PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Development and validation of the Health Belief Model questionnaire to promote smoking cessation for nasopharyngeal cancer prevention: a cross-sectional study
AUTHORS	Kueh, Martin; Rahim, Fairuz Fadzilah; Rashid, Abdul

VERSION 1 – REVIEW

REVIEWER	Duangporn Kerdpon Prince of Songkla University, Stomatology
REVIEW RETURNED	13-Feb-2022

GENERAL COMMENTS	Comments to the authors Development and validation of the health behavioural intention among at-risk smokers to prevent nasopharyngeal cancer in Sarawak, Malaysia based on the Health Belief Model Manuscript ID: bmjopen -2021-057552 The study's title and objective about "health behavioural intention among at-risk smokers to prevent nasopharyngeal cancer" is a broad term. This phrase is better to clarify to the what "health behavioural intention" is being investigated. In the conclusion of the abstract: "The instrument can be utilized for other smoking-related cancers in different at-risk populations." is not relevant to the last two sentences of the discussion "Finally, the smokers' cultural perspective may be represented in this study. As a result, further studies on smokers from other cultural backgrounds will be required to review the psycho-metric properties of the instrument." Method, Page 6, line26 What does it mean by "meticulously documented" in the replies by smokers who requested assistance in answering the questionnaire since the questionnaire used a 5-point Likert scale? Introduction, Page 4, line 27-29 and Conclusion, Page 14, line 18-19 It would be interesting to comment on how this instrument could be used and to what extend to promote cancer prevention among smokers. Page 20 According to question 3 and 4 of Table S1, are there any missing word(s) from these questions?

REVIEWER	Mateusz Jankowski Centrum Medyczne Ksztalcenia Podyplomowego, School of Public Health
REVIEW RETURNED	14-Mar-2022

GENERAL COMMENTS	This is a well-prepared manuscript. The Authors should consider the following changes: 1) Please add one paragraph on the justification of the study topic (why this study is important, why the Sarawak population was selected, etc.) 2) Please add practical implications of this study and further research need 3) Please provide more precise conclusions

REVIEWER	Randall Holcombe University of Vermont Cancer Center, Cancer Center
REVIEW RETURNED	11-Apr-2022

GENERAL COMMENTS	This study describes the validation of an instrument to assess the intention of smokers to prevent nasal or head and neck cancers. The exploratory and confirmatory factor analyses appear to be appropriately performed. Specific questions or comments include: 1. Face validity was noted to be evaluated both quantitatively and qualitatively. The qualitative analysis is not described sufficiently. Was this obtained via individual feedback, surveys, focus groups? 2. It is unclear what the value was of the "importance score" since all factors were retained. 3. There is lacking a description about the frequency of missing data and how missing data was handled? 4. Figure 1 does not appear to be necessary as it is described sufficiently in the text. 5. Most importantly, there is no information about the results of the survey. Over 200 individuals were evaluated. While the focus of the paper is on validation of the instrument, the lack of information about the responses markedly reduces the significance of the manuscript. This could easily be incorporated and would support the rationale for development of the instrument.

VERSION 1 – AUTHOR RESPONSE

REVIEWER 1

Dr. Duangporn Kerdpon, Prince of Songkla University COMMENTS AND RESPONSES FROM AUTHORS:

1. The study's title and objective about "health behavioural intention among at-risk smokers to prevent nasopharyngeal cancer" is a broad term. This phrase is better to clarify to the what "health behavioural intention" is being investigated.
We agree with the reviewer that "health behavioural intention" is a broad term. The health behavioural intentions investigated in this study mainly on smoking cessation. We have amended thorough the manuscript which defining the scope on the health behavioural intention on smoking cessation.
2. In the conclusion of the abstract: "The instrument can be utilized for other smoking-related cancers in different at-risk populations." is not relevant to the last two sentences of the discussion "Finally, the smokers' cultural perspective may be represented in this study. As a result, further studies on smokers from other cultural backgrounds will be required to review the psycho-metric properties of the instrument."

We agree with the comment. Thank you for pointing it out. There was a confusion in the two sentences. We have amended the statement in the “Abstract” as the following:
“The instrument can be utilised for other smoking cessation-related cancers in different at-risk populations.”
We have also amended the statement in the “Discussion” as the following:
“The third limitation is the health behavioural intentions investigated in this study were mainly on smoking cessation, the smokers’ cultural perspective of other health behavioural intentions was not presented. Future studies looking at different perspective of health behavioural intentions will help to review the psychometric properties of the instrument.”
3. Method, Page 6, line 26 What does it mean by “meticulously documented” in the replies by smokers who requested assistance in answering the questionnaire since the questionnaire used a 5-point Likert scale?
Thank you for pointing it out. Yes, the participants’ responses were based on the 5-point Likert scale. The word “meticulously document” has been removed to avoid confusion.
4. Introduction, Page 4, line 27-29 and Conclusion, Page 14, line 18-19 It would be interesting to comment on how this instrument could be used and to what extend to promote cancer prevention among smokers.

Thank you for your valuable suggestion. The following statement has been added in the “Introduction” to emphasize on the important usage of the instrument:

“The Health Belief Model (HBM), an approachable theoretical model that could aid in the understanding of the individual’s or a smoker’s belief on the health-related behavioural intention [to cite the reference]. This HBM can further predict the smokers’ effort to improve health or their health-seeking behaviours in the preventive practices of NPC.”

The following statement has been added in the “Discussion” to emphasize on the practical implications of the instrument in promoting cancer prevention among smokers:

“This study provides practical implications. With it being valid and reliable, the public health officials and researchers now have a reason to launch larger population-based study on health behavioural intentions to minimise NPC. Given that the current smoking rates in Malaysia remain high, this questionnaire can help in the understanding and determining the construct that influences smokers’ health decisions. Subsequently, cancer risk can be reduced by better prediction, a comprehensive tobacco control programme, policy creation and health interventions.”.

5. Page 20 According to question 3 and 4 of Table S1, are there any missing word(s) from these questions?

Yes, the word “cancer” is missing and it has been amended. Thank you for pointing it out.

REVIEWER 2
Dr. Mateusz Jankowski, Centrum Medyczne Ksztalcenia Podyplomowego COMMENTS AND RESPONSES FROM AUTHORS:

1. Please add one paragraph on the justification of the study topic (why this study is important, why the Sarawak population was selected, etc.)

Thank you for this comment. The justification of the study topic and the study population was available in the third paragraph of the “Introduction” as the following:

“In Malaysia, NPC is a nationwide public health concern and the 5th leading form of cancer, amounting to 4,597 new diagnoses of NPC for the 2012-2016 period. The recent report from the Malaysian National Cancer Registry reported that the lifetime risk of developing NPC among men and women are 1 in 175 and 1 in 482 respectively [10]. Strikingly, there is a substantial geographical variance within the country, with Sarawak exhibiting a higher prevalence rate of NPC. A previous study has shown a significant high age-standardised rates in males (13.5/100,000, 95% Confidence Interval = 12.2 – 15.0) and females (6.2/100,000, 95% CI= 5.7-6.7) by which the local at-risk ethnic groups including Bidayuh, Chinese, Iban, Malays and Melanau were collectively ranked top globally. In particular, the risk among the Bidayuh ethnic population, which is a native indigenous group, exceeds the general population of male and females in Sarawak by 2.3 times and 1.9 times respectively [11].”

The focus is on smoking cessation to minimise NPC risk in the population, as Sarawak has one of the highest smoking rates in the country, as highlighted in the fourth paragraph of the "Introduction” as the following:

“The Malaysian National Health and Morbidity Survey 2015 showed that the prevalence of tobacco smoking among the population in Sarawak was 25.4%. The native indigenous male (61.2%) and female smokers (10.7%) in Sarawak were among the highest nationwide [16].”

2. Please add practical implications of this study and further research need.

Thank you for this valuable suggestion which could strengthen the study implications. This comment is similar to the one provided by Reviewer 1. Thus, we have added in the practical implications of this study in “Discussion” as the following:

“This study provides practical implications. With it being valid and reliable, the public health officials and researchers now have a reason to launch larger population-based study on health behavioural intentions to minimise NPC. Given that the current smoking rates in Malaysia remain high, this questionnaire can help in the understanding and determining the construct that influences smokers’ health decisions. Subsequently, cancer risk can be reduced by better prediction, a comprehensive tobacco control programme, policy creation and health interventions.”.

3. Please provide more precise conclusions.

Thank you for the suggestion. We have amended the “Conclusions” accordingly by emphasising on the summary and future direction as the following:

“The current study developed a comprehensive HBM-based questionnaire with satisfactory psychometric properties, confirming the validity and reliability. A health intervention targeting NPC in this population may be more effective due to the awareness of this population regarding their increased susceptibility to NPC and may also benefit from being informed by this questionnaire. With the possibility of being expanded to general health campaigns that target tobacco smoking, the authors also propose further studies to use the instruments for application in other smoking-related cancers in different susceptible populations and geographic locations.”

REVIEWER 3
Dr. Randall Holcombe, University of Vermont Cancer Center COMMENTS AND RESPONSES FROM AUTHORS:

1. Face validity was noted to be evaluated both quantitatively and qualitatively. The qualitative analysis is not described sufficiently. Was this obtained via individual feedback, surveys, focus groups?

Thank you for the constructive comment. The qualitative analysis was evaluated via cognitive interviews to obtain the participants' feedback on the instrument. Amendment has been made in the revised manuscript as the following:

"In the qualitative stage, cognitive interviews were conducted face-to-face individually to obtain participant's feedback on their comprehension and answers [27]. Items which were not well understood were identified from this cognitive interview."

2. It is unclear what the value was of the "importance score" since all factors were retained.

Thank you for addressing this. The importance score was calculated based on "clinical impact method" in which the clinical impact of each item was determined from the proportion of participants who identified it as important. We have amended the paragraph to provide better clarity as the following:

"In the quantitative stage, a survey was disseminated based on a Likert scale of 1 (least importance) to 5 (extremely important) to determine the clinical impact of each item. The importance score was calculated based on "clinical impact method" in which the clinical impact of each item was determined from the proportion of participants who identified it as important. This technique was chosen for better clarity where the items were ranked according to their impact score. Mean importance score of each item was computed using the following formula: Impact Score = Frequency (Proportion) x Importance [28]. Factors were kept if the Impact Score equal or more than 1.5. They were defined as deemed suitable and kept for further evaluation [28]. In the current study, the impact score for each item ranged from 1.7 to 4.6, therefore, no item was eliminated."

3. There is lacking a description about the frequency of missing data and how missing data was handled?

Thank you for pointing this out. We agree that it is important to not have any missing data for the Exploratory Factor Analysis and Confirmatory Factor Analysis. Prior to the participants filling out the questionnaire, efficient communication was established. As a result, there was relatively little missing data.

The following description of the missing data has been added to the "Data Management" first paragraph, second sentence:
"Listwise deletion was done for the missing data of less than 2%."

Another line is added to the "Results" first paragraph, second sentence:

"The response rate for Phase 1 was 100% (100/100), whereas Phase 2 response rate was 98.3% (171/174)."

4. Figure 1 does not appear to be necessary as it is described sufficiently in the text.

We agree with the reviewer. Thank you for pointing it out. We have removed Figure 1 from the manuscript.

5. Discuss: Most importantly, there is no information about the results of the survey. Over 200 individuals were evaluated. While the focus of the paper is on validation of the instrument, the lack of information about the responses markedly reduces the significance of the manuscript. This could easily be incorporated and would support the rationale for development of the instrument.

We agree with the reviewer. Thank you for the important suggestion. We have incorporated the results of the survey in 'Table 5: Result of total mean score and standard deviation' together with a description.

A new subheading titled "Final scoring of instrument" of how the Likert-scale questionnaire can be scored has been added as the following:

"In the main study, the total mean score for each HBM components were formulated on the five- point Likert scale options from strongly disagree to strongly agree, with scores ranging from 1 to 5 points. With the exception of 'Perceived Barriers,' which is inversely proportional, a greater score reflects a firmer desire to quit smoking."

Another line is added to the "Data management" last paragraph:

"The HBM components were analysed with the mean total score and standard deviation (SD)."

VERSION 2 – REVIEW

REVIEWER	Duangporn Kerdpon Prince of Songkla University, Stomatology
REVIEW RETURNED	07-Jun-2022

GENERAL COMMENTS	Comments as followed: 1. Please describe the total number of the population accessed together with the number selected according to the inclusion criteria. 2 Although it was referred to that there was a high incidence of smokers in Sarawak in the introduction, the percentage of smokers in the population selected would provide a background for better understanding the behavioural intentions of the population studied. 3. The third limitation defined in the study is out of the scope of this study, thus it is not considered a limitation.

REVIEWER	Mateusz Jankowski Centrum Medyczne Ksztalcenia Podyplomowego, School of Public Health
REVIEW RETURNED	10-Jun-2022

GENERAL COMMENTS	This study has some methodological concerns. The rationale for this study should be clearly defined. The development of the questionnaire should be precisely described. There is limited international interest in this study. This study should be submitted to some local/regional journal rather than an international journal.

REVIEWER	Randall Holcombe University of Vermont Cancer Center, Cancer Center

REVIEW RETURNED	25-May-2022

GENERAL COMMENTS	Improved manuscript.

VERSION 2 – AUTHOR RESPONSE

REVIEWER 1

Dr. Duangporn Kerdpon,

Prince of Songkla University

1. Please describe the total number of the population accessed together with the number selected according to the inclusion criteria.

   We have now included a sentence to describe the total population for the two selected divisions in Sarawak:

   "The two divisions selected for the study were Miri and Bintulu, which had respective populations of 433,800 and 266,200."

   The aforementioned two divisions were selected because of ease of accessibility. We were unable to identify the population based on the inclusion criteria which highlighted a limitation for our study.

2. Although it was referred to that there was a high incidence of smokers in Sarawak in the introduction, the percentage of smokers in the population selected would provide a background for better understanding the behavioural intentions of the population studied.

   As mentioned above, unfortunately, this is a limitation of the study because we were unable to collect smoking status from all members of the selected population.

3. The third limitation defined in the study is out of the scope of this study, thus it is not considered a limitation.
   Thank you and we note your comment and we have revised the paragraph accordingly.

   Another limitation was included as follows:

   "This study was carried out with the cooperation of smokers from accessible areas in Sarawak. However, due to the dispersion of the locations, the population size was difficult to determine due to the dispersion of the locations, which contributed to the second limitation."

REVIEWER 2

Dr. Mateusz Jankowski,

Centrum Medyczne Kształcenia Podyplomowego

1. This study has some methodological concerns.

We truly appreciate your concerns:

a) Bias: This is the first limitation we highlighted in the manuscript. We are cognizant of the fact that because convenience sampling was used, there is a risk selection and recall bias.

b) Adequacy of sample size: The sample size was sufficient as quoted from our manuscript *"...the KMO test yielded a result of 0.697 (Phase 1) and 0.830 (Phase 2) while the Bartlett's test of sphericity obtained 1746.76 (Phase 1) and 3362.86 (Phase 2), both with p-value < 0.001."*

c) Validity establishment: This study utilized a systematic and rigorous approach to ascertain the validity and reliability of the questionnaire by including face validity, content validity, construct validity, convergent validity and divergent validity. As suggested in most papers, the EFA and CFA were done in 2 different data sets. The analysis results were stable.

d) Depiction of the effect of health belief model variables to the health behavioural intention: The links were not covered in the study as the objective of the study was is the development of the questionnaire.

2. The rationale for this study should be clearly defined.

For clarity the following paragraph is added:

"In order to examine the variables affecting smoking cessation for cancer prevention, this study made an effort to develop a comprehensive HBM-based questionnaire. Our results depict consistently satisfactory psychometric properties, confirming the validity and reliability. Considering that smoking is a major contributor to cancer, it is critical to address the health behavioural intention to uncover obstacles and implement improvements for a more successful intervention. The authors propose further studies to use the instruments for application in other smoking-related cancers in different susceptible populations and geographic locations."

3. The development of the questionnaire should be precisely described.

Thank you for your concern. We have included Figure 1, which is a flow diagram to highlight the steps taken in your study. Our research protocol, which was created after carefully analyzing the published literature, was strictly followed when developing the questionnaire and drafting manuscript.

We are always open to suggestions. If any particular stages require more clarification, kindly let us know.

4. There is limited international interest in this study. This study should be submitted to some local/regional journal rather than an international journal.

We are grateful for your opinion regarding what would be best for the journal and article. Both tobacco smoking and cancer pose serious threats to worldwide public health. Given the significance, the need for a novel questionnaire linking the two themes becomes irrefutable. Because nasopharyngeal cancer has a remarkably high occurrence in our area relative to the rest of the world, we decided to utilize it to represent the cancer theme. Notwithstanding, it won't have an impact on the application in other malignancies linked to smoking because of the generalizability of the questionnaire.

The developed questionnaire propels an effective initiative toward assessing the critical elements in smoking intervention. Having explored the aims and scope of the journal thoroughly, BMJ Open was carefully prioritized as it serves as a potential platform to advance our effort in the field of public health to a global stage.

REVIEWER 3

Dr. Randall Holcombe,

University of Vermont Cancer Center

1. Improved manuscript.

Thank you for your time once again to review the manuscript.