHUM), among a national sample of SMM in the U.S.

Methods Data from the 2020 American Men's Internet Survey, an annual online survey among SMM, were analyzed. Drawing on AHUM-related constructs, we used a modified stepwise Poisson regression with robust variance estimates to examine differences in willingness to screen for PrEP in a pharmacy. Estimated prevalence ratios (PR) were calculated with 95% confidence intervals ($CI_{95\%}$).

Results Out of 10,816 men, most (76%) were willing to screen for PrEP in a pharmacy. Participants were more willing to screen for PrEP in a pharmacy if they (1) had a general willingness to use PrEP (PR = 1.52; $CI_{95\%}$ =1.45, 1.59); (2) felt comfortable speaking with pharmacy staff about PrEP (PR = 2.71; $CI_{95\%}$ =2.47, 2.98); and (3) had HIV-related concerns (PR = 1.04; $CI_{95\%}$ =1.02, 1.06). There were no observed differences in men's willingness to screen for PrEP in a pharmacy by race/ethnicity, education level, annual household income, nor insurance status.

Conclusions Strategically offering PrEP screening in pharmacies could mitigate access-related barriers to HIV prevention services among SMM, particularly across various sociodemographic domains. Importantly, this approach has vitally important implications for addressing broader inequities in HIV prevention. Future studies should examine strategies to successfully integrate PrEP screenings in pharmacies among diverse populations, especially among those at elevated risk for HIV.

Keywords: Sexual minority men, HIV prevention, PrEP, Pharmacy-based HIV intervention

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Introduction

The HIV epidemic in the U.S. disproportionately affects populations at an increased risk of its acquisition and transmission, particularly cisgender sexually minoritized men (SMM), people who inject drugs, and transgender women. In 2021, SMM accounted for approximately 70% of all new HIV diagnoses, constituting 63% of all people with HIV nationwide.

Pre-exposure prophylaxis (PrEP) stands as one of the most effective tools in preventing HIV. Taken daily, it can substantially reduce the risk of acquiring HIV, up to 99% [1]. Despite its effectiveness, PrEP remains severely underutilized, especially among groups who might benefit from it the most, especially racially and sexually minoritized individuals. Disturbingly, 2020 data from the Centers for Disease Control and Prevention (CDC) indicate that less than 25% of the 1.2 million people who could have benefited from PrEP actually received a prescription [2]. Furthermore, racial inequities in PrEP uptake persist, with Black Americans being more than seven times less likely to have obtained a PrEP prescription compared to their White counterparts in 2022 [3]. At the intersection of race and sexuality, studies underscore compounded inequities in PrEP uptake among Black SMM (BSMM), where recent data shows that only 26% were on PrEP as compared to 42% of White SMM [4].

Structural barriers play a critical role in impeding PrEP utilization, notably through inequitable access to PrEP-prescribing facilities and providers [5–7]. For example, studies reveal that a considerable proportion of PrEP-eligible SMM reside in areas termed "PrEP deserts," where the nearest PrEP provider is at least a 30-minute drive away [6]. Harrington and colleagues' recent geospatial analysis illustrates that areas with the highest HIV incidence rates, particularly in the US Southeast, notably lack PrEP-prescribing clinics [5]. Further, traditional healthcare providers, including many primary care physicians, often lack the awareness and knowledge of PrEP, posing a barrier to prescribing it, especially for populations at increased risk of HIV acquisition such as SMM [8, 9].

To address these access barriers, integrating HIV prevention services such as PrEP screenings into pharmacies emerges as a promising, yet underexplored strategy [10]. Pharmacies boast high accessibility, with most Americans residing within 5 miles of one; people generally visit them about three times a month; and, most have extended operating hours beyond those of traditional healthcare facilities [10]. It has also been documented that pharmacies—particularly community pharmacies—are generally located in areas that experience the highest burden of HIV. Indeed, Harrington and colleagues project that the accessibility of HIV prevention resources, including PrEP,

could experience an eightyfold increase if pharmacies were equipped to offer these services [5]. Lastly, many US pharmacy students receive didactic training in HIV prevention services [11]; and, practicing pharmacists exhibit high levels of willingness to provide these services, especially for SMM [12, 13], further positioning pharmacy-based settings as a robust and innovative approach to improve PrEP access and uptake.

While a rapidly growing body of literature has explored the role of pharmacies in enhancing HIV prevention and treatment outcomes [10], extant literature exhibits limitations. Notably, most studies involve small, predominately white community samples, limiting the generalizability of findings. Furthermore, to our knowledge, only one study has assessed willingness to use HIV prevention services in a pharmacy setting among a national sample of SMM, exclusively focused on BSMM [14], Despite its encouraging findings, the study underscores the need for broader data applicable to the wider SMM population. Finally, most studies that have assessed willingness to utilize HIV prevention services in pharmacies, particularly PrEP, lack theoretical frameworks. The use of theoretical frameworks in this field is critical, as it provides a systematic lens through which to analyze the complex interplay of individual, social, and structural factors affecting willingness to engage with healthcare services, informing targeted interventions to optimize PrEP utilization among SMM [15, 16].To address these gaps, this paper aims to examine willingness to obtain PrEP screening in a pharmacy and its associated correlates among a diverse, national sample of SMM in the US.

Methods

Analytical framework

The analysis presented is based on Andersen's Behavioral Model of Health Service Utilization (hereafter referred to as Andersen's behavioral model) [17] to provide a comprehensive understanding of factors influencing willingness to screen for PrEP in a pharmacy among SMM. This model considers the impact of distinct structural and social determinants of the utilization of healthcare services. According to this model, three key domains play a crucial role in shaping an individual's access to and use of health services: predisposing factors, enabling factors, and need factors. Predisposing factors encompass pre-existing sociodemographic characteristics, such as age and race, independent of health behavior. Enabling factors address logistical aspects of obtaining care and may signal social-structural disadvantage, including disparities in health insurance, educational attainment, income levels, and stigma. Finally, need factors encompass an individual's perceived risks and assessed needs for medical care.

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Numerous reviews of existing literature consistently affirm that Andersen's behavioral model provides a valuable approach to assessing the social and structural factors influencing healthcare utilization [18, 19]. Consequently, it serves as a strategic analytical framework to identify potential intervention targets to enhance accessibility to and utilization of PrEP-related services in pharmacies.

Data source

Data were obtained from the 2020 American Men's Internet Survey (AMIS). AMIS is a cross-sectional online behavioral health survey of SMM in the US that has been conducted annually since 2013. The survey collects data on sociodemographic characteristics, sexual behavior, health-related behaviors, and HIV prevention services. The 2020 cycle was conducted from August 2020 to January 2021. Briefly, individuals were recruited through convenience sampling from various websites through banner advertisements and social networking and geospatial networking applications. Additional detail about AMIS are available elsewhere [20].

Study participants

Men were eligible for the AMIS if they reported (1) ≥ 15 years of age, (2) male sex at birth, (3) cis-gender identity, (4) residing in the US, (5) ever having sex with a man OR a gay/bisexual identity (for those 15–17 years old), and (6) ability to complete the survey in English. Participants were included in the current analysis if they completed the full survey, had oral or anal sex with a man in the past 12 months, and reported being HIV-negative or had an unknown status. Participants who reported being HIV-positive were excluded from this analysis, as PrEP eligibility requires a person to be HIV-negative. Additionally, participants who had taken PrEP in the past 12 months at the time of the survey were not asked about their willingness to obtain PrEP screening in pharmacies, as a function of the skip pattern in the survey [20]. We also excluded participants who had missing data related to their willingness to screen for PrEP in a pharmacy setting (i.e., the outcome variable; $n = 273$).

Measures

Guided by AHUM domains, we used the following variables to assess willingness to obtain pharmacy-based HIV prevention services among a sample of US SMM.

> Dependent Variable: To assess willingness to be screened for PrEP in a pharmacy, men were provided with a brief description of what screening for PrEP entailed:

> *Screening for PrEP includes answering questions about your sexual behaviors and being tested for HIV and sexually transmitted infections.*

They were subsequently asked, "Would you be willing to be screened for PrEP in a private area in a pharmacy?" and were provided the options: Yes, No, I prefer not to answer, and Don't Know. The latter two options were excluded from this analysis ($n = 1019$). Predisposing Factors: Age was treated as a continuous variable in years in descriptive and bivariate analyses. To enhance the interpretation of our findings, age was scaled to five-year increments in multivariable analysis [21]. Race was categorized into four groups: non-Hispanic Black, non-Hispanic White, Hispanic, and Other/Multiple races.
Enabling Factors: Employment status was assessed using three categories: Employed, Unemployed, and Retired. Annual household income was categorized into four groups including \$0 to 19,999, \$20,000 to \$39,000, \$40,000 to \$74,999, and \$75,000 or more. Education was defined as the highest level of education completed and categorized as less than ($<$) a high school (HS) diploma, HS diploma, some college, and college degree or more. Health insurance was assessed as a binary yes/no variable. Lastly, we included a series of questions with binary (yes/no) responses related to health insurance, PrEP awareness, willingness to use PrEP, SMM healthcare stigma (defined as ever feeling afraid of accessing health care services due to someone finding out they have sex with men), and PrEP pharmacy comfort (defined as comfort with speaking to pharmacy staff about PrEP).
Need Factors: Need factors were those associated with increased HIV risk and PrEP uptake, particularly among SMM. Participants were asked about the number of male sexual partners they had in the past 12 months (categorized as '1' or '2 or more'; no participants reported 0 sexual partners). This item was included as previous studies have found an association between multiple sexual partners and HIV risk [22]. Additionally, participants were asked if they have had condomless anal sex in the past 12 months with another man (yes/no); had any type of sex with a woman in the past 12 months (yes/no); had any STI test in the past 12 months (yes/no); ever been tested for HIV (yes/no); had an HIV test in the past 12 months (yes/no); and if they were worried about becoming infected with HIV (yes/no). Lastly, we categorized participants by their HIV-negative status: HIV negative and never tested/unknown/indeterminate.

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Analysis plan

Sample characteristics were described with medians and interquartile ranges (IQRs) for continuous variables and frequencies for categorical variables. Wilcoxon rank tests were performed to examine differences in median age among those who reported willingness to obtain PrEP in pharmacies versus not. Chi-square and Fisher's exact (when sample sizes were <5) tests were performed to explore differences by the included AHUM measures for the main outcome. Bivariate analyses were conducted to explore differences in willingness to be screened for PrEP in pharmacies by the three AHUM domains.

In accordance with AHUM, we also estimated a series of three multivariable models. First, all predisposing variables were included in a model. Second, predisposing and enabling factors were modeled together. Finally, predisposing, enabling, and needs based factors were modeled simultaneously. The use of a hierarchical analytic approach was based on multi-level theory, and to assess the incremental contribution of each variable block group on participants' willingness to screen for PrEP in pharmacies.[23] To increase parsimony, variables that were not significant in bivariate analyses were removed from multivariable models. We estimated correlates of willingness to use pharmacy-based HIV prevention services using a modified stepwise Poisson regression method suited for common binary outcomes with robust variance estimates [24]. A 95% confidence interval ($CI_{95\%}$) was calculated for each prevalence ratio (PR). Analyses were conducted using SAS version 9.4 (Cary, NC).

Results

Our sample included a total of 10,814 SMM who were not taking PrEP at the time of the survey and responded on their willingness to obtain HIV prevention services in pharmacies. The median age was 26 years, and most men were White (61%) and Hispanic (20%). A large proportion of participants were employed (71%) and college-educated (42%), with household incomes <$75,000/year (63%). Eighty-nine percent of participants reported that they had health insurance. Most participants had heard of PrEP (79%), were willing to use PrEP (56%), and felt comfortable speaking with pharmacy staff about getting PrEP (75%). Overall, risk behaviors were high. In the past 12 months, most participants (70%) had two or more male sexual partners and 68% had condomless anal sex. Most (76%) reported that they were willing to screen for PrEP in a pharmacy.

In bivariate analyses, younger participants were significantly more willing to be screened for PrEP in pharmacies compared to older participants (*P* < .0001) (Table 1). Among racial and ethnic groups, Hispanic participants (80%) and participants of Other/Multiple races (79%)

were significantly more willing to be screened for PrEP in a pharmacy setting compared to Black (75%) and White (75%) participants (*P* < .0001). Household income was inversely associated with willingness to be screened for PrEP in a pharmacy setting (*P* < .0001). Similarly, participants with less than a college education were more willing to be screened for PrEP in a pharmacy compared to those with a college degree (*P* < .0001). Seventy-six percent of participants who had health insurance were willing to screen for PrEP in a pharmacy compared 84% who did not have health insurance. Individuals who reported being afraid of accessing healthcare services because someone may discover that they have sex with men (80%) were significantly more willing to screen for PrEP in pharmacies compared to those who were not fearful (76%) (*P* < .0001). Participants who reported being worried about becoming infected with HIV (87%) were more willing to screen for PrEP in a pharmacy setting compared to those who were not worried (70%) (*P* < .0001).

In adjusted analyses, younger participants were slightly less willing to be screened for PrEP in a pharmacy than older participants (PR = 0.99; $CI_{95\%}$ = 0.98, 0.99) (Table 2). The race/ethnicity association noted above did not persist after accounting for age. Compared to employed individuals, individuals who reported being retired were less willing to be screened for PrEP in pharmacies (PR = 0.89; $CI_{95\%}$ = 0.81, 0.98). Participants who had a general willingness to use PrEP, compared to those who were not, were more willing to screen for PrEP in a pharmacy (PR = 1.52; CI 95% = 1.45–1.59). Individuals who reported feeling comfortable speaking with pharmacy staff about PrEP were almost three times as likely to be willing to screen for PrEP in a pharmacy compared to those who did not feel comfortable (PR = 2.71; $CI_{95\%}$ = 2.47, 2.98). Reported worry around becoming infected with HIV was also associated with willingness to obtain PrEP screening in pharmacies (PR = 1.04; $CI_{95\%}$ = 1.02, 1.06). Importantly, we observed no differences among those who were willing to be screened for PrEP in pharmacies according to race and ethnicity, education level, household income, nor insurance status.

Discussion

Guided by Andersen's behavioral model, this study explored factors associated with willingness to obtain PrEP screenings in pharmacies among a diverse, national sample of SMM in the US. Although there is a general increase in PrEP willingness among MSM [25], our data suggests variations in willingness to obtain PrEP services in pharmacies based on need, enabling, and predisposing factors. Our findings reveal that a substantial proportion of SMM (76%) expressed willingness to undergo PrEP screening in a pharmacy setting. Our study also shows

Table 1 Sample Characteristics and Bivariate Associations with Willingness to Screen for PrEP in Pharmacies among SMM in the U.S. (*n* = 10,816)

	Total		Willing to Screen for PrEP in a Pharmacy		*p*-value
			Yes		
			N = 6,474 (76%)		
Predisposing Factors					
Age (median, IQR)	26 (22, 37)		24 (21, 29)		**<.0001**
	n	%	n	%	
Race					**<.0001**
Black, Non-Hispanic	1125	10.63	637	74.77	
White, Non-Hispanic	6497	61.36	3860	74.92	
Hispanic	2140	20.21	1357	80.25	
Asian/Native Hawaiian/Other PI	314	2.97	206	82.07	
American Indian/Alaska Native	83	0.78	40	66.67	
Other/Multiple Races*	429	4.05	260	78.79	
Enabling Factors					
Employment Status					**<.0001**
Employed	5911	70.76	4610	76.99	
Unemployed	2511	23.38	1626	81.38	
Retired	629	5.86	208	44.26	
Annual Household Income					**<.0001**
$0 to $19,999	1412	14.60	891	79.62	
$20,000 to $39,999	2167	22.41	1361	78.89	
$40,000 to $74,999	2472	25.56	1467	75.54	
$75,000 or more	3620	37.43	2094	73.01	
Education					**0.0007**
Less than HS diploma	297	2.76	117	76.29	
HS diploma	2102	19.5	1282	78.31	
Some college	3955	36.8	2427	77.49	
College degree or higher	5284	41.9	3440	75.82	
Comfortable speaking to pharmacy staff about getting PrEP					**<.0001**
Yes	6247	74.79	5546	91.64	
No	2196	25.21	543	28.21	
Has Health Insurance					**<.0001**
Yes	9235	88.95	5499	75.59	
No	1147	11.05	782	84.18	
Heard of PrEP					**<.0001**
Yes	8589	79.41	5636	78.65	
No	2227	20.59	838	62.54	
Willing to use PrEP					**<.0001**
Yes	5817	56.2	5219	92.80	
No	4538	43.8	1255	43.55	
MSM healthcare stigma					**<.0001**
Yes	2158	29.00	1477	80.45	
No	5284	71.00	3440	75.82	
PrEP pharmacy comfort					**<.0001**
Yes	6247	74.79	5546	91.64	
No	2196	25.21	543	28.21	
Need Factors					
Number of male sex partners in past 12 months					**<.0001**

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Table 1 (continued)

	Total		Willing to Screen for PrEP in a Pharmacy	*p*-value
			Yes	
			N = 6,474 (76%)	
1	3247	30.02	1710	66.93
2 or more	7569	69.98	4764	80.05
Condomless anal sex in past 12 months				**<.0001**
Yes	7379	68.22	4607	78.81
No	3437	31.78	1867	70.19
Has had female sex partner in past 12 months				**<.0001**
Yes	1630	15.67	862	68.2
No	8771	84.33	5371	77.45
Any STI test in past 12 months				**<.0001**
Yes	2510	23.21	1671	81.47
No	8306	76.79	4803	74.41
Ever tested for HIV				0.845
Yes	7582	70.10	4578	76.17
No	3234	29.90	1896	75.96
Had HIV test in past 12 months				**<.0001**
Yes	4441	41.06	2751	78.96
No	6375	58.94	3723	74.13
HIV Status				0.7551
Negative	7215	70.99	4518	76.27
Never tested/unknown/indeterminate	2949	29.01	1859	76.6
Worried about becoming infected with HIV				**<.0001**
Yes	2998	42.69	2260	87.23
No	4025	57.31	2405	69.51

IQR interquartile range, *STI* sexually transmitted infections, *PrEP* pre-exposure prophylaxis, *SMM* sexually minoritized men

*We aggregated data on individuals who reported their race and ethnicity as American Indian/Alaska Native, Asian/Native Hawaiian/Other Pacific Islander, and Other/ Multiple races, because each of these groups represented less than 5% of the total sample size, with American Indians/Alaska Natives being the least represented (0.78%)

that being of younger age was associated with less willingness to screen for PrEP in a pharmacy setting. Among enabling factors, those who had a general willingness to use PrEP and felt comfortable discussing PrEP with pharmacy staff were more willing to screen for PrEP in pharmacies. Participants who were reported being retired were less willing to screen for PrEP in a pharmacy compared to those who were employed. Finally, being worried about potentially acquiring HIV was the only need factor linked to willingness to screen for PrEP in a pharmacy-based setting.

Notably, we observed no significant differences in willingness to obtain pharmacy-based HIV prevention services based on race/ethnicity, educational level, annual household income, nor insurance status. This finding is promising as it suggests that pharmacies may serve as an accessible and equitable option for individuals, including those most structurally disadvantaged and at-risk for HIV acquisition. Previous studies have highlighted

racial inequities in PrEP uptake, often attributed to various barriers faced by minoritized populations, including structural inequities and intersectional stigma and discrimination [26–28]. However, contrary to existing research on the relationship between stigma and healthcare utilization among SMM, our findings reveal that stigma may not fully impact willingness to use screen for PrEP in pharmacy settings among a diverse group of SMM. In the context of this study, this might be due to a higher need for HIV prevention services. Similarly, the substantial willingness observed across demographic groups in our study signals a potential avenue for addressing these inequities through innovative service delivery models like pharmacy-based PrEP screening.

Our study highlights the pivotal role of pharmacists and pharmacy staff in facilitating discussions about PrEP and promoting its uptake among SMM. Comfort with speaking to pharmacy staff about PrEP emerged as a significant predictor of willingness to undergo pharmacy-based HIV

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Table 2 Stepwise Poisson Regression Examining Factors Associated with Willingness to Screen for PrEP in Pharmacies Among SMM in the U.S. (*n* = 10,816)

	Model 1[a]	Model 2[b]	Model 3[c]
Predisposing Factors			
Age (5 years)	**0.95 [0.94, 0.95]**	**0.99 [0.98, 0.99]**	**0.99 [0.98, 0.99]**
Race (ref. White, Non-Hispanic)			
Black, Non-Hispanic	0.97 [0.93, 1.01]	0.97 [0.93, 1.01]	0.97 [0.93, 1.01]
Hispanic	1.00 [0.97, 1.02]	0.99 [0.97, 1.02]	0.99 [0.97, 1.02]
Other/Multiple Races	0.99 [0.95, 1.04]	0.99 [0.95, 1.03]	0.99 [0.95, 1.03]
Enabling Factors			
Employment Status (ref. = Employed)			
Unemployed		0.99 [.0.97, 1.02]	0.99 [0.97 1.02]
Retired		**0.88 [0.80, 0.97]**	**0.89 [0.81, 0.98]**
Education (ref. = Less than HS diploma)			
HS diploma		0.99 [0.91, 1.07]	1.00 [0.92, 1.09]
Some college		0.98 [0.91, 1.06]	1.00 [0.92, 1.09]
College degree or more		1.00 [0.93, 1.08]	1.01 [0.93, 1.10]
Household Income (ref. = $0 to $19,999)			
$20,000 to $39,999		1.01 [0.96, 1.04]	1.01 [0.97, 1.04]
$40,000 to $74,999		0.99 [0.96, 1.03]	1.00 [0.96, 1.03]
$75,000 or more		1.00 [0.96, 1.03]	1.00 [0.97, 1.04]
Has Health Insurance (vs. none)		0.98 [0.96, 1.01]	0.98 [0.95, 1.01]
Heard of PrEP (vs. not)		1.01 [0.97, 1.05]	1.00 [0.96, 1.05]
Willing to use PrEP (vs. not)		**1.55 [1.48, 1.62]**	**1.52 [1.45, 1.59]**
SMM healthcare stigma (vs. not)		**1.04 [1.02, 1.07]**	1.03 [1.00, 1.06]
PrEP pharmacy comfort (vs. not)		**2.63 [2.41, 2.87]**	**2.71 [2.47, 2.98]**
Need Factors			
Number of male sex partners in past 12 months (ref. = 1 partner)			1.02 [0.99, 1.05]
Condomless anal sex in past 12 months (vs. not)			1.01 [0.99, 1.04]
Has had female sex partner in past 12 months (vs. not)			0.96 [0.94, 1.01]
Any STI test in past 12 months (vs. not)			1.01 [0.98, 1.04]
Had HIV test in past 12 months (vs. not)			0.98 [0.96, 1.01]
Worried about becoming infected with HIV (vs. not)			**1.04 [1.02, 1.06]**

STI sexually transmitted infections, *SMM* sexually minoritized men, *PrEP* pre-exposure prophylaxis

a = R^2= 0.0601, b = R^2=0.4776, c = R^2= 0.4838

All estimates displayed are prevalence ratios [95% confidence interval]

prevention services. Indeed, in a previous study, Lutz et al. report that approximately 94% of participants felt comfortable discussing PrEP with a pharmacist prior to starting the medication [29]. This underscores the importance of pharmacist training and ensuring patient privacy to foster a supportive environment for discussing sensitive topics related to HIV prevention. Additionally, addressing social stigma and discrimination remains a critical piece in enhancing HIV prevention efforts, particularly among populations like BSMM. Pharmacies, perceived as less stigmatizing and more convenient settings than traditional clinics, [12, 29, 30, 31, 32] hold significant promise in mitigating the impact of stigma on HIV prevention access and uptake.

In this study, we employed Andersen's Behavioral Model of Health Service Utilization as a comprehensive framework for understanding the factors influencing willingness to obtain HIV prevention services in pharmacies among SMM. This model allowed us to consider the impact of various predisposing, enabling, and need factors on individuals' access to and use of pharmacy-based PrEP screening.

Previous intervention studies have demonstrated the feasibility of implementing HIV testing and PrEP access in pharmacies, effectively reaching populations with increased needs [10, 33]. For instance, one study found that pharmacy-based point-of-care HIV testing, including pretest counseling, test processing, and

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posttest counseling, was feasible within a 30-minute period in 21 pharmacies across both rural and urban areas in the U.S. [34]. Another study, addressed the stigma usually associated with HIV and HIV testing by utilizing a comprehensive health screening approach, which improved HIV testing uptake among individuals at increased risk in disadvantaged neighborhoods [35]. This intervention found that individuals that participants who received HIV testing, holistic chronic disease screening, and a healthy lifestyle video—aimed at normalizing all screenings and destigmatizing HIV—were more likely to undergo HIV testing in a pharmacy compared to those who only received HIV testing services [35]. Regarding PrEP screenings specifically, Sawkin and Shah's study trained clinical pharmacists to provide PrEP education and medication management, enabling PrEP providers through a collaborative practice agreement (CPA) [36]. They employed a destigmatizing approach similar to Crawford et al. [35], offering PrEP screening alongside other health condition screenings [36]. Despite growing evidence and advocation for integrating HIV prevention services in pharmacies, very few interventions have specifically focused on enhancing pharmacy-based HIV testing and PrEP screening among SMM, particularly racially and SMM living in disadvantaged neighborhoods. This is particularly notable given their demonstrated willingness to utilized such services, as evidenced by this study's findings and others [12, 14, 32]. HIV prevention services in pharmacies, particularly PrEP screenings, may currently be limited due to restrictions around pharmacists' ability to initiate PrEP for clients without a CPA with a partnering PrEP-prescribing physician [37]. Efforts to address these limitations and barriers are critically needed.

Building upon the findings of this study, future studies may focus on integrating and testing culturally appropriate strategies within pharmacy-based settings to assess if willingness to undergo PrEP screening translates into true uptake and sustained engagement with preventive care. Moreover, further research is needed to explore the mechanisms by which stigma, including intersectional stigma and discrimination, influences HIV risk and PrEP utilization among SMM, particularly BSMM, in pharmacy settings. To advance PrEP equity, further investigation is warranted to comprehensively understand and address the underlying reasons behind certain men's willingness and unwillingness to access such services. By addressing these challenges and leveraging the potential of pharmacies as accessible and inclusive platforms for HIV prevention, we can make advancements towards the goal of reducing HIV disparities and ending the epidemic.

Limitations

Several limitations should be considered in the interpretation of our findings. First, AMIS relies on a convenience sample of internet-using SMM, which may introduce selection bias. Caution should be exercised when generalizing these results to the broader population of SMM in the US. Notably, Notably, while a significant portion of our sample consisted of non-Hispanic white men, which does not fully represent the diversity within the SMM community. Second, the data collection period during the Fall of 2020 coincided with the COVID-10 pandemic, which may have influenced men's perceptions of healthcare and their access to it, including through pharmacies. The evolving landscape of healthcare delivery during this time may have affected participants' willingness to engage with pharmacy-based HIV prevention services. Third, the categorization of race/ethnicity data, particularly to the grouping of individuals under 'Other/Multiple Races', limits the ability to address specific prevention needs of communities disproportionately affected by HIV. For instance, the CDC reports a notable increase (24%) in HIV diagnoses among American Indian/Alaska Native individuals between 2015 and 2019 [38]. Future research efforts should prioritize strategic recruitment of racially and ethnically diverse SMM cohorts, enabling a nuanced analysis able to consider unique prevention strategies tailored to different communities. Finally, the cross-sectional design of our study precludes establishing causality or assessing temporality. While our findings indicate willingness among SMM to access pharmacy-based HIV prevention services, longitudinal studies are needed to ascertain whether this willingness translates into true uptake of services such as PrEP over time.

Conclusion

Integrating HIV prevention services within pharmacy-based settings is a promising strategy in the comprehensive initiative to end the HIV epidemic in the US, including inequities experienced by priority populations. The receptivity of a diverse, nationwide sample of SMM to undergo PrEP screening in pharmacies, even in the face of potential sexuality-based stigma, underscore the viability of this approach. Recognizing pharmacies as inherently conducive and accessible environments for such services further strengthens the case for their pivotal role in advancing HIV prevention efforts.

The next crucial step involves the implementation of demonstration studies aimed at assessing the impact of pharmacy-based PrEP delivery models on both the uptake and adherence of PrEP among SMM. These studies will contribute invaluable insights to inform and enhance the effectiveness of future strategies, ultimately bringing us closer to the goal of eradicating HIV.

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