

# Why do men who have sex with men fail to use condoms consistently during sex? A systematic review and Meta-synthesis

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## Research Article

**Keywords:** Men who have sex with men, human immunodeficiency virus, condom use, barrier, qualitative study, meta-synthesis

**Posted Date:** May 17th, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1607935/v1>

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# Abstract

**Background** Despite a large amount of behavioral interventions to reduce human immunodeficiency virus-related high-risk sexual behaviors, consistent condom use remains suboptimal among men who have sex with men (MSM). However, current databases are lack of synthesized evidence to explain why MSM always fail to use condoms consistently during sex.

**Objective** Our study aims to conduct a systematic review and meta-synthesis of 39 eligible qualitative studies to explore the barriers to condom use among MSM.

**Methods.** A systematic review and meta-synthesis of qualitative studies. On March 4, 2021, a comprehensive search was conducted in 14 electronic databases. The study was conducted based on the Joanna Briggs Institute's recommendations.

**Results.** Thematic analysis produced six synthesized themes, which were classified into three levels according to the Social-ecology Model. Individual level barriers to condom use include physical discomfort, lack of HIV/STI-related knowledge and substance use; interpersonal-level barrier was mainly the condom stigma, namely regarding using condom as symbols of distrust or HIV/ STIs prevention, or as violating traditional cognition of sex, or as an embarrassing topic; environmental/ structural-level barriers included situational unavailability, unaffordability of condoms and power imbalance in the sexual relationship. **Conclusion** This meta-synthesis offered in-depth understanding of condom use barriers for MSM and could guide the development of multifactorial interventions according to the identified barriers, especially targeting to reduce condom stigma, which has not been focused and intervened previously.

## Introduction

Despite the global efforts for preventing HIV and treating people living with HIV/AIDS (PLWH), the HIV/AIDS epidemic continues to grow. The new HIV cases increased by 1.7 million in 2019 [1]. By the end of 2019, 32.7 million people have died of AIDS and around 38.0 million people were living with HIV (UNAIDS, 2020a).

The growth of the epidemic has been particularly alarming among men who have sex with men (MSM) [3]. The global proportion of newly reported HIV cases among MSM increased from 2% in 2007 to 6.4% in 2011 (UNAIDS, 2015) and further to 17% in 2018 (UNAIDS, 2018). The incidence of other sexually transmitted infections (STIs) such as syphilis and gonorrhea has also increased among MSM owing to condomless sex and other high-risk behaviors [6]. The incidence of syphilis and gonorrhea increased from 6.6% [7] to 12.9% in China [8] and from 21.5% to 38.1% between 2011 and 2015 in United States [9].

It is well established that consistent and correct condom use was a highly effective preventive measure against HIV and STI transmission (Dong et al., 2019; R. & T., 1997; UNFPA et al., 2015; WHO, 2020). However, despite a variety of behavioral intervention campaigns aimed to reduce unprotected sexual intercourse in MSM, consistent condom use in this population remains suboptimal. Statistics from the Joint United Nations Programme on HIV/AIDS (UNAIDS) and meta-analyses showed that the rates of consistent condom use were 28% among HIV-infected and 29% among uninfected MSM in the United States [14], 61% among Canadian MSM (UNAIDS, 2020b), 64% among Australian MSM (UNAIDS, 2020b), 63% among Italian MSM (UNAIDS, 2020b), 39% among Egyptian MSM (UNAIDS, 2020b), and 47% among Chinese MSM [16]. Several systematic reviews summarized the

effectiveness of the interventions on improving condom use, including motivational interviewing [17], mass media education [18], peer education [19], psychosocial support and counseling services [20–24], and condom social marketing [25], and all these interventions showed short-term effects on reducing condomless sex, but no long-term effects [26–28]. Lack of persistently effective interventions might hinder the realization of the goal to end HIV epidemic by 2030 as set by UNAIDS [29–31].

To develop effective interventions for increasing condom use among MSM, it is crucial to understand the barriers to condom use in a systematic perspective. Although both quantitative and qualitative studies have been conducted on this topic in different sociocultural settings [32–34], comprehensive systematic reviews for synthesizing factors associated with condom use were still rare in MSM populations. For example, in MSM populations, we retrieved only one systematic review summarizing the structural barrier of price for condom use [35], and one meta-analysis showing that older age was associated a higher odd of condom use [36].

This study aims to aggregate, interpret, and synthesize the findings from a systematic review of the qualitative research literature about barriers to condom use among MSM. It is designed to address the question: Why do men who have sex with men always fail to use condoms consistently during sex?

## **Material And Methods**

### **Conceptual framework**

The Social-Ecological Model: A Framework for Prevention (SEM) was chosen as the framework for conducting this systematic review. SEM was a useful framework to organize a comprehensive model of the factors influencing health related behaviors among key populations in order to thoughtfully inform effective interventions [37]. As studies have suggested that the barriers to condom use could be individual [38], interpersonal [39] or environmental factors [40], the model for guiding the meta-synthesis should combine these factors. The SEM is a proper model for the factors at individual/intrapersonal (e.g. psychology, knowledge, attitudes, behavior), interpersonal/network (social networks, social support) and environmental/ structural (e.g. community, public policy, relationships among organizations/ institutions, culture) levels that influence condom use among MSM [41].

### **Study design**

A systematic review was conducted to synthesize qualitative findings on the barriers to condom use among MSM. We focused on qualitative studies as the primary data source because individual perceptions are valuable resources for reasons not to use condom, and qualitative data could offer new perspectives through which to understand respondents' perceptions on condom use using their own voices [42, 43].

The meta-synthesis was conducted according to the Joanna Briggs Institute (JBI) guidance for systematic reviews [44]. JBI is one of the world-famous evidence-based practice institutions. The Evidence-Based Practice (EBP) model they pioneered has been regarded as a benchmark indicator by the field of medical care. We used the JBI Qualitative Assessment and Review Instrument to synthesize evidence from individual qualitative studies to create a new understanding of and comprehensively represent the essence of the phenomenon [45]. The approach involved searching for articles meeting the inclusion criteria, assessing methodological quality, and

synthesizing findings based on data extraction. The review protocol was registered in PROSPERO (CRD42020180894).

## **Search strategy**

We systematically searched PubMed, Web of Science, CINAHL, EMBASE, PsycINFO, Scopus, ProQuest, HMSS database, Elsevier/ Science Direct, Cochrane, CNKI, Wanfang, VIP, and CBM for studies published in English and Chinese as of March 4, 2021. We used the search terms (“MSM”, “men who have sex with men”, “homosexual”, “gay”, “bisexual”, “same-sex”, OR “queer”) AND (“condom”, OR “condom use”) AND (“barrier”, “bias”, “obstacle”, OR “factor”) AND (“qualitative study”, “qualitative research”, “qualitative methods”, “interview”, “mix-methods study”, OR “mix-methods research”). Grey literature was also sought. Additional studies were hand searched by screening the references of included studies. The detailed literature search strategy used can be found in Table 1.

We made a deviation from the registered protocol. We updated one time of the literature search on 4 March 2021. And the number of included studies increased from 37 to 39.

## **Eligibility criteria**

Based on PIC(o)S terms, studies were included if all following criteria applied: (1) the target population (P) was MSM, that is, gay or bisexual men or transgender women, with no age limit; (2) phenomenon of interest (I) was the barriers to condom use; (3) the study context (Co) was communities, associations, services, or public domains; and (4) the study design (S) employed a qualitative design or presented qualitative findings from a mixed method study.

Studies were excluded if they: (1) were statistical reviews, books or book chapters, letters, dissertations, editorials, or study protocols; (2) did not focus on condom use; or (3) only discussed the facilitators of condom use or effectiveness of interventions for improving condom use among MSM.

## **Study selection**

All included records were imported to Endnote X9 [YS, LM] and duplicates were identified [YS]. Two co-authors [YS, CZ] independently screened the titles and abstracts. Any disagreements were discussed by two reviewers or a third independent reviewer [XHL]. Full texts of the included abstracts were then read by two authors [YS, CZ]. Again, any disagreements were resolved through discussion.

## **Quality assessment**

JBI Critical Appraisal Skills Programme qualitative checklist [44] for qualitative studies was used to evaluate the quality of the included studies. The evaluation tool consists of 10 questions (Table 2). Each item of the tool was rated yes (Y), no (N), unclear (U), or not applicable (NA). Two reviewers [YS, CZ] independently assessed each study while the third reviewer [XHL] resolved any discrepancies. Consistent with prior reviews [46, 47], we set a priori inclusion criteria of at least six of the ten methodological quality indicators (Table 2).

## **Data extraction**

Data were independently extracted from included studies by two reviewers [YS, CZ] and the results were compared and modified if needed. These data included: author, country, design, data collection, sample size and

samples (Table 3). Data on the barriers to condom use were also extracted and are presented in Supplementary Material (S1).

## Data synthesis

The thematic synthesis approach outlined by Thomas and Harden [48] was broadly followed to identify, interpret, and explain the findings of the original studies [49]. This approach consists of three steps: coding the original descriptions line by line, developing descriptive themes, and generating analytical themes [48]. In our review, the steps were as follows:

First, to determine the barriers to condom use among MSM, findings from each original qualitative study were extracted and coded using the JBI-Qualitative Assessment and Review Instrument [45]. Original findings from the included studies were repeatedly re-examined, compared, and discussed by the study team to obtain final codes. Second, based on a thorough understanding of these codes, similar codes were combined to generate new categories called “descriptive themes” [48]. Third, descriptive themes were further categorized based on similarity or differences in meanings and subjected to meta-synthesis to produce aggregated findings called “analytical themes” [44]. All “analytical themes” were supported by the raw data quotes [50]. Each step was independently completed and cross-checked by two reviewers [YS, CZ]. Any disagreements were discussed and solved by the team.

## Results

### Study selection and characteristics

The electronic literature search identified 5,072 records. After the removal of 1,291 duplicates, 3,781 records remained. Subsequently, 3,676 records were removed after reviewing titles and abstracts, as they did not contain data on barriers to condom use among MSM. We further screened all 105 full-text articles and identified 39 articles for inclusion in the synthesis (Figure 1).

The included studies (N = 39) were conducted between 1994 and 2021. Most studies (82%) were conducted in upper-middle and high-income countries. Thirty-five studies (90%) employed a qualitative design while four (10%) used a mixed method approach. Data were typically collected using in-depth semi-structured interviews (82%), and 10% of the studies used focus group discussion. Sample size varied from 12 to 960. Detailed characteristics of the studies are described in Table 3.

### Quality of the studies

All 39 studies met the cutoff of the quality assessment, which was mentioned in the Methods section and were thus included in the review (Table 2).

### Data synthesis

A total of 423 original findings relevant to condom use barriers were extracted (S1). Thematic analysis of the original findings produced six synthesized themes, which were classified into three levels according to the Social-ecology Model. Physical discomfort, lack of HIV/STI-related knowledge, substance use and psychological factors were the individual-level barriers; condom stigma, including regarding using condom as symbols of distrust, HIV/

STIs prevention, violating traditional cognition of sex, and embarrassing topic were interpersonal-level barriers; socioeconomic and situational factors, including situational unavailability, unaffordability of condoms, and power imbalance in the relationship were environmental/ structural-level barriers. (Figure 2).

## **Domain 1: Individual-level barriers**

### **Physical discomfort**

Thirty-two studies indicated that physical discomfort diminished consistent condom use (Table 4). Specifically, physical pain was a very common reason for not using condoms.

“Condoms are not bad, but the problem is when used for more than a minute, they tend to get dry; it starts hurting and can even cause bruises. It is good to use a condom for a few minutes and then get a new one.” (Musinguzi et al., 2015, P. 5) [32]

Reducing sexual pleasure was another common complain reported in 29 studies (S 1). MSM complained that condoms reduced physical sensation and diminished sexual pleasure. In order to avoid reducing sexual pleasure, delaying ejaculation, and diminishing their capabilities or sensitivity, MSM preferred not to use condoms during intercourse.

“My opinion is that men do not like to use condoms because they take away the pleasure of the actual flesh.” (Harawa et al., 2006, P. 5) [38]

### **Lack of HIV/STI-related knowledge**

The findings from 25 studies (Table 4) suggested that some MSM were unclear about the necessity of condom use to prevent HIV and other STIs. Some MSM knew very little about the exact prevalence of HIV among MSM and believed it could not happen to them. Owing to a gap in sexual education and incorrect knowledge of HIV/STIs and condoms, nearly one-third of MSM were suspicious about condoms. Nine studies illustrated that as a result of inaccurate knowledge, MSM had developed their own ways to prevent HIV infection.

“So, I asked him why he agreed not to use a condom, and he told me that he just went to the toilet and took the sperms out afterwards. Actually, I also used to think that sex between men is safer since you can remove the sperms afterwards. I used to believe that until a friend told me that this is not the case.” (Moen et al., 2013, P. 11) [51]

### **Substance use**

Nineteen studies reported substance use as a barrier to condom use (Table 4). Intoxication and the effect of drugs including rush poppers, methamphetamine and heroin made respondents lose their self-control and decision-making capacity with regard to condom use.

“I think that...the reason most men don't use condoms is that they are either intoxicated or on some type of drug. Caught up in the heat of the moment, they lose self-control and don't stop to think (whether they should use condoms or not).” (Harawa et al., 2006, P. 6) [38]

### **Psychological factors**

Sixteen studies showed that psychological factors, including “fluke thinking”, negative emotions, and a vengeful perspective, contributed to condom-less sex (Table 4).

Eight studies demonstrated that “fluke thinking” was a significant factor negatively affecting condom use (Table 4). The fluke thinking tent to ignore the essence of things, act according to their needs and preferences, and believe that everything would go well as they wish [52]. Although some MSM were aware of the risk of HIV/STIs, they believed that it could not happen to them.

“Although I have heard about the seriousness of HIV, I never thought I would be unlucky enough to be infected. Although I was worried, there was still a fluke mind for myself. I thought I could get away with it.” (Zou, 2008, P. 38) [53]

In seven studies, participants stated that their negative emotions were an important factor in risk-taking behavior. Bad moods, negative emotions, and daily pressure were regarded as barriers to safe sex, mainly owing to low self-esteem because of their sexual minority identities (Table 4).

“When my self-esteem is down...or if I’m depressed and just sort of, you know, feeling downtrodden by the world... it’s just, I...get into that ‘I don’t care’ mode (even without condoms).” (Adam et al., 2010, P. 5) [54]

Although not common, three studies demonstrated that MSM decided not to use condoms from a vengeful perspective, because they had been unexpectedly infected with HIV (Table 4).

“A person could feel, ‘Someone didn’t tell me they had a disease, so I caught it from them. So now, I’m going to give it to everybody I can.’ You know?” (Harawa et al., 2010, P. 13) [55]

## **Domain 2: Interpersonal-level barriers**

Nearly all included studies (n = 35, Table 4) implied that condom stigma had a negative influence on condom use among MSM. Condom stigma refers to any taboos or misbeliefs about condom use or feeling ashamed or embarrassed to talk about using condoms. This was demonstrated through four sub-themes.

### **A symbol of distrust**

Thirty studies indicated that concerns regarding trust and loyalty were the primary reason for non-use of condoms (Table 4). Unprotected anal intercourse was usually interpreted as a primary sign of trust and intimacy. Proposing condom use during intercourse aroused suspicions about disloyalty.

“It is based on respect, affirmation, and trust for your partner. Let’s suppose you want to be his boyfriend, and if you used a condom or required him to use one, it sends the message that you do not trust him. It is like an insult.” (Li et al., 2016, P. 7) [39]

Especially, having a regular sexual partner or being in a monogamous relationship were reasons not to use condoms. Participants viewed sexual monogamy as a buffer against the risk of HIV/STI acquisition within the relationship, and condom use was seen as an indicator of an inferior relationship.

“Why didn’t I wear a condom? Because I was either in a committed relationship with that person or had known that person long enough not to question him when he told me about his sexual past.” (Mustanski et al., 2014, P.

6) [56]

### **A symbol of HIV/STIs prevention**

Twenty-nine studies indicated that MSM usually felt that condoms are solely for HIV/STIs prevention (Table 4). In other words, once MSM believed their partners were “safe” (without HIV infection), they no longer used condoms. On the contrary, initiating condom use automatically brought thoughts of HIV-related risk to the fore. Therefore, condoms served as a reminder of the possibility of HIV/STIs.

“It’s expected, routine, not to use a condom, because if we did, it would imply that one of us was infected or had sex outside the relationship.” (Boulton et al., 2010, P. 7-8) [57]

Nine studies further showed that MSM might use some techniques to assess their partners’ health to avoid the embarrassment of talking about HIV or using condoms. These techniques included observing their partner’s physical conditions (such as physical appearance), assessing their partner’s living situation, and checking their partner’s sexual history. They could also adopt the strategy of “sero-positioning” or “serosorting” (according to the HIV serostatus and/or sex role) [58] to decide whether to use condoms.

“I went to his home. It was a big apartment. We didn’t use condoms because I felt that he would not be an unsanitary person, and his body condition was healthy.” (Li et al., 2010, P. 5) [59]

Treatment optimism contributed to HIV-related high-risk behaviors as well. Given the availability of highly effective antiretroviral treatment, HIV has come to be regarded as a treatable chronic disease. Some MSM no longer had a fear of HIV and therefore might expose themselves to the risk of infection in condomless sex.

“Most people are aware of the risk factors for HIV, including not using condoms. I know people who think that HIV medication will fix things. There are a lot of gay men who think that HIV is curable, and because of that [they] take risks and don’t use condoms.” (Neville et al., 2016, P. 14) [60]

### **A symbol of violating the traditional cognition of sexual intercourse**

Twelve studies reported that MSM usually hold the traditional cognition of sexual intercourse and believe that using condoms is a violation of its true purpose (Table 4). In some settings, they believed that sexual intercourse is a symbol of “true love” and must involve direct genital contact; this is known as “*rouyu*” (*desire of the flesh*) or “bare sex.” There is a belief that during intercourse, partners should exchange body fluids. Based on this traditional cognition, condom use was deemed as violating the true meaning of human intercourse.

“At its root, love is direct flesh-to-flesh contact; that’s so-called ‘*rouyu*.’ Two lovers should blend in with each other.” (Li et al., 2010, P. 3) [59]

### **A symbol of an embarrassing topic**

Fourteen studies showed that MSM felt embarrassed to suggest using a condom or even to initiate the discussion regarding condom use (Table 4). In some situations, although they tried to initiate a condom-related discussion, miscommunication led to awkwardness. Furthermore, buying condoms was a huge challenge, especially for young MSM. They felt ashamed to go to the store to buy condoms and did not feel smart enough as they could not determine the kind of condoms to get. They complained that cashiers gave them dirty looks

because of their young appearance. Some unmarried men said they felt embarrassed to carry condoms and feared discovery by their parents or others.

“For example, I would be extremely embarrassed to ask for them (condoms), and wouldn’t even know where to get them (I think they’re sold in vending machines and pharmacies). Also, some [people] don’t know how to use them properly and would feel awkward to use them.” (Mustanski et al., 2014, P. 6) [56]

### **Domain 3: Environmental/ structural-level barriers**

Thirty-one studies revealed that socioeconomic and situational factors were an insurmountable obstacle to consistent condom use (Table 4). Socioeconomic and situational factors were spread across three sub-themes: situational unavailability of condoms, unaffordability of condoms, and power imbalance in the relationship.

#### **Situational unavailability of condoms**

Evidence of situational unavailability was identified in 25 studies (Table 4). In five studies, participants experienced unplanned sex with no condom at hand. Furthermore, the “heat of the moment,” “not enough condoms,” and “unavailability of appropriately sized condoms” also contributed to the low rate of consistent condom use.

“I don’t carry condoms with me but if the other person has them, I don’t resist using them. But I know that others also don’t carry condoms with them so then most of the time we have sex without condoms.” (Chakrapani et al., 2013, P. 7) [61]

#### **Unaffordability of condoms**

Fifteen studies reported that despite being aware of the benefits, some MSM, particularly those who were homeless, could not afford condoms, whether of the regular type or of particularly good quality (Table 4). In some studies, MSM could get free condoms, but most of them complained that these were of poor quality, and some even experienced condom breakage or slippage and other quality deficits.

“I never used condoms because I didn’t have money to buy them or lacked both money and place to acquire them.” (Musinguzi et al., 2015, P. 5 [32]) [32]

#### **Power imbalance in the relationship**

In eight studies, there were imbalances in participants’ relationship power dynamics and sexual decision-making (Table 4). Some explained that they lacked the ability to put their point across, while others experienced sexual abuse and were forced to have unprotected intercourse. Moreover, male sexual workers who served male clients would engage in unprotected sex to earn more money.

“I don’t want it (not to use condoms), but if he gives more money, I think it’s OK.” (Kong, 2008, P. 3) [40]

## **Discussion**

This review and meta-synthesis had qualitatively presented the comprehensive barriers to condom use among MSM in global community settings. Based on the analyses of qualitative data extracted from included studies,

our results provide insight into the barriers that influenced MSM's use of condoms at individual, interpersonal, and environmental/ structural levels. Multidimensional understanding of the condom using barriers could provide strategies for researchers, health providers and policy makers to reduce high-risk sexual behaviors among MSM and contribute to achieving the 2030 target of ending HIV epidemic.

Individual-level barriers were commonly reported in literature. In these synthesized results, the most common complain on why taking condomless sexual behaviors was that the usage of condom during sex made them felt pain, uncomfortable and reduced sexual pleasure. However, the description of physical discomfort and sexual pleasure is subjective and cannot be objectively measured by tools, thus some scholars believed it might be susceptible to psychological influence [62]. Pachankis et al. [63] revealed that psychological stress, especially sexual minority stress, had a direct and considerable impact on their HIV-related risk behaviors among MSM. Some MSM viewed enjoyment of sexual pleasure as a way of escaping from sexual minority stress [64–67]. Zou [53] also noted that MSM might prioritize sexual pleasure over sexual safety. Therefore, addressing psychological stress through other measures could potentially reduce the chance of relying on enjoying sexual pleasure to achieve temperately joy among MSM.

Not surprisingly, lack of HIV/STI-related knowledge was identified as an individual-level barrier to condom use, especially in resource-limited countries and areas with high stigma towards HIV and homosexuality [68]. However, the gap between knowledge and practice still exists, and better knowledge does not always lead to safer sexual practices [69]. Literature indicated that the reasons might be rooted in culture, values, individual feelings, and other social-economic-psychological factors [69–72]. Some studies [39] also showed that sub-cultural factors had a huge impact on misbelieves about HIV transmission, which greatly affected safe sex in MSM. Therefore, intervention programs for improving the HIV related knowledge should fill the knowledge-behavior gap by taking into account of the social-economic and subcultural characteristics.

In addition, condom stigma was synthesized as a prominent barrier to condom use in interpersonal level. "Stigma" is originally a Greek term referring to "bodily signs designed to expose something unusual and bad about the moral status of the signifier" [73], like a tattoo or a mark on a slave. Goffman further defined stigma as "a characteristic or an attribute that is deeply discrediting" [73]. As per the evidence synthesized in this review, condom stigma was a perceived negative attitude and characteristic about condom use by MSM. Several studies have demonstrated that attitude toward condoms was an important variable in predicting condom use behaviors [74]. In our analysis, we found that condom stigma was mainly derived from the distortion of trust and loyalty relationship, viewing condom as a symbol as HIV/AIDS and STIs, shame and embarrassment of sex-related topic, and distortion of cognition of sexual intercourse, which were classified into four sub-themes. Condom use and even discussions about safe sex were regarded as a symbol of disloyalty or distrust between partners. Some people avoid using condoms because of the belief that it violates the true purpose of human intercourse. Owing to the desire to be accepted in one's social network, the fear of being stigmatized may be a stronger driver of condomless sex than the commitment to safe sex in this population.

Furthermore, socioeconomic and situational factors that were classified at environmental/ structural level barriers to condom use [32, 75–77]. Socioeconomic vulnerability leads to less power to negotiate safer sex for some MSM, for example the money boys or some young men [77]. Moreover, situational sex is common in the MSM community, while men might not have condom by hands, which also results in unprotected sex [39]. Even

worse when group substance using happened in some circumstances, which greatly increases the likelihood of unprotected intercourse [78–80].

This review had several limitations. First, despite the comprehensive search strategy, some qualitative studies might have been excluded because of the language restrictions to Chinese and English in our analysis; this may lead to selection bias. Second, the synthesized themes generated from the qualitative results were based on our subjective discussions which might be limited by personal comprehension. However, triangulation was adopted to ensure the credibility of the results, and the data were categorized by two persons and checked by a third person in the study group. Third, our review focused only on barriers of condom use during data extraction process, and did not included study findings on the facilitators for condom use, which is the other side of the study topic. It might be worthwhile to conduct a separate research on it.

Our review and meta-synthesis presented the comprehensive barriers to condom use among MSM and identified that barriers were deeply influenced by individual, intrapersonal and social-structural level factors. Our results could offer deeper insight into what kind of factors should be taken into account when designing innovative and long-term effective interventions to improve safer sex practices among MSM[81]. Future interventions could target on a specific barrier or collectively focusing on several barriers, for example, condom stigma has been synthesized as a new concept in this meta-synthesis, however, rare interventions has been conducted to address condom stigma. Thus, future studies can focus on how to reduce condom stigma among MSM from sub-cultural perspective to improve safer sex.

## Conclusion

This is the meta-synthesis to qualitatively summarize the barriers to condom use among MSM. The social-ecological model provides a relevant framework to understand and analyze the barriers that affect condom use among MSM, which can be classified into six themes at three levels. Based on the findings, scholars and health policymakers can develop tailored, innovative and effective interventions to address condom use barriers and reduce HIV transmission risk among MSM globally.

## Abbreviations

Men who have sex with men, MSM

Human immunodeficiency virus, HIV

Acquired immune deficiency syndrome, AIDS

People living with HIV/AIDS, PLWH

Sexually transmitted infections, STIs

The Joint United Nations Programme on HIV/AIDS, UNAIDS

The social-ecological model, SEM

Joanna Briggs institute, JBI

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Availability of data and materials

Not applicable.

### Competing interests

The authors declare that they have no competing interests.

### Funding

This study was funded by National Natural Science Foundation of China (Grant Number: 72074226; PI: Xianhong Li) and Hunan Science and Technology Innovation Platform and Talent Plan (Grant Number: 2017TP1004; PI: Xianhong Li).

### Authors' contributions

YS and XHL design the research study. YS, LM, CZ and XHL performed the research. YS, YYC, MAV and LM acquired the data. YS, LM, CZ and XHL analyzed the data. YS prepared the initial draft of the manuscript. YS, CZ, MAV, HZQ and XHL revised the manuscript. All authors contributed to and approved the final version of the manuscript.

### Acknowledgments

The authors would like to acknowledge all authors of included studies for their previous contribution and thank all authors for their contributions.

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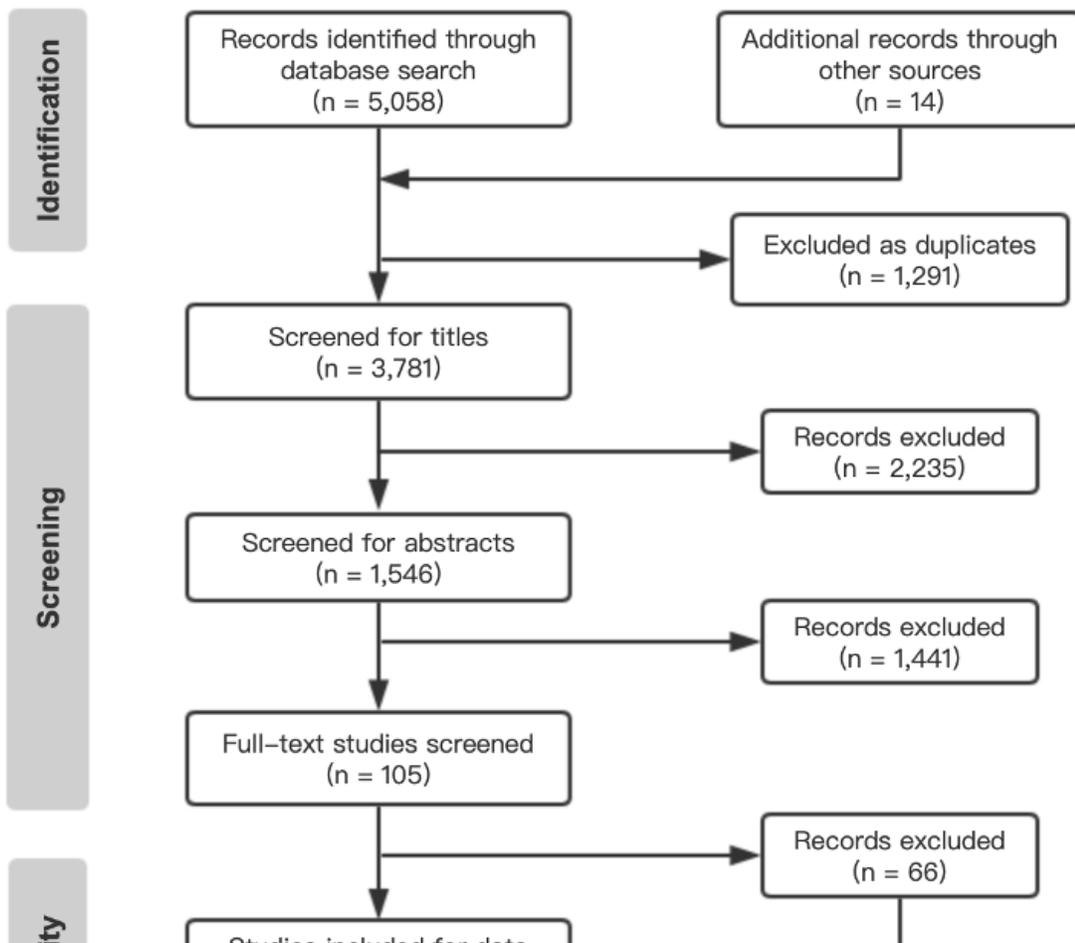
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## Tables

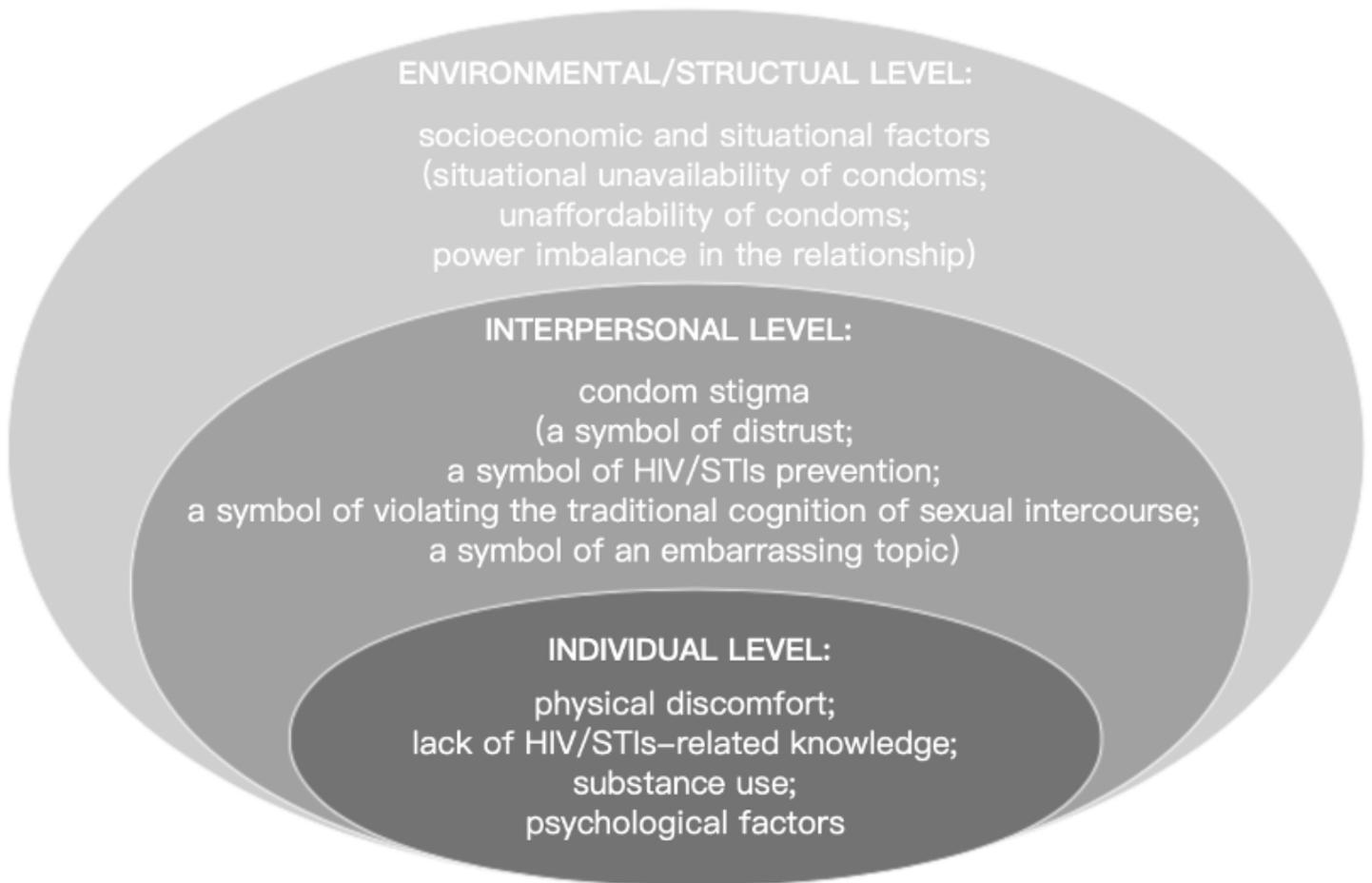
Tables 1 to 4 are available in the Supplementary Files section

## Figures



**Figure 1**

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**Figure 2**

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