Peer-review Comments and Author Responses

Reviewer A

1. *In the "Results" section, inside "Characteristics of DSME technologies" (page 3) the sentence: "56.4% of the DSME apps are available for Android, 18% for iOS, 7.7% for both, and 5.1% for Windows Mobile" needs a reference.*

Thank you for the comment. We added the reference to the text.

2. *Which are the limitations of your study? In my opinion, one of the most important limitations is that you did the search strategy only in one database (Pubmed), so, I believe there are some other studies that were not included in the review. How does this limitation affect the results and conclusions? Do you believe the results would have been different? Why you did not use another database? Please, try to describe all the limitations you consider relevant for this review.*

Thank you for your very interesting comments. We added a final paragraph further discussing these questions and the ways we addressed these limitations, and added 4 additional references to discuss them more thoroughly.

"There are some limitations in our study. Although Pubmed is one of the most commonly used and the ideal database for reviewing biomedical electronic literature (), the addition of other databases would have brought our study a wider scope and include more studies. To reduce this bias, we developed a broad initial search strategy, to appropriately screen a high number of articles to be included in our review. However, another limitation is the final low number of articles included because of our stringent criteria. Because of the high heterogeneity of the population and protocols used in this area of ongoing research, we decided to further limit our scope to increase the validity of our results. Despite the inclusion of a limited number of studies, our results and conclusions are coherent with existing literature ."

Reviewer B

3. *Please decide if you want to review the evidence quantitative or qualitative. Follow the chosen path more consequently. Quantitative analysis should follow the idea of a meta-analysis. A mixed-method systematic review seems to result in a confusing outcome - it becomes not clear what the main objective of the study was in the end.*

We choose to review the evidence as a qualitative

4. Define primary and secondary outcomes clearly. Use a straight, clear, and constant way to show the results for these outcomes. If this is not possible e.g. by heterogeneous study designs, do not try to use quantitative analysis of the evidence.

Thank you for your suggestion, we redefined the outcomes more clearly as: 'The purpose of this study is to assess the effects of digitally delivered DSME programs on the glycosylated hemoglobin (HbA1C) of patients with prediabetes and T2DM. '

5. Write a discussion section that shows the strengths and weaknesses of your study/your results, possible sources of mistakes (i.e., bias, confounder), and put your results in order to other related studies. Assess the reliability and validity of your work.

The discussion section was rewritten to adequately emphasize the key points of the results section and compare with the state of the art literature.

6. The text should be read and improved by a native English speaker.

Thank you for your suggestion. The text was extensively reviewed by the authors and numerous grammatical errors and sentences were corrected.

Reviewer C

7. Thorough English language editing and polishing is warmly advised due to grammar and punctuation issues. Some improvements are suggested below.

Thank you for your suggestion. The text was extensively reviewed by the authors and numerous grammatical errors and sentences were corrected.

8. There is a discrepancy between the title indicated in the cover letter ("Digital interventions in Type 2 diabetes mellitus: What the healthcare providers need to know") and the one in the manuscript text ("Digital interventions in Type 2 diabetes mellitus"). Please choose the one which is more convenient and explicative to your study aims.

Thank you for pointing this out. We have addressed the issue and be coherent across the text with the same title and aims across the manuscript.

9. *Please be consistent in the definition of your study outcomes. In the Abstract, authors affirm to evaluate "the effectiveness of digital DSME interventions on HbA1c (glycosylated hemoglobin) levels". Then, in the Introduction, they state: "our objective in this study is to review the characteristics and effectiveness of the main digital DSME tools, in relation to three critical aspects of T2DM: previous stage of disease (prediabetes), HbA1c levels, and adherence". However, in the Data Extraction subsection, they assert: "From the included studies, data on HbA1c was extracted as the primary outcome. Other aspects such as adherence, body mass index (BMI), and lipid profile were extracted as secondary outcomes". Please unify your outcomes and be linear in their definition. In each of these three instances, different ones are mentioned.*

We correct the study outcomes on each part of the project, 'The purpose of this study is to assess the effects of digitally delivered DSME programs on the glycosylated hemoglobin (HbA1C) of patients with prediabetes and T2DM. '

10. *Please be consistent with the use of abbreviations: once introduced, keep on using them instead of their corresponding extended form.*

All the corrections were performed as suggested by the reviewers and authors.

11. *Abstract, Introduction: please remove quotation marks from "Diabetes self-management education" . Please replace "enhance the attendance" with "enhance program attendance". Please add "patient" before "adherence".*

All the corrections were performed as suggested by the reviewers and authors.

12. *Abstract, Results: please replace "Overall" with "Out of" and remove "the" before "eligibility". Please replace "gauging" with "evaluation" (also later in the text) and "informed" with "reported".*

All the corrections were performed as suggested by the reviewers and authors.

13. *Introduction: please rephrase "T2DM's well-being" with "well-being in patients with T2DM". Please replace "to deliver the DSME program" with "to deliver DSME*

programs". Please replace "than" with "compared to". Please remove "the" before "available".

All the corrections were performed as suggested by the reviewers and authors.

14. *The last sentence of the Introduction is not clear and should be rephrased.*

All the corrections were performed as suggested by the reviewers and authors.

15. *Materials and Methods, Eligibility Criteria: what type of intervention was DSME compared to? This is not clear from the inclusion criteria. Please revise English language in the whole paragraph.*

Thank you for pointing this out. The eligibility criteria was explicitly stated in the text and uniformly addressed through the text.

16. *Materials and Methods, Data collection: please clearly state how many reviewers participated in article screening at each stage. Figure 1 does not depict a narrative description, but article screening and inclusion workflow. Please modify the text accordingly.*

We agree with the reviewer´s suggestions and changes were made in the manuscript accordingly.

17. *Materials and Methods, Synthesis methods: it is not clear what kind of method was used to evaluate the quality of included data. As per PRISMA guidelines, risk of bias should be assessed with referenced scales and scores (e.g., MINORS, ROBINS, RoB-2 etc.).*
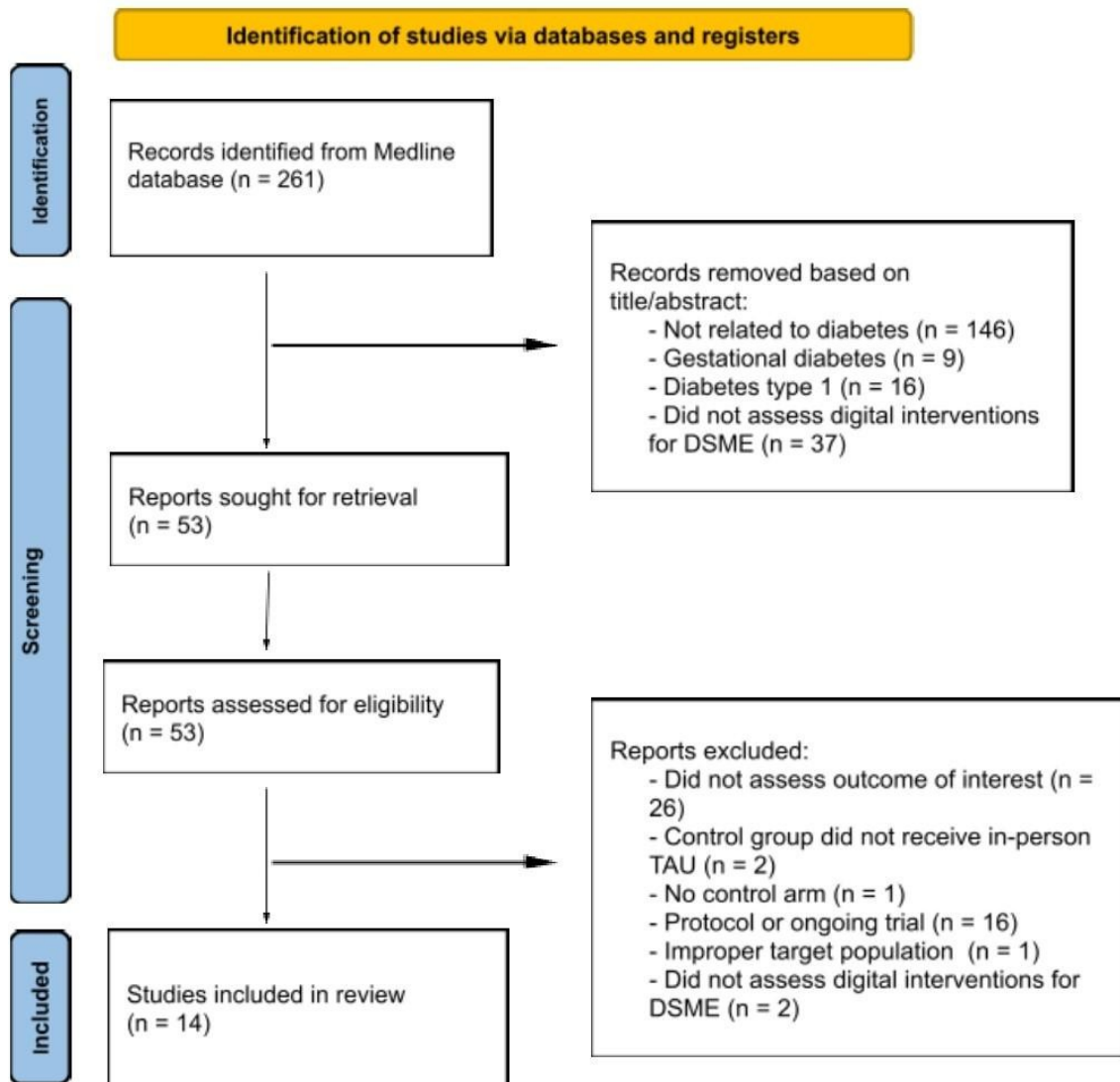
We used the Rob-2 method to see the risk of bias of our mini review and added it to the manuscript.

	Randomisation process	Deviations from the intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall
Kassavou et al., 2020	+	!	!	+	+	!
Christensen et al., 2022	+	+	+	+	+	+
Lee et al., 2022	+	+	+	+	+	+
Katula et al., 2022	+	+	+	+	+	+
Farmer et al., 2021	+	+	+	+	+	+
Middleton et al 2021	+	+	-	+	+	-
Gong et al., 2020	+	!	+	+	+	!
McLeod et al., 2020	+	+	+	+	+	+
Hilmarsdóttir et al., 2021	!	!	!	-	-	-
Fortman et al., 2017	+	+	+	+	+	+
Xu et al, 2020	+	+	-	+	+	-
Kleinman et al., 2017	+	+	+	+	+	+

	Randomisation process	Timing of identification or recruitment of participants	Deviations from the intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall
Frias et al., 2017	+	+	+	+	+	+	+
Kulzer et al., 2018	+	+	+	+	+	+	+

Low risk: +
Some concerns: !
High risk: -

18. *Figure 1: please use the flow chart template available on the PRISMA website. At least at the full-text article screening phase, reasons for excluding records should be clearly indicated in the flow chart.*

Thanks for the suggestion, we changed the chart flow template for the PRISMA.

Identification of studies via databases and registers

Identification

Records identified from Medline database (n = 261)

Records removed based on title/abstract:
- Not related to diabetes (n = 146)
- Gestational diabetes (n = 9)
- Diabetes type 1 (n = 16)
- Did not assess digital interventions for DSME (n = 37)

Screening

Reports sought for retrieval (n = 53)

Reports assessed for eligibility (n = 53)

Reports excluded:
- Did not assess outcome of interest (n = 26)
- Control group did not receive in-person TAU (n = 2)
- No control arm (n = 1)
- Protocol or ongoing trial (n = 16)
- Improper target population (n = 1)
- Did not assess digital interventions for DSME (n = 2)

Included

Studies included in review (n = 14)

19. *Table 1: please provide the table in a Word-editable format and add in a footnote all the abbreviations mentioned in the table text. Furthermore, demographic and quantitative data should be listed as well. I suggest that the authors rename the actual Table 1 as Table 2, and add an additional Table including, for each study: number of participants in each group, mean age in each group, mean follow-up in each group, type of DMSE and evaluated outcome.*

Thank you for your suggestion, we did some modifications to table 1 that included the number of participants, mean age in each group and outcome time.

20. *Results, Characteristics of DSME technologies: according to the opening sentence, it seems like telemedicine was introduced to overcome DMSE drawbacks; please rephrase. Please also check the formatting of the reference here indicated as ("Committee et al., 2022). Please replace "dispositives" with "devices"*

We Change the sentence to 'Telemedicine was developed to improve some of the barriers that limited adherence to different treatments, including the DSME program (ADA Professional Practice Committee, 2022).' Also replace the suggested.

21. *Discussions: author should emphasize that some statistically significant changes in investigated outcomes (such as the mentioned 0.23% difference in the study by Katula et al) may not be clinically significant. Please refer to HbA1c minimally clinically important difference for further reference. Limitations of the study should be listed at the end of the Discussion, including drawbacks of HbA1c as a surrogate outcome.*

The following sentence was added at the end of the limitations paragraph in the discussion.

22. *Finally, the use of HbA1c as a surrogate outcome might be statistically significant, although it might not reach a clinically significant improvement. Nonetheless, digital interventions that are able to improve HbA1c, could also improve adherence, lifestyle changes, among others; thus, the impact of an intervention with a subsequent improvement in HbA1c, could also give rise to improvement in other areas outside the scope of this review.*

Reviewer D

23. *I would like to clarify why you include patients at high risk of developing T2DM and how this high risk was defined.*

A sentence defining high risk and reasons to include them in our review was added to the introduction; as well as discussed afterwards with the strengths of limitations of this scope.

24. *What the authors mean when they say "conflicts were resolved through discussion".*

When an article one of the authors were not sure to include, the author asked the remaining authors to discuss if the article was eligible for inclusion. Even though our criteria was explicitly stated before we began the search strategy, because of the high heterogeneity of the manuscripts analyzing digital interventions, discussions and detailed reviews by multiple authors were frequent. However, the discussion with the authors did not lead to a change in the inclusion or the exclusion of any of the articles

analyzed, and all the authors agreed with the initial decision made by the initial screener of the articles.

25. *I would recommend reviewing the last paragraph of the discussion section as it is a little hard to read, and it is not completely clear.*

The last paragraphs of the discussion were entirely rewritten to improve clarity and cohesiveness of the text with the results and research question.

26. *Regarding the results section, I consider you to have important and valuable points that, in my opinion, should be placed in the discussion section.*

The discussion section was rewritten and many sentences were rephrased to address this issue.

27. *How would you include more articles? I see you have a high number of it being excluded.*

A detailed inclusion and exclusion figure following PRISMA guidelines was performed to clearly define the process of data collection of the manuscript.