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

<table>
<thead>
<tr>
<th>TITLE (PROVISIONAL)</th>
<th>Associations between use of diabetes technology and diabetes distress: a Danish cross-sectional survey of adults with type 1 diabetes</th>
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<tr>
<td>AUTHORS</td>
<td>Lorenzen, Johanne Triantafyllou; Madsen, Kristoffer Panduro; Cleal, Bryan; Joensen, Lene; Nørgaard, Kirsten; Pedersen-Bjergaard, Ulrik; Schmidt, S; Rytter, Karen; Willaing, Ingrid</td>
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VERSION 1 – REVIEW

<table>
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<tr>
<th>REVIEWER</th>
<th>Eszter, Kovács Karolina</th>
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<td></td>
<td>University of Debrecen</td>
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<tr>
<td>REVIEW RETURNED</td>
<td>06-Oct-2023</td>
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| GENERAL COMMENTS    | This is an interesting paper with valuable insight into a relevant research topic. |
|                     | Abstract The abstract introduces the content of the paper appropriately. Its content is meaningful. |
|                     | Introduction The introduced theories and previous research results are in line with the content and direction of the paper. The authors introduce basic knowledge and up-to-date research results as well. All the necessary background information is provided. The content is coherent and provides a stable basis for the research. A minor mistake: in line 37, the authors write "both observational studies" but they refer to 3 papers (20, 24, 28) |
|                     | At the end of this chapter, a brief paragraph with the aims and research question(s) should be mentioned. |
|                     | Methods This section introduces the research design, measures and statistical analysis. Their content is appropriate, the order is logical. In my opinion, the Setting subchapter can be introduced at the end of the Introduction section, before highlighting the aims of the study. |
|                     | Results Results are introduced clearly. Tables support the understanding. After formulating the research questions and/or hypotheses, the results should be introduced following them. |
Thw subchapter entitled ‘IPT vs. MDI and CGM vs. BGM’ should be renamed to a more sophisticated but informative title, e. g. The differences in the impact of the various therapies.

Conclusions
This chapter is correctly defined. The authors try to reflect on previous findings and theories. This makes the paper coherent. Limitations as well as strength mentioned are correct. The practical implications should be also stated, along with the possible research directions for the future, e.g. interrelations with satisfaction with life, satisfaction with treatment etc.

Overall, this paper is a valuable study which is worth publishing after minor modifications.

| REVIEWER | Kubiak, Thomas  
Johannes Gutenberg Universität Mainz |
| REVIEW RETURNED | 12-Oct-2023 |

**GENERAL COMMENTS**
This is a well-written and interesting report that addresses an important, yet understudied topic. In doing so, two reasonably sized survey datasets on diabetes distress in type 1 diabetes mellitus were used. The findings are particularly clinical importance as they suggest that the common notion that CGM use ubiquitously alleviates diabetes distress is unfounded.

However, I do have identified some points that warrant further attention:

1. Analytic approach: A wide array of covariates have been included in the models without proper justification for doing so. Please comment and provide for a justification. Could integrating some of the covariates as proper predictors into the models be helpful? This, for instance, about A1C levels. It would make senses, e.g., that CGM use might contribute to diabetes distress particularly if treatment targets are not met. Readily and continuously available CGM readings “confront” the individual with diabetes permanently with the fact that glycemic control is poor possibly contributing to experienced distress. Please comment.

2. Analytic approach: There are very many statistical comparisons in there. Please comment on the risk of an inflation of alpha errors by this approach. In a full model that contains the full set of predictors wouldn’t it be worthwhile to examine the interaction of insulin regimen (CSII vs. MDI) with type of SMG (CGM vs. BGM) on diabetes distress, accompanied by respective contrasts or post hoc comparison?

3. Results: More information on the type of CSII (sensor-augmented systems included?) and CGM (which generation of devices?) needs to be added (if available). Technology has advanced rapidly over the past years. As I understand the data are from 2020 and, e.g., for isCGM only first-gen devices were included?

4. Discussion: Conclusions should be made more cautiously given the correlative nature of the data. Possible impact of the pandemic – the survey data are from 2020 – should be discussed more thoroughly.
5. General Discussion: What were the underlying reasons for using CGM (or CSII) in the first place. If respective data are on file, this would be very valuable information. E.g. CGM might alleviate distress (and be associated with lower DD scores) if the main reason for its use is the prevention of hypoglycemia. Please comment and discuss.

VERSION 1 – AUTHOR RESPONSE

Reviewer 1
Comment 1:
Introduction
The introduced theories and previous research results are in line with the content and direction of the paper. The authors introduce basic knowledge and up-to-date research results as well. All the necessary background information is provided. The content is coherent and provides a stable basis for the research.
A minor mistake: in line 37, the authors write "both observational studies" but they refer to 3 papers (20, 24, 28)
At the end of this chapter, a brief paragraph with the aims and research question(s) should be mentioned.
Response 1:
Thank you. We have now deleted the word “both” in the sentence.
Comment 2:
Methods
This section introduces the research design, measures and statistical analysis. Their content is appropriate, the order is logical. In my opinion, the Setting subchapter can be introduced at the end of the Introduction section, before highlighting the aims of the study.
Response 2:
Thank you, we appreciate this. All things considered, however, we feel that Setting is a section more at home within research design and methods.
Comment 3:
Results
Results are introduced clearly. Tables support the understanding. After formulating the research questions and/or hypotheses, the results should be introduced following them. The subchapter entitled 'IPT vs. MDI and CGM vs. BGM' should be renamed to a more sophisticated but informative title, e.g. The differences in the impact of the various therapies.
Response 3:
We have changed the name of the subchapter to 'Impact of various insulin delivery and glucose monitoring methods' and hope it is more informative.
Comment 4:
Conclusions
This chapter is correctly defined. The authors try to reflect on previous findings and theories. This makes the paper coherent. Limitations as well as strength mentioned are correct. The practical implications should be also stated, along with the possible research directions for the future, e.g. interrelations with satisfaction with life, satisfaction with treatment etc.
Response 4:
Thank you for this comment. We have rewritten the following sentence in the Conclusions section to make it clearer that we are discussing practical implications of our findings: “Thus, practical implications of our findings include that decisions about insulin delivery and glucose monitoring methods should be based on an assessment of and with the individual with T1D to identify which
combination of technology will generate the best clinical and psychosocial outcomes for that specific
person”.
Reviewer 2
Comment 1:
Analytic approach: A wide array of covariates have been included in the models without proper
justification for doing so. Please comment and provide for a justification. Could integrating some of the
covariates as proper predictors into the models be helpful? This, for instance, about A1C levels. It
would make senses, e.g., that CGM use might contribute to diabetes distress particularly if treatment
targets are not met. Readily and continuously available CGM readings "confront" the individual with
diabetes permanently with the fact that glycemic control is poor possibly contributing to experienced
distress. Please comment.
Response 1:
Thank you for this comment. A justification for the inclusion of covariates has now been provided in
the Methods section. We agree that being confronted with (poor) results from the CGM may
contribute to diabetes distress, however, investigating this statistically is outside the scope of this
article. It should be noted that even people who are performing well according to CGM readings may
experience high diabetes distress resulting from the effort that it requires to remain within the
parameters of 'normal' range. As such, HbA1C is not a reliable predictor of diabetes distress.
Comment 2:
Analytic approach: There are very many statistical comparisons in there. Please comment on the risk
of an inflation of alpha errors by this approach. In a full model that contains the full set of predictors
wouldn't it be worthwhile to examine the interaction of insulin regimen (CSII vs. MDI) with type of SMG
(CGM vs. BGM) on diabetes distress, accompanied by respective contrasts or post hoc comparison?
Response 2:
Yes, we agree that the high number of statistical comparisons should be addressed. To this end, we
have acknowledged the risk of multiple comparison problems in the study limitations section, at the
same time stressing that we do not place undue weight in our analysis on statistical significance seen
in isolation. Undertaking the analyses suggested by the reviewer here would indeed have been
interesting and might provide different insights than those we have been able to present.
Comment 3:
Results: More information on the type of CSII (sensor-augmented systems included?) and CGM
(which generation of devices?) needs to be added (if available). Technology has advanced rapidly
over the past years. As I understand the data are from 2020 and, e.g., for isCGM only first-gen
devices were included?
Response 3:
We have now added further information about the type of devices in the Methods section.
Comment 4:
Discussion: Conclusions should be made more cautiously given the correlative nature of the data.
Possible impact of the pandemic – the survey data are from 2020 – should be discussed more
thoroughly.
Response 4:
Thank you for this comment. We are in full agreement with the reviewer about the need for caution in
the conclusions that can be drawn from this study given the nature of the data. That being said, we
feel as if we have already made a concerted effort to be clear about this. With this in mind, we would
require more specific guidance from the reviewer as to which conclusions we have presented without
sufficient caution. We have now added a part about the potential impact of the Covid-19 pandemic of
participants’ DD levels in the discussion: “Also, as both surveys were conducted in 2020, the
presence of the Covid-19 pandemic may have affected participants’ psychosocial wellbeing, including
DD levels, negatively. However, the prevalence of moderate to high DD in this study was similar to
prevalences reported before the pandemic (1).”
Comment 5:
General, Discussion: What were the underlying reasons for using CGM (or CSII) in the first place. If respective data are on file, this would be very valuable information. E.g. CGM might alleviate distress (an be associated with lower DD scores) if the main reason for its use is the prevention of hypoglycemia. Please comment and discuss.

Response 5:
Unfortunately, we do not have information about the specific reasons for prescription and use of the various devices, which we agree is a weakness of our study. We have tried to make this limitation more clear by rewording the following sentence in the study limitations section: “Because the reasons for prescription and use of IPT and, especially, CGM in Denmark is not only based on clinical outcomes, but also on the clinical assessment of a person’s ability and motivation for investing time in using these technologies in their daily life, we cannot exclude that the observed associations are due to confounding by indication”.

VERSION 2 – REVIEW

| REVIEWER | Eszter, Kovács Karolina  
| University of Debrecen |
| REVIEW RETURNED | 28-Dec-2023 |

| GENERAL COMMENTS | Thank you very much for considering the recommendations. I accept the argument concerning the place of the Setting subchapter. The new title added to the paper (’Impact of various insulin delivery and glucose monitoring methods) is significantly better and understandable regarding the context. The sentence added to the Conclusions concerning the practical implications is acceptable as well. The modifications carried out following the suggestions of the other reviewer are correct too. Overall, the paper can be accepted in its current form. |

| REVIEWER | Kubiak, Thomas  
| Johannes Gutenberg Universität Mainz |
| REVIEW RETURNED | 08-Jan-2024 |

| GENERAL COMMENTS | All the points I made in my previous review have been adequately addressed. |