**Peer-Review comments and authors responses**

**Reviewer** 1:

1. Recommendation: Revisions Required

   *Response: First and foremost, we would like to thank Reviewer 1 for their thoughtful comments on our manuscript, which have greatly contributed to its improvement.*

2. The authors present the manuscript as a scoping review; nevertheless, given the methodology they describe in their manuscript, the reviewer thinks the document contains what could be considered a systematic review in lieu of the rigor used in its development. This must be clarified.

   *Response: We thank the Reviewer for this insightful comment. Our intent was not to conduct a rigorous systematic review but rather to capture key studies related to the topic using a similar methodological approach. Given the limited number of studies in this emerging area of technological approaches, we believe a scoping review is well-suited to map the current landscape. This clarification has been added to the manuscript to better define the scope and purpose of our review.*

3. **INTRODUCTION** : The introduction establishes a relevant context for the study, highlighting the role of digital health and its potential impact on vulnerable populations, with a focus on immigrants. Its content is well structured. However, some areas could be improved and strengthened. Its argument, for instance, shows statistics based on previous studies on how digital health and the use of digital devices improve or could improve access among vulnerable populations. In addition, some of the arguments are redundant and can be summarized to improve clarity. For instance, the sentence "They concluded that furthermore there may be distrust in healthcare systems, cultural barriers, and difficulties in covering associated direct and indirect costs" is repetitive with what was already mentioned in the previous segments.

   *Response: The authors thank the reviewer for the comment about the manuscript. The suggested changes about the repetition of the arguments were summarized, improving clarity of the introduction as proposed.*

4. **METHODS** : While the methods section is generally well-described, some points require clarification. The search strategy is not specified, which ensures transparency and reproducibility. The authors could briefly describe how the PICO format was adapted and the search strategy used. The inclusion and exclusion criteria are clear; however, the authors could briefly explain why some designs were excluded. The process of reconciling disagreements is only briefly mentioned. The authors could provide some details on how these disagreements were handled; for instance, the authors can state that discrepancies in the assessment were resolved by consensus after consultation with a third reviewer. Regarding the bias assessment, this seems to be rigorous enough to consider this scoping review a systematic review: this could be

briefly mentioned in the manuscript. In addition, the authors do not specify how different tools were applied to specific papers nor how the thematic synthesis was performed to develop the review.

*Response: We thank the reviewer for their comment. Regarding the search strategy, it can be read in its detailed form in Supplementary Table 4. The PICO format combined each element of the research question to compose the search strategy, with the addition of synonyms for each element.*
*The description of how discrepancies between reviewers were resolved, it was modified in the methods section.*
*The particular Risk of Bias Assessment Tools used for each study design was described in the methods section.*

5. **RESULTS**: The results section provides a detailed overview of the findings of the scoping review. However, some points could be addressed. The text sometimes lacks clarity due to inconsistent use of terminology and minor typographical errors. The presentation of study characteristics, populations, and interventions is somewhat disjointed. The reader might struggle to follow the narrative due to the shifting focus between different aspects of the studies included in the review. The authors could organize the studies with key aspects common to them, for instance, setting, population, interventions, and/or outcomes, helping the reader through their findings in an easier, more coherent manner. In this regard, a more detailed description of the populations and the interventions could be greatly improved by providing specific details on the effectiveness of the interventions under discussion to understand the context of the interventions better.

*Response: Thank you very much for your comment. We have revised the results section of our manuscript, maintaining all the information presented while removing redundancies and making the text more concise and focused. We created subsections to specifically address the relevant topics, corrected typographical errors, and added the subsection "Vaccination Uptake: Insights and Influencing Factors" in the penultimate part of the Results section. These changes have improved the overall coherence and flow of the manuscript.*

    a. The analysis of bias is detailed; however, it could summarize the main sources of bias and discuss their potential impact on the findings. This section could also be organized more effectively for ease of reading.

*Response: Thank you for your valuable feedback. We fully agree with your suggestions and have made the necessary revisions. The analysis of bias has been summarized to highlight the main sources and their potential impact on the findings. Additionally, we have organized this section more effectively for improved readability.*

6. **DISCUSSION**: The discussion provides a detailed and comprehensive analysis of the findings. However, some parts of the text, for instance, the opening, are vague and can focus on the main findings of the manuscript. In addition, discussing barriers and facilitators is somewhat general and could be improved by giving a more detailed analysis. The section on limitations mentions the risk of bias but does not discuss how bias could affect and/or distort the review's findings. The discussion briefly mentions policy implications but could provide a more direct and detailed exploration of how the findings can inform healthcare policy and practice, strengthening the discussion on how the findings can be applied to healthcare policy and practice, particularly in designing and implementing digital health interventions for migrant populations, the focus of the review.

*Response: Thank you very much for your valuable feedback. We initially appreciated your suggestions; however, from our perspective, the objective of this scoping review was to summarize key findings without delving into extensive evaluation.*
*We truly value your point regarding the need for a more detailed analysis of barriers and facilitators, as well as a clearer discussion on how bias may affect our findings. Nonetheless, we would like to emphasize that these aspects were addressed briefly throughout the discussion.*

   a. Finally, some sections are repetitive, particularly in discussing the results of similar interventions across different studies. The authors are recommended to work on these grammar and syntax issues to improve the overall quality of their paper.

   *Response: Thank you for your insightful comments. We have addressed your suggestions throughout the entire results section, with particular attention to the final part. We have eliminated repetitive content, especially in discussing the results of similar interventions across different studies. Additionally, we have revised the grammar and syntax to enhance the overall quality of the paper.*


**Reviewer** 2:
Recommendation: Accept Submission.

First of all, congratulations on the manuscript. The topic selected is indeed very interesting, and poorly explored. Understanding the barriers to vaccination among migrants is of great importance to Public Health policies nowadays.

*Response: We would like to sincerely thank the reviewer for the comment and the time invested in reviewing our manuscript. The comments provided have allowed us to improve our work.*

   1. **TITLE**: It is self-explained. I would not change it. Abstract: it caught my attention that the authors used interpretation rather than conclusion. Interpretation suits quite well a

scoping review as the goal is to highlight the knowledge on the topic. However, the abstract could be shorter, mainly regarding the findings

*Response: The authors thank the reviewer for the comment about the manuscript. The suggested changes about a shorter abstract were conducted and the results section of the abstract was summarized, showing the primary findings improving readability to the audience. Thanks for the feedback*

2. **INTRODUCTION**: The four paragraphs written in this section are great. It explains what is the topic of study, the gap in the literature, which is related to the migrants, and the importance of understanding more about it. I would only re-read carefully to avoid typos, and try to diminish the word count.

*Response: The authors thank you for your feedback. We have revised the introduction to make it more concise and fluid while retaining all essential information and reducing the word count.*

3. **METHODS**: Great work on this section. It is well explained, making it easy to reproduce the search strategy found in the Supplementary table. Good job using the tools to assess Bias. Results: It could be shorter. Even though it is a scoping review, and the review showed many important results, those could have been written more concisely. More tables and graphs could have helped to avoid too many words.

*Response: Thank you for your feedback. We have addressed your suggestions by creating subsections in the Results section and removing redundancies to enhance conciseness. While this is a scoping review and presents many important findings, we have worked to express these results more succinctly. Additionally, we have incorporated more graphs to reduce the amount of text.*

4. **DISCUSSION**: Great section! In this section, the reader can actually understand the most important bullet points from the articles reviewed. It is great that you have highlighted the limitations of the scoping review, but also its strength, such as showing further gaps in the literature.

5. **CONCLUSION**: Great job!

Overall: It is a great piece of work. I have really enjoyed reviewing your manuscript. It is a topic which is really important, and that can have a huge impact on Public Health. I'd love to read more from you. But the manuscript could be shorter. There are too many words. Careful reassessing can also help avoiding typos.

*Response: Thank you for your feedback. We agree with your observations and have revised the manuscript to make it more concise while also addressing any typographical errors.*

**Reviewer** 3:
Recommendation: Revisions Required.

The manuscript is a review about the impact of digital health intervention on vaccination rate in a specific and fragile population, immigrants. For me, the authors' effort to produce a review following the highest quality clinical research guidelines is clear. Especially in a historical period in which vaccination faces a world immersed in misinformation, the topic is of great global interest. Alongside this, immigration is also a sensitive topic and this look at the health of this population is of tremendous importance. Therefore, I would like to congratulate the authors for taking on this difficult topic. That said, I believe that some improvements need to be made to assist authors in constructing the manuscript in order to achieve the publication quality of this journal.

> *Response: We thank the Reviewer for the comments and appreciate his remarks on our manuscript. We are grateful to have benefited from his suggestions and have implemented them to the best of our abilities in this reviewed version of our manuscript.*

**ABSTRACT**
1. Background: I understand that the reason for compelling information on a systematic review or meta analysis is related to a gap of certainty about some aspect and not to a lower number of studies related to the proposed theme. Thus, I suggest you change the aims of the study, once you should only write that there is a lack of certainty about the usefulness of these strategies in this special population.

> *Response: We thank the reviewer for their comment and we have change in the abstract the aims of the study clarifying the lack of certainty and usefulness of the digital health interventions.*

2. Methods: "Two independent reviewers screened articles, performed data extraction and synthesis, and assessed bias risk using CovidenceR": This sentence seems that the hole work was made by only two reviewers. For example, a passive voice could help you, such as: "each article was screened by two independent reviewers". So, I suggest authors change this sentence.

> *Response: We thank the reviewer for their comment and have changed the sentence to better reflect our research process.*

3. "Targeting immigrants, primarily from South and East Asia, the Middle East, and Hispanic/Latinx populations.": this sentence is disconnected from the previous and next sentence. Beside this, "targeting immigrants" seems to need a subject. I suggest rewriting this sentence.

> *Response: We thank the reviewer for their comment and have improved the sentence in the method section of the abstract.*

4. Findings: I did not understand why the authors decided to use "findings" instead of "results" as the title of this section. It is not a main problem, however as the contempt of this section is not different from those found in sections usually titled as "results", I suggest you use the traditional title. Beside this, this section is a little extensive to an abstract. I believe that a short result section will help you to lead readers to look for the full text.

   *Response: We thank the reviewer for their comment and have modified the title accordingly. The text has also been shortened.*

5. Interpretation: I believe that entitled the last section as "interpreting" does not seem a proper title for the referred section. Actually, the section seems more like a conclusion than an interpretation or discussion of your results.

   *Response: We thank the reviewer for their comment and have modified the title according to the suggestion made.*


## INTRODUCTION

6. "Digital health interventions have been proposed to improve vaccine coverage and awareness in the general population (Abdullahi et al., 2020).": I had the feeling that authors need to develop this issue better. I understood by this sentence that digital health interventions were proposed with this aim, however it is not clear for me if any study was able to prove that this digital health intervention can increase vaccination in the general population. And in my point of view, this is essential to build your gap. If it is already proved in the general population, it is easier to understand that now we need to prove this in refugees, so your gap is related to a specific population, although you have strong evidence that this kind of intervention is probably useful.

   *Response: We thank the reviewer for their comment and have aimed to better characterize the effectiveness of digital health interventions in the general population, to better define our knowledge gap.*

7. Also in the last paragraph, as it is written, it seems that your final objective is to determine the knowledge gap in this issue. I think that you can restructure the sentence to show that your objective is to determine if a digital health intervention can increase vaccination coverage. When we should write the last paragraph, we need to make our "research question". So, we need to think about PICO. Thus, if you rewrite the sentence including the primary outcome (increase vaccination coverage), your research question will be clearer for the reader.

   *Response: Thank you for your comment. We have made our aim more explicit by clearly stating our primary research question of whether digital health interventions can increase vaccination coverage in migrant populations. We have also added our aim of*

*identifying facilitators and barriers to vaccination as we also included qualitative research papers in our scoping review. This dual focus addresses the effectiveness of digital interventions on vaccination rates and also identifies critical knowledge gaps setting the stage for future research in this area.*

**METHODS**

8.  "Multiple databases were used : Central..." in the "search strategy" section: in this sentence, there is a space before ":". Beside this, CENTRAL is a framework to Cochrane Central Registers for Controlled Trials, thus I suggest authors to rewrite this (Cochrane Controlled Register of Trials (CENTRAL) | Cochrane Library).

    ***Response***: *We thank the reviewers for their comment and have corrected the spacing and name in the text.*

9.  The PICO framework is essential to build your research question, and I understand that the authors tried to show this in a clear format in the section "Inclusion and exclusion criteria". However, the PICO system is not proper to describe your inclusion or exclusion criteria. I would split this information as "population" and "outcome". Then, I would consider including more precise definitions, such as what you considered as digital health interventions.

    ***Response***: *We thank the reviewer for their comment and have improved our eligibility criterion section.*

10. On "Selection of studies and data extraction", I suggest you include a reference for the site Covidence®.

    ***Response***: *We thank the reviewer and have cited Covidence according to the organization (Goulas, G. (2023, 8 mars). How can I cite Covidence? https://support.covidence.org/help/how-can-i-cite-covidence).*

11. In "Risk of bias assessment", the authors wrote "Two reviewers independently assessed bias using...". As occurred in the abstract, this sentence is not clear enough. When I read, my impression is that only two reviewers assessed all articles. A construction like the first paragraph of the section "Selection of studies and data extraction" may help you.

    ***Response***: *We thank the reviewer for their comment and have modified the text and abstract to clarify this element.*

**RESULTS**:

12. In the first paragraph of the section "Description of the studies", authors wrote "69 Underwent full-text review". I suggest authors change the sentence in order to not begin with a numeral or, if maintenance is necessary, write the numeral out fully.

    ***Response***: *We thank the reviewer for their comment and have corrected the text.*

13. On the Prisma Flow Chart (figure 1), it is not necessary to include a board to "References from other sources" if the authors do not have an article from this kind of source. Also, in the Prisma Flow Chart (figure 1) it is not necessary to report in the figure: "included studies ongoing (n = 0)" and "studies awaiting classification (n = 0)". For more information, I suggest authors see some templates on the site PRISMA 2020 flow diagram — PRISMA statement (prisma-statement.org).

    *Response: Thank you for the valuable feedback. According to the reviewer's comments, we have corrected the figure.*

14. The section "Description of the studies" was detailed in many aspects, which show the thorough analysis made by the authors. However, the references inside the text made the reading very difficult. Thus, I believe that this detailed information can be referenced, for example, to the tables, once it is possible to find these article's information and the respected reference. This will make the text clearer for the reading.

    *Response: Thank you for your valuable feedback. We have restructured the text as you suggested. While we agree that the references can disrupt the flow of reading, we have retained them to maintain consistency in our citation style when they were not cited under the respective figure. However, we have worked to improve the overall fluidity of the text and have created figures, referencing tables with additional information for clarity, erasing some others from the rest of the text.*

    *Furthermore, we have removed redundancies related to the multiple repetitions of methods in the results section. We introduced more subsections, such as "Overview of Interventions and Exposures in the Studies," "Specific Interventions Results," and "Outcomes and Results According to Study Design," along with "Vaccination Uptake: Insights and Influencing Factors." These changes aim to enhance the clarity and coherence of the manuscript.*

15. In the last paragraph of "Description of the studies" section, the authors stated that "sample size varied from 8 to 889,000 participants". As case series were not eligible (as you wrote in the manuscript), thus I suggest checking the classification nature of the study with 8 participants (this low sample size used to be from case series).

    *Response: We thank the reviewer for their comment. The 8 participants were part of a single-arm study by Kim et al. (2023) where mothers were invited to participate in workshops where they evaluated the impact of a computer-based technology. We assessed that this did not qualify as a case series because it did not observe separate cases and simply report them together. Kim et al. (2023) described a digital storytelling workshop intervention applied to all participants, as stated in their methodology: 'We used descriptive statistics to summarize quantitative data and constant comparative analysis to analyze qualitative data collected in the workshop and field notes.'*

16. In the sentence "Marital status was reported in 6 studies", there are some extra spaces between the number 6 and studies. Beside this, usually, numbers less than 10 should be written.

    *Response: We thank the reviewer for their comment and have corrected the text.*

17. In the section "Intervention characteristics and effects/Exposure/Controls", when you refer to an author as responsible for an information, it is necessary to include the year of the publication. For example, "Xu et al. provided a flexible channel..." should be "Xu et al. (2022) provides a flexible channel...". It is important to let the reader know exactly which is the reference, once some authors can publish more than one article on the same theme.

    *Response: We thank the reviewer for their comment and have corrected the text.*

18. I really enjoyed the section "Exposure", however, as it is on topics, this section is pretty different from the rest of the document. I suggest changing the topic structure to running text or at least introduce the section before the topics. Beside this, on topic 2, the reference "Logie et al., 20247" needs to be corrected. I also had the impression that each topic was introduced by a title, but without the correct formatting. So, as an example, where we can find "Internet seeking A positive correlation was seen" needs to be corrected to "Internet seeking: A positive correlation was seen" or similar structure.

    *Response: Thank you for your feedback. We have revised the "Exposure" section to align it more closely with the rest of the document by changing the topic structure to running text and adding an introductory statement. We corrected the reference "Logie et al., 20247" and ensured proper formatting for topic titles. Additionally, we modified the section on "Internet seeking."*

19. I did not understand why the subsection "non-interventional" in the section "Outcomes and Main results" was included in the results. If authors are analyzing the efficacy of digital health intervention on vaccination rate in migrants' population, why are these "non-interventional" articles included? I understand that these articles can be important, but they can help authors to enrich the discussion section. But I think that these "non-interventional" articles should not be on the result section (and also should not be on the Prisma flow chart and tables as included articles), once they do not correspond to your research question.

    *Response: We sincerely thank the reviewer for highlighting this valid concern. Given the nature of this scoping review, where the goal is to explore the breadth of evidence rather than focus solely on intervention efficacy, we believe it is essential to include these studies in the results section. They help us summarize key aspects of how digital interventions function within these populations. As such, we respectfully suggest retaining these studies in both the results section and the PRISMA flowchart to*

*comprehensively report on the state of evidence, in line with the principles of scoping reviews. We acknowledge the potential bias in these studies, however all the studies that were included, underwent a risk of bias assessment using validated tools (Newcastle Ottawa Scale for descriptive studies, JBI tool for quasi experimental studies and ROB2 for randomized control trials), which we have addressed in the subsequent section on the risk of bias. To enhance clarity, we have updated the term "non-interventional" to "Descriptive," as it more accurately reflects the nature of these studies.*

20. The last part of the Results is well written and detailed. Even so, I suggest authors consider following the previous parts, adding more marked divisions. Beside this, some paragraphs lack references, which can be easily solved, considering the quality of authors' review.

    ***Response***: *Thank you for your insightful comments. We have taken your suggestions into account and added more clearly marked divisions throughout the Results section to enhance its organization and readability. Additionally, we have reviewed the paragraphs that previously lacked references and ensured that appropriate citations were included.*

## DISCUSSION

21. The first paragraph of discussion needs to summarize the main results found by the authors. It is important to improve this paragraph.

    ***Response***: *We thank the reviewer for their comment and have corrected the text, incorporating a paragraph for this topic, specifying the main results that relate to the identified knowledge gap.*

22. The last paragraph from discussion is similar to the conclusion. A good solution is to fuse both paragraphs.

    ***Response***: *Thank you for your feedback. We have reviewed the last paragraph of the discussion and made improvements accordingly.*