Chamberlain University

MPH 620: Integrative Learning Experience (ILE)

Sexually Transmitted Infections Prevention and Reduction Program for Connecticut.

A systematic Review

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Competency Reflection

Evidence- based approaches to public health

Utilizing evidence based guidance and innovations to deliver essential services for HIV/STIs that are culturally tailored to meet the needs of the populations while advocating for healthier sexual behaviors in the community is a vital part of reducing the disease burden (Mann et al., 2021). I plan to use evidence-based quantitative studies that are culturally and linguistically appropriate to sexual health studies. Racial and gender disparities continue to escalate STI/HIV rates, and research proves that lack of access to stable housing, and sociocultural factors can also influence risk behaviors and the ability of compliance with screening, medications and follow up care (Huang et al., 2020). My program will design policies that are geared towards STI prevention, promote healthy sexual health and other systems that impact health inequalities

Public Health & Healthcare Systems

There is sufficient literature consistently reporting disparity in the prevalence of STIs, high risk sexual behaviors, complications, access to care, and quality of care for populations ravaged by STIs (Feldstein Ewing & Bryan, 2020). More attention needs to be given to ending the STI pandemic and future research should utilize evidence based theory approaches that are likely to improve self efficacy. Addressing social determinants of health is a critical step towards reducing STI rates and preventing unhealthy outcomes (Samarasekara et al., 2021). Federal funding and support for clinicians should be increased to boost treatment and prevention. STI assessment should be included in routine clinical management. Clinicians should use innovative and sustainable ways to establish trust with patients, and engage in difficult conversations about

sexual health to increase abstinence, condom use, vaccinations, testing, and treatment (Meunier et al., 2021).

Adequate funding dedicated to STI prevention is the first step to finding solutions reducing the STI burden placed on these communities. STIs can happen to anyone irrespective of race, gender, or ethnicity and the data is concerning. There isn't a quick fix to reverse this growing problem across the US. Clinicians must be meticulous in screening, and actively passing messages that aid prevention. Structural barriers to prevention and access to care should be eliminated and the government should modernize surveillance, increase workforce, and innovative monitoring systems to ensure equitable access to prevention, screening, treatment and follow up care.

Planning and Management to Promote Health

This program will initially assess a needs based assessment of MSM living in Hartford county and thereafter evaluate, design, and implement, a sustainable, community–based patient outreach model to improve preventive screening, and quality access to quality care for MSM. The key to ameliorating the high prevalence of STIs in Hartford County is through equitable planning and management of resources that are geared to eradicate perceived barriers to treatment and prevention (Feldstein Ewing & Bryan, 2020).

A needs assessment is necessary to understand the correlation between STIs and behavior change. The success of this program will depend heavily on efforts to design and implement a culturally and holistic approach that will promote comprehensive sexual health interventions. More research tailored and designed specifically towards MSM should be done to increase access to screening and treatment.

Communication

Strong communication skills are vital in designing a health behavior change as it assists public health professionals to convey scientific knowledge to all audiences for effective interventions and actions. It is important to communicate clearly without stigmatizing a particular group or gender. For example, Infectious agents don't discriminate against people, but they are transmitted more or less easily depending on our behavior. If we explain that STIs can be contracted from occasional unprotected sexual encounters, this information is valid for everyone across all gender caveats. Effective communication helps a community understand how policies affect healthcare, institutional directives, healthcare structure (e.g access to care, and research ethics), and ethno social conditions (health belief, and literacy) (Kroke & Ruthig, 2023). A culturally designed intervention that involves a collaborative effort with the community will aid in disseminating prevention practices.

Systems thinking a process that integrates interconnected agents and their capacity to adapt to change should be applied towards STI prevention. Emerging STIs require collaboration, resource sharing, and partnerships in STI prevention to promote systems thinking (Vujcich et al., 2023). As public health systems continue to evolve to overcome challenges, new paradigms in medical practices also emerge. Therefore it is important to broaden our capabilities to understand factors that affect population health including; political stability, power distribution, and allocation of resources. Addressing the health of our shared planet is relevant to the human health consequences of our environment. In a nutshell, we live in a global society where the health of individuals is intimately entwined with the quality of life shared.

Abstract

Roughly 4% of males in the United States constitute Men who have Sex with Men (MSM) yet their sexual health remains disproportionately poor compared to other genders. Findings across all studies show evidence of higher behavioral risk resulting in transmission of STIs, and lower rates of preventative care among this group. We also know unequivocally that accurate knowledge about STIs is vital to finding prevention strategies. The question of why this population has been the subject of much debate and research for over two decades yet few studies have delved deeply into better ways to improve the sexual health of this population. Social determinants of health (income, sex or gender based discrimination, social support, education, and poverty) are the powerful drivers of negative health outcomes in this population.

This systematic review is intended to bridge the gap between STI prevention and reduce the high prevalence among MSM by examining barriers to accessing care. Google scholar, Medscape, Chamberlain Library, Pubmed, the Lancet HIV databases were used to conduct peer reviewed quantitative studies to assess the high risk behaviors among MSM using The Health Belief Model (HBM). The review included more than 20 articles and the results found significant associations in perceptions, perceptions to STI susceptibility, severity of the disease and barriers to engage in safe sex practices. Given the alarming rates of STIs and the urgent unfulfilled need for treatment and prevention, it is important for policy makers to reframe sexual health as a key aspect of overall health. More explanation of results and potential implications of this research are detailed throughout this review.

Introduction

Sexually Transmitted Infections (STIs) remain the elephant in the room that is seldom discussed even in healthcare settings, it is therefore important to realize the risks and long term consequences including infertility. The increased prevalence of STIs including; chlamydia (the most common in the USA), gonorrhea, trichomoniasis, syphilis, genital herpes, human papillomavirus, sexually transmitted hepatitis B, and sexually transmitted HIV is disproportionately attributed to gender intersection (Weinstock et al., 2021). STIs are parasitic, bacterial and viral pathogens that are transmitted via vaginal, anal, and oral sexual contact (David et al., 2020). Behaviors that exacerbate STIs include; condomless sex with multiple partners, inconsistent condom use, and sharing needles. Most STIs are treatable with antibiotics, unfortunately most infected people are asymptomatic and therefore go untreated until they develop complications.

Most sexually transmitted infections are insidious and current medical practices have failed to accurately address risky sexual behaviors especially among Men who have Sex with Men (MSM) (Parchem & Molock, 2021). Therefore, leaving this group to be disproportionately impacted by HIV/STIs. Despite great success with PrEP, and interventions for STI/HIV prevention and infection control.MSM still remain at a greater risk for STIs compared to other genders. Despite insurmountable evidence of STI risk among MSM, there are notable gaps in the literature on STI surveillance data precisely related to poor STI testing especially in metropolitan cities like Hartford where there is suboptimal STI testing. It is imperative that local state and national health policies and jurisdictions that will expand and sustain STI surveillance among MSM. Such improvements will help in the effective implementation of comprehensive sexual health and prevention programs (Parchem & Molock, 2021).

According to the World Health Organization (WHO), More than 1 million sexually transmitted infections (STIs) are acquired every day worldwide, the majority of which are asymptomatic. Each year there are an estimated 374 million new infections with 1 of 4 curable STIs: chlamydia, gonorrhea, syphilis and trichomoniasis. More than 500 million people 15–49 years are estimated to have a genital infection with herpes simplex virus (HSV or herpes). Human papillomavirus (HPV) infection is associated with over 311 000 cervical cancer deaths each year. STIs have a direct impact on sexual and reproductive health through stigmatization, infertility, cancers and pregnancy complications and can increase the risk of HIV (WHO, 2022).

The CDC website states that**,"** U.S. STI Epidemic Showed No Signs of Slowing in 2021 – April 11, 2023. Reported cases of the sexually transmitted infections (STIs) chlamydia, gonorrhea, and syphilis all increased between 2020 and 2021 – reaching a total of more than 2.5 million reported cases". The synergistic relationship between HIV and STIs has led to poor outcomes, increased risk for transmission, and co-infection (Samarasekara et al., 2021). It is therefore an urgent public health issue and treatment efforts must improve access to care to quality and competent care to disable this lethal combination of HIV/STIs.

Perceptions of risk factors in contracting STI/HIV are essential for behavioral change and safe sex practice (Samarasekara et al., 2021). However, this is not the case for the communities in Hartford County, there is also limited data regarding STIs risk beliefs and perceptions among MSM in this population. Factors contributing to the dramatic rise in STI/HIV cases among MSM include; poor policies, limited investment by public health departments in surveillance, prevention and testing, mistrust of the healthcare system, and poor education about practicing safe sex (White et al., 2022). Therefore most communities across the USA could benefit from a behavioral focussed prevention intervention that promotes safe sexual practices.

The program will be designed to address ways to develop and evaluate a behavioral intervention that will prevent STI/HIV transmission among men who have sex with men in Hartford, Connecticut, a population most impacted by STIs/HIV. This program is intended to address ways to prevent STIs before they occur. Increase awareness of STIs and promote sexual health awareness. Some of the issues to be addressed include; Non-stigmatizing sexual health education that will integrate STI/HIV prevention. The plan will be equipped to address the unshared burden of STIs resulting from poverty, life's challenges and systemic racism.

The success of this program entirely depends on community participation in strategically navigating the barriers to effectively screen and treat sexually transmitted infections in this population. After all, it takes a village to educate and effectively engage program participants with information related to the risk and severity (complications related to untreated STIs). Beliefs and perceptions about STIs in this community need to be reversed to lead program participants to reverse unhealthy sexual behaviors.

Literature Review

The Centers for Disease control and Prevention (CDC) has reported an increase in STIs that is estimated to be up to 563.3 million, including 6.3 million cases of syphilis, 86.9 million cases of gonorrhea, 127.2 million cases of chlamydia, 156.0 million cases of trichomonas, and 186.9 million cases of genital herpes (CDC, 2022). The U.S. reached record high levels by enumerating 2.5 million STIs cases in 2021, a number that is likely to exacerbate HIV transmission rates. Among the STDs, chlamydia, gonorrhea, syphilis, and congenital syphilis cases combined were up 4.4% in 2021, especially amongst men who have sex with men (David et al., 2020).

The above statistics highlight the multifaceted STI burden which calls for increased knowledge and awareness, identifying the diversity of sexual behavior in marginalized populations and creating sustainable solutions that address the unique challenges faced by MSM (Blair et al., 2021). Multiple studies have illustrated the relationship between MSM and STI/HIV incidences showing that frequent STI infections may elevate the risk for HIV (Samarasekara et al., 2021). This calls for increased prevention efforts and the CDC website has updated new guidelines on STI testing (every 3-6 months), and treatment which recommend the initiation of PrEP for such people at risk (CDC, 2022). Unfortunately, there is substantial evidence showing suboptimal screening rates. The low input of STI/HIV screening amongst infected people poses danger to disease surveillance as it creates an urgency to develop new and effective ways for infection control (Meunier et al., 2021). The downside is resistance to life saving prevention strategies like doxycycline (Mann et al., 2021).

In Hartford county, 5405 cases of Gonorrhea were reported this is 22% increase since 2020 and 329 cases of Syphilis were reported thus 56% increase since 2020 and 14750 cases of

chlamydia were reported thus 14.7% increase since 2020. As for the newly diagnosed cases of HIV, findings indicate that 58% were attributed to men having sex with men, 28% were heterosexual contact and 7% were injecting drugs. The new HIV diagnosis by race among male indicated that 18% were Hispanic, 15% black and 14% were white.more information on STI/HIV prevalence in connecticut and across the country is as summarized on the table below:

Infection/ Condition	Nationwide (USA)		Connecticut	
	No of Cases	Rate Increase since 2020	No of Cases	Rate of Increase since 2020
Chlamydia	1,644,416	4%	14,750	15%
Gonorrhea	710,151	5%	5,405	16%
Syphilis	176,713	32%	329	15%

According to data from HIV.gov; MSM were most affected by HIV/STIs in 2021. They accounted for 70% (22,400) of the 32,100 estimated new HIV infections in and 86% of estimated infections among all males. The high prevalence of concurrent HIV infection and reportable STI diagnoses within this population is consistent with previous reports (Stewart, J., & Baeten, J. M. 2020). Paradoxically, peer reviewed studies have found that HIV infection rates are well controlled since the inception of PrEP (Liu et al., 2022). Hartford county is structurally and culturally distinctive (Thomas et al., 2020; National Center for Education Statistics, 2021), such factors can create disparities in sexual health among MSM.

White et al. (2022) examined the impact of structural environmental factors, community, culture, policy aspects of the environment, and individual high risk behaviors such as unsafe sexual practices as major barriers of infection control. Forms of marginalization especially poverty, sex work stigma, and racism all contribute to inequitable access to STI screening,

prevention and care **(**Huang et al., 2020**).** The authors of this study assessed that stigma related to STI/HIV has direct relevance to health seeking behaviors. Sabato T. (2021) found correlation between education and STI/HIV diagnosis. The association was moderated by lack of education about sexual health, screening, and treatment interventions.

Multiple forms of internalized feelings especially Misandry and institutional stigma are classic structural barriers that deter MSM from accessing STI/HIV care. Prior research has linked gender identity social stigma to poor utilization of health services. MSM often experience intense levels of stress related to gender identity, or expression leading to limited social support and these factors exacerbate disparities in sexual health (Hegazi, 2019).

STI/HIV high infection rates profoundly affect global disease burden and many theoretical models have been used in research to determine why some people choose to engage in unhealthy sexual behaviors while others don't (Huang et al., 2020). While increased number of sexual partners is a major determinant of STI transmission, inconsistent or no condom use has been on the rise since the initiation of HIV preexposure prophylaxis (PrEP). A Better way to understand human behavior using the Health Belief Model (HBM) to explore intentions, attitude and belief towards participation in screening and prevention of STIs (Li et al., 2016). The HBM states that people's beliefs influence their health-related actions or behaviors (Hegazi, 2019).

The Health Belief Model was proposed in 1952 by three psychologists and its key construct is based on behavioral change that focuses on value expectation theories, motivation and cognitive knowledge for health maintenance (Kumar et al, 2020). The model consists of three parts: a person's health beliefs, the clues or intentions of behavior, and behavior constraints. HBM is a model that utilizes; perceived sensitivity, severity, benefits, barriers and self efficacy as predictors of prevention behaviors (Liu et al., 2022).

The chief purpose of this research is to determine the social determinants of sexual behavior based on a health belief model. The peer reviewed literature confirms the efficacy of education in preventing the spread of STIs (Mann et al., 2021). The health belief model framework is likely to contribute to enhanced awareness, susceptibility, severity, benefits, perceived self-efficacy, behavioral intentions and eventually prevent high-risk behavior among MSM (Kumar et al, 2020). Applying this program to this population may lead to the prevention of STIs/HIV in this community. Theoretical interventions using HBM have been effective in health behavioral changes (Li et al., 2016).

The increasing burden and worsening health disparities of STIs/HIV is a call to action for public health organizations to design a more complex theoretical approach towards addressing the structural barriers to STIs/HIV treatment and prevention. This can be achieved by addressing structural determinants of health, and stigma that manifests across cultural, community and sexual behavior relating to HIV testing that shape the distribution and availability of health-relevant resources (Sabato, T. 2021).

While several theories of behavior change models have been developed to assess behavioral competency. The Health Belief Model is possibly the simplest and the most widely used and tested for exploring high risk sexual behaviors. The four elements of the Health Belief Model are: “perceived susceptibility (likelihood of getting the disease), perceived severity (perception of how serious an outcome or consequence is from the disease), perceived benefits (efficacy of preventive action undertaken) and perceived barriers (time, effort, money, inconvenience, pain, side effects of preventive action)”. These constructs are evidence based and have been used in the past to improve knowledge, skills and beliefs among MSM (Hegazi, 2019). The HBM is an effective way to determine the root causes of risky health behaviors as it is based

on the construct that change is induced by an individual's perception of the actual threat of being infected. In other words, the higher the perceived susceptibility and perceived severity of disease, the higher the chances of engaging in self protective behaviors (Kroke & Ruthig, 2023).

Program Overview

Assimilating existing knowledge to understand risky sexual behavior, and attitudes in MSM in Connecticut presents new opportunities to eliminate the burden of negative sexual health outcomes while bridging the gaps in sexual health disparities. The goal of this program is to explore alarming rates of STIs despite scientific progress that has been made towards prevention and treatment. This program will be centered on reducing STI/HIV-related health disparities and health inequities among MSM in Hartford county, Connecticut (Mann et al., 2021). It would also be important to assess current STI/HIV knowledge, safe sex practices, attitudes, beliefs, and use of STI clinics. Other goals are to integrate HBM with peer reviewed articles to find factors that reduce condom use among MSM.

Objectives

The purpose of this program is to utilize evidence-based sexual health behavior to increase community knowledge regarding STIprevention and to identify ways to reduce STI transmission by utilizing prophylactic measures. My goal is to apply a theory based behavioral intervention to improve self efficacy in sexual health among MSM. (Feldstein Ewing & Bryan, 2020). This program will be based on the following objectives;

- To decrease the incidence of STIs among MSM in Connecticut by 10% within the first two months of program implementation. This will have increased sexual health knowledge in STI prevention, screening, and treatment. This in turn will effectively boost the community's collective power, attitude, beliefs in sexual knowledge, and disseminate risk aversion behaviors.
- Collaborate with my preceptor to identify at least 80% of the gaps in care toward the management of STI screening and prevention programs by the end of the first week of the program.
- To increase knowledge related to perceived severity of lack of condom use among MSM living in Hartford County by 30% within two months of program implementation, this will have improved perception about self-protective behaviors like using condoms and discussing sexual history with potential partners.
- To estimate the STI burden among MSM in Hartford county utilizing The Health Belief model constructs to assess and identify ways to reduce STI prevalence among MSM by 30% by the end of December 2023.

Methods

Target Population

STIs can affect people of any age and they have long term consequences that can be prevented. According to the Centers for Disease Control and Prevention (CDC, 2022) condom use has significantly declined amongst Men who have Sex with Men (MSM) leading to new cases of STI/HIV infections (Burton et al., 2018). These changes are highly influenced by; cultural attitudes towards disease prevention, the efficacy of healthcare providers, environmental and structural differences but also biological, cultural, and risky sexual behavior reasons (drug use, inconsistent condom use, and multiple sex partners) seem to exacerbate the numbers (U.S. Department of Health and Human Services, 2021).

According to Healthy people 2030; "Syphilis rates in men who have sex with men are higher than in other groups. Untreated syphilis can cause brain and eye problems, and having syphilis makes it more likely that people will get and transmit HIV". Condom use, screening, and early treatment of people with syphilis and their sexual partners can reduce syphilis rates (Healthy People, 2022). The importance of sexual health among MSM requires an urgent assessment, detection and treatment of STIs to maintain good sexual health (Parchem & Molock, 2021).

I will focus on MSM in Hartford County, Connecticut because a 2022 report by CDC indicates that there were 2.5million reported cases of chlamydia, gonorrhea and syphilis. The data further reveals that over the past 10 years STI rate has increased by 35% among men and decreased by 3.2 % among females with highest numbers being reported among Hispanic and black/African American MSM.

Research Design

Quantitative research design will be used in this study; the findings are anticipated to provide a better understanding on STI prevalence among MSM using the health belief model. The quantitative data will be obtained from: CDC the leading national, science based data driven organization that protects the public's health; DPH the umbrella body responsible for enhancing the well being and health of all Americans by using advanced technology to provide better medical , public health and social services. Data will also be gathered from Ryan White Program (RWHAP): a program which helps low income earners who are HIV Positive have access to medical care, medication and other essential services. All these sources use a cross sectional method to collect data at the state and county level. Cross sectional study uses different groups with diverse interests to describe population attributes. A cross sectional study is a cheap, simple method used to understand a population at a given point in time (Cherry, 2015).

This study sample is a smaller representation of the actual population. In this case the sample consists of approximately 4,500 MSM in Connecticut. My focus will be based on the Hartford county, Connecticut population as opposed to the entire population in the USA as this enables researchers and analysts to collect relevant information on the population at a reduced cost. Getting the correct sample size is important in quantitative study because it determines its power by use of standard error and standard deviation (Frankfort Nachmais & Nachmais, 2018).

To better understand the sample, stratified random sampling was used to divide the population into subpopulations since data from the sources consist of information on STI prevalence among MSM. This led to a more precise feedback focused on MSM other classifications of the subgroups including gender identity, age range, STI Classification and HIV status.

Survey method was used in most of the peer reviewed articles that I am utilizing for my research. Most researchers used a questionnaire with both open ended and closed ended questions. This was an ideal instrument as it measures the attitude of the participants and can be administered to a large group of people. It's reliable and a valid tool used to ease data analysis. The open ended questions enable participants to give more information and it's less expensive. All validation procedures were followed during data collection and reliability was achieved by pretesting the questionnaire on a smaller sample of the target population

Sample data collection questions

1. How was your experience with a prevention services provider for example HIV/STI testing, partner services, or syringe service program? In the past 12 weeks, were you tested for any sexually transmitted diseases (e.g chlamydia, gonorrhea, syphilis, genital herpes or Hepatitis B?
2. How do you prefer to receive prevention services; virtual or in person? And what are your main barriers to screening? Stigma? Transportation? Or lack of trust in healthcare providers?
3. How often do you use condoms and what are the factors that drive your condom use decision?
4. What would improve your access to getting tested for an STI?

Results

STI/HIV testing and experience with preventive service providers

In 2021 there were over 1.8 Million new HIV infections reported worldwide which was a significant decline over the last 5 years. Men who have sex with men (MSM) are 30 times at a higher risk of being infected with STIs compared to the heterosexual men even in high income countries across the world. There are various ways HIV/STI testing can be done eg home testing, hospitals and community based organization. Among MSM the preferred retesting , test location and results delivery was surveyed among 109 MSM in Connecticut and findings were as per the Table 1 below:

Preference	All Participants, No. (%)	Age ≤45 y, No. (%)	Age ≥46 y, No. (%)	*P* Value
HIV test type	n = 83	n = 64	n = 19	
Rapid oral	59 (71.1)	45 (70.3)	14 (73.7)	1.00
Rapid finger stick	7 (8.4)	7 (10.9)	0 (0)	.34
Traditional clinic test	17 (20.5)	12 (18.8)	5 (26.3)	.52
Rapid HIV test location	n = 79	n = 59	n = 20	
Home	62 (78.5)	47 (79.7)	15 (75.0)	.76
Clinic	12 (15.2)	9 (15.3)	3 (15.0)	1.00
Community health	5 (6.3)	3 (5.1)	2 (10.0)	.60
Retail	0 (0)	0 (0)	0 (0)	n/a
Social venue	0 (0)	0 (0)	0 (0)	n/a
HIV test result notification: negative result	n = 72	n = 53	n = 19	
Electronic: secure website login	24 (33.3)	17 (32.1)	7 (36.8)	.78
Electronic: e-mail or text message	31 (43.1)	22 (41.5)	9 (47.4)	.79
Health provider call or office visit	17 (23.6)	14 (26.4)	3 (15.8)	.53
US mail	0 (0)	0 (0)	0 (0)	n/a
HIV test result notification: positive result	n = 72	n = 53	n = 19	
Electronic: secure website login	10 (13.9)	7 (13.2)	3 (15.8)	.72
Electronic: e-mail or text message	10 (13.9)	9 (17.0)	1 (5.3)	.27
Health provider call or office visit	52 (72.2)	37 (69.8)	15 (78.9)	.56
US mail	0 (0)	0 (0)	0 (0)	n/a
Rapid STI test collection method/location	n = 82	n = 55	n = 27	
Collect own samples at home	50 (61.0)	29 (52.7)	21 (77.8)	.03*
Collect own samples at clinic	10 (12.2)	8 (14.5)	2 (7.4)	.49
Health professional collect in clinic	22 (26.8)	18 (32.7)	4 (14.8)	.11
STI test result notification: negative result	n = 76	n = 51	n = 25	
Electronic: secure website login	23 (30.3)	15 (29.4)	8 (32.0)	1.00
Electronic: e-mail or text message	35 (46.1)	23 (45.1)	12 (48.0)	1.00
Health provider call or office visit	18 (23.7)	13 (25.5)	5 (20.0)	.78
US mail	0 (0)	0 (0)	0 (0)	n/a
STI test result notification: positive result	n = 76	n = 51	n = 25	
Electronic: secure website login	13 (17.1)	7 (13.7)	6 (24.0)	.33
Electronic: e-mail or text message	19 (25.0)	12 (23.5)	7 (28.0)	.78
Health provider call or office visit	43 (56.6)	32 (62.7)	11 (44.0)	.15
US mail	1 (1.3)	0 (0)	1 (4.0)	.33

Findings indicate that the rapid oral HIV/STI test (71%) was the preferred test among MSM, and most participants chose home testing as a top option (78.5%). For negative results the respondents preferred the results to be electronically via email or text (76.4%) and if result is positive results to be through a one on one discussion in person through a clinical visit or via a phone call (70%) and most were comfortable making a followup visit to the clinic if their result was positive.

As for the STI testing location and result delivery the findings revealed that MSM preferred self collection of the specimen (73.2%), and they preferred the venue to be home (61%) . It's good to note that the men >45 years preferred the specimen to be collected from home(77.8%) whereas the men <45 years preferred to go to the clinic (52.7%). These respondents preferred electronic feedback for negative results and (76.4%) however they preferred getting results in person or via phone if the results are positive (56.6%).

Further findings by Clark, (2020) conducted on 60 MSM in Connecticut revealed that the MSM interaction with the testers was an important part of STI/HIV testing. Having professional , non judgemental and knowledgeable clinicians perform STI screening gave the respondents more comfort with the services being provided. The staff demeanor and how they perceived them had a significant difference on their HIV/STI testing experience.

Most of the participants indicated that they were sensitive to how they were perceived by the staff. Some participants also indicated preference towards service providers who specialized in interacting with MSM's as they felt more understood. Survey on 354 MSM in Connecticut also indicated that they preferred public clinic testing services as long as the staff were professional and sensitive to their emotions (Leitinger, et.al, 2018). The overarching goal to

reduce the burden of STIs is an integrated approach to address stigma by creating a non-stigmatizing, welcoming environment in STI testing sites.

Barriers to screening and the preferred prevention services by MSM

Timely access to screening , testing and treatment has been reported to be very critical in controlling HIV/STIs among MSM. The rate of STI and HIV continues to rise among MSM compared to women and men who have sex with women in Connecticut as a third of the sample had not been tested in the last 3 years. In most cases incomplete testing has been reported as a major barrier to controlling HIV/STI among MSM. Testing among MSM is suboptimal with only one third of the sample HIV/STI testing amongst this population has been reported to be suboptimal. A US cross-sectional study found that one-third of the sample had not been tested in the previous two years. Other barriers testing and screening barriers include limited access to care and HIV Testing and financial instability (Llewellyn C., Et.al,2021).

There are a number of perceived barriers identified from various studies and summarized in the table below:

Testing Barriers	All Participants, No. (%)	Age Category			Risk Category			HIV Serostatus		
		Age ≤45 y, No. (%)	Age ≥46 y, No. (%)	*P* Value	Lower-Risk Behavior, No. (%)	High-Risk Behavior, No. (%)	*P* Value	HIV-, No. (%)	HIV+, No. (%)	*P* Value
HIV testing barriers	n = 75	n = 52	n = 23		n = 25	n = 50		n = 62	n = 12	
No exposure	43 (57.3)	26 (50.0)	17 (73.9)	.08	16 (64.0)	27 (54.0)	.47	39 (62.9)	3 (25.0)	.02*
Fear/anxiety	34 (45.3)	25 (48.1)	9 (39.1)	.62	8 (32.0)	26 (52.0)	.14	25 (40.3)	9 (75.0)	.05
Privacy concerns	8 (10.7)	6 (11.5)	2 (8.7)	1.00	2 (8.3)	6 (12.0)	.71	8 (12.9)	0 (0)	.34
Fear of needles	2 (2.7)	2 (3.8)	0 (0)	1.00	1 (4.0)	1 (2.0)	1.00	2 (3.2)	0 (0)	1.00
Lack of venue	7 (9.3)	6 (11.5)	1 (4.3)	.43	2 (8.0)	5 (10.0)	1.00	6 (9.7)	0 (0)	.58
Cost	2 (2.7)	2 (3.8)	0 (0)	1.00	1 (4.0)	1 (2.0)	1.00	2 (3.2)	0 (0)	1.00
Inconvenience	30 (40.0)	27 (50.9)	4 (17.4)	.01*	8 (32.0)	22 (44.0)	.45	26 (41.9)	3 (25)	.35
STI testing barriers	n = 70	n = 48	n = 22		n = 19	n = 51		n = 57	n = 13	
No exposure	44 (62.9)	28 (58.3)	16(72.7)	.30	16 (84.2)	28 (54.9)	.03*	39 (68.4)	5 (38.5)	.06
No symptoms	41 (58.6)	28 (58.3)	13 (59.1)	1.00	8 (42.1)	33 (64.7)	.11	33 (57.9)	8 (61.5)	1.00
Fear/anxiety	15 (21.4)	13 (27.1)	2 (9.1)	.12	2 (10.5)	13 (25.5)	.21	11 (19.3)	4 (30.8)	.46
Privacy concerns	11 (15.7)	6 (12.5)	5 (22.7)	.30	2 (10.5)	9 (17.6)	.72	6 (10.5)	5 (38.5)	.03*
Fear of needles	3 (4.3)	2 (4.2)	1 (4.5)	1.00	1 (5.3)	2 (3.9)	1.00	3 (5.3)	0 (0)	1.00
No venue	7 (10.0)	6 (12.5)	1 (4.5)	.42	0 (0)	7 (13.7)	.18	7 (12.3)	0 (0)	.33
Cost	3 (4.3)	3 (6.3)	0 (0)	.55	1 (5.3)	2 (3.9)	1.00	3 (5.3)	0 (0)	1.00
Inconvenience	35 (50.0)	28 (58.3)	7 (31.8)	.07	6 (31.6)	29 (56.9)	.11	28 (49.1)	7 (53.8)	1.00

These findings indicate that inconvenience (40%) and anxiety and fear (45.3%) ,were some of the barriers to testing and screening of STIs among MSM. However the leading barrier to HIC testing and screening is limited information regarding prior exposure to STIs is unknwn(57.3%). These findings also indicated that inconvenience as a barrier was more predominant among adults <45 years and respondents who were already HIV positive did not find lack of prior exposure as a barrier they were only 25%.

As for the perceived barriers to STI testing inconvenience (50%) and absence of symptoms of STI (58.6%) were mentioned. However the biggest hindrance was the abscence of known prior STI exposure (62.9%). Other findings also reveal that respondents who engage in high risk behaviors were unlikely to report prior STI exposure compared to those with low risk behaviors (54.9% vs 84.2%). Privacy concern as a barrier to STI was predominant among the HIV positive respondents compared to the HIV negative respondents (30.8% vs 10.5%) (Barnard, 2018).

Other studies suggest that previous negative test results in STI is one major testing barrier because the respondents felt embarrassed during these previous tests and some felt uncomfortable discussing their sexual history with the clinician. A semistructured interview conducted on African American MSM in Connecticut revealed that most of them were anxious during the test which prevented them from future tests. Others indicated that the negative relationship or perceived negative attitude of the clinical staff towards the participants led to lack of re-testing (Kularadhan 2022). Additionally, another study revealed that in Connecticut even when the previous HIV test is positive most MSM preferred not to go back to the same location they were first diagnosed to be HIV positive due to fear of being stigmatized due to promiscuity (Clark, 2015).

Studies by Raffe. et al (2020) conducted following 10 focus groups in Connecticut revealed that stigma associated with testing was a major barrier to screening. Individual testing would help curb this barrier and would encourage more MSM to get tested. An in depth study by Hoyo, (2020) in 10 focus groups and 60 MSM in Connecticut revealed that the MSM were self conscious and felt like they had a, “Walk of Shame”attitude when going to the clinic for testing. Unwillingness to seek screening can lead to poor health outcomes due to delayed diagnosis and treatment. Some of the suggestions given to reduce this stigma were peer led testing and home self testing. Stigma is generally considered an amalgamation of fear that can harm sexual health (Clark, 2015).

Condom use, accessibility and availability of other safe sex educational supplies among MSM

According to Weller (2019) condoms are highly effective in STI prevention especially among MSM where condom use has been found to reduce HIV by at least 78%. However condom use is still not embraced by MSM due to inability for the men to negotiate with partners on condom use, condom breakage or slippage, pain during intercourse, rectal bleeding and latex intolerance. Most MSM no longer use condoms while on pre-exposure prophylaxis (PrEP). Clinical trials are underway to investigate prevention strategies for men who don't wear condoms or don't use prophylaxis treatment (Delaney & DiNenno, 2021). The benefit of this research needs to be expedited by the federal government and relevant stakeholders allocating funds to discover safe and effective prevention strategies to curb STI trends.

Studies by CDC (2021) indicate that in the past 6 months 90% of MSM had anal sex and only 75% used a condom during their last anal sex encounter. The use of compatible lubricants has been found to reduce slippages and breakages among MSM in Connecticut with over 230 respondents reporting success in use of compatible lubricants. However the lack of water based lubricants has led to men resulting in the use of petroleum jelly, body cream and saliva which increases risk of condom failure and transmission of viral infections. The use of lubricants without condoms also increases risk of STI and for men who use hyperosmolar they risk their chances of being infected with HIV (Russo, 2010).

Some of the behaviors promoting condom use as per Sullian (2021) include; condom use negotiation script where 1 in every 7 men used phrases such as "no condom no sex" and this was feedback from men who are consistent condom users and HIV negative. In situations where condoms were inaccessible or the partners refused to use condoms at least 1- 10 men would

suggest oral sex, this behavior was also commonly noted among HIV negative men with no previous STI infection history. Additionally, 1 in 6 men confirmed consistency with condom use; amongst both HIV positive and HIV negative men.

According to Smith (2019), motivational beliefs linked to condoms use include; high self worth where 1 in 8 men indicated that they have life goals and the older they get the more alert they are to the need to protect themselves. Positive self valuation was predominant among the older men aged 27 years and above who understood the threat posed by HIV and STIs. 1 in 10 men believed that condoms use reduced anal sex pain . Findings from participants indicate that condoms and lubricants should be used together to make the experience pleasurable and avoid any form of anal trauma.

As much as there are behaviors that encourage condom use there are also behaviors that discourage condom use. Among them intoxication and sex. 3 in 4 men have sex while intoxicated and in most cases it's unprotected sex. There is a lot of compromise when it comes to sex while intoxicated as it distorts one's thinking.

Another behavior factor discouraging condom use is partner abuse where receptive partners are overpowered by their partners. The more one accepts condomless sex the higher the risk of STI transmission. In other cases insertive partners insisted on having condomless sex and would even manipulate their partners who would agree to having unprotected sex.

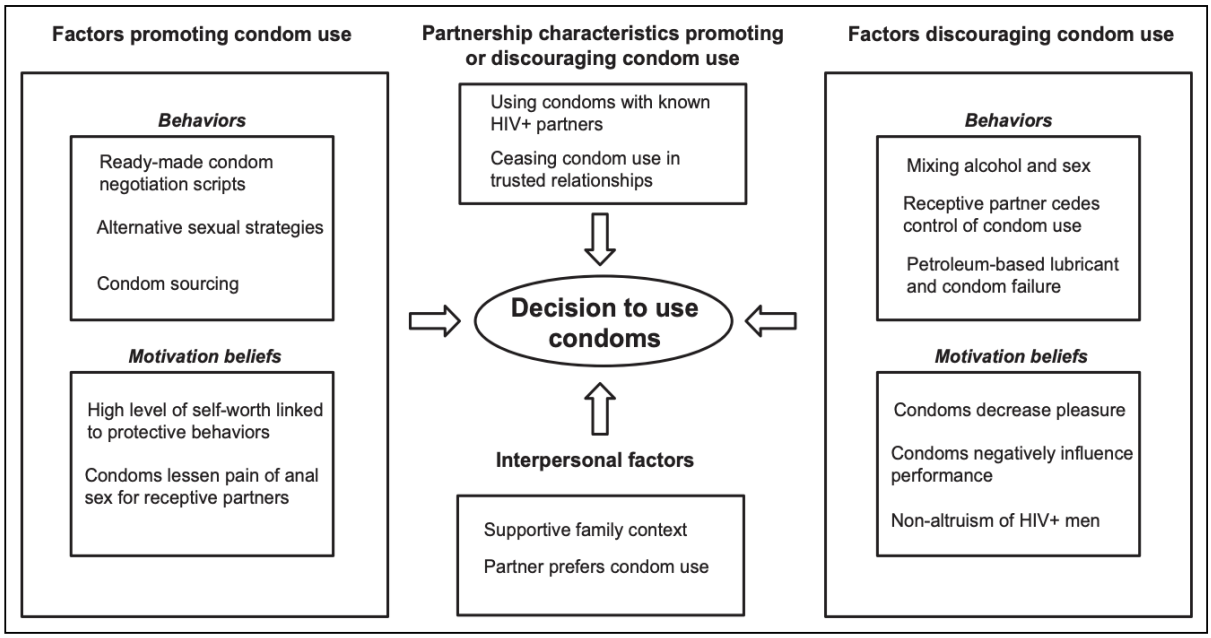
Lastly petroleum based lubricant was mentioned as a behavioral factor that discouraged condom use. 1 in 5 men cited condom breakage as a result of using petroleum lubricants like vaseline. However participants who used water based lubricants did not face this challenge of condom breakage.

Motivational believes that discouraged condom use as mentioned by respondents in Smith (2021) study indicated that condom reduces their performance during sex because it decreases their pleasure during the act. 1 in 2 men expressed that unprotected sex gave them more pleasure, especially the older MSM. They further explained that condoms resulted in erectile dysfunction, that is difficulty having an erection, maintaining an erection or even getting an orgasm. Some men, especially HIV Positive men explained that selfishness made them care only about protecting themselves hence having unprotected sex with men who did not know their status and maintained that it was not their responsibility to protect someone who did not care to know their status. It is such behaviors that exacerbate the STI burden.

Partner driven concepts create disparities in condom use in STI Discordant relationships. It's reported that 1 in 5 men are aware of their partner's status and therefore use protection. Despite these participants knowing their status, they still had unprotected sex with other partners whose status remained unknown, hence increased exposure to STI's. Other participants cited being in a trusting relationship hence no need to use condoms. But for relationships where there was no trust condom was used and for partners who are having sex for the first time then condom is predominantly used.

Lastly, there are interpersonal factors that influence condom use such as encouragement from those close to you. 1 in 3 men indicated that they were encouraged to use condoms either by a family member, sibling or friend and others further explained that their support system even went ahead and purchased these condoms and showed them how to use them so that they are informed and have the power to protect themselves.

Figure1: Factors Influencing Condom use



Author: Siegler (2014)

Ways to improve access to getting tested for STI/HIV among MSM

STI self test allows MSM to get tested and get results within 20 mins at the comfort of their home. It's one strategy that has so far been recommended by the CDC. In 2020 the eSTAMP (Evaluation of Rapid HIV Self-testing Among MSM Project)findings indicate that 80% of the men who were mailed the HIV test kits tested themselves more frequently compared to those who had to visit clinics in order to get assistance. In this project these MSM were allowed to share feedback to their social network which led to more STI Awareness within the community.

Findings indicate that MSM also recommended a mail-in self test where kits are sent to them and allows them to collect their dried blood sample from home, this sample is sent to the lab and results provided by the healthcare providers. These kits can be ordered by the respondents or can be recommended by the health care provider. Participants in this group also stated preference for mail-in self tests because the sample collected can be tested for HIV and

any other STI. Fistonich et al.(2021) designed the GetCheckedDC which allows any MSM to have access to kits for testing HIV and STI.

Retail pharmacies testing was an approach recommended by MSM due to the fact that they could also get active HIV care from the pharmacies hence saving them the journey to the health care settings. Findings by CDC Connecticut in 2021 indicate that partnership between the Health department and local retail pharmacies could aid in identifying first time testers, new HIV infections and assist in getting new cases the medical care they need (CDC, 2021).

Another unique testing strategy indicated by MSM is mobile/ outreach testing ; these are non clinical setups that are more sociable to MSM and include community based organizations, bathhouses, syringe service programs, churches, shelters and social services organizations. These are social areas where MSM frequent and hence they can easily be tested without stigma or feeling inconvenienced in any way (Bowles, 2018).

Addressing Structural Barriers to STI Prevention

Despite multiple structural and institutional changes about sexual minorities, MSM still face barriers to culturally adequate access to care (Siegler et al., 2014). It is these barriers that create inequities and unless they are addressed, MSM will continue to face challenges seeking treatment and the STI rates among this population will continue to skyrocket. A policy-based intervention should seek to promote healthy behavior and eliminate structural racism and inequities to drive improvements in STI management.

The following interventions are necessary to achieve optimal STI surveillance; and treatment. STI screening should be made part of routine visits, electronic health records (EHRs) should be equipped with automated alerts that remind providers to screen patients(Kreisel et al., 2021). Communities affected should normalize discussions involving healthy sexual practices

especially the need to use protection when involved with multiple sexual partners. Sexual health discussions should be normalized and integrated in community discussions to build healthier communities.

Discussion

From the findings it is clear that MSM prefers Oral rapid HIV testing and self collection of STI specimens. These respondents also indicated a preference for the tests to be done at home. Even though the respondents were given a variety of options to choose from they were able to rack the options against the other option making this a strength in the sturdy. Even though these options allowed the respondents to rank their preferred testing venue it limited the options to home and clinical based testing.

Overall findings indicate lack of rapid home STI tests in the USA is a big barrier to accessing sexual health. California is the only state with such capabilities even though insurance is a big hindrance to this program's success. Even though there is an alternative for home STI testing among MSM as per the findings there is no option of self collection of specimens from the clinic. This would be a good recommendation for clinics to offer the alternative of self collection of specimens. Access to self testing resources has been identified by several scholars as a factor that drives more HIV/STI testing as it is convenient for the participants. Due to the severe sequelae on accuracy of self testing , and difficulty in use of STI test kits. Data underline self testing as the most popular option across most studies. Nevertheless, it is important for service providers to utilize self testing as a way of encouraging regular testing among MSM.

Unfortunately, respondents aged <45 years preferred home specimen collection kits for STI but not HIV testing. The downside to home STI testing is the timing as it requires transportation to the lab either in person or sent via mail; this can be a barrier to younger people

who are dependent on adults for support as it raises privacy concerns. Self testing was also preferred by first time testers while high risk behavior respondents preferred in clinic testing . African American MSM preferred being tested by healthcare professionals and receiving their test results from clinicians. Most MSM preferred cheaper/free services as this would determine how regularly they would get tested. Education on use of the test kits is important to ensure more data accuracy. According to Balam (2022) a combination of pre-test counseling, self test ability and multiple results option ability will help increase the popularity of HIV/STI testing among MSM. Clinics could offer remote counseling and prescriptions to reduce anxiety and stigma (Pleasure, 2023).

Most of the recommendations by MSM on the preferred HIV/STI testing circle back to resources that allow them to take charge, be independent and off clinical services. This is a great move off the traditional clinical visits which tend to be time consuming, is expensive as each visit means the patient has to come to the hospital by commuting or being driven there. Clinical visits are also expensive for the medical facilities as there has to be staff present to attend to the staff. These modern approaches reduce stigma and increase trust between providers and the MSM. By having approaches that are MSM friendly means more comfort around testing and more frequent testing hence eliminating both HIV/STI cases.

Using quantitative data from research to estimate STI incidence rates has its own set of limitations as most of the studies in this review were not specifically designed for age specific MSM population. I performed a sensitivity analysis to support the validity of the approach. Another limitation is the inclusion of data from diverse study designs from different populations of MSM in the United States. Being at risk of acquiring STIs was the common inclusion criterion for majority of the participants, and risk behavior was not accurately reported in consistent ways

across the studies. This could be a limitation as stratifying these risky behaviors in a meaningful way may not be feasible. Other potential limitations to be considered include using data from PrEP trials and cohort studies that were not specifically designed to assess STI prevalence rates among MSM.

Additional studies are required to understand the incidence rates of STIs among MSM and how certain sexual behaviors may influence transmission of infections. Challenges to using large data bases may create bias. For example, MSM makes up such a small part of the population and there is no specific definition for 'high-risk sexual activity'. Future research should focus on longitudinal studies which identify correlates and advocates for other underlying issues like substance abuse among this population that may exacerbate sexual risk over time. Such studies will help researchers find culturally appropriate prevention strategies to tailor the needs of men of diverse ages and race.

It is the responsibility of public health clinicians to find multifaceted approaches, targeting public health clinicians and communities towards understanding the underlying factors associated with behaviors that jeopardizes the health of MSM. Until then can we design and implement effective prevention programs to reduce high incidence of STIs among this population. To improve evidence in research, future studies should gather detailed data on sexual behavior to avoid the confusion between reinfections, and treatment failures like antibiotic resistance. Research on STI prevention should be integrated to discover safe and effective ways for treatment. STI surveillance should be increased to address structural barriers and assist MSM in experiencing culturally centered health care.

Application of Competencies

The aim of this program was to find ways to reduce and prevent high STI prevalence among MSM in Connecticut as they are a population adversely impacted by STIs and are known for high risk sexual behaviors. The cost of STIs among MSM is complex and requires the responsibility of public health clinicians to coordinate solutions to curb this epidemic. Clinicians need to ensure that patients at risk are informed and screened frequently (Guilamo-Ramos et al., 2021). The high rates of chlamydia, HIV/AIDS, and gonorrhea in this population raises health concerns and an urgent need for collective action towards finding solutions to eradicate STIs in the United States (de Wit et al., 2022). A shared responsibility approach is necessary to eliminate health inequities, and stigma that occur in tandem with poverty, and mental health issues. Public health goals should be aimed at eliminating the burden of STIs for every American despite socio economic standards, gender identity, sexual orientation, age, race, religion, disability, geographic location, or ethnicity (de Wit et al., 2022).

According to Guilamo-Ramos et al., (2021) A vital aspect of Expanding access to care for sexually transmitted infections (STIs) is sharing responsibility across all continuum of care and community resources. A multifaceted approach is necessary to control the current STI epidemic among this population (Guilamo-Ramos et al., 2021). Clinicians need to adopt a policy based approach that is geared towards eliminating structural inequities to drive the much needed change in STI. It will be necessary for the government to have dialogues with affected communities and make partnerships that will normalize sexual health. Vigorous STI surveillance, and modernization of existing testing sites and equipment are required to make the sexual health delivery system appropriate for MSM.

Current public health departments are typically underfunded with antiquated infrastructure, and saddled with outdated equipment. Besides, they are also understaffed, and under modernized to take advantage of computer technology. They don't have the funds to give money to private businesses to meet pandemic standards of infection control. My MPH curricula taught me the importance of communication, an essential part for understanding human behavior and the environment.

Health officials need to communicate with local, state and federal government as collaborative efforts are necessary to end the STI burden. It is through communication that trust is established, and therefore the public may not be hesitant to follow evidence based infection control measures. Best ways to improve communication and build public trust is for clinicians to engage with different segments of communities in assessing and responding to health challenges. We have to meet people where they are to help strengthen disease surveillance.

Demonstration of Competencies

More emphasis should be placed on optimal management of any diagnosed STIs in MSM to include screening for all STIs, partner notification and follow-up where appropriate. Public health surveillance systems should be utilized to collect such data Close liaison between testing sites, primary care providers,case managers, and counseling is imperative. Effective communication with patients should include; a detailed explanation of their results with particular emphasis on the long-term health implications for themselves, and their partners. Early diagnosis and treatment of STIs not only alleviates symptoms and reduces complications, but also reduces the period of infectivity and onward transmission.

Advancing STI equity at any level requires collaborations and data sharing with community organizations to enable evidence based program implementation. In this case, I

researched why STI prevalence among MSM is high in Connecticut and how to prevent and reduce the startling numbers. Communication is an important part of assessment and analysis of existing data in order to find barriers to STI prevention and then sharing gathered data pertaining to STI prevalence with community partners allows clinicians to modify prevention programs.

How to disseminate the findings to community stakeholders

Findings in this study indicate that knowledge and perceived risk for STI transmission can result in self efficiency strategies such as taking ownership of condom source, oral sex and condom negotiation. Such foundations can be used to empower MSM and prevent STIs. Tag lines such as "NO CD NO SEX" can be used in marketing condoms and promoting safe sex practices among MSM. Using clinics for educating and counseling MSM, availing condoms in these clinics and providing resources for continued care are strategies that can be used to promote safe sexual behaviors hence reducing spread of HIV and STI's. Findings can also be discussed at planning council meetings. Culturally appropriate short videos (2-5 minutes long) in French, Creole, English and Spanish will be used to discuss the outcomes of the program.

Recommendations for Change

Public health advocates should engage communities through collaborative partnerships that leverage STI providers, community health workers, stakeholders, and clinicians in finding appropriate ways to reduce the high STI prevalence by disseminating appropriate messages that promote healthy sexual behaviors to all patients including MSM. STI prevention programs should be programmed with cultural caveats that suit the communities beliefs, religion, and language. Such socio-cultural concepts when incorporated into programs can help bridge gaps in stigma and help patients' develop trust in their providers. Providers should be open to discuss sexual health, and educate MSM on risky sexual behaviors.

It is the responsibility of public health clinicians to find multifaceted approaches, targeting public health clinicians and communities towards understanding the underlying factors associated with behaviors that jeopardizes the health of MSM. Until then can we design and implement effective prevention programs to reduce high incidence of STIs among this population.

To improve evidence in research, future studies should gather detailed data on sexual behavior to avoid the confusion between reinfections, and treatment failures like antibiotic resistance. Research on STI prevention should be integrated to discover safe and effective ways for treatment. STI surveillance should be increased to address structural barriers and assist MSM in experiencing culturally centered health care.

Conclusion

The incidence of STIs among MSM is a lightly researched topic that has been centered on behavioral factors such as gender and number of sexual partners. Of all STIs that pose a risk to MSM, the reviewed articles are mostly based on HIV/AIDS. Considering the complexity of these studies, additional factors must be examined from socio-demographic realms as the occurrence of high prevalence of STIs apart from HIV/AIDS among this population is rampant and at a glance; incomprehensible by individual variables. STI prevention messages should be programmed to make significant changes and seek to alter negative sexual health outcomes. Collaborative sustainable and equitable efforts are a must to curb this silent epidemic

Reference

Balán I.C., Rios J.L., Lentz C., Arumugam S., Dolezal C., Kutner B., Rael C.T., Ying A.W., Macar O.U., Sia S.K.(2022) Acceptability and Use of a Dual HIV/Syphilis Rapid Test and Accompanying Smartphone App to Facilitate Self- and Partner-Testing Among Cisgender Men and Transgender Women Who Have Sex with Men. AIDS Behav.doi: 10.1007/s10461-021-03322-9.

Barnard S., Free C., Bakolis I., Turner K.M.E., Looker K.J., Baraitser P (2018). Comparing the characteristics of users of an online service for STI self-sampling with clinic service users: A cross-sectional analysis. Sex. Transm. Infect.;94:377–383. doi: 10.1136/sextrans-2017-053302

Blair, C., Javanbakht, M., Shoptaw, S., & Gorbach, P. (2021). O18.4 uncovering risky networks: Risk behaviors, sexual partnerships, and provider discussions among men who have sex with men and women (MSMW). *Sexual Partnerships and Partner Therapy*. https://doi.org/10.1136/sextrans-2021-sti.155

Bowles KE, Clark HA, Tai E, et al. (2018) Implementing rapid HIV testing in outreach and community settings: results from an advancing HIV prevention demonstration project conducted in seven U.S. cities. Public Health Rep. 2018;123(suppl 3):78–85. https://doi.org/10.1177/00333549081230S310.

Burton, N. T., Misra, K., Bocour, A., Shah, S., Gutierrez, R., & Udeagu, C.-C. (2018). Inconsistent condom use with known HIV-positive partners among newly diagnosed HIV-positive men who have sex with men interviewed for Partner Services in New York City, 2014. *Sexually Transmitted Infections*, *95*(2), 108–114. https://doi.org/10.1136/sextrans-2017-053479

CDC: "Syphilis – CDC Basic Fact Sheet," "Preliminary data show 2.5 million reported cases of chlamydia, gonorrhea, and syphilis in 2021," "Chlamydia – CDC Basic Fact Sheet," "Gonorrhea – CDC Basic Fact Sheet."

Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance: Preliminary 2021 Data*. Atlanta: US Department of Health and Human Services; 2022. https://www.cdc.gov/std/statistics/2021/default.htm#:~:text=Preliminary%20data%20show%202.5%20million,%2C%20syphilis%2C%20and%20congenital%20syphilis

Cherry, K. (2015). *What is cross sectional study.* Retrieved from http://psychology.about.com/od/cindex/g/cross-sectional.htm

Cushman, T. A., Graves, S. K., & Little, S. J. (2019). Attitudes and preferences regarding the use of rapid self-testing for sexually transmitted infections and HIV in San Diego area men who have sex with men. *Open Forum Infectious Diseases*, *6*(3). https://doi.org/10.1093/ofid/ofz043

David, J. F., Lima, V. D., Zhu, J., & Brauer, F. (2020). A co-interaction model of HIV and syphilis infection among gay, bisexual and other men who have sex with men. *Infectious Disease Modelling*, *5*, 855–870. https://doi.org/10.1016/j.idm.2020.10.008

Delaney, K. P., & DiNenno, E. A. (2021). HIV testing strategies for health departments to end the epidemic in the U.S. *American Journal of Preventive Medicine*, *61*(5). https://doi.org/10.1016/j.amepre.2021.06.002

De Wit, J. B., Adam, P. C., den Daas, C., & Jonas, K. (2022). Sexually transmitted infection prevention behaviors: Health impact, prevalence, correlates, and interventions. *Psychology & Health*, *38*(6), 675–700. https://doi.org/10.1080/08870446.2022.2090560

Feldstein Ewing, S. W., & Bryan, A. D. (2020). Have we missed the boat? the current, preventable surge of sexually transmitted infections (stis) in the United States. *Health Psychology*, *39*(3), 169–171. https://doi.org/10.1037/hea0000834

Fistonich GM, Troutman KM, AJ Visconti AJ.(2021) A pilot of mail-out HIV and sexually transmitted infection testing in Washington, District of Columbia during the COVID-19 pandemic. Am J Prev Med. 2021;61(5S1):S16–S25.

Flowers P, Knussen C, Li J, McDaid L. Has testing been normalized? An analysis of changes in barriers to HIV testing among men who have sex with men between 2000 and 2010 in Scotland, UK. HIV Med 2013; 14:92–8.

Force, U. P. S. T. (2020, August 18). *USPSTF RECOMMENDATION: Behavioral counseling interventions to prevent stis*. JAMA. https://jamanetwork.com/journals/jama/fullarticle/2769474

Frankfort-Nachmias, C., & Nachmias, D. (2008). Research methods in the social sciences (7th ed.). New York: Worth.

Guilamo-Ramos, V., Thimm-Kaiser, M., Benzekri, A., Mead, A., Hook, E. W., & Rietmeijer, C. A. (2021). The National Academies Report on sexually transmitted infections: Implications for clinical training, licensing, and practice guidelines. *Clinical Infectious Diseases*, *73*(9), 1711–1716. https://doi.org/10.1093/cid/ciab609

Hegazi, A. (2019). S07.2 chemsex and STI/HIV diagnoses among gay, bisexual and other men who have sex with men attending sexual health clinics. *Symposia Presentations*. https://doi.org/10.1136/sextrans-2019-sti.41

HIV testing in retail pharmacies. Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/effective-interventions/diagnose/hiv-testing-in-retail-pharmacies?sort=title%3a%3aasc&intervention%20name=hiv%20testing%20in%20retail%20pharmacies. Updated August 2, 2021. Accessed August 20, 2021.

Hoyos J., Koutentakis K., Maté T., Pulido J., Sordo L., Guerras J.M., Belza M.J.(2020) High risk men who have sex with men in Spain are reporting low intentions of actively seeking HIV testing: Results from a cross-sectional study. BMC Public Health. 20:398. doi: 10.1186/s12889-020-8440-3.

Huang, Y., Yu, B., Jia, P., Wang, Z., Yang, S., Tian, C., Lai, W., Yang, S., & Qian, H. Z. (2020). Association between psychological factors and condom use with regular and nonregular male sexual partners among Chinese MSM: A quantitative study based on the health belief model. *BioMed Research International*, *2020*, 1–10. https://doi.org/10.1155/2020/5807162

Kularadhan, V., Gan, J., Chow, E. P., Fairley, C. K., & Ong, J. J. (2022). HIV and STI testing preferences for men who have sex with men in high-income countries: A scoping review. International Journal of Environmental Research and Public Health, 19(5), 3002. https://doi.org/10.3390/ijerph19053002

Kreisel, K. M., Spicknall, I. H., Gargano, J. W., Lewis, F. M. T., Lewis, R. M., Markowitz, L. E., Roberts, H., Johnson, A. S., Song, R., St. Cyr, S. B., Weston, E. J., Torrone, E. A., &

Weinstock, H. S. (2021). Sexually transmitted infections among us women and men: Prevalence and incidence estimates, 2018. *Sexually Transmitted Diseases*, *48*(4), 208–214. https://doi.org/10.1097/olq.0000000000001355

Kroke, A. M., & Ruthig, J. C. (2023). Conspiracy beliefs predicting health behaviors: An integration of the theory of planned behavior and health belief model. *Current Psychology*. https://doi.org/10.1007/s12144-023-04953-y

Kumar, S., Haderxhanaj, L. T., & Spicknall, I. H. (2020). Reviewing prep's effect on STI incidence among men who have sex with men—balancing increased STI screening and potential behavioral sexual risk compensation. *AIDS and Behavior*, *25*(6), 1810–1818. https://doi.org/10.1007/s10461-020-03110-x

Leitinger D., Ryan K.E., Brown G., Pedrana A., Wilkinson A.L., Ryan C., Hellard M., Stoove M.(2018). Acceptability and HIV prevention benefits of a peer-based model of rapid point of care HIV testing for Australian gay, bisexual and other men who have sex with men. AIDS Behav. doi: 10.1007/s10461-017-1888-1.

Li, X., Lei, Y., Wang, H., He, G., & Williams, A. B. (2016). The health belief model: A qualitative study to understand high-risk sexual behavior in Chinese men who have sex with men. *Journal of the Association of Nurses in AIDS Care*, *27*(1), 66–76. https://doi.org/10.1016/j.jana.2015.10.005

Liu, H., Lai, G., Shi, G., & Zhong, X. (2022). The influencing factors of HIV-preventive behavior based on the health belief model among HIV-negative MSMs in Western China: A structural equation modeling analysis. *International Journal of Environmental Research and Public Health*, *19*(16), 10185. https://doi.org/10.3390/ijerph191610185

Llewellyn C., Pollard A., Smith H., Fisher M.(2021)Are home sampling kits for sexually transmitted infections acceptable among men who have sex with men? *J. Health Serv. Res. Policy.* 2009;**14**:35–43. doi: 10.1258/jhsrp.2008.007065.

Mann, L. M., Guillou, A. L., Goodreau, S. M., Marcus, J. L., Sanchez, T., Weiss, K. M., & Jenness, S. M. (2021). *Correlations between Community-Level HIV Preexposure Prophylaxis Coverage and Individual-Level Sexual Behaviors among Us Men Who Have Sex with Men*. https://doi.org/10.1101/2021.07.16.21260658

Meunier, É., Cai, X., Bamonte, A., Callander, D., & Schrimshaw, E. W. (2021). Exchange sex and condom use among gay, bisexual, and other men who have sex with men who use social and sexual networking technologies. *Annals of LGBTQ Public and Population Health*, *2*(2), 166–180. https://doi.org/10.1891/lgbtq-2020-0058

Pant Pai N, Sharma J, Shivkumar S, et al. Supervised and unsupervised self-testing for HIV in high- and low-risk populations: a systematic review. PLoS Med 2013; 10:e1001414.

Parchem, B., & Molock, S. D. (2021). HIV testing preferences, barriers and facilitators to receiving HIV services among young Black Sexual Minority men. *AIDS Care*, *34*(7), 839–846. https://doi.org/10.1080/09540121.2021.1975627

Pleasure, Z. H. (2023, September 1). *HIV & Stis*. Guttmacher Institute. https://www.guttmacher.org/united-states/hiv-stis

Prestage G, Brown G, Keen P .(2012). Barriers to HIV testing among Australian gay men. Sex Health; 9:453–8. 33.

Raffe S., Pollard A., Vera J.H., Soni S., Peralta C., Rodriguez L., Dean G., Llewellyn C.D.(2020). HIV self-tests for men who have sex with men, accessed via a digital vending machine: A

qualitative study of acceptability. *Int. J. STD AIDS.***31**:420–425. doi: 10.1177/0956462419890726

Russo J, Rohan LC, Moncla B, et al. (2010) Safety and anti-HIV activity of over-the-counter lubricant gels. Microbicides: building bridges in HIV prevention; Pittsburgh, PA, USA; May 22–25, 2010. 347.

Sabato, T. (2021). Enhancing HIV prevention services: Exploring Psychosocial Associations of HIV antibody testing frequency among sexually active men who have sex with men. *Medical Research Archives*, *9*(4). https://doi.org/10.18103/mra.v9i4.2356

Samarasekara, K., Fitzpatrick, C., Finnerty, F., & Richardson, D. (2021). P029 pharyngeal chlamydia trachomatis in HIV positive and HIV negative men who have sex with men (MSM). *Poster Presentations*. https://doi.org/10.1136/sextrans-2021-sti.176

Sexually transmitted infections. Sexually Transmitted Infections - Healthy People 2030. (2022, October 25). https://health.gov/healthypeople/objectives-and-data/browse-objectives/sexually-transmitted-infections

Siegler, A. J., Voux, A. de, Phaswana-Mafuya, N., Bekker, L.-G., Sullivan, P. S., Baral, S. D., Winskell, K., Kose, Z., Wirtz, A. L., & Stephenson, R. (2014). Elements of condom-use decision making among South African men who have sex with men. Journal of the International Association of Providers of AIDS Care (JIAPAC), 13(5), 414–423. https://doi.org/10.1177/2325957414535979

Smith AD, Tapsoba P, Peshu N, Sanders EJ, Jaffe HW.(2019). Men who have sex with men and HIV/AIDS in sub-Saharan Africa. Lancet. 2019;374(9687):416-422.

Stewart, J., & Baeten, J. M. (2020). Preventing disease, not sex—harm reduction, HIV pre exposure prophylaxis, and sexually transmitted infections. *JAMA Network Open*, *3*(12). https://doi.org/10.1001/jamanetworkopen.2020.31102

Sullivan PS, Carballo-Dieguez A, Coates T, et al. (2021) Successes and challenges of HIV prevention in men who have sex with men. Lancet. 2021; 380(9839):388-399

Traeger, M. W., Cornelisse, V. J., Asselin, J., Price, B., Roth, N. J., Willcox, J., Tee, B. K., Fairley, C. K., Chang, C. C., Armishaw, J., Vujovic, O., Penn, M., Cundill, P., Forgan-Smith, G., Gall, J., Pickett, C., Lal, L., Mak, A., Spelman, T. D., … Wright, E. J. (2019). Association of HIV preexposure prophylaxis with incidence of sexually transmitted infections among individuals at high risk of HIV infection. *JAMA*, *321*(14), 1380. https://doi.org/10.1001/jama.2019.2947

Vujcich, D., Roberts, M., Selway, T., & Nattabi, B. (2023). The application of systems thinking to the prevention and control of sexually transmissible infections among adolescents and adults: A scoping review. *International Journal of Environmental Research and Public Health*, *20*(9), 5708. https://doi.org/10.3390/ijerph20095708

Weinstock, H. S., Kreisel, K. M., Spicknall, I. H., Chesson, H. W., & Miller, W. C. (2021). STI prevalence, incidence, and costs in the United States: New estimates, New Approach. *Sexually Transmitted Diseases*, *48*(4), 207–207. https://doi.org/10.1097/olq.0000000000001368

Weller SC, David-Beaty K. Condom (2019) effectiveness in reducing heterosexual HIV transmission. Cochrane Database Sys Rev 2019: CD003255.

White, J., Apea, V., & Day, S. (2022). O27 sexually transmitted infection (STI) rates among pre-exposure HIV prophylaxis (PrEP)-using and non-prep-using men who have sex with

men (MSM) accessing a regional online STI Testing Service. *Abstracts*. https://doi.org/10.1136/sextrans-bashh-2022.27