Author’s response to reviews

Title: Predictors of condom use behavior among men who have sex with men in China using a modified Information-Motivation-Behavioral Skills (IMB) model

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Version: 1 Date: 21 Dec 2018

Author’s response to reviews:

December 21, 2018

Ref.: PUBH-D-18-03583

“Predictors of condom use behavior among men who have sex with men in China using a modified Information-Motivation-Behavioral Skills (IMB) model”

Dear Dr. Anthony Idowu Ajayi,

Thank you very much for your letter and the review of our manuscript. We have carefully addressed all the comments and revised the manuscript as requested. Our responses to comments are detailed below. We also highlighted in yellow the major changes made in the text.

We thank you and the reviewers for your positive comments, pertinent criticisms, and concrete suggestions, which provided very helpful to improve our manuscript. We hope that these changes will make the manuscript acceptable for publication in BMC Public Health. If there are
additional changes that we should make, please let us know. Thank you very much for your consideration.

Yours sincerely

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Response to comments on manuscript (PUBH-D-18-03583) entitled “Predictors of condom use behavior among men who have sex with men in China using a modified Information-Motivation-Behavioral Skills (IMB) model” submitted to BMC Public Health for publication.

Editor's comments to the Authors

This paper contributes to the literature on consistent condom use. However, authors should proof-read the manuscript. Also, authors need to clearly justify the need to modify the Information Motivation Behavioural Skill Model. What inadequacies did they observe in the model and how would their proposed modification improve the model? Essentially, there is need to explain how the added concepts and assumptions improve the model. This case has not been made clearly enough in both the background to the study and the discussion of the study.

Response: Thank you for your comment. Many individual-level theories have played important roles in past behavioral interventions which focused on HIV prevention and AIDS care, including especially social cognitive theory, the theories of reasoned action and planned behavior, the transtheoretical model, and the IMB model. However, the individual-level theories were constrained, because they do not consider high-level connections [1]. Recent efforts have been made to expand from individual-level factors to multilevel factors at different ecological levels [1-4]. Another review recommended a multilevel approach to HIV-related behavior changes, which suggested that the HIV risk and AIDS care involve complex behaviors beyond individual-level factors that are influenced by multilevel factors [5]. These multilevel factors include individual-level factors, interpersonal/network-level factors, and structural-level factors. This multi-level approach can serve as the theoretical framework for the modified IMB model.
Thus, we have added some more detailed evidence to clarify the need to modify the IMB model in the third paragraph of Section Background and the sixth paragraph of Section Discussion.


Reviewers’ Comments to the Authors

Sylvester Reuben Okeke (Reviewer 1):

General Comments:

This paper examines a very important subject matter in the field of sexual health among minority populations in China. Overall I like this paper and think it has potential to add to the literature on HIV prevention among men who have sex with men.

Response: Thank you for your positive comment.

Abstract

The abstract reads well but I believe the authors can suggest to effectively design interventions in addition to frontiers for future research.
Response: Thank you for your positive comment. The modified IMB model with extended multilevel factors could serve as a theoretical framework for behavioral interventions for condom use among Chinese MSM.

Introduction:

Although the authors give a brief explanation of the components of IMB model, I think they can expatiate more on the rationale for why a modified model is needed, or how the IMB model should be modified in this section. For instance, I am left wondering why they cannot use another model as opposed to modifying the IMB model.

Response: Thank you for your comment. Many individual-level theories have played important roles in past behavioral interventions which focused on HIV prevention and AIDS care. However, the individual-level theories were constrained, because they do not consider high-level connections [1]. Recent efforts have been made to expand from individual-level factors to multilevel factors at different ecological levels [1-5]. A multilevel approach was recommended to HIV-related behavior changes, which suggested that the HIV risk and AIDS care involve complex behaviors beyond individual-level factors that are influenced by multilevel factors [5]. This multi-level approach can serve as the theoretical framework for the modified IMB model. Thus, we added multilevel factors to modifying the IMB model rather than use another individual-level model. And we have added some more detailed evidence clarify the need to modify the IMB model in Section Background.


Data and Methods:

The sampling strategy is not very clear. Was selection of participants from district centres random or purposeful? Is this sample representative? It has been stated in the limitations but was weighting applied in the analysis?

Response: Thank you for your comment. Because of no sampling framework for these hard-to-reach population groups, participants from VCT clinics in district CDCs and community-based HIV service centers were selected purposefully using a convenience sampling method. Although we did not select the sample randomly, the selected districts covered 8 of 11 districts in Guangzhou, which are believed to have provided a relatively adequate representative sample. The birthplaces of the participants in Guangzhou, other cities in Guangdong province, and other provinces each accounted for approximately one-third of the participants, which might extend the generalizability of the current study. And we did not apply weighting in the analysis. Thus, we added "using a convenience sampling method" in Paragraph 1 for Participants in Section Methods.

On variables, what is the justification for dividing the raw scores on depression?

Response: Thank you for your comment. The Self-Rating Depression Scale (SDS) is a 20 question scale. Each item is scored between 1 and 4, which makes the maximum possible score of 80 for all 20 items. The calculated sum of scores across the 20 items is converted to a 100-point scale by dividing the sum by 0.8. Respondents are classified as exhibiting depressive symptoms when their converted score is 50 or over [1]. The SDS index is derived by dividing the sum of the raw scores obtained on the 20 items by the maximum possible score of 80. That is to say an SDS index of 0.5 or above indicates depression.


Although the Cronbach’s alpha confirms internal consistency of scale items, it has been noted that as only one form of reliability and validity assessment, and should be acknowledged as a limitation.

Response: Thank you for your comment. The Cronbach’s alpha is commonly used in observational studies to confirm internal consistency of scale items. There were other forms of reliability and validity assessment, such as test-retest reliability and discriminate validity. Thus, we added "only Cronbach’s alpha was used to assess the reliability of the scale items. More forms of reliability and validity assessment, such as test-retest reliability, and discriminate
validity should be conducted in future studies." in the limitation of Section Discussion as your suggestion.

Conclusion:

What are the implications of this study and how do they influence men who have sex with men in China? How can the findings influence condom use among the population studied?

Response: Thank you for your comment. The results of the current study revealed relative lower proportion of consistent condom use among MSM in Guangzhou, China. The modified IMB model covered not only the original constructs of IMB model but also multilevel factors including interpersonal/network-level, structural-level and more individual-level factors. The modified IMB models could serve as a theoretical framework of multilevel behavioral interventions for safe sex, which would facilitate the effectiveness of the intervention.

Oluwaseyi Dolapo Somefun, M.A (Reviewer 2):

General Comments:

The study is a product of an original research in the Chinese MSM context. It has a strong participants recruitment and data collection methods. It also has a strong data analysis technique. Its results and conclusion make important contribution to knowledge in relation to research and practice in HIV prevention. However, measures of constructs in relation to IMB model and extension is somewhat blurred. In extending a model, I believe that one can either distil or disintegrate constructs that make up the model, if possible, in relation to similar models (e.g. the work of Taylor and Todd 1995 in decomposed theory of planned behaviour where constructs of Technology Acceptance Model were used in TPB) or expand the original constructs in the model by adding related constructs or both. It is thus strongly recommended that the authors take a stand in their extension and clearly describe what extension is in relation to their study. Again, wrong use of tenses, articles and vague sentences need attention.

Response: Thank you for your positive comment. The constructs of the original IMB model include information, motivation, behavioral skills and HIV-prevention behavior. The motivation construct was measured including personal attitudes towards condom use, subjective norms and behavioral intentions regarding condom use. The behavioral skills comprised perceived difficulty and perceived effectiveness of HIV-preventive behaviors. These constructs were totally referred to works of Fisher JD and Fisher WA who proposed the original IMB model [1-2]. Actually, motivation to engage in HIV-preventive behavior in the original IMB model was measured in accord with the constructs and operations of Fishbein and Ajzen's theory of reasoned action (TRA). The concept of theory of planned behavior (TPB) was proposed by Icek Ajzen to
improve on the predictive power of the TRA. Technology acceptance model (TAM) is one of the extensions of Ajzen and Fishbein's TRA in the literature. Thus, these models share some common constructs such as personal attitudes, subjective norms and behavioral intentions. We have added some more detailed evidence to clarify the need to modify the IMB model as well. Regarding the language, we have asked a native English speaker to review the manuscript.


Title
Appropriate and excellent

Response: Thank you for your positive comment.

Abstract

Background:

“Men who have sex with men were at high risk of…”: Consider replacing ‘were’ by ‘are’ as they are still at this risk. It is important not to end this background without an idea of why this knowledge is important. Authors are advised to consider injecting rationale or utility of their study to end the abstract background. This could be in a sentence.

Response: Thank you for your comment. We revised "were" to "are" and added "Correct and consistent condom use is one of the most effective strategies for preventing the spread of HIV".

Methods:

“…from May to September: Please consider ‘from May through September’

Response: Thank you for your comment. We revised " from May to September " to " from May through September " as your suggestions.
Results

Appropriate but consider ‘p’ instead of ‘P’ for level of significance: Use small letter for all p values

Response: Thank you for your comment. We revised all "P" to "p" as your suggestions.

Background

Paragraph 1

“burdens of HIV infection in countries of low, middle, and high income.” Consider: ‘burdens of HIV infection in low, middle- and high-income countries.’

“The proportion of new reported cases attributed to MSM in China from 2006 to 2014 …” Consider: ‘Notification of HIV cases among MSM in China rose from 2.5% in 2006 to 25.8% in 2014.’

“The high HIV prevalence among MSM was closely associated with unprotected anal intercourse (UAI) which had become the main high-risk behavior and reason of HIV infection.” Consider: ‘High HIV prevalence among MSM is closely associated with unprotected anal intercourse (UAI), which is a common high-risk behavior for HIV infection.’

“One previous meta-analysis.. among Chinese MSM…” Consider: ‘Evidence from a recent meta-analysis … among MSM in China…’ Please not Chinese MSM. I looked up that study and it does not have being a Chinese as inclusion criterion in selection of studies included in the meta-analysis.

“Correct and consistent condom use…” Consider: ‘Correct and consistent condom use is one of the most effective strategies for preventing HIV among general and high-risk population [8]. Strengthening this behaviour among MSM in China is thus an important issue for research.’

Response: Thank you for your comment. We revised the texts as your suggestions.

Paragraph 2

“Growing evidence revealed that public health and health-promotion interventions based on social and behavioural science theories were more effective than those lacking a theoretical framework [9].” Consider: ‘Evidence shows that public health and health-promotion interventions based on social and behavioural science theories are more effective than those lacking a theoretical framework [9]. This is because these interventions are tailored towards addressing the identified predictors of the health behaviour of interest.’
“The Information-Motivation-Behavioral Skills (IMB) model was one of the theories which effectively…” Consider: ‘Specifically, the Information-Motivation-Behavioral Skills (IMB) model has been found to significantly predict condom use among MSM [10], female sex workers [11], hazardous alcohol users attending sexually transmissible infection clinic [12] and students [13].’

“Existing literatures also showed that intervention programs under the guidance of IMB model effectively increased the condom use among MSM [14]…” Consider: ‘Consequently, interventions designed along IMB constructs have been found to increase condom use among MSM [14], people on anti-retroviral (ARV) therapy [15] and students [16].’

“The IMB model proposed that information, motivation, and behavioral skills were fundamental determinants of …” Consider: The IMB model proposes that information, motivation and behavioral skills are fundamental determinants of HIV-preventive behaviors, such as condom use [17].

“According to the IMB model, the information and motivation resulted in the behavioral skills needed to …” Consider: ‘According to the model, possession of adequate information, coupled with strong motivation to act on the information; propels desired behavioral skills, which in turn, initiate and sustain condom use.’

“The behavioral skills directly contributed to…” Consider: ‘The behavioral skills directly influence condom use while also partially mediating the associations between information and motivation components and condom use [17-19].’

“Although the components of IMB model affected one another, sometimes they were…” Consider: ‘Although the components of the IMB model influence one another; studying them in isolation to other social influences of behaviour yields less predictive power [20]. This is because, IMB model, in its non-extended form, relies only on psychological or individual-level influences, whereas, social factors have significant influence on behaviors [20, 21]. Researchers have thus suggested the extension of the model by incorporating other social factors that influence preventive behaviors to the model [20-23].’

‘Moreover, beyond individual-level factors, HIV risk and AIDS care involve complex behaviours which are influenced by multi-level factors at different ecological levels [24-25].’

‘These multi-level factors include (not included)… interpersonal/network-level factors (remove article ‘the’ before interpersonal as it is redundant), intimate partner violence (IPV) (remove and before intimate partner violence) and sexual partner seeking behaviour [28-30], structural-level factors such as access to HIV/AIDS prevention and care services [31, …].’ Then identify at least one study that has investigated influence of access to HIV/AIDS care service on AIDS treatment behaviour to make up the citation space provided in the bracket above.
Please remove ‘(HIV prevention service)’ as well as ‘and so on’

‘Thus, modified IMB models with extended constructs, have been found to explain more variance in HIV-preventive behaviours than the original non-extended model [20-23].’

‘However, less is known (not was known)… among MSM in China.’ (Please remove among MSM generally, as this has been extensively studied in other countries).

‘Based on the high proportion of UAI (evidence), increasing HIV prevalence among MSM (evidence) and lack of evidence regarding the influence of modified IMB model on condom use among MSM in China, we …’

Response: Thank you for your comment. We revised the corresponding texts as your suggestions. Besides, Reference 36 investigated influence of access to HIV/AIDS care service on condom use. We added references in "Based on the high proportion of UAI [6-7], increasing HIV prevalence among MSM [3-4]".


Methods

Participants

VCT Consider: ‘Voluntary Counseling and Testing (VCT)’

“After finishing the questionnaire…Consider: After completing the questionnaire, participants had HIV consultations and testing. They also received gifts (condoms and personal lubricants) as compensation for their time.’

‘A total of 1174 MSM completed the survey but analysis was based on 976 who reported having had anal intercourse in the past six months.’

Response: Thank you for your comment. We revised the corresponding texts as your suggestions.
Measures

“Three questions were administrated…Consider: ‘Three questions were used to assess whether participants have received HIV prevention services in the last one year. Such services include … for HIV prevention.’ It is suggested you consider deleting “Responses with …”

Response: Thank you for your comment. We revised the texts as your suggestions.

Information

This measures information as it applies to original IMB model.

Response: Thank you for your comment.

Motivation

This is drawn from the theory of planned behaviour

I fear this is a clear replication of TPB constructs. Authors, I believe, took cue from the study of Van Huy and Debattista (2016) which they cited as [20] in this measure. I suggest that they cite them and modify their measures as attitude towards condom use, social norms and intentions regarding condom use as used by Van Huy and Debattista.

Response: Thank you for your comment. The motivation construct was measured including personal attitudes towards condom use, subjective norms and behavioral intentions regarding condom use. These constructs were totally referred to works of Fisher JD and Fisher WA who proposed the original IMB model [1, 2]. Actually, motivation to engage in HIV-preventive behavior in the original IMB model was measured in accord with the constructs and operations of Fishbein and Ajzen’s theory of reasoned action (TRA). The concept of theory of planned behavior (TPB) was proposed by Icek Ajzen to improve on the predictive power of the TRA. Thus, these models share some common constructs such as personal attitudes, subjective norms and behavioral intentions. However, the measures of motivation in the study of Van Huy and Debattista (2016) were not exactly the same with the measures used in our study which referred to works of Fisher JD and Fisher WA.


Results
‘Among the 976 participants, 74.08% identified themselves homosexuals.’
Response: Thank you for your comment. We revised the text as your suggestion.

Discussions
“The correct and consistent condom use.. Consider: ‘Correct and consistent…’
Generally, authors need to be careful with article ‘the’ as it keeps appearing where it is not necessary.
Again, the use of past tense for ongoing and future events should be addressed. For instance “Therefore, it was important to develop…” “The IMB was one of those theories…”
Response: Thank you for your comment. We revised the texts as you suggestions.

Conclusion
The first line of the conclusion seems vague. It could be shortened, or punctuations should be used to make it clearer. The same effort should also be considered for the second sentence.
The last line of the conclusion should be reconstructed or deleted.
Response: Thank you for your comment. We revised the first two sentences to "Our results stressed the need to pay more attention to the relatively lower proportion of consistent condom use among MSM in the current study. Thus, targeted interventions for safe sex should be created. The modified IMB model fit the data ideally and could serve as a theoretical framework of behavioral interventions for safe sex". The last sentence was revised to "Furthermore, behavioral
intervention programs with a multilevel approach under guideline of the modified IMB model are encouraged to improve consistent condom use among MSM".