PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Developing an evidence assessment framework and appraising the academic literature on migrant health in Malaysia: a scoping review
AUTHORS	de Smalen, Allard; Chan, Zhie; Abreu Lopes, Claudia; Vanore, Michaella; Loganathan, Tharani; Pocock, Nicola S.

VERSION 1 – REVIEW

REVIEWER	Anne MacFarlane University of Limerick, Ireland.
REVIEW RETURNED	28-Jul-2020

GENERAL COMMENTS	This is an excellent scoping review, which is really well-written. It was most interesting to learn about the field of migrant health research in Malaysia. I believe that it will certainly enable researchers to address gaps in knowledge to improve the evidence base on migrant health in Malaysia in order to support policymakers with high quality evidence for decision-making The paper has several strengths: The authors pay careful attention to the issue of defining migrants and they explain their meaning of, and focus on, 'vulnerability'. This is not always the case in the field of migrant health so it is important to acknowledge the authors in this regard. Apart from the fact that inter-rater reliability was limited to a 20% sample of the records in the first screening stage, the review is methodologically robust, following PRISMA and JBI guidelines for example. It makes methodological contributions by creating an evidence assessment framework, including modified Joanna Briggs Institute (JBI) checklists and a decision tree that identifies the type of study design and corresponding level of evidence. The use of the Bay Area Regional Health Inequities Initiative (BARHII) framework as a conceptual framework was valuable and the framework was clearly explained and used. The description and synthesis of findings in the Results and Discussion sections is meticulous, clear and engaging. In terms of revisions, I have some comments for the authors' attention: The Sweileh et al. 2018 paper is an important reference included in the Introduction. It has a focus on global migrant health research and highlights a lack of empirical studies about labour migrants. The findings of this review, therefore, are important given that the majority of studies were about this population. It would be good to see an explicit discussion about these findings from Malaysia and the Swelieh et al, 2018 paper in the Discussion Other countries have seen the value of scoping review e.g. Ireland (reference below) and it would be valuable to include this in the Introduction so readers can gain a sense of similar work in the field

	https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-6651-2 The authors explain that the rationale for the selection of the BARHII framework is that it was comprehensive and inclusive of various health dimensions, whereas most other models focused on specific public health elements or lacked clear explanation regarding the included health-related components of the model. Please include some references for these other models. The meaning of the following sentence is not clear to me because it sounds like the authors are seeing the BARHII framework's emphasis on health inequities as a limitation of some kind? "Although the framework was developed to address health inequities, its coherent structure lends itself to this project as it allows the researchers to approach health from different perspectives". The first paragraph in the Discussion makes excellent points about the need for migrant health governance, more epidemiological studies and attention to inter-sectoral contexts and collaboration. WHO Europe produced the first ever WHO Strategy and Action Plan for Refugee and Migrant Health in 2016 and makes important points like this. The authors may wish to include a reference: https://www.euro.who.int/en/about-us/governance/regional-committee-for-europe/past-sessions/66th-session/documentation/working-documents/eurrc668-strategy-and-action-plan-for-refugee-and-migrant-health-in-the-who-european-region A final comment, which does not require a response or action by the authors: I would like to point out that, while I understand that there were no patients involved in this study, there is still scope for Public and Patient Involvement in literature reviews. Further, it is important for researchers working in the field of migrant health to consider ways of increasing the involvement of migrants in our research. Here are some relevant references, which may be of interest to the authors for future projects: https://www.researchgate.net/publication/327838775_Patient_and_Public_Involvement_in_Systematic_Reviews_A_Systematic_Review_of_Literature https://bjgp.org/content/69/682/255/tab-article-info

REVIEWER	Nirmal Aryal Bournemouth University, UK
REVIEW RETURNED	17-Aug-2020

GENERAL COMMENTS	This is an interesting piece of work stemmed from rigorous process. Malaysia has been one of the major destination countries for the migrants particularly from South Asia and South East Asia and I strongly believe that this review will improve the understanding, extent and scope of migration health research in Malaysia. Thank you for this extensive work. Following are my suggestions: 1. Introduction - Line 64: Use the current global estimate of migrant workers which is 272 million according to the World Migration Report 2020. - Try to minimize the use of definition of the terms like refugees, asylum seekers, regular or irregular migrants etc. You can provide the links to the reference if you wish. - Line 105: All foreign workers are not vulnerable to health risk, please consider specifying the sub-groups like low-skilled labour migrants.

	2. Methods: - Methods section is comprehensive and well described. - Line 142: Give reference to Bay Area Regional Health Inequities Initiative (BARHII) framework if possible. - Line 149: patient and public involvement usually means how the potential beneficiaries (i.e. researchers for this review) were discussed and consulted for this review. - Line 262: Description of level of evidence is repeated and also I think it best fits in line 250-51. Results: - Line 425 to 428, repeated from methods. - Results on level of evidence could be summarized because associated table is self-explanatory. - It would be interesting to understand main source of research on migration health in Malaysia (e.g.government institutions, public/private national academic institutions of Malaysia, international academic institutions, international organisations such as WHO or IOM etc). It would also useful to know if there are any discernible pattern of migration health research targeted to specific origin country (or countries) of the migrants or migrants from which countries are more/less studied. Discussion - Line 602, expatriates were not included in the review, it is not clear how expatriates were defined and how they differ from foreign workers. Thank you.

REVIEWER	Daniel Vujcich Curtin University, Australia
REVIEW RETURNED	21-Aug-2020

GENERAL COMMENTS	Thank you for the opportunity to review this paper. Your study design is rigorous and your attention to detail is to be commended. My specific comments (below) are offered to help improve the impact of your paper and ought not to detract from your sense of achievement in having undertaken this interesting and important study. Introduction • The paragraph commencing line 87 is very ‘definition heavy’. It may be more appropriate to paraphrase the definitions here and set them out more fully in the methods section (e.g. at line 167). • The reference used to support the statement “the total number of migrant workers is estimated to fall” was published in 2015. Is there a more contemporary source available to support this proposition? • The introduction would benefit from a greater explanation as to why it is necessary to collate and summarise all publications since 1965. What is the relevance of such a broad retrospective review, as opposed to a review that is more focussed on recent studies (e.g. since 2000)? Method • Line 140: Consistent with PRISMA-ScR guidelines, please specify how the protocol can be accessed (e.g. on request from the first-named author). • Line 146: “data was” should be “data were”

	• Line 191: it may be useful to explain the logic behind these choices of databases, especially EconLit • Line 193: It may be necessary to explain why the databases were searched from date of inception notwithstanding that studies were excluded if they were conducted or included data from 1965 or earlier. • Line 202: it is stated that studies were included if they were conducted in Malaysia (it is not clear to me whether this includes cross-national studies in which Malaysia was included – I assume so but please specify if not) • Line 207: the decision to include only English studies (and not papers published in Bahasa Malaysia) seems very significant and the logic for imposing this criterion should be stated very clearly. • Line 209: the sixth inclusion criteria is “inclusion of (im)migrants, foreign workers” etc (it is not clear to me whether this means that the review included general population surveys that may have included – but not been directly aimed at - migrants) • Line 230: AS screened all articles and DC screened a 20% sample. According to Figure 3, discrepancies were found in approximately 13% of that sample. This should be explicitly stated in the text together with a brief description of the nature of the discrepancies. • Line 232: Data were extracted by one reviewer. Were any steps taken to cross-check the accuracy of data extraction? If not, this should be stated as a limitation. • Figure 2: it is not clear how the decision tree is applied in the case of mixed methods studies Results • Consideration could be given to other ways of presenting the data. The tables are very useful but extremely detailed and could be complemented by appropriate use of graphs (e.g. showing publications over time, proportion of publications by BARHII dimension etc). Discussion • The discussion makes statements about ‘research gaps’ based on studies spanning a very long period of time - 1965 to 2019. However, I think the discussion could be more nuanced. For instance, the fact that a particular area of research accounted for a low proportion of overall included studies may not necessarily be problematic. To demonstrate my point, as a contemporary sexual health researcher, the fact that (say) STI studies accounted for only 10% of the literature published since 1965 may not concern me if I knew that STI studies accounted for 50% of studies published in the last 10 years. Research gaps need to be interpreted in the context of shifting demographics, disease burdens etc.

REVIEWER	Gayle Halas University of Manitoba, Canada
REVIEW RETURNED	30-Aug-2020

GENERAL COMMENTS	**BMJ Open: Developing an evidence framework and assessing the evidence on migrant health research in Malaysia: a scoping review** Manuscript copy has a number of areas flagged for further authors’ review (see highlighted**)**

Abstract

- databases searched would be a good addition
- I question whether this makes a *methodological* contribution yet? Not sure this is best stated in the first line of the conclusion.

Article Summary

- P 2 Authors' line 29-30: fitting the articles in to BARHII framework? If so, what criteria were used to exclude? Consider rewording as BARHII providing the framework used to extract and examine the articles.
- p 3 authors' line 52: consider changing "evidence base" to "research"
- Pg 3 Authors' Line 62 – change "could" to "may"
- P 3 Authors' line 48: Would not consider this methodological research (Key word); scoping review would be a useful KW

Article purpose

- It is not clear why such a focus on quality and evidence is needed if simply scoping the research on [the nature and extent of] migrant health in Malaysia.
- I felt the word STATUS and ESTABLISH were not the most useful words to use in your objective, ie., " to explore the current status? and composition of migrant health research in Malaysia, and to establish? a framework to assess the quality of this academic literature." P 24 line 502 – this statement is inconsistent with your stated study purpose – but in fact is probably a more relevant way of stating the purpose of your review.

Outcomes

- Findings from the studies are well described. Few wording changes suggested. Would also recommend a different presentation of table 3….would be helpful to rank order the articles according to highest quality perhaps? Or according to the BARHII dimensions?
- Further consideration needed re quality viz. level of evidence.

Statistics

- A multiple-correspondence analysis (MCA)?? This is a new albeit very interesting approach for me. It would have been beneficial to describe how the points are plotted on the graph, and more appropriately label the axes.
- Again, not my area of expertise: how is the MCA affected by the size of the sample in each study and the number of studies?
- MCA: Why are different study designs used rather than the "levels of evidence" being proposed in this work?

Other comments

• Throughout the first section of the paper, I was uncertain of the scope of this work. It was very helpful to have the definitions provided, but might be strengthened even more by explicitly, up front, stating the term you will use to define your population of interest, and then stick to using that term thereafter. In my mind – the pop of interest is migrant individuals in Malaysia who may be experiencing health-related vulnerabilities.

• Methods: P 8 Authors' line 167: what exactly are unclassified migrants – is this the same as undocumented? (ie., different terminology being used comes across as confusing)

• Pg 9: For search strategy (particularly as provided in supplementary material) -- Why a list of conditions? Leaves the question of how these were determined or if it is complete (for example, "heart" is not specified). However, wider encompassing terms such as ailment*, health OR healthcare, morbidit* OR mortalit*, well-being OR wellbeing are present.

A decision tree was developed to classify the type of study design and level of evidence of each journal article. Did the author with expertise in EBM have significant input into the development of the decision tree?
Related concerns: Figure 2: subjective component regrading the decision of level 2 or 3 for qualitative studies. As stated in the footnote for Table 2: "Rigor was subjectively assessed and based on the number of included participants, amount of collected data, and detailed explanation how the study was conducted. " Not completely consistent with how trustworthiness is determined or conceptualized by qualitative methodologists.
Reliability: how did AS determine which BARHII health dimension was the focus or 'most prominent' within an article (as per PRISMA guideline for data charting process: describe…processes for obtaining and confirming data from investigators.) p 14 line 307

• P11 Authors line 232: data extracted and quality assessed by one reviewer - weakens reliability

• P 12 Authors line 268 – more detail needed to explain "incorporating feedback and multiple testing rounds"

• P 13 Lines 286-287 – how are these scoring bands determined?

• P 13 Lines 293-5 – how was the quality score calculated for variables versus articles?

• P 14 line 310 – perhaps change "existing" to 'strength of'

Results section: some very interesting findings presented here.

• P 18 line 383 – "foreign workers were with 36 articles…"- wording to be changed for easier reading. Line 388 – remove ~~"merely"~~ descriptive…makes it sound like weak research.

	• P20 Line 439 – its not the QUALITY of the evidence base….you are just reporting on a snapshot of research based on a determination of evidence LEVELS. • P23 Line 447 – please clarify what you mean by "non-appraised" article. (your table provides a better description) • P 21 Lines 466+ re study quality by study design…. this decontextualized information (ie not attached to the articles themselves) felt less useful. • P22 Line 475 – I don't think you mean research dimension; consider research design or approach • P 24 Line 511 – wording issue: what are "health outcomes of other dimensions"? Line 517-519: Non -health policies….countries" needs to be clarified, particularly a systematic review [of what?] in high income countries? • P 26 Line 554 – not just smoking behaviour. I think a more encompassing statement could be made about further research re risk behaviours and outcomes more generally. • P 26 Line 563, as a first line in a paragraph, I'm not clear on which "most studies" you are referring to? • Line 565-566; Not clear what is meant by "the latter issue could have occurred due to lacking information on the data used" • P 27 Line 571-573 : I suppose it is not surprising there are no studies on pops affected by illegal behaviour….perhaps change this to something like "…yet there is very little known about the health issues experienced by trafficked persons…." • P 27 line 586-7: the issue isn't the quality of the evidence base or the need to produce papers, but that there is a need to conduct research that will provide strong evidence to support practices and policies that will positively impact migrant health. • Pg 28 Line 595: not all identified peer-reviewed articles, but those that met the review inclusion criteria. • Lines 598-600 – wonder if this might be reworded to " we utilized a modified JBI toolkit and decision tree to help identify…, and found it to be useful for…." Similarly for p 31 lines 652-655: it would helpful to keep this open and invite people to use/modify this approach for enhancing understanding of the evidence base…etc…. • Tables 2 and 5: levels of evidence (from 1-4) are methodologically different in each design category so not sure the numbering system is suitable. Again – requires review/input from an EBM expert.

	• Would be helpful to know how the JBI tools were modified. • PRISMA checklist appended but not completed.

VERSION 1 – AUTHOR RESPONSE

Response to Reviewer 1 Comments

Point 4: The Sweileh et al. 2018 paper is an important reference included in the Introduction. It has a focus on global migrant health research and highlights a lack of empirical studies about labour migrants. The findings of this review, therefore, are important given that the majority of studies were about this population. It would be good to see an explicit discussion about these findings from Malaysia and the Swelieh et al, 2018 paper in the Discussion

Response 4: Thank you for the suggestion. We now discuss findings in relation to Swelieh's 2018 papers (on global migration health research outputs, and migrant worker health outputs respectively), in the Discussion.

Page 27, line 541-544

> *Despite the strong representation, over half the research papers concentrated on communicable diseases, while only a few examined non-communicable diseases, consistent with global research output on international migrant workers.*[114]

Page 27, line 548-552

> *We found that the majority of studies involved foreign workers (n=41/67), and only 10 studies examined asylum seekers and refugees as the primary population of interest. Our findings, therefore, offer useful synthesis on migrant worker's health specifically, which is lacking relative to studies on asylum seekers and refugees in global migration health research.*[14]

Point 5: Other countries have seen the value of scoping review e.g. Ireland (reference below) and it would be valuable to include this in the Introduction so readers can gain a sense of similar work in the field
https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-6651-2

Response 5: We have incorporated the feedback.

Page 6, line 103-105

> *Scoping reviews can be helpful to map the academic literature and have been used by different researchers to present the available evidence on migrant health in other countries.*[15 16]

Point 6: The authors explain that the rationale for the selection of the BARHII framework is that it was comprehensive and inclusive of various health dimensions, whereas most other models focused on specific public health elements or lacked clear explanation regarding the included health-related components of the model. Please include some references for these other models.

Response 6: Other models are, for example, the Rural Community Health and Well-being Framework and Public Health Outcomes Framework. We have added the references for these models to this section.

Page 8-9, line 136-139

> *The BARHII framework was selected due to its comprehensive nature and inclusion of various health dimensions, whereas other models focused on specific public health elements or lacked clear explanation regarding the included health-related components of the model.*[20 21]

Point 7: The meaning of the following sentence is not clear to me because it sounds like the authors are seeing the BARHII framework's emphasis on health inequities as a limitation of some kind? "Although the framework was developed to address health inequities, its coherent structure lends itself to this project as it allows the researchers to approach health from different perspectives".

Response 7: We have removed this sentence, as this information does not improve the article's clarity.

Point 8: The first paragraph in the Discussion makes excellent points about the need for migrant health governance, more epidemiological studies and attention to inter-sectoral contexts and collaboration. WHO Europe produced the first ever WHO Strategy and Action Plan for Refugee and Migrant Health in 2016 and makes important points like this. The authors may wish to include a reference:
https://www.euro.who.int/en/about-us/governance/regional-committee-for-europe/past-sessions/66th-

session/documentation/working-documents/eurrc668-strategy-and-action-plan-for-refugee-and-migrant-health-in-the-who-european-region

Response 8: We have added the reference to the sentence on page 25, lines 494 to 497.

Among the five BARHII health dimensions, institutional inequities, and mortality and morbidity were the least represented. Yet, studies concerning the influence of governance on migrant health are of utmost importance, as overarching governance can affect health outcomes of the other BARHII dimensions.[99 100]

Response to Reviewer 2 Comments

Point 9: Line 64. Use the current global estimate of migrant workers which is 272 million according to the World Migration Report 2020.

Response 9: We have made the recommended changes and added the World Migration Report 2020 reference.

Page 5, line 63-64

Worldwide, the international migrant population accounts for approximately 272 million people, with almost one-third within Asia.[1]

Point 10: Try to minimize the use of definition of the terms like refugees, asylum seekers, regular or irregular migrants etc. You can provide the links to the reference if you wish.

Response 10: We have removed most of the in-text definitions and created a definitions table (please, see Table 1 in the manuscript).

Page 5, line 68-76

DOSM defines a non-citizen as a person that resides in Malaysia for six months or more in the reference year.[4] However, no subcategories were included in this definition. According to the Office of the United Nations High Commissioner for Human Rights (OHCHR), a non-citizen is an individual that does not have an effective connection with the location where the person is situated according to the host nation, and includes various types of migrants, such as foreigners with permanent residency, refugees, asylum seekers, foreign labour, international students, stateless individuals, and victims of human trafficking.[5] Other definitions of migrant-related terms that are used in this paper are presented in Table 1.

Point 11: Line 105. All foreign workers are not vulnerable to health risk, please consider specifying the sub-groups like low-skilled labour migrants.

Response 11: We have made the recommended changes.

Page 6, line 94-96

Refugees, asylum seekers, and both documented and undocumented low-skilled foreign workers can be classified as vulnerable migrants in Malaysia, as these populations may face significant hardships in their new country of residence.[9 10]

Point 12: Line 142. Give reference to Bay Area Regional Health Inequities Initiative (BARHII) framework if possible.

Response 12: We have added the reference.

Page 8, line 122-123

Data were extracted and organised using the Bay Area Regional Health Inequities Initiative (BARHII) framework.[18]

Point 13: Line 149. Patient and public involvement usually means how the potential beneficiaries (i.e. researchers for this review) were discussed and consulted for this review.

Response 13: Thank you for the clarification. We have made the following changes:

Page 8, line 130-132

> *There were no patients involved in this study. The findings of this study were presented at the Migrant Health Research Dissemination Workshop in Kuala Lumpur to stakeholders working on migrant health in Malaysia.*[19]

Point 14: Line 262. Description of level of evidence is repeated and also I think it best fits in line 250-51.

Response 14: Although the information concerning the level of evidence was not repeated, we have made some changes to clarify this section.

Page 13, line 240-251

> *The decision tree built on the study design tree from the Centre for Evidence-Based Medicine (CEBM)*[24] *and essentially allowed research of varying designs to be consistently, reliably classified into one of several design families. The newly developed decision tree was created through a two-step process. First, a definitions table of included research designs was developed to adapt specific characteristics of each definition into the decision tree to identify the paper's study design (Table 2).*
>
> *[INSERT TABLE 2]*
>
> *Second, Tomlin & Borgetto's*[29] *model was utilised to identify the level of evidence of the included literature, as the study designs that were included in their model were in line with the research designs in the definitions table.*

Point 15: Line 425 to 428, repeated from methods.

Response 15: We have removed this part.

Point 16: Results on level of evidence could be summarized because associated table is self-explanatory.

Response 16: We have made the recommended changes and summarised this section.

Page 22-23, line 455-466

> *In general, the quality of the evidence base on migrant health in Malaysia is low (49.2%) and consists mostly of level 3 evidence papers (n=27/65). Level 2 evidence represents 38.5% of the evidence base (n=25/65), followed by level 4 evidence papers (n=13/65). No level 1 evidence studies (systematic reviews or meta-analyses) were identified. The majority of the papers (n=41/65) focused on foreign workers, however, studies that included asylum seekers and refugees have the highest mean quality (58.4%). Furthermore, only four out of five BARHII health dimensions were included in the quality assessment. The living conditions dimension has the highest average score (59.7%), followed by the risk behaviour dimension (48.7%), mortality and morbidity dimension (47.9%), and the disease and injury dimension (46.3%). Moreover, the descriptive research category represents the majority (70.8%) of the evidence base with a mean quality of 47.7%. The qualitative research category has the highest mean quality and is the only research category with a high-quality score (76%).*

Point 17: It would be interesting to understand main source of research on migration health in Malaysia (e.g. government institutions, public/private national academic institutions of Malaysia, international academic institutions, international organisations such as WHO or IOM etc). It would also useful to know if there are any discernible pattern of migration health research targeted to specific origin country (or countries) of the migrants or migrants from which countries are more/less studied.

Response 17: Thank you for the suggestion. As with other countries, migration health research is comprised of a mix of the sources above - there were no discernible patterns by source, but as noted in the Limitations section, only peer-reviewed literature was searched, which may have missed some relevant grey literature from UN agencies and NGOs. We also did not find any specific patterns of investigation by migrant origin country. Given these findings, we do not think it relevant to include this as a discussion point in the paper.

Point 18: Line 602, expatriates were not included in the review, it is not clear how expatriates were defined and how they differ from foreign workers.

Response 18: We have added some examples to show the difference between expatriates and foreign workers.

Page 29, line 589-594

> *As this paper focuses exclusively on vulnerable migrants within the non-citizen population in Malaysia, we excluded other non-citizen groups, such as expatriates and international students, based on the assumption that these groups are less vulnerable (e.g., expatriates in Malaysia have more privileges in terms of recognition regarding their roles in society, receive better financial compensation, and tend to have access to many other benefits compared to foreign workers).*

Response to Reviewer 3 Comments

Point 19: The paragraph commencing line 87 is very 'definition heavy'. It may be more appropriate to paraphrase the definitions here and set them out more fully in the methods section (e.g. at line 167).

Response 19: Please, see '**Response 10.**'

Point 20: The reference used to support the statement "the total number of migrant workers is estimated to fall" was published in 2015. Is there a more contemporary source available to support this proposition?

Response 20: We have changed the old reference to a reference from the IOM (2020)

Page 5, line 83-84

> *However, the total number of migrant workers, both documented and undocumented, is estimated to fall between 4.2 and 6.2 million people.*[2]

Point 21: The introduction would benefit from a greater explanation as to why it is necessary to collate and summarise all publications since 1965. What is the relevance of such a broad

retrospective review, as opposed to a review that is more focussed on recent studies (e.g. since 2000)?

Response 21: Thank you for the suggestion. We have decided not to give an explanation for the year cut-off (1965) in the introduction, but in the methods section.

Page 11, line 204-206

> *Studies were excluded if they were: 1) conducted or included data from 1965 or earlier, as Singapore was part of Malaysia until 1965, and this study is careful to only include Malaysia studies without Singapore; …*

Point 22: Line 140. Consistent with PRISMA-ScR guidelines, please specify how the protocol can be accessed (e.g. on request from the first-named author).

Response 22: We have incorporated the feedback.

Page 8, line 121-122

> *The pre-review protocol can be accessed on request from the first author.*

Point 23: Line 146, “data was” should be “data were”

Response 23: We have incorporated the feedback.

Page 8, line 122-123

> *Data were extracted and organised using the Bay Area Regional Health Inequities Initiative (BARHII) framework.[18]*

Point 24: Line 191. It may be useful to explain the logic behind these choices of databases, especially EconLit

Response 24: We have incorporated the feedback and added some references to this section.

Page 10, line 176-179

Based on the guidelines of the London School of Hygiene and Tropical Medicine[22] and Bramer et al[23] on selecting the number and types of databases that should be included in biomedical systematic searches, six databases were selected for this study: Econlit, Embase, Global Health, Medline, PsycInfo, and Social Policy and Practice.

Point 25: Line 193. It may be necessary to explain why the databases were searched from date of inception notwithstanding that studies were excluded if they were conducted or included data from 1965 or earlier.

Response 25: We have incorporated the feedback.

Page 10, line 179-182

This scoping review includes studies from 1965 onwards until 2019. However, all records (including records published before 1965) were retrieved to manually screen the data for publication date-related issues.

Point 26: Line 202. It is stated that studies were included if they were conducted in Malaysia (it is not clear to me whether this includes cross-national studies in which Malaysia was included – I assume so but please specify if not)

Response 26: We have incorporated the feedback.

Page 11, line 192-193

Studies were eligible for inclusion if they met the following inclusion criteria: 1) conducted in Malaysia, including cross-national studies in which Malaysia was included; …

Point 27: Line 207. The decision to include only English studies (and not papers published in Bahasa Malaysia) seems very significant and the logic for imposing this criterion should be stated very clearly.

Response 27: This decision is based on the fact that the first author does not speak the Malaysian language. Therefore, he would not have been able to verify the data from the second reviewer. However, only one paper in Bahasa Malaysia was identified and is mentioned in the limitations section.

Page 29, line 600-601

> *Also, only English language articles were included, resulting in the exclusion of one paper in Bahasa Malaysia (the Malay language).*[120]

Point 28: Line 209. The sixth inclusion criteria is “inclusion of (im)migrants, foreign workers” etc (it is not clear to me whether this means that the review included general population surveys that may have included – but not been directly aimed at - migrants)

Response 28: We have incorporated the feedback.

Page 11, line 199-203

> *… 6) inclusion of international (im)migrants, foreign workers, asylum seekers, and refugees, as these groups were considered as vulnerable migrant populations in Malaysia. Articles that included both migrants and the general population were included in this study if sufficient information concerning the migrant population was available.*

Point 29: Line 230. AS screened all articles and DC screened a 20% sample. According to Figure 3, discrepancies were found in approximately 13% of that sample. This should be explicitly stated in the text together with a brief description of the nature of the discrepancies.

Response 29: We have incorporated the feedback.

Page 12, line 224-226

In both stages, the discrepancies were about 13% to 14% of the papers and were mostly around the study design and target populations. Conflicts were examined and resolved by NP.

Point 30: Line 232. Data were extracted by one reviewer. Were any steps taken to cross-check the accuracy of data extraction? If not, this should be stated as a limitation.

Response 30: We mentioned this issue in the limitations section. However, we have incorporated an additional statement concerning this matter in the methods section to improve the transparency of this article.

Page 13, line 231-232

Data extraction and categorisation into the BARHII framework categories was not cross-checked by a second reviewer due to time and human resource constraints.

Page 30, line 604-606

Inter-rater reliability was limited to a 20% sample of the records in the first screening stage, and no data extraction nor quality assessment was verified by a second reviewer due to resource constraints.

Point 31: Figure 2: it is not clear how the decision tree is applied in the case of mixed methods studies

Response 31: We have incorporated the feedback.

Page 13, line 235-236

Although various research designs were included in the decision tree, some study designs did not fit in this model, such as the mixed-method design.

Point 32: Consideration could be given to other ways of presenting the data. The tables are very useful but extremely detailed and could be complemented by appropriate use of graphs (e.g. showing publications over time, proportion of publications by BARHII dimension etc).

Response 32: We have created three additional figures (bar charts) to present overviews of the number of studies disaggregated by health dimension, type of migrant, and research design (please, see Figures 4-6 in the manuscript).

Page 18, line 353-354

> *Figures 4 and 5 present overviews of the number of studies disaggregated by health dimension and type of migrant, respectively.*

Page 22, line 446-447

> *In addition, Figure 6 shows an overview of the number of studies disaggregated by research design.*

Point 33: The discussion makes statements about 'research gaps' based on studies spanning a very long period of time - 1965 to 2019. However, I think the discussion could be more nuanced. For instance, the fact that a particular area of research accounted for a low proportion of overall included studies may not necessarily be problematic. To demonstrate my point, as a contemporary sexual health researcher, the fact that (say) STI studies accounted for only 10% of the literature published since 1965 may not concern me if I knew that STI studies accounted for 50% of studies published in the last 10 years. Research gaps need to be interpreted in the context of shifting demographics, disease burdens etc.

Response 33: Thank you for this interesting point. This review catalogues the breadth and quality of migrant health research in Malaysia since the beginnings of nationhood to the present day, which may not take into account shifting demographics, disease burdens and corresponding research priorities. Therefore, future research could focus on subsequent analyses of this dataset to explore these nuances.

Response to Reviewer 4 Comments

Point 34: Abstract – Databases searched would be a good addition.

Response 34: Please, see '**Response 1**.'

Point 35: I question whether this makes a *methodological* contribution yet? Not sure this is best stated in the first line of the conclusion.

Response 35: We have removed this part from the conclusion in the abstract.

Point 36: Page 2 Authors' line 29-30. Fitting the articles in to BARHII framework? If so, what criteria were used to exclude? Consider rewording as BARHII providing the framework used to extract and examine the articles.

Response 36: We have reworded this section.

Page 2, line 28-31

> *Studies were eligible for inclusion if they were conducted in Malaysia, peer-reviewed, focused on a health dimension according to the Bay Area Regional Health Inequities Initiative (BARHII) framework, and targeted the vulnerable international migrant population.*

Point 37: Page 3 authors' line 52. Consider changing "evidence base" to "research."

Response 37: We have changed "evidence base" to "research."

Page 4, line 52-54

> *This study provides a comprehensive overview of migrant health research in Malaysia, including a summary table, critical assessment tables, and a multiple-correspondence analysis (MCA).*

Point 38: Page 3 Authors' Line 62. Change "could" to "may."

Response 38: We have changed “could” to “may.”

Page 4, line 59-61

> *Only English peer-reviewed academic articles were included in this study, and, therefore, much relevant information that could potentially be used to inform both policies and practice may have been excluded from this review.*

Point 39: Page 3 Authors’ line 48. Would not consider this methodological research (Key word); scoping review would be a useful KW Article purpose

Response 39: We have changed the key word “methodological research” to “evidence assessment framework.”

Page 3, lines 48-49

> ***Key Words:*** *Malaysia, migrant, health, refugee, foreign worker, disease, evidence assessment framework*

Point 40: It is not clear why such a focus on quality and evidence is needed if simply scoping the research on [the nature and extent of] migrant health in Malaysia.

Response 40: In scoping reviews, quality appraisal according to PRISMA-ScR guidelines,[17] is optional, as long as authors state the rationale for doing so. We provide this rationale in the Introduction:

Page 6-7, line 109-113

> *Aggravating the matter, there is no overall picture currently available of the evidence base on migrant health in Malaysia, including critical appraisal of the quality of research. Therefore, this study aims to map the existing academic literature on migrant health in Malaysia since 1965 to identify the gaps in this field, as well as to present an overview of the quality and level of evidence of these scientific studies.*

Point 41: I felt the word STATUS and ESTABLISH were not the most useful words to use in your objective, ie., " to explore the current status? and composition of migrant health research in Malaysia, and to establish? a framework to assess the quality of this academic literature." P 24 line 502 – this statement is inconsistent with your stated study purpose – but in fact is probably a more relevant way of stating the purpose of your review.

Response 41: We have incorporated the feedback and reworded this section.

Page 2, line 24-26

> *This study aims to map the existing academic literature on migrant health in Malaysia and to provide an overview of the quality and level of evidence of these scientific studies.*

Point 42: Findings from the studies are well described. Few wording changes suggested. Would also recommend a different presentation of table 3....would be helpful to rank order the articles according to highest quality perhaps? Or according to the BARHII dimensions?

Response 42: Thank you for the suggestion. However, we will keep this order, as the table is organised from oldest article first to latest article last.

Point 43: Further consideration needed re quality viz. level of evidence.

Response 43: We present findings on mean study quality by study design, in relation to the level of evidence in Table 6., with discussion of these findings on pages 22-23, line 442-466. Given the already long word count and extensive description of findings by BARHII dimension, we prefer not to expand this section further. In our view doing so would not add to the findings.

Point 44: Statistics – A multiple-correspondence analysis (MCA)?? This is a new albeit very interesting approach for me. It would have been beneficial to describe how the points are plotted on the graph, and more appropriately label the axes.

Response 44: The MCA is a latent analysis that summarises the relationship between the levels of categorical variables. It projects categories in a bi-dimensional space based on weighted Euclidean distances. The axes are statistical latent dimensions and, therefore, not possible to label.

We have also added more information to this section to describe the MCA better.

Page 16, line 309-322

> *An MCA is a descriptive technique that can be utilised to visually demonstrate relationships among the levels of several categorical variables – here, these include the type of migrant, main health dimension, quality of the study, and research design – in a two-dimensional space. The MCA projects categories in a two-dimensional space with axes defined by latent dimensions (and, therefore, it is not possible to label the axes), based on weighted Euclidean distances.[31] The MCA allows categories with similar profiles to be grouped together, where a closer distance of categories within the same quadrant demonstrates a stronger relationship, whereas categories that are further apart and in opposite quadrants present weaker associations.[32] In addition to the MCA, chi-square tests were conducted to assess whether categorical variables were independent (e.g., not associated). It should be noted that a few studies included two BARHII dimensions, yet, the analysis only allowed one dimension to be included. Therefore, only the most prominent dimension, based on the amount of attention given to the specific dimension in the article, was selected and used for the analysis.*

Point 45: Statistics – Again, not my area of expertise: how is the MCA affected by the size of the sample in each study and the number of studies?

Response 45: The multiple correspondence analysis is a descriptive technique with no statistical assumptions. There is no significance test in the analysis, therefore the size of the sample will not affect the results of the analysis. However, larger sample sizes produce more robust results since the analysis is sensitive to variations in values.

Point 46: Statistics – MCA: Why are different study designs used rather than the “levels of evidence” being proposed in this work?

Response 46: The MCA requires categorical variables and ‘levels of evidence’ is an ordinal variable. However, Table 3 presents the correspondence between research designs and levels of evidence. The results of the analysis types of design can also be interpreted alluding to levels of evidence.

Point 47: Throughout the first section of the paper, I was uncertain of the scope of this work. It was very helpful to have the definitions provided, but might be strengthened even more by explicitly, up front, stating the term you will use to define your population of interest, and then stick to using that term thereafter. In my mind – the pop of interest is migrant individuals in Malaysia who may be experiencing health-related vulnerabilities.

Response 47: Please, see '**Response 10**.'

Point 48: Page 8 Authors' line 167. What exactly are unclassified migrants – is this the same as undocumented? (ie., different terminology being used comes across as confusing)

Response 48: We have added an explanation to this section.

Page 9, lines 149 to 151

> *The lattermost category was applied if a paper used the term 'migrants' or 'immigrants' but lacked specific information to classify the study population as foreign workers or asylum seekers/refugees.*

Point 49: Page 9. For search strategy (particularly as provided in supplementary material) -- Why a list of conditions? Leaves the question of how these were determined or if it is complete (for example, "heart" is not specified). However, wider encompassing terms such as ailment*, health OR healthcare, morbidit* OR mortalit*, well-being OR wellbeing are present.

Response 49: We have added an explanation to this section.

Page 10-11, line 182-190

> *The search process was conducted by AS and included a two-stage procedure to ensure that the search was exhaustive and to minimise the risk of missing potentially eligible studies. The first stage focused on identifying English-language key words and Medical Subject Headings (MeSH) terms for migrants (e.g., immigrants, foreign workers, refugees), health (e.g., disease, infection, disorder), and Malaysia (e.g., Sabah, Kuala Lumpur) through reading search strategies of other review studies on migrant health as well as looking over medical*

terminology of renowned medical institutions, such as the Mayo Clinic. Subsequently, these items were combined by using Boolean operators (e.g., migrant AND health AND Malaysia) in the search platform of each database (Supplementary file 2).

Point 50: A decision tree was developed to classify the type of study design and level of evidence of each journal article. Did the author with expertise in EBM have significant input into the development of the decision tree?

Response 50: We used the CEBM framework as a starting point for creating the decision tree, followed by Tomlin & Borgetto's evidence-based pyramid model, as described in the Methods section (page 13-14, line 233-270). The lead author led decision tree development, supported by co-authors with expertise in systematic reviews and evidence frameworks.

Point 51: Related concerns: Figure 2: subjective component regarding the decision of level 2 or 3 for qualitative studies. As stated in the footnote for Table 2: "Rigor was subjectively assessed and based on the number of included participants, amount of collected data, and detailed explanation how the study was conducted. "Not completely consistent with how trustworthiness is determined or conceptualized by qualitative methodologists.

Response 51: Tomlin & Borgetto (2011) used the categories 'more rigor' and 'less rigor' in their model. Unfortunately, they did not describe how to objectively assess the level of rigor in a qualitative study, and only provided three subjective criteria: a) prolonged engagement with participants; b) triangulation of data (multiple sources); c) confirmation of data analysis and interpretation (peer and member checking). Therefore, we do admit that this is a limitation of the decision tree, and we would like to address this aspect in future research to improve our model.

Point 52: Reliability. How did AS determine which BARHII health dimension was the focus or 'most prominent' within an article (as per PRISMA guideline for data charting process: describe...processes for obtaining and confirming data from investigators.) p 14 line 307

Response 52: We have added an explanation to this section.

Page 16, line 318-322

It should be noted that a few studies included two BARHII dimensions, yet, the analysis only allowed one dimension to be included. Therefore, only the most prominent dimension, based on the amount of attention given to the specific dimension in the article, was selected and used for the analysis.

Point 53: Page 11 Authors line 232. Data extracted and quality assessed by one reviewer - weakens reliability.

Response 53: Please see '**Response 30**.'

Point 54: Page 12 Authors line 268 – more detail needed to explain "incorporating feedback and multiple testing rounds."

Response 54: We have added some additional information to this sentence.

Page 14, line 267-270

After incorporating feedback on the questions used to identify the research design and multiple testing rounds to assess if the questions were specific enough to distinguish these designs within the full set of articles, the final version of the decision tree – as seen in Figure 2 – was used to extract the data.

Point 55: Page 13 Lines 286-287 – how are these scoring bands determined?

Response 55: We have added an explanation to this section.

Page 15, line 286-301

As the JBI toolkit has no standard scoring index, the following scoring system was applied: 1) low quality = 0% to 50%; 2) moderate quality = above 50% and below 75%; 3) high quality = 75% or higher. Although a four-band scoring system – where each category would include a 25% scoring range – was considered, a three-band scoring system was selected because the

three given categories – low, moderate, and high – would simplify the interpretation concerning the quality of the study. In a four-band system, the distinction and classification of the two middle categories are less straightforward compared to the three-band scoring system. Further, the first two categories in a four-band scoring system would still represent a poor-quality study, and, hence, should be used to signal more cautious interpretation of the study results among readers. The cut-off score was based on the idea that if a study could answer 'yes' to only half or less of the questions, it would not be sufficient to transmit a reliable message to the audience. Therefore, at least more than half of the questions should be answered with 'yes' to obtain a moderate score. The 75% cut-off was still based on the idea of having four equal scoring categories, where 75% and above would be classified as a high-quality study and would inform the audience with a more credible message.

Point 56: Page 13 Lines 293-5 – how was the quality score calculated for variables versus articles?

Response 56: We have added some information to clarify this point.

Page 16, line 305-307

Mean quality scores were calculated for the different variables by using Microsoft Excel, including the type of migrant, health dimension, health subdimension, research design, and level of evidence.

Point 57: Page 14 line 310 – perhaps change "existing" to 'strength of'

Response 57: We have reworded this section, please see '**Response 44**.'

Point 58: Page 18 line 383 – "foreign workers were with 36 articles..."- wording to be changed for easier reading.

Response 58: We have reworded this sentence.

Page 20, line 401-403

Most articles (n=36/46) studied foreign workers,[37 40 43 44 46-56 58-60 66 69 73-75 78 79 81 83-86 89 91-93 95 97] while only six and four articles included unclassified migrants[39 45 57 65 68 70] and refugee populations,[33 34 71 87] respectively.

Point 59: Line 388 – remove “merely” descriptive...makes it sound like weak research.

Response 59: We have removed the word “merely” in this sentence.

Page 20, line 406-407

Most of the studies were descriptive and presented that migrants, irrespective of the defined type, represented a significant share among the study populations.

Point 60: Page 20 Line 439 – its not the QUALITY of the evidence base....you are just reporting on a snapshot of research based on a determination of evidence LEVELS.

Response 60: We do talk about the quality of the evidence base, as we conducted critical appraisal to assess the quality of the articles. In addition, we assessed the level of evidence of the articles.

Point 61: Page 23 Line 447 – please clarify what you mean by “non-appraised” article. (your table provides a better description)

Response 61: We have removed the ‘non-appraised’ sentence and reworded this section.

Page 22, line 444-446

Two articles – representing a scoping review[72] and mixed-method design[80] – were excluded from this assessment, as the JBI toolkit does not accommodate these study designs.

Point 62: Page 21 Lines 466+ re study quality by study design.... this decontextualized information (ie not attached to the articles themselves) felt less useful.

Response 62: Please, see '**Response 16**'.

Point 63: Page 22 Line 475 – I don't think you mean research dimension; consider research design or approach.

Response 63: We have changed the word "dimension" to "category."

Page 23, line 464-466

> *Moreover, the descriptive research category represents the majority (70.8%) of the evidence base with a mean quality of 47.7%. The qualitative research category has the highest mean quality and is the only research category with a high-quality score (76%).*

Point 64: Page 24 Line 511 – wording issue: what are "health outcomes of other dimensions"?

Response 64: We have reworded this sentence.

Page 25, line 493-496

> *Among the five BARHII health dimensions, institutional inequities, and mortality and morbidity were the least represented. Yet, studies concerning the influence of governance on migrant health are of utmost importance, as overarching governance can affect health outcomes of the other BARHII dimensions.*[99 100]

Point 65: Line 517-519. Non-health policies....countries" needs to be clarified, particularly a systematic review [of what?] in high income countries?

Response 65: We have reworded this sentence.

Page 25, line 503-505

> *Furthermore, a recent systematic review on the effects of non-health-targeted policies on migrant health in high-income countries showed that non-health policies (e.g., restrictive immigration policies) were associated with poor health outcomes.*[103]

Point 66: Page 26 Line 554 – not just smoking behaviour. I think a more encompassing statement could be made about further research re risk behaviours and outcomes more generally.

Response 66: We have incorporated the feedback.

Page 27, line 537-539

> *Therefore, future research should further explore the differences in other risk behaviours, such as smoking, between Malaysians and migrants in Malaysia.*

Point 67: Page 26 Line 563, as a first line in a paragraph, I'm not clear on which "most studies" you are referring to?

Response 67: We have reworded this sentence.

Page 27, line 548-549

> *We found that the majority of studies involved foreign workers (n=41/67), and only ten studies examined asylum seekers and refugees as the primary population of interest.*

Point 68: Line 565-566. Not clear what is meant by "the latter issue could have occurred due to lacking information on the data used"

Response 68: We have reworded this sentence.

Page 27-28, line 552-556

> *Furthermore, eleven studies did not specify the included migrant population. This issue could have occurred due to missing information on the type of migrant in the dataset that the researchers used for their studies. For example, the Ministry of Health (MOH) will not report anything more detailed than 'non-Malaysian,' as no further information on non-citizens are collected during patient registration at MOH facilities.*

Point 69: Page 27 Line 571-573: I suppose it is not surprising there are no studies on pops affected by illegal behaviour....perhaps change this to something like "...yet there is very little known about the health issues experienced by trafficked persons...."

Response 69: We have reworded this sentence.

Page 28, line 558-560

> *Also, human trafficking could significantly affect a person's health and vulnerability, yet, there is very little known about the health issues experienced by trafficked persons in Malaysia.*[116]

Point 70: Page 27 line 586-7. The issue isn't the quality of the evidence base or the need to produce papers, but that there is a need to conduct research that will provide strong evidence to support practices and policies that will positively impact migrant health.

Response 70: We have reworded this sentence.

Page 28, line 573-575

> *Therefore, there is a clear need to conduct research that will provide strong evidence to support practices and policies that will positively impact migrant health.*

Point 71: Page 28 Line 595. Not all identified peer-reviewed articles, but those that met the review inclusion criteria.

Response 71: We have incorporated the feedback.

Page 29, line 581-583

> *This study is the first systematic literature synthesis and scoping review on migrant health in Malaysia and presents a comprehensive overview of all identified peer-reviewed articles that met the inclusion criteria.*

Point 72: Lines 598-600 – wonder if this might be reworded to “we utilized a modified JBI toolkit and decision tree to help identify..., and found it to be useful for....” Similarly for p 31 lines 652-655: it would helpful to keep this open and invite people to use/modify this approach for enhancing understanding of the evidence base...etc....

Response 72: We have incorporated the feedback.

Page 29, line 584-588

> *Furthermore, we utilised a self-developed decision tree and modified JBI checklists to help identify the type of study design and corresponding level of evidence of the included studies. We found this evidence assessment framework to be useful for the quality assessment of migrant health-related studies, and it might be useful for other research fields as well.*

Point 73: Tables 2 and 5: levels of evidence (from 1-4) are methodologically different in each design category so not sure the numbering system is suitable. Again – requires review/input from an EBM expert.

Response 73: Table 2 (changed to Table 3, see page 54) and Table 5 (changed to Table 6, see page 72) are the same, however, Table 5 splits up ‘case series’ and ‘prevalence study without analytical component’ to make sure that every individual research design gets its own attention.

Point 74: Would be helpful to know how the JBI tools were modified.

Response 74: We have developed objective criteria for each question of the JBI checklists, as the previous criteria was rather subjective, and, therefore, could affect critical appraisal scores among researchers due to a different interpretation of the question. Also, we have slightly modified the sentence on this matter.

Page 14-15, line 275-279

> *Additional objective criteria specific to migrant health studies were developed for each question of the JBI checklists to increase the reliability of the quality assessment. After discussing the additional criteria and piloting the tools, slight modifications were made for the JBI tools, and these final versions were used to assess the quality of the papers. The modified checklists can be accessed on request from the first author.*

Point 75: PRISMA checklist appended but not completed.

Response 75: The PRISMA checklist was completed, but it was attached as a separate file. Please see the PDF file (Supplementary file 1).

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VERSION 2 – REVIEW

REVIEWER	Daniel Vujcich Curtin University, Australia
REVIEW RETURNED	12-Nov-2020

GENERAL COMMENTS	Thank you for addressing our feedback. I am generally satisfied with the revisions. In my view, two points still need to be addressed: (1) point 21 - I am not seeking an explanation for the cut-off year, rather the paper requires a statement of the RELEVANCE of such a broad retrospective review. Basically, as a reader, I want to know why a review going back to 1965 is needed and valuable (as opposed to a more focused, in-depth review of more contemporary literature).

	(2) point 27 - the limitation section states "only English language articles were included, resulting in the exclusion of one paper in Bahasa Malaysia". I think this statement could create a misleading impression. One reason that you did not find more relevant articles in Bahasa Malaysia may be the fact that you did not include Malaysian keywords in your search terms and you did not specifically search Malaysian language journals and databases. Certainly, language biases are common in literature reviews; however, I feel that the limitation is particularly pertinent in this case because you are seeking to provide a comprehensive review of the literature from/about one country without devising a search strategy that is tailored to the official language of that country. I need more information to be convinced that this is not a serious problem with your study design. The following reference may be useful: https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-018-0786-6. The Cochrane Handbook also notes that "Removing language restrictions in English language databases is not a good substitute for searching non-English language journals and databases": https://training.cochrane.org/handbook/current/chapter-04

REVIEWER	Gayle Halas University of Manitoba. Canada
REVIEW RETURNED	15-Nov-2020

GENERAL COMMENTS	For authors: Line 24: needs an additional word - “Procuring proper health care…” Line 32: could “self-developed” be changed to something like “a decision tree developed by the project team” or for simplicity in the abstract: ‘:…a newly developed decision tree…” Line 38 some wording lending confusion. Does the following change convey the intended message? On average, the quality of the papers was low, yet quality differed significantly among papers using various research designs and addressing the range of health dimensions. Line 105: Related to use of the word “evidence”….more accurate to state “evidence on migrant health <concerns or issues or needs>…” Line 126: JBI needs a citation Line 128: more clarity on what those variables are? …BARHII dimensions or factors and levels of evidence? Line 120-132: This addition doesn’t really speak to patient and public involvement since the presentation was delivered to stakeholders working on migrant health. I would suggest removing so as not to confuse the puprpose of engaging individuals with lived experience. Second, simply saying a presentation was provided without conveying their feedback and how it was relevant to this work, is not useful. Line 147: change to “which was…” (singular referring to population) Line 180: clarity needed…please identify where these additional records came from. Also, not clear on why it is explicitly stated that records published before 1965 are included – this runs contrary to what is stated in the exclusion criteria re including Malaysia and not Singapore. 206 studies without Singapore; Line 187: “looking over” too parochial for a systematic review Line 221: should say “inclusion criteria”

	Line 230: This is the first mention of “subdimensions” and although described later and in Figure 4, it would be beneficial to further describe at this point in the paper. Line 232: still a weakness. I think the authors could provide some argument about the reliability of the data extraction process, based on the level of interpretation that was needed (or not needed) to extract the data. For example, if fairly objective indicators (such as cancer diagnosis) were extracted into the disease and injury category, then one would expect a more trustworthy process of data extraction. Line 244: not clear on what is being adapted. Lines 277-279: If the modified checklists are not provided, inserting an example of a modification would be helpful. Results section: Table 4 and results sections should be organized similarly (ie following BARHII health dimensions). Line 364-366: Interesting statement but in my opinion, how does it relate to your review question? That needs to be explicit. Line 399: Spelling: Injury Line 488: no research gaps are presented in the findings. Not clear where Table 7 recommendations are coming from. Lines 611-627 – this minimizes your entire study! Suggesting an alternate approach (or alternate tools) suggests an entirely different study. I don’t believe what is stated here is a limitation, however maybe just one or two lines that simply suggests the use of additional elements (such as…X.Y.Z…) would be beneficial for future study. Figure 1 – permission to use this graphic?

VERSION 2 – AUTHOR RESPONSE

Response to Reviewer 3 Comments

Point 3: I am not seeking an explanation for the cut-off year, rather the paper requires a statement of the RELEVANCE of such a broad retrospective review. Basically, as a reader, I want to know why a review going back to 1965 is needed and valuable (as opposed to a more focused, in-depth review of more contemporary literature).

Response 3: We have included papers from 1965 onwards to identify if specific trends were happening (e.g., did the specific focus area in migrant health research change over the years; did the quality of the papers improve over the years?) As a result, we learned that the data set was quite heterogenous, and, hence, did not observe any specific trends in the research area (within migrant health) or in the quality of the papers. We have added this statement to the paper.

Page 7, lines 107-110

> *Therefore, this study aims to map the existing academic literature on migrant health in Malaysia since 1965 to identify the trends and gaps in this field, as well as to present an overview of the topical coverage, quality, and level of evidence of these scientific studies*

Page 38, lines 360-361

The literature was first assessed to understand the trends and topical coverage of research against the six dimensions of the BARHII public health framework.

Page 48, lines 514-517

In terms of research trends, no specific changes in health dimension or quality have been observed over the last six decades. However, it should be noted that qualitative research made its entry in the early 2010s and made up a vast amount of the papers published in recent years.

Point 4: the limitation section states "only English language articles were included, resulting in the exclusion of one paper in Bahasa Malaysia". I think this statement could create a misleading impression. One reason that you did not find more relevant articles in Bahasa Malaysia may be the fact that you did not include Malaysian keywords in your search terms and you did not specifically search Malaysian language journals and databases. Certainly, language biases are common in literature reviews; however, I feel that the limitation is particularly pertinent in this case because you are seeking to provide a comprehensive review of the literature from/about one country without devising a search strategy that is tailored to the official language of that country. I need more information to be convinced that this is not a serious problem with your study design.

Response 4: Thank you for the thorough explanation, and we agree with your point. We have modified this section.

Page 53, lines 627-632

Also, only English language articles were included, resulting in the exclusion of one identified paper in Bahasa Malaysia (the Malay language).[120] Aggravating the issue, other Malaysian articles might not have been identified due to the lack of Malaysian keywords in the search strategy. As a result, much relevant information that could potentially be used to inform both policies and practice, as well as to make this review more comprehensive, may have been excluded from this review.

Response to Reviewer 4 Comments

Point 5: Line 24: needs an additional word - "Procuring proper health care…"

Response 5: We have modified this sentence.

Page 2, lines 23-24

> ***Background:*** *A large number of international migrants in Malaysia face challenges in obtaining good health, the extent of which is still relatively unknown.*

Point 6: Line 32: could "self-developed" be changed to something like "a decision tree developed by the project team" or for simplicity in the abstract: ':…a newly developed decision tree…"

Response 6: We have modified this sentence.

Page 2, lines 31-33

> *Data were extracted by using the BARHII framework and a newly developed decision tree to identify the type of study design and corresponding level of evidence.*

Point 7: Line 38 some wording lending confusion. Does the following change convey the intended message?
"On average, the quality of the papers was low, yet quality differed significantly among papers using various research designs and addressing the range of health dimensions."

Response 7: We have modified this sentence.

Page 2, lines 38-39

> *The average quality of the papers was low, yet quality differed significantly among them.*

Point 8: Line 105: Related to use of the word “evidence”….more accurate to state “evidence on migrant health <concerns or issues or needs>…”

Response 8: We have modified this sentence.

Pages 6-7, lines 100-102

> *Scoping reviews can be helpful to map the academic literature and have been used by different researchers to present the available evidence on migrant health issues in other countries.*[15 16]

Point 9: Line 126: JBI needs a citation

Response 9: We have added the reference.

Page 8, lines 122-123

> *Subsequently, a quality assessment of the included literature was conducted by using the Joanna Briggs Institute (JBI) critical appraisal toolkit.*[19]

Point 10: Line 128: more clarity on what those variables are? …BARHII dimensions or factors and levels of evidence?

Response 10: We have modified this sentence.

Page 8, lines 123-126

> *Lastly, the data was analysed, and a multiple-correspondence analysis (MCA) was applied to explore existing relationships between variables, including the type of migrant, main health dimension, quality of the study, and research design.*

Point 11: Line 130-132: This addition doesn't really speak to patient and public involvement since the presentation was delivered to stakeholders working on migrant health. I would suggest removing so as not to confuse the purpose of engaging individuals with lived experience. Second, simply saying a presentation was provided without conveying their feedback and how it was relevant to this work, is not useful.

Response 11: We have removed this part from the patient and public involvement statement.

Page 8, line 128

> *Patients and the public were not involved in this study.*

Point 12: Line 147: change to "which was…" (singular referring to population)

Response 12: We have modified this sentence.

Page 9, lines 143-145

> *The social inequities element was incorporated by describing the population of interest, which was divided into three categories: foreign workers, asylum seekers and refugees, and unclassified migrants.*

Point 13: Line 180: clarity needed…please identify where these additional records came from. Also, not clear on why it is explicitly stated that records published before 1965 are included – this runs contrary to what is stated in the exclusion criteria re including Malaysia and not Singapore.

Response 13: We have modified this sentence.

Page 10, lines 177-179

However, all identified records were retrieved from the six databases to manually screen the data for publication date-related issues.

Point 14: Line 187: “looking over” too parochial for a systematic review

Response 14: We have changed the verb.

Page 11, lines 181-185

The first stage focused on identifying English-language key words and Medical Subject Headings (MeSH) terms for migrants (e.g., immigrants, foreign workers, refugees), health (e.g., disease, infection, disorder), and Malaysia (e.g., Sabah, Kuala Lumpur) through reading search strategies of other review studies on migrant health as well as utilising medical terminology of renowned medical institutions, such as the Mayo Clinic.

Point 15: Line 221: should say “inclusion criteria”

Response 15: We have changed “selection criteria” to “inclusion criteria”

Page 12, lines 217-218

The first stage involved screening titles and abstracts according to the inclusion criteria.

Point 16: Line 230: This is the first mention of “subdimensions” and although described later and in Figure 4, it would be beneficial to further describe at this point in the paper.

Response 16: We have introduced the subdimensions in the ‘Conceptual framework’ section.

Page 9, lines 140-141

In addition, each health dimension contains various subdimensions (as presented in Figure 1).

Point 17: Line 232: still a weakness. I think the authors could provide some argument about the reliability of the data extraction process, based on the level of interpretation that was needed (or not needed) to extract the data. For example, if fairly objective indicators (such as cancer diagnosis) were extracted into the disease and injury category, then one would expect a more trustworthy process of data extraction.

Response 17: As point 17 and 24 are addressing similar issues, we present a thorough explanation (that includes this point) in point 24. Please, see point 24 for more information.

Point 18: Line 244: not clear on what is being adapted.

Response 18: We have reworded this sentence.

Page 13, lines 238-240

First, a table was created that included definitions of various research designs, and, subsequently, specific traits of these definitions were used to develop guiding questions for the decision tree.

Point 19: Line 277-279: If the modified checklists are not provided, inserting an example of a modification would be helpful.

Response 19: We have added an example. Please see Table 4 on page 16.

Page 15, lines 276-277

An example is provided in Table 4.

Point 20: Table 4 and results sections should be organized similarly (ie following BARHII health dimensions).

Response 20: Thank you for your suggestion. We decided to keep this structure, as the references are presented in chronological order.

Point 21: Line 364-366: Interesting statement but in my opinion, how does it relate to your review question? That needs to be explicit.

Response 21: This information contributes to addressing one of the research objectives – creating a comprehensive overview of migrant health in Malaysia – by providing a description of the included study. However, we realised that this was not clearly stated in the 'Introduction' (research objectives paragraph), and, therefore, have modified this section.

Page 7, lines 107-110.

> *Therefore, this study aims to map the existing academic literature on migrant health in Malaysia since 1965 to identify the trends and gaps in this field, as well as to present an overview of the topical coverage, quality, and level of evidence of these scientific studies.*

Point 22: Line 399: Spelling: Injury

Response 22: We have corrected the word

Page 40, line 414

> ***Disease and injury***

Point 23: Line 488: no research gaps are presented in the findings. Not clear where Table 7 recommendations are coming from.

Response 23: Thank you for this comment. We have revised this section thoroughly.

Page 48, lines 505-517

> *The majority of these studies focus on the 'disease and injury' dimension, especially infectious diseases, and includes mostly foreign workers. Two health dimensions (institutional inequality, and morbidity and mortality) as well as various subdimensions of each health dimension, are lacking substantial research. In addition, only a few papers include the asylum seeker and refugee population, and a vast amount do not provide any details to classify the type of migrant. The average quality of the papers was low, yet quality differed significantly among the studies. High-quality studies were mostly qualitative designs that included refugees and focused on living conditions, while prevalence and analytical cross-sectional studies were mostly low quality. In terms of research trends, no specific changes in type of migrant, health dimension or quality of the study have been observed over the last six decades. However, it should be noted that qualitative research made its entry in the early 2010s and made up a vast amount of the papers published in recent years.*

Point 24: Lines 611-627 – this minimizes your entire study! Suggesting an alternate approach (or alternate tools) suggests an entirely different study. I don't believe what is stated here is a limitation, however maybe just one or two lines that simply suggests the use of additional elements (such as…X.Y.Z…) would be beneficial for future study.

Response 24: Thank you for the feedback regarding this matter. We have revised this section thoroughly. We have removed the following sentence from the 'Data extraction' section (previously, page 13, lines 231-232):

> *Data extraction and categorisation into the BARHII framework categories was not cross-checked by a second reviewer due to time and human resource constraints.*

Subsequently, we have addressed this matter in the 'Limitations' section.

Pages 53-54, lines 633-651

> *Inter-rater reliability was limited to a 20% sample of the records in the first (abstract and title) screening stage, and no data extraction nor quality assessment was verified by a second reviewer due to time and resource constraints. Yet, we anticipate low selection bias as the health dimensions in the BARHII framework present clear distinctions between each other,*

and most of the included papers used objective indictors. For example, when a paper was measuring the knowledge and awareness regarding the pap smear test among female migrants, it would be classified as a 'risk behaviour' study. Furthermore, we believe that the development of the decision tree and additional objective criteria for the JBI tools – an example was given earlier in Table 4 – reduced the subjectivity of this study, and, hence, increases the reliability. Yet, future research is needed to validate both the decision tree and modified JBI toolkit.

Besides the BARHII framework, various conceptual public health models are available, and these models may include different (sub)dimensions. For instance, the WHO Commission on Social Determinants of Health (CSDH) framework includes material circumstances, such as food availability, whereas this dimension is not included in the BARHII framework.[121] Similarly, critical appraisal tools other than the JBI toolkit are available, which could address different points to determine the quality of the study. Therefore, it would be helpful to assess other public health models and critical appraisal tools to see if they include additional elements (e.g., food availability) that would be beneficial for future studies.

Point 25: Figure 1 – permission to use this graphic?

Response 25: Yes, we have sought permission from BARHII. Please see the 'Acknowledgement' and 'Consent for publication' sections.

Page 56, lines 678-681

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Consent for publication:

Consent regarding the use of the BARHII framework was granted by BARHII.

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