

A Theoretical Model Influencing the Use of Pre-Exposure Prophylaxis in MSM Population: A Qualitative Study from China

Research Article

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Abstract

Background: To understand the attitude of Men who have sex with men (MSM) towards Pre-exposure prophylaxis (PrEP) and the factors influencing the promotion of PrEP in MSM population.

Methods: MSM population recruited by Red Ribbon Public Welfare Organization in Beijing from April 2023 to August 2023 were selected and interviewed. Qualitative research methods were employed in this study. The interview materials were summarized and the theme was extracted.

Results: The study shows that the cognitive level and compliance of PrEP amongst MSM population are relatively low. The level of awareness, willingness to use, other infectious diseases, medication costs, welfare, promotion, service provision, passion, behavioral disinhibition, drug side effects, and medication administration methods are important factors that affect the use of PrEP. These factors then were classified into five categories: cognitive factors, economic factors, social factors, sexual factors, and drug factors, and then summarized into three levels: physiological, psychological, and social. A theoretical model of influencing factors was then constructed.

Conclusion: The implementation of PrEP in China still faces challenges and it is recommended that the role of MSM public welfare organizations be strengthened, the cognitive level and mental health level of MSM population be paid attention to, and the faster dissemination of PrEP implementation plans be promoted.

Keywords: MSM; Qualitative Research; Pre-Exposure Prophylaxis

Introduction

At present, the prevention and control of human immunodeficiency virus (HIV) still faces some challenges. As of the end of 2022, there are still 1.223 million HIV infected individuals living in China (excluding Hong Kong, Macao, and Taiwan), with approximately 107000 newly discovered cases that year, with a gender ratio of 3.6:1 [1]. Faced with the severe situation, the Chinese government has actively responded to the World Health Organization's (WHO) strategy on HIV infection by formulating the Chinese version of the "Four 95s" policy and the goal of "ending AIDS".

In the process of policy implementation, the study found that Men who have sex with men (MSM) is a high risk population of HIV infection, and its infection risk is 25-28 times that of the general population [2,3]. Pre-exposure prophylaxis is a new method that can well inhibit the risk of HIV infection in MSM population [4]. And it has been rec-

ognized by the United Nations Programme as an important part of a joint prevention strategy [5]. Pre-exposure prophylaxis involves anti-retroviral therapy (ART) for people with high-risk sexual behaviors to prevent HIV infection. The corresponding treatment plans, whether long-term or short-term, have been proven to be safe and effective in reducing the transmission of HIV virus [6]. Some studies have shown that the MSM population's decision as to whether to use Pre-exposure prophylaxis prevention is strongly related to their cognitive level of this protection method [7,8]. However, in fact, the popularity and cognitive level of this prevention method is not high. Therefore, we are interested in finding the factors that affect the cognitive level of Pre-exposure prophylaxis, as well as the factors that influence the decision to use Pre-exposure prophylaxis among MSM population.

Few studies have evaluated how MSM people's views on Pre-exposure prophylaxis affect their decision-making. Therefore, identifying the influencing factors and their relationships can provide richer in-



formation and a more comprehensive understanding for public health managers and decision-makers. It is also conducive to providing humanized protection for potential HIV infected individuals and reducing the risk of HIV infection. This study is focused on the MSM population in China. We try to understand their understanding of Pre-exposure prophylaxis and what factors affect these understandings, and then establish a theoretical model on the impact of Pre-exposure prophylaxis decision-making, as well as provide some suggestions that can be promoted in the future.

Subject and Methods

Subject

MSM personnel recruited by Red Ribbon Public Welfare Organization in Beijing from April 2023 to August 2023 are the research subjects. The inclusion criteria are:

- i. Male
- ii. Having a history of same-sex sexual activity
- iii. Self admission of sexual orientation as male
- iv. The HIV antigen test has been negative within the past month

Exclusion criteria:

- a. Lack of complete self-awareness of the subject
- b. Not willing to participate in the interview

The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. This study was reviewed and approved by the Ethics Committee of The Fifth Medical Center of Chi-

nese PLA General Hospital (KY-2023-6-41). All subjects and/or their legal guardians gave informed consent for the release of identifying information in an online open access publication.

Methods

Nvivo 10 software was used to store and manage transcribed text data. Using the Grounded theory method, the data are sorted and analyzed according to the order of first level coding, second level coding and third level coding. The first level coding stage categorizes the data into subcategories, the second level coding stage merges subcategories into the main category, and the third level coding stage analyzes the main category to obtain research results and theoretical framework. Following the principle of information saturation, that is, increasing the sample size until no new information appears, we ultimately included MSM10 subjects. Data were collected through semi-structured interviews. The interview generally lasted 30 minutes and was conducted in a quiet and undisturbed consulting room. The interviewer is a professionally trained psychotherapist. Before the interview began, the psychotherapist would inform the subject that the entire interview process would be recorded. If the subject disagreed, a record would be taken and the information would be retained. Throughout the interview process, the psychotherapist maintained a neutral attitude, raised outline questions, and guided the visitor to narrate their viewpoints and experiences as much as possible. Audio or paper materials were converted into electronic text materials within 48 hours after the interview ends. The sorting process was carried out by one researcher and checked by another researcher to ensure the objectivity and authenticity of the data.

On the basis of literature review, the interview outline was collated and confirmed after obtaining the opinions of three experts in the field of AIDS studies. The interview content was anonymous, with names replaced by numbers. See Table 1.

Table 1: Interview outline on the cognitive level and influencing factors of PrEP use decision-making among MSM population.

Basic Information	Age
	Occupation
	Income
	Educational background
	Sexual roles
	Number of sexual partners
	Sexual frequency
Factors Influencing PrEP Cognitive Level and Usage Decisions	How did you learn about PrEP related information?
	Are you willing to use PrEP?
	What do you think is hindering the use of PrEP?
Popularization of PrEP	How do you think PrEP should be better popularized?
	How do you think we can better provide these services?

Results

General Information

A total of 10 subjects were included in this study, as shown in Table 2.

First level results

Through conversation and data organization, 11 subcategories were formed. See Figure 1.

Awareness level: Understanding what PrEP is is very important. In the interview materials, A1 and A9 believe that PrEP is post exposure prevention, A5 has heard of it from friends, A7 has some understanding, and others have stated that they have not heard of it. A8 learned

about it from volunteers. A1: "I know, every time they go, they talk a lot, and I can't remember clearly. Just remember some key points. He said taking medication within three days is effective. A5: "I've heard about it from a friend, but I'm not sure about the specifics. A7: "Learn more about some product promotions on the official account, Xiaolan, or some details pages, or Personal media, such as Tiktok." A8: "There are some so-called volunteers who will be mentioned in some occasions. A9: "I seem to understand a little bit, which means that if the condom ruptures, it seems like you're taking medication, right.

Intention to Use: When asking the visitor if they would use PrEP, A1 believed that they would use it at a cheaper price, A2 said they would, and everyone else said they would not choose PrEP. A1: "Yes, but money is a problem. A2: "Be willing, after all, life is more important.



Table 2: General information.

Number	Occupation	Income (RMB)	Education	Number of Sexual Partners	Sexual Frequency (least)
A1	Restaurant Attendant	3500	Technical Secondary School	5	Once a week
A2	Hardware testing	8000-10000	Junior college	several	fortnightly
A3	university student	N	University degree	2	Once every one month
A4	Supermarket staff	4000	Junior high school	several	Once a week
A5	Traditional Chinese Medicine Massage Master	5000-6000	High school	several	Uncertain time
A6	Technician	9000	Junior college	several	Twice a week
A7	Security	5500	Junior college	several	Once a week
A8	Architectural Engineer	8000	University degree	several	Once a week
A9	E-commerce personnel	20000	Master's degree	several	Once a week
A10	Purchase	5000	Junior high school	several	Once a week

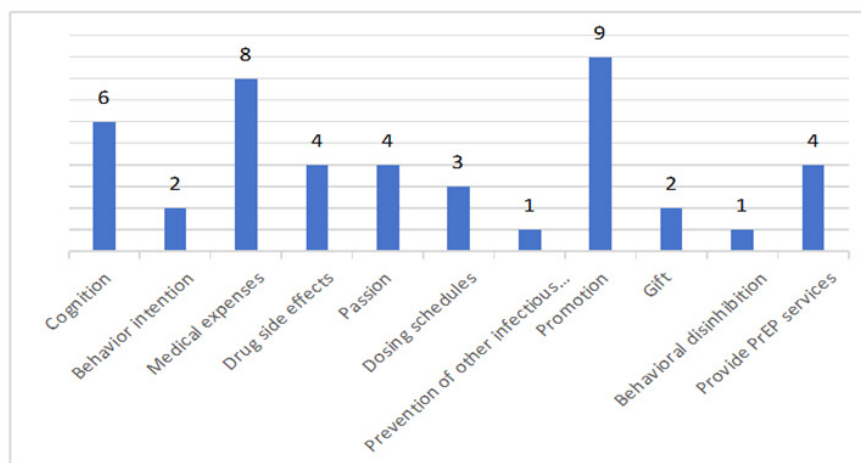


Figure 1.

Medical expenses: In the interview, most visitors expressed that the cost of medication is a very important factor. A1: "If it needs to be within 200 at a time, it can still be accepted. A3: "Look, if it takes more money to do it once than buying a box of condoms and oil, why should I buy medicine. A4: "From 60 to 70, because a set and oil are only so much money. A5: "If it's free, you can still consider it. A6: "50-100 yuan per session is about the same. A7: "It feels more expensive than a set, but it's still a cost-effective set"; I can accept it for less than 250 yuan once. A8: "30 times, please" A9: "A total of 20 yuan for these three medications is acceptable.

Drug side effects: Regarding the side effects of the drug, A4, A5, A7, A8 believe that the side effects will affect their use of PrEP. A4: "I will be worried about the negative impact, my liver is not good. A5: "That medicine will definitely harm the body. A7: "It seems that it is said that medicine is three parts toxic, and there will always be some small negative effects on the body, so if you can avoid it, you can avoid it. If you can avoid it, you can avoid it. A8: "Perhaps it's because I don't

know much about this thing, but I think it's better to eat less medicine.

Passion: Visitors believe that taking medication is more difficult during periods of passion. A1: "It seems like it's okay in theory, but it seems that it's difficult to operate in practice, unless you keep that medicine on hand. A5: "If it's a courier delivery, the waiting time is too long, even those in a hurry can't wait. A6: "Many times, when two people are together, they can still wear a condom or take a medicine like you said. But when people play a lot, they don't even care. A7: "If two people are fixed companions, they may not consider it.

Medication method: The medication regimen of PrEP is also one of the factors hindering its use. A2: "This thing is actually difficult to say, because everyone is different, and there are also some who may forget to eat when they are busy with work, which is also possible. A3: "Maybe I could still know at that time, but in a day or two, I probably forgot about it. A8: "It's difficult to be on time.



Other infectious diseases: Compared with wearing condoms, PrEP cannot prevent the spread of other Sexually transmitted infection, although it has benefited from pleasure. A9: "Compared with wearing condoms, condoms can actually prevent a variety of sexually transmitted diseases, including AIDS. But although you can say that you can not wear condoms, this drug only blocks the spread of AIDS, but it will not affect other diseases."

Promotion: When discussing how to promote PrEP among the MSM population, most of them expressed the importance of promotion. A1: "You can promote more. A2: "If it's a suggestion from my partner, I will still listen. A3: "Let's publicize the small videos like Tiktok and Kwai". A4: "Promote it, or transfer specific videos to your phone for you to watch. A5: "Short videos, Tiktok, brochures and leaflets, I will also read them". A6: "More publicity, such as BlueD and Tiktok". A7: "I think through some publicity, such as Tiktok, Little Red Book and WeChat group". A8: "Generally, do some promotion on software or websites, and then volunteer for offline activities. A9: "On such software as Tiktok and Xiaolan, which are widely used by people in the circle". A10: "It can be done on social networking software."

Benefits: A visitor expressed that adding some gifts and benefits while promoting may help promote PrEP. A2: "If you can recharge some APP members, phone bills, and so on, it should attract many people. A4: "Gifts of toys, canvas bags, etc., but even if condoms are not included, it really doesn't have much appeal."

Behavioral disinhibition: The visitor also expressed their views on the phenomenon of behavioral disinhibition. A2: "If it's not good, people may be more reckless in coming into contact with high-risk

individuals, right? But I think this medicine can reduce consumption, so it cannot be completely free. If you say you're free, then most people are at high risk."

Providing Services: Visitors believe that it is acceptable to collect them from WeChat groups, Taobao, pharmacies, express delivery, Vending machine and inspection points. But there are different opinions on receiving it at the hospital. A1: "WeChat, Taobao, and pharmacies are all fine, but the hospital is not too embarrassed. A4: "Express delivery and Vending machine are acceptable, but hospital sales are not acceptable". A6: "Just pick it up at the hospital and testing point. A8: "Hospitals are quite troublesome."

Secondary Encoding

Through 11 subcategories of first level coding, further induction and summary were conducted to obtain 5 main subcategories of second level coding. They are: cognitive factors (level of knowledge, willingness to use, other infectious diseases), economic factors (drug costs, benefits), social factors (promotion, service provision), sexual factors (passion, behavioral disinhibition), and drug factors (drug side effects, medication methods). See Figure 2.

Third level Coding

Based on 5 main categories of secondary encoding, 3 research results on tertiary encoding were summarized. That is, at the physiological level (sexual factors, medication factors), at the psychological level (cognitive factors), and at the social level (economic and social factors). See Figure 3.



Figure 2.

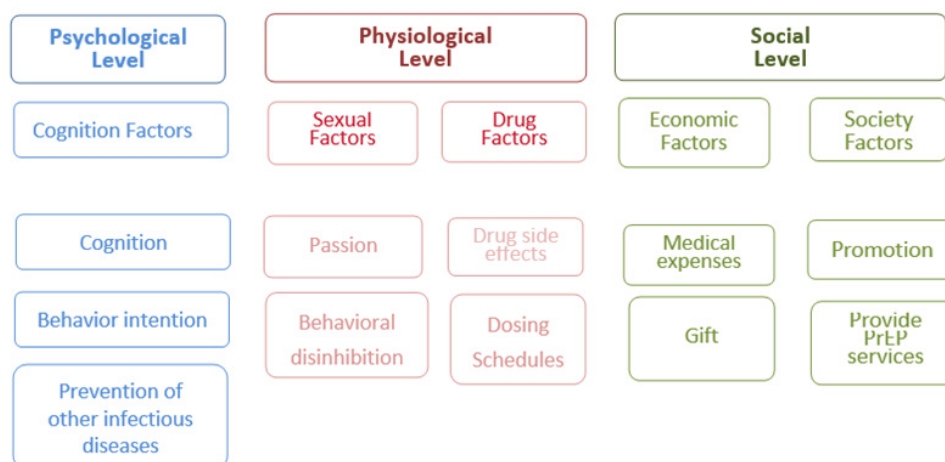


Figure 3.



Theoretical Model

For the MSM population, the factors influencing the use of PrEP are composed of three parts: physiological, psychological, and social. Each

part can individually affect the use of PrEP, and there is also a mutual influence relationship between the three parts. See Figure 4 and Figure 5.

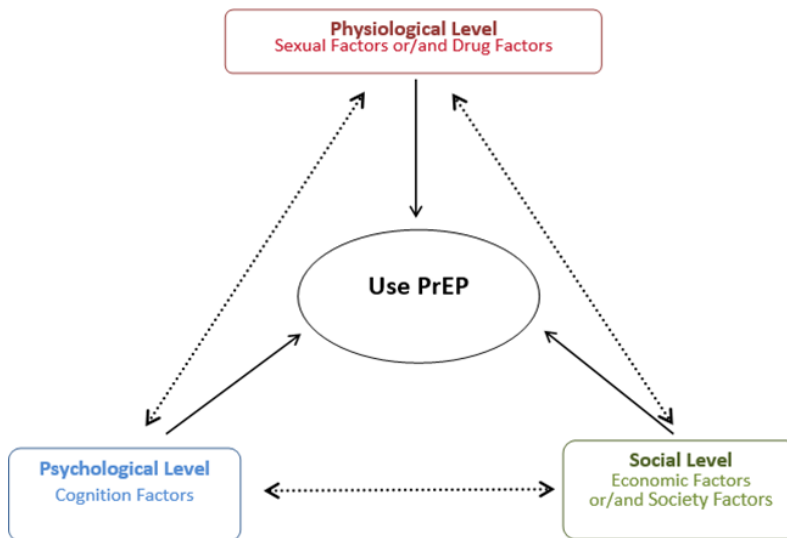


Figure 4.



Figure 5.

Discussion

In this study, we found that the popularization and application of PrEP in China still face many challenges. Through theoretical models, it was found that among physiological factors, drug factors are one of the reasons that affect the use of PrEP. According to research results, the administration method and strategy of PrEP are important factors affecting the willingness and compliance to use PrEP, with 75% of people hoping to use long-term injection for PrEP [9]. For the current administration plan of PrEP in China, there are two convention-

al methods: daily medication plan and on-demand medication plan [10]. And the compliance rate for daily medication is 83%, higher than 55% for on-demand medication [11]. This indicates that choosing a daily medication regimen is more effective in maintaining PrEP compliance. In future drug delivery strategies, more attention needs to be paid to the method of long-term injection.

From a social perspective, economic factors are very important. Research has found that drug costs are a key factor affecting PrEP usage intention and compliance. Most of the visitors expressed the view that



the cost should not be too high when discussing the topic of drug costs. Taking Shufatai (TDF/FTC) as an example, if purchased from a commercial pharmacy and used a daily medication regimen, the monthly consumption would be nearly 2000 RMB [12]. There is a significant gap compared to the results of this study. Therefore, the cost of drugs may be one of the core issues in the use of PrEP [13]. Faced with such difficulties, one can try to introduce commercial insurance to address the issue of high consumption costs [14].

In terms of providing pharmaceutical services, based on the current situation in China, relying on testing points for pharmaceutical services can increase the willingness of MSM groups to use PrEP [15]. During the interview, some visitors expressed resistance to hospital medication, which may be the result of stigmatization, and the testing points of public welfare organizations and communities can make MSM groups more receptive [16].

From a psychological perspective, the results indicate that most people do not understand the relevant knowledge of PrEP, which is consistent with previous research results [17]. The reasons for this phenomenon are very complex. According to a US study, the speed of public health information dissemination is slower among minority groups compared to the general population [18]. Therefore, to accelerate the speed of information dissemination, it is necessary to make publicity more diverse, add more communication channels, and increase investment. In addition, in terms of the output of advertising content, improving the fun of the content and clarifying drug side effects is one of the important means to improve the quality of communication [19]. MSM population and HIV/AIDS infected people in China face greater Psychological stress [20]. This promotes closer relationships between peers, and the MSM population has a greater sense of identification with suggestions from individuals with similar sexual preferences. The research results are the same as those of predecessors. The relationship between Sexual partner and peer trust can improve the willingness to use and compliance of PrEP [21,22]. Therefore, it is possible to strengthen partner education, exert peer supervision, and achieve the effect of increasing PrEP compliance.

In summary, the implementation of PrEP in China still faces some difficulties. As a connecting part between doctors and patients, public welfare organizations play a crucial role. As a frontier outpost for testing, public welfare organizations can undertake various tasks such as data collection, information monitoring, and health testing at three levels in theoretical models. And based on the collected information, establish a data information network of "psychological social physiological"/"individual community hospital". Through the integration of resources, the "trinity" effect is achieved, enabling relevant departments to collect or push data information more quickly, comprehensively, and accurately, providing assistance for promoting PrEP [23,24].

Limitations

Our research findings should take into account several limited explanations. Firstly, the MSM personnel in this article are from the Beijing region and cannot represent the entire MSM community in China. Secondly, as the capital of China, Beijing has significant differences in terms of economy, culture, and social welfare compared to other regions. And these differences, such as economic and social environments, may result in subtle differences in research results.

Statements and Declarations

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Funding Statement

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Ethics Approval

The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. This study was reviewed and approved by the Ethics Committee of The Fifth Medical Center of Chinese PLA General Hospital (KY-2023-6-41).

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare no competing interests.

Consent for Publication

Not applicable.

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