PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Preferences of people with type 2 diabetes for tele-medical lifestyle programmes in Germany: Protocol of a discrete choice experiment
AUTHORS	Sommer, Jana; Dyczmons, Jan; Grobosch, Sandra; Gontscharuk, Veronika; Vomhof, Markus; Roden, Michael; Icks, Andrea

VERSION 1 – REVIEW

REVIEWER	Rabbia Haider Westmead Hospital, Australia
REVIEW RETURNED	01-Feb-2020

GENERAL COMMENTS	Well written paper, with detailed description of how the discrete thought experiment was conducted. Very in-depth description of how consultation occurred in people with diabetes and how the DCE was adjusted after interviews. I believe the paper would benefit from elaboration on the initial design of the Telipro RCT. How does the online portal provide information to support the change in lifestyle? How often does the coach interact with the participant? In regards to outcomes, the hypothesis is that remission rate 12 months after baseline will be 11% in the IG and 5% in the CG. Where was this hypothesis derived from? Further elaboration would be beneficial.

REVIEWER	Yaara Zisman-Ilani Temple University, Philadelphia, PA, USA
REVIEW RETURNED	14-Mar-2020

GENERAL COMMENTS	Thank you for the opportunity to review the manuscript titled: "Preferences of people with type 2 diabetes for tele-medical lifestyle programmes in Germany: Protocol of a discrete choice experiment" for BMJ Open. The protocol manuscript describes an ongoing study to measure the preferences of people with T2DM regarding tele medical lifestyle programs and to predict program success based on participants' preferences. The topic is interesting and timely, and I was pleased to learn about the study. In my opinion, there are a few needed clarifications to make the manuscript clearer and to better reflect this important work. First, the introduction should be more concise and focus on the rationale for the study and what gap it may fill. (1) Emphasize the gap that the study tries to address. Is it the lack of information about patients'

	preferences? Or is it the effect of tele medical lifestyle interventions on HbA1c levels ? (2) The description of the DCE should appear in the method section and not in the introduction, as it is a methodology used in the study to learn about preferences. (3) Rewrite the aims section in the introduction and make it clearer. For example, aim 3 ("to study possible preference heterogeneity") can be part of aim 1 ("to measure preferences of people…"). Second, the methods section should include information about informed consent and detailed recruitment strategies for both section of the study, the RCT and the DCE. It is not clear why the DCE to assess preferences for participation didn't precede the RCT. The data analysis section should be revised for clarity – make a clear distinction between analysis dedicate to the RCT and the effect of the intervention, and analysis dedicate to preferences and DCE. Last, per BMJ Open guidelines, authors should add a section about the strengths and limitations of this study.

REVIEWER	Mette Nexø Steno Diabetes Center Copenhagen, Denmark
REVIEW RETURNED	01-May-2020

GENERAL COMMENTS	This study examines the preferences of people with T2DM with respect to tele-medical lifestyle programs in connection with a larger RCT in Germany. The authors state four aims of the study: i) to measure preferences, ii) compare preferences before and after the RCT intervention, iii) examine preference heterogeneity, iv) examine whether preferences predict programme success. This is examined with Discrete Choice Experiments before and after the RCT. The protocol introduces an interesting study and a new way of involving the preferences of people with diabetes in the evaluation of interventions. However, the manuscript also left me confused with regards to the study aims, study design and data collection and, in my opinion, needs to be clarified to make final judgements about the study. I have provided some suggestions to improve transparency. The description of the development and pilot testing of the DCE is well-described. However, the overall design and method of the preference study is lacking. It is stated that the study will be performed 'alongside a randomised-controlled trial (RCT)' followed by a description of the RCT. However, descriptions of how the specific preference study will be carried out is lacking leaving the important similarities and differences of the design and methods undescribed. Descriptions of the recruitment procedure, participants data-collection, analysis etc. specifically referring to the preference study needs to be clarified e.g. state how many participants are recruited/minimum number of participants needed for achieving sufficient power of the preference study/DCE, inclusion/exclusion criteria (e.g. are controls also examined pre- and post in this study), which items of the survey are included in the DCE analysis etc. It would be helpful, if the authors made clear whether the development of the intervention is finalized and whether the results of the preference study will be implemented in to the intervention accordingly to improve outcomes? Perhaps the BMJ framework can be useful in this regard: 'BMJ 2008 Developing and evaluating complex interventions: the new Medical Research Council guidance'. Accordingly, a clear definition of patient centeredness

	and how it is applied in the present study is needed. Patient centeredness is mentioned as part of the rationale to examine preferences with reference to Scholl et al. 2014. Scholl defines patient centeredness as a multi-dimensional concept, in which preferences can be one of many variables that play a role. Can the authors clarify how the preferences will be considered with regards to the intervention? e.g. will they be integrated in the intervention in order to influence the outcomes? I find this point important as it helps clarify how the results of the study are applied to benefit future care of people with diabetes. I am not sure I follow the rationale of why Discrete Choice methodology is the best way to examine preferences of people with diabetes. Although I think the DCE of the current study reflect thorough development and testing there are known limitations to examining preferences with this methodology. For example, DCE involves responders to consider a complex psychological processes, involving multiple attributions and decisions and may not be the best way to directly assess preferences. The method was originally intended to examine economic choices and not complicated choices regarding diabetes care. Do the authors think the method has limitations and how can they address them? I look forward to the revised manuscript.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name, Institution and Country: Rabbia Haider, Westmead Hospital, Australia
"Well written paper, with detailed description of how the discrete thought experiment was conducted. Very in-depth description of how consultation occurred in people with diabetes and how the DCE was adjusted after interviews."

Reviewer 1, comment #1:
"I believe the paper would benefit from elaboration on the initial design of the Telipro RCT. How does the online portal provide information to support the change in lifestyle? How often does the coach interact with the participant?"
Answer:
Thank you for this advice. We added information about the online portal and the communication between the coach and the participants in the paragraph about the intervention group "The number and duration of contacts between health coach and individuals of the IG is determined by the needs of the participants (on average 14 contacts over the course of the intervention with a duration of 10–30 minutes each). The health coach encourages the participant and they set target agreements together (i.e., behavioral changes concerning physical activity and eating).", (page 16, lines 358–63 in "Main document – marked copy") and "for example an article database with information on illness, nutrition, exercise, motivation, and health parameters.", (page 16, line 369–70). However, we did not intend to put the spotlight on the RCT, as our manuscript focusses on the development of a discrete choice experiment (DCE) to elicit patient preferences. Nevertheless, in our revision, on the basis of comments made by each of the three reviewers, we clarified the relationship between the DCE and the RCT, and we edited the Methods and Analysis section; please see page 8, lines 183–92.

Reviewer 1, comment #2:
"In regards to outcomes, the hypothesis is that remission rate 12 months after baseline will be 11% in the IG and 5% in the CG. Where was this hypothesis derived from? Further elaboration would be beneficial."

Answer:
The hypothesis on the expected remission rate and the improvement in HbA1c in the IG and CG was derived from a proof of concept study by our clinical colleagues (Kempf et al., 2017). Since this is the topic of the clinical group that is conducting the RCT, and the aim of the present manuscript is to describe the development and elicitation of patient preferences with a DCE, we shortened the section on the RCT (please see pages 15–18, line 333ff.) because further elaboration on the RCT and its hypothesis will be the subject of a later publication from the TeLIPro trial. To avoid any misunderstandings, we now emphasize this point on page 18, lines 408–10: “The analysis of effectiveness and health economic evaluation of the TeLIPro trial will be topic of a later publication.” To address the concerns you expressed in your comment, we also added a paragraph that deals with the calculation of the sample size for the DCE (page 20, lines 464–72). As all participants of the RCT will also participate in the DCE, the sample size for the DCE will thereby be determined by the RCT’s sample size calculation. As no initial estimates of parameter values in the target population are available, we used a rule of thumb to determine the sample size instead of a parametric approach for DCEs to emphasize that the number of observations will most likely exceed those of comparable DCEs.

Reviewer: 2
Reviewer Name, Institution and Country: Yaara Zisman-Ilanim Temple University, Philadelphia, USA
“Dear Dr. Adrian Aldcroft, Thank you for the opportunity to review the manuscript titled: “Preferences of people with type 2 diabetes for tele-medical lifestyle programmes in Germany: Protocol of a discrete choice experiment” for BMJ Open. The protocol manuscript describes an ongoing study to measure the preferences of people with T2DM regarding tele medical lifestyle programs and to predict program success based on participants’ preferences. The topic is interesting and timely, and I was pleased to learn about the study. In my opinion, there are a few needed clarifications to make the manuscript clearer and to better reflect this important work.”

Reviewer 2, comment #1:
“First, the introduction should be more concise and focus on the rationale for the study and what gap it may fill. (1) Emphasize the gap that the study tries to address. Is it the lack of information about patients’ preferences? Or is it the effect of tele medical lifestyle interventions on HbA1c levels?”
Answer:
Thank you very much for this suggestion. We followed your convincing advice and tightened and restructured the Introduction. To focus on the rationale of the study, we therefore deleted some and reworded other sentences in the Introduction, which addressed clinical aspects only and did not focus on patients’ preferences (please see pages 4–5, line 74ff. in “Main document – marked copy”). In particular, we strengthened the focus on the gap that the study fills: the lack of information about lifestyle programme preferences. To emphasize this point, we also changed and added paragraphs that detail the programme preferences on pages 5–7, line 111ff.

Reviewer 2, comment #2:
“The description of the DCE should appear in the method section and not in the introduction, as it is a methodology used in the study to learn about preferences.”
Answer:
To take your advice, we shifted and reworded the sentences about the methodological aspects of the DCE from the Introduction to the Methods and Analysis section. Therefore, “An increasingly popular method for eliciting patient preferences in health care is the discrete choice experiment (DCE),[24–28] a stated preference method. The DCE methodology – based on the Random Utility Theory – allows researchers to estimate and contrast the relative strengths of preferences across a range of particular attributes.” (page 6, lines 128–132) was shifted and reworded so that it now reads: “To measure preferences, we employ a DCE, a stated preference method, which is the predominant method for eliciting patient preferences in all fields of health care[24–28]. The DCE methodology – based on the

Random Utility Theory – allows researchers to estimate and contrast the relative strengths of preferences across a range of particular attributes." (page 9, lines 209–211).
Because employing a DCE is also relevant for showing the gap that our study aims to fill, with respect to considering programme components, we had to briefly mention the DCE, as a multi-attribute method, in the Introduction.

Reviewer 2, comment #3:
Rewrite the aims section in the introduction and make it clearer. For example, aim 3 ("to study possible preference heterogeneity") can be part of aim 1 ("to measure preferences of people…").
Answer:
Thank you for your very valuable comment. We followed your suggestion and rewrote the aims section (pages 7–8, lines 168–181). We also incorporated the previous aim 3 into aim 1. In the Introduction, we now highlight our motivation to assess and compare preferences before and after the intervention and to use preferences to predict programme success. We hope that this will further strengthen the perspective on preferences and clarify the gap we want to fill as you also recommended in your comment #2 (pages 5–7, line 111ff.). With regard to the changes in the aims section, we also had to restructure the Data analysis of the DCE section; please see pages 19–20, lines 430–62.

Reviewer 2, comment #4:
Second, the methods section should include information about informed consent and detailed recruitment strategies for both section of the study, the RCT and the DCE.
Answer:
The recruitment strategies for the RCT and the DCE are the same. Participants of the RCT fill out the DCE as one of the questionnaires provided in the online portal. Participants of the RCT are recruited from within the members of a German statutory health insurance programme (Allgemeine Ortskrankenkasse, Rhineland/Hamburg, AOK) via informational letters and reminder telephone calls (please see page 15, line 338–41.). Information about informed consent was written in the Data collection section ("Participants are given detailed information about the programme and provide informed consent."). To make this clearer, we moved the sentence to the paragraph about participants (page 15, line 344–5).
Due to several reasonable comments on the link between the RCT and the DCE, we now highlight the assessment of the DCE within the RCT in the Methods and Analysis section (particularly pages 8, 15, & 18) in our revision. Therefore, please see also our answer to Reviewer 3's comment #1.

Reviewer 2, comment #5:
"It is not clear why the DCE to assess preferences for participation didn't precede the RCT."
Answer:
Thank you very much for bringing up this point. We now clarify the relationship between the DCE and the RCT in the Methods and Analysis section in our revision (pages 8, 15, & 18). The DCE is carried out two times within the RCT: before the intervention begins and at the end of the intervention (one year later). We agree that it would have been helpful to measure patient preferences before the start of the RCT, for example, to design the intervention in accordance with patient preferences. However, the current design allowed us to measure programme preferences (aim 1), the association between preferences and programme success (aim 2), and changes in preferences over the course of the programme (aim 3). In addition, the elicited programme preferences can be used to further develop the TeLIPro Health Programme. We added this to the Strengths and Limitations section "Programme preferences may be used to further develop the TeLIPro Health Programme." (page 3, line 59–60).
Moreover, even if the study could be improved by incorporating the preferences into the design of the intervention, we argue that the elicited preferences are still informative on their own. The actual design allowed us to analyse the effects of preferences on programme success and to study changes in preferences over the course of the intervention, both of which are useful beyond the TeLIPro

intervention. By adjusting the Introduction, we show the importance of these research questions (pages 5–7, line 111ff.).

Reviewer 2, comment #6:
“The data analysis section should be revised for clarity – make a clear distinction between analysis dedicate to the RCT and the effect of the intervention, and analysis dedicate to preferences and DCE.”
Answer:
Thank you very much for this comment. Our study is dedicated to the development, assessment, and analysis of programme preferences with a DCE that used individuals who participated in the TeLIPro trial (RCT). The analysis of the RCT will be undertaken by our clinical colleagues, who will conduct the RCT, and will be the topic of a later publication of the TeLIPro trial (page 18, lines 408–10). Therefore, we wanted to keep the section on the RCT as brief as possible. The analysis section in the present manuscript exclusively considers the analysis of the DCE (pages 19–20). To clarify this issue, we rearranged the Methods section and separated the description of the preferences and the DCE when necessary; please see also comments #4 and #5.

Reviewer 2, comment #7:
Last, per BMJ Open guidelines, authors should add a section about the strengths and limitations of this study.
Answer:
Please find the section on the Strengths and Limitations of this study right after the Abstract; please see page 3.

Reviewer: 3
Reviewer Name, Institution and Country: Mette Nexø, Steno Diabetes Center Copenhagen, Denmark
“This study examines the preferences of people with T2DM with respect to tele-medical lifestyle programs in connection with a larger RCT in Germany. The authors state four aims of the study: i) to measure preferences, ii) compare preferences before and after the RCT intervention, iii) examine preference heterogeneity, iv) examine whether preferences predict programme success. This is examined with Discrete Choice Experiments before and after the RCT. The protocol introduces an interesting study and a new way of involving the preferences of people with diabetes in the evaluation of interventions. However, the manuscript also left me confused with regards to the study aims, study design and data collection and, in my opinion, needs to be clarified to make final judgements about the study. I have provided some suggestions to improve transparency. “

Reviewer 3, comment #1:
“The description of the development and pilot testing of the DCE is well-described. However, the overall design and method of the preference study is lacking. It is stated that the study will be performed ‘alongside a randomised-controlled trial (RCT)’ followed by a description of the RCT. However, descriptions of how the specific preference study will be carried out is lacking leaving the important similarities and differences of the design and methods undescribed. Descriptions of the recruitment procedure, participants data-collection, analysis etc. specifically referring to the preference study needs to be clarified e.g. state how many participants are recruited/minimum number of participants needed for achieving sufficient power of the preference study/DCE, inclusion/exclusion criteria (e.g. are controls also examined pre- and post in this study), which items of the survey are included in the DCE analysis etc.”
Answer:
We thank the reviewer for this very helpful advice. We agree that we did not clearly explain the separation and similarities of the preference study, where we are using a discrete choice experiment (DCE) as the method of choice within an RCT. We are eliciting patient preferences for tele-medical lifestyle programmes and coaching approaches with a DCE in individuals who are participating in a

randomised-controlled trial RCT that is testing the effectiveness of the tele-medical lifestyle intervention programme TeLIPro. Participants of the RCT are also taking part in the DCE. Therefore, the DCE is using the infrastructure of the RCT for data collection. However, the DCE cannot influence the RCT with respect to the selection of participants or the randomised assignment of the participants. To address this issue, we reordered the Methods and Analysis section to clarify the structure of the RCT and DCE as in the following:

Old structure of METHODS AND ANALYSIS
The TeLIPro Health Programme
The RCT: The TeLIPro trial
- Participants
- Intervention Group
- Control Group
- Outcomes
Data collection
Development of the DCE
- Compilation of evidence
- Consultation of experts
- Consultation of people with diabetes/Pretest
- Pilot Test
DCE questionnaire design
Assessment of the DCE
Data analysis
Patient and Public involvement

New structure of METHODS AND ANALYSIS
The TeLIPro Health Programme
Development of the DCE (to measure patient preferences)
- Compilation of evidence
- Consultation of experts
- Consultation of people with diabetes/Pretest
- Pilot Test
- DCE questionnaire design
Assessment of the DCE within the RCT
- The RCT: The TeLIPro trial (including: Participants, Intervention Group, Control Group, Outcomes, Data collection)
- Assessment of the DCE
Data analysis of the DCE
Sample size calculation for the DCE
Patient and Public involvement

In addition, we made several changes to the Method and Analysis section to clarify the design of the DCE within the RCT (please see pages 8, 13, 15, & 18 in “Main document – marked copy”).
• We reworded the Introduction to clarify the design: “Patient preferences for tele-medical lifestyle programmes and coaching approaches are elicited with a DCE in individuals that participate in a RCT which tests the effectiveness of the tele-medical lifestyle intervention programme TeLIPro. Participants of the RCT also take part in the DCE. The DCE uses the infrastructure of the RCT for data collection. However, the DCE does not influence the RCT, neither the selection of participants, nor the randomised assignment of the participants.” (page 8, lines 184–93).
• To focus on the DCE, we moved the section about the Development of the DCE (to measure patient preferences) up so that it now directly follows the description of the TeLIPro Health Programme (pages 9–14).

• We changed the heading from the section Development of the DCE to Development of the DCE (to measure patient preferences) to clarify that the DCE is being used to measure patient preferences.
• We merged all information about the RCT in the The RCT: The TeLIPro trial section and shortened it where possible. The section now includes information about the participants, the intervention group, the control group, the outcomes, and the collection of data for the RCT (pages 15–18).
• In the Assessment of the DCE section, we now clarify that data collection for the DCE is integrated into the RCT (page 18, line 413). Participants of the RCT answer an online questionnaire (the discrete choice experiment) that asks for their preferences at two time points, before the intervention begins and at the end of the intervention. There is no additional recruitment necessary, as the DCE is implemented as part of the RCT.
• We changed the heading from Data analysis to Data analysis for the DCE (page 19). This section refers exclusively to the analysis of the DCE data. All variables that are part of the RCT and are used in the DCE analysis (e.g., for the LCA) are mentioned here.
• We added a Sample size calculation section for the DCE. All participants of the RCT are also participating in the DCE. The sample size for the DCE is thus determined by the calculation of the sample size for the RCT. As no initial estimates about parameter values in the target population are available, a rule of thumb for determining the sample size is used instead of a parametric approach for DCEs to emphasize that the number of observations will most likely exceed those of comparable DCEs (page 20, line 464–72).

Reviewer 3, comment #2:
“It would be helpful, if the authors made clear whether the development of the intervention is finalized and whether the results of the preference study will be implemented in to the intervention accordingly to improve outcomes? Perhaps the BMJ framework can be useful in this regard: ‘BMJ 2008 Developing and evaluating complex interventions: the new Medical Research Council guidance’.
(…comment #3…) Can the authors clarify how the preferences will be considered with regards to the intervention? e.g. will they be integrated in the intervention in order to influence the outcomes? I find this point important as it helps clarify how the results of the study are applied to benefit future care of people with diabetes.
Answer:
Thank you for this comment and for the opportunity to clarify these points in our paper. The DCE is carried out within the RCT two times: before the intervention begins and at the end of the intervention (one year later). In the present study, the results of the preference study are not being implemented into the currently ongoing TeLIPro trial. Therefore, the design of the intervention does not integrate the results of the elicited preferences like a doubly randomized preference design or fully randomized preference design where participants are fully or partly allocated into groups (e.g., lifestyle programmes) according to their preferences. We acknowledge that this is a shortcoming and that it would have been reasonable to design the intervention in accordance with patient preferences. Unfortunately, there was no room to do this in the current design. However, a further development of the TeLIPro Health Programme in accordance with the MRC framework by considering patient preferences is still possible. As the assessment of patients’ preferences is part of the ongoing intervention (RCT), the results could be used to adjust future tele-medical lifestyle programmes and thereby improve the outcomes of future work.
Moreover, even if there is room for improvement by incorporating the preferences into the design of the intervention, we argue that the elicited preferences are still informative on their own. The present design allows us to analyse the preferences and their heterogeneity, how they change during the time that the programme is being implemented, and their effect on programme success, which is useful beyond the TeLIPro intervention. By adjusting the Introduction, we show the importance of these research questions.

Reviewer 3, comment #3:
“Accordingly, a clear definition of patient centeredness and how it is applied in the present study is

needed. Patient centeredness is mentioned as part of the rationale to examine preferences with reference to Scholl et al. 2014. Scholl defines patient centeredness as a multi-dimensional concept, in which preferences can be one of many variables that play a role."
Answer:
We share your concern that preferences are just one aspect of the multi-dimensional concept of patient-centeredness according to Scholl et al. 2014. To address this issue, we rearranged this part of the Introduction. Moreover, the revision of the Introduction is aimed at strengthening the rationale on preferences (pages 5–7, line 113ff). Patient-centeredness here is meant only as the broader framework for considering preferences. To clarify this, we reworded the following two sentences: "Preferences answer the question of which alternative is most favourably evaluated by patients (e.g., which type of lifestyle programme is preferred). According to Scholl et al., the consideration of patient preferences is an essential part of patient centeredness[20]." as "As one integral part of the multidimension concept of patient-centeredness[18], preferences determine which alternative is most favourably evaluated by patients (e.g., which type of lifestyle programme is preferred)." (page 5, line 117–9.).

Reviewer 3, comment #4:
"I am not sure I follow the rationale of why Discrete Choice methodology is the best way to examine preferences of people with diabetes. Although I think the DCE of the current study reflect thorough development and testing there are known limitations to examining preferences with this methodology. For example, DCE involves responders to consider a complex psychological processes, involving multiple attributions and decisions and may not be the best way to directly assess preferences. The method was originally intended to examine economic choices and not complicated choices regarding diabetes care. Do the authors think the method has limitations and how can they address them? I look forward to the revised manuscript."
Answer:
We will gladly elaborate on why the DCE is the best way to capture the preferences of people with diabetes from our perspective. The method was originally developed to examine economic choices. However, we argue that the DCE reflects the current state-of-the-art method for eliciting patients' preferences in health economics and has been widely used in recent years (Lancsar & Louviere, 2008; Mühlbacher & Johnson, 2016; Craig et al., 2017). We now elaborate on this point in the manuscript (page 6, line 124ff.). Furthermore, we agree with Reviewer 3 that a DCE is a demanding task and respondents need to consider complex psychological processes. However, we argue that such psychological processes reflect our everyday decisions very well because decisions in reality are highly complex, and it is a matter of weighing options realistically. In our opinion, the DCE is therefore an appropriate method for investigating choices with respect to diabetes care.
Nevertheless, as mentioned by Reviewer 3, the DCE has limitations, which we have addressed as follows in the development of the DCE: As noted by Reviewer 3, complex decisions are expected from the respondents, and it is therefore questionable whether respondents understand this demanding task and can provide reliable responses. To address the reliability of the choices participants made, one of the DCE scenarios is presented two times (see page 14, line 325–6). Moreover, we did cognitive pretesting to check the target group's understanding of the task (please see page 11, line 259ff.).
A further limitation of the method is that the collection of preferences is only successful if the attributes that are used reflect the entire complex decision situation. To address this issue and to identify all attributes and levels that are relevant in tele-medical coaching programmes, we followed the current literature on the development of DCEs and implemented several steps: the compilation of evidence in a comprehensive literature research, the consultation of experts, and the consultation of people with diabetes as relevant actors with respect to the pretest and the pilot test.

VERSION 2 – REVIEW

REVIEWER	Yaara Zisman-Ilani The Department of Social and Behavioral Sciences College of Public Health Temple University Philadelphia, PA, USA 19122 yaara@temple.edu
REVIEW RETURNED	14-Jul-2020

GENERAL COMMENTS	The authors addressed the previous comments.