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)	Drivers for successful long-term lifestyle change, the role of e-health: a qualitative interview study
AUTHORS	Brandt, Carl; Clemensen, Jane; Nielsen, Jesper; Søndergaard, Jens

VERSION 1 – REVIEW

REVIEWER	Jason Tang University of Dundee, Scotland 23-Sep-2017
REVIEW RETURNED	23-Sep-2017

GENERAL COMMENTS	1. Please could you elaborate on how saturation was reached? A sentence or two on why was it appropriate to stop recruiting after 10 interviews? 2. Why was the qualitative interview method chosen in preference to some sort of thinking aloud protocol where users interact with the app and describe what they are thinking? 3. Please explain why you only recruited participants who had lost weight (median=10.5kg). It would be insightful to compare with participants who weren't successful in weight loss. This group could identify issues on engagement and non-adherence. 4. Please speculate on issues surrounding bias in recruiting. For example, those who agreed to participate (all lost weight successfully) could be keen users of ehealth interventions, are more technically savvy in comparison to other populations. 5. Please report whether participants attribute their weight loss success from the online intervention or solely on professional contact from clinicians. Do the participants value one over the other? Regular professional contact could add to costs and many not be feasible for some so if the online intervention can achieve significant weight loss with little face to face contact with health professionals then that could be more sustainable and of wider reach. 6. Line 16, pg 3. This research question is unclear ("and when using e-health solutions seen from a patient perspective"). Please rephrase. 7. A number of typos spotted throughout the paper. Please reread and amend before resubmitting.

REVIEWER	Professor Bjørg Karlsen University of Stavanger, Norway
REVIEW RETURNED	14-Nov-2017

GENERAL COMMENTS	**General comments**
	This paper describes a qualitative study about drivers for successful long-term lifestyle change, the role of eHealth. The study addresses an interesting theme as a follow-up study from a pilot study about long-term effect of interactive online dietician weight loss advice in general practice in 2011. However, there are some limitations of the paper. The descriptions and elaborations of some of the sections are meager and there is a need for better descriptions to make the study more clear and understandable for the reader. In the following, I will provide some comments about the need for clarification of terms and sections that I find confusing. **Specific comments** *Re Abstract* Objectives in the abstract is not fully corresponding with the aims/research question in the paper. Moreover, the theme about the role of family and friends is not mentioned in the result section. There is a need for more consistency between the content of the abstract and the paper. *Re Strengths and limitations of the study* The third point here is confusing and it would help the reader to know why you mean that the findings are generalizable to future e-eHealth solutions in this qualitative study. The fourth point stating limitation of the study is also confusing. What do you mean with such a statement and why? *Re Introduction* It would help the reader to understand the situation of people with overweight if there was more information about how to live with this challenge? What are the challenges regarding life-style changes? What do you mean by using self-monitoring and self-care technologies for monitoring health? Regarding the sentence “In accordance with social cognitive theory, physical expectations and proximal goal setting are important” there is a need for more elaborations of this. What were the patients’ outcomes and how did

	the goalsetting take place in the intervention? *Re Methods* The intervention should be described more in details. Could you give some examples of the content of the intervention? You chose a phenomenological approach. There is a need for more elaboration of this choice and a reference. At the end of the third paragraph, something is missing about Sampling. There seems to be some confusion about the terms role and support. In the research questions, you are asking for the role of peers etc., whereas in the interviews you are focusing on support. The terms or concepts are not the same, and I would therefore suggest that you use the same concepts to provide consistence between these. Regarding the analysis: This section needs a more detailed description. What kind of data base did you use? Why did you choose a thematic analysis and how did you use this? You also need to have some references to this choice. An example of the analysis process would help the reader to understand the identification of your themes. It is also confusing that you in this section include your theoretical framework. It would be better to remove this to the introduction section. You need to include something about ethical considerations in the Method section. *Re Results* Table 1 gives a good description of your results, but I would suggest to provide a short description of the table in the text with reference to this. The different titles of the themes described in the text below the table are not the same as in Table 1. I would suggest that the titles here should correspond with the themes in Table 1. *Re Discussion* More information is needed regarding the three different theories used in the study. Please see comments above about where to present the theories. More details in this presentation would make the correspondence with the results more clear. In the last sentence in this section, the authors argue that the findings will be included in

	future development of e-Health solutions and tested in studies based on these new e-Health solutions. This needs some more elaboration about how this could be done. One last question, are there any other implications for research that you have identified? Generally, the paper needs to follow the reference style of the journal as well as the instruction of the authors.

VERSION 1 – AUTHOR RESPONSE

To BMJ Open and the reviewers,

Thank you for your thorough and constructive review, and for giving us the possibility to improve our manuscript accordingly. Below you will find a point to point response to the comments from the reviewers. A file with track changes, and a clean version will be uploaded as well.

Best regards,
Carl J. Brandt

Reviewer: 1
Reviewer Name: Jason Tang
Institution and Country: University of Dundee, Scotland
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
1. Please could you elaborate on how saturation was reached? A sentence or two on why was it appropriate to stop recruiting after 10 interviews?

We have changed the method section:
After the initial 4 interviews, the authors conducted an overview of the transcripts and identified themes of importance. The authors then agreed on codes across ideas and themes that could be categorized. CJB then coded all transcripts in accordance with the agreed codes. The coded transcripts were shared and discussed. Data from each theme were condensed and summarized into concepts and generalized descriptions. Several times throughout the process, identified themes were compared between the different researchers. Overlap was identified and consistency was reached. Coinciding themes of importance were then put into a common framework. Data collection was terminated due to saturation when no new themes emerged..

2. Why was the qualitative interview method chosen in preference to some sort of thinking aloud protocol where users interact with the app and describe what they are thinking?

This is a pre-study creating knowledge on what was at stake for the individual. We have inserted this in the Method section:
Design
To create new knowledge about the essential themes for this group of patients we used qualitative, semi-structured, individual interviews to explore the field without distraction.

The final part of the conclusion has been changed in accordance:

The present findings are probably generalizable to the use of collaborative e-health tools and have formed the basis of the later development of a collaborative e-health tool using focus group interviews in a 'thinking aloud' protocol where the patients and healthcare professionals interact with the app and the backend control panel,21 that is going to be used in a future study.22

3. Please explain why you only recruited participants who had lost weight (median=10.5kg). It would be insightful to compare with participants who weren't successful in weight loss. This group could identify issues on engagement and non-adherence.

Information about participants in the interview study has been extended in relation to this relevant comment under "Sampling":
Six had been consistently interacting with the designated healthcare professional during the study, two stopped responding to information given, one left the study early and one never started. Invitations for this qualitative study were by phone and none declined the invitation.

We have covered reasons for non-adherence in the result sections paragraph about the: "The establishment of an honest and trustworthy relationship to the health professional":
Six found support from the dietician involved in the study (including online support), one found support from the GP nurse, one found support from an online coach, one from a spiritual leader, and one had not been successful. The four (three men and one woman) who had not found support in the dietician in the intervention were the least successful in the pilot study.13

and in the last part writing:
Some of the patients said that they did not trust the dietician who had been assigned to them or the IT system, and they stated the lack of trust as the main reason for them to discontinue the intervention or to find another guidance.

And added this text to the discussion:
The main reasons for non-adherence was lack of trust in the dietician, and lack of trust in the e-health tool, which is in line with other studies examining reasons for noncompliance with e-health tools20.

But in accordance with your comment in strength and limitations:
This study mainly included patients with successful long-term lifestyle change, meaning reasons for lack of engagement and non-adherence might have been overseen.

4. Please speculate on issues surrounding bias in recruiting. For example, those who agreed to participate (all lost weight successfully) could be keen users of ehealth interventions, are more technically savvy in comparison to other populations.

This is an important question that needs to be addressed in future studies. We have added the point in: "Strength and limitation in this study" in the discussion by writing:
It is a potential weakness that we do not know if our sample was more technically savvy than the average population, which should be addressed in future studies.

5. Please report whether participants attribute their weight loss success from the online intervention or solely on professional contact from clinicians. Do the participants value one over the other? Regular professional contact could add to costs and many not be feasible for some so if the online intervention

can achieve significant weight loss with little face to face contact with health professionals then that could be more sustainable and of wider reach.

As partly stated previously we have clarified the text concerning who they had found to support them through their lifestyle change:
They all had a good and trustworthy relationship to their GPs. Six found support in the dietician involved in the study (including online coaching), one found support in the GP nurse, one found support in an online coach, one in a spiritual leader, and one had not been successful. The four (three men and one woman) who had not found support in the dietician in the intervention were the least successful in the study.

And

One of the participants established contact with another online lifestyle coach who helped him to achieve a significant weight loss without a single face-to-face meeting, which means that seven out of ten had used online support for their weight loss and three had found face-to-face support from alternative sources that were better for them.

6. Line 16, pg 3. This research question is unclear ("and when using e-health solutions seen from a patient perspective"). Please rephrase.

Rephrase:
The aim of the study was to identify drivers of importance for long-term personal lifestyle changes from a patient perspective when using a collaborative e-health tool, including the support of peers and healthcare professionals.

And in the later part of the Background:
Hence we aimed to identify drivers of importance for weight loss management for patients who had used a hybrid collaborative online e-health tool for weight loss taking into account the patient's perspectives having experienced a collaborative e-health model.

7. A number of typos spotted throughout the paper. Please reread and amend before resubmitting.

Corrected by a native English speaker

Reviewer: 2
Reviewer Name: Professor Bjørg Karlsen
Institution and Country: University of Stavanger, Norway
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
Please see my comments in the attached file.

General comments
This paper describes a qualitative study about drivers for successful long-term lifestyle change, the role
of eHealth. The study addresses an interesting theme as a follow-up study from a pilot study about longterm effect of interactive online dietician weight loss advice in general practice in 2011. However,

there are some limitations of the paper. The descriptions and elaborations of some of the sections are meager and there is a need for better descriptions to make the study more clear and understandable for the reader. In the following, I will provide some comments about the need for clarification of terms and
sections that I find confusing.

Specific comments
Re Abstract
Objectives in the abstract is not fully corresponding with the aims/research question in the paper.

Change made in abstract and introduction:
The aim of the study was to identify drivers of importance for long-term personal lifestyle changes from a patient perspective when using a collaborative e-health tool, including the support of peers and healthcare professionals.

And in the later part of the Background:
Hence we aimed to identify drivers of importance for weight loss management for patients who had used a hybrid collaborative online e-health tool for weight loss taking into account the patient's perspectives having experienced a collaborative e-health model.

Moreover, the theme about the role of family and friends is not mentioned in the result section.

We have changed the wording and used "family and peers" though out the paper.

There is a need for more consistency between the content of the abstract and the paper.

Changed throughout the paper.

Re Strengths and limitations of the study
The third point here is confusing and it would help the reader to know why you mean that the findings are generalizable to future e-Health solutions in this qualitative study.
The fourth point stating limitation of the study is also confusing. What do you mean with such a statement and why?

Deleted:
• This is the first qualitative research study exploring drivers for long-term lifestyle change using an online e-health approach in general practice successfully.
• The findings of this study are relevant and generalizable to future e-health solutions
• The main limitation of the study is the lack of methodological triangulation.

Inserted:
• This study identified drivers for successful long-term lifestyle change among patients having used a collaborative online e-health tool in general practice.
• This study only included patients with successful long-term lifestyle change, therefore reasons for lack of engagement and non-adherence might have been overseen.
• Authors CJB and JS both are General Practitioners, which might have influenced their prejudices however, all authors took this in to consideration when analysing the data.

And further elaborated in the discussion:

Strengths and limitations of this study
This is the first qualitative research study exploring drivers for successful long-term lifestyle change using a collaborative online e-health approach in general practice. The digital revolution makes it difficult to detect general principles for successful e-health tools before they are out-dated; instead, this qualitative study explores themes of importance across various persuasive technologies and collaborative e-health platforms that could not be highlighted in a quantitative study. It is a potential weakness that we do not know if our sample was more technically savvy than the average population, which should be addressed in future studies. On the other hand the access to new technologies becomes easier all the time why we believe the principles outlined in this applies study to most patients.
This study mainly included patients with successful long-term lifestyle change, meaning reasons for lack of engagement and non-adherence might have been overseen.
The study did not look at perspectives of individuals in relation to their outcomes; with more individuals and methodological triangulation, this might have revealed the quantitative importance of the identified themes. The result of this study is probably generalizable and supports the notion that the implementation of collaborative e-health tools might have the potential to change patient lifestyles via low-cost support for healthy living. The preconception of the authors' CJB and JS, who are GPs, might have compromised the objectivity of the data, in interviews and analysis even though it was taken into account in the analysis. Future research needs to examine the perspectives of GPs and healthcare professionals who assist patients using collaborative e-health tools, in order to better understand the perspectives of all stakeholders.

Re Introduction
It would help the reader to understand the situation of people with overweight if there was more information about how to live with this challenge? What are the challenges regarding life-style changes?
What do you mean by using self-monitoring and self-care technologies for monitoring health?

First section rewritten:
Although being overweight and having an unhealthy lifestyle can be uncomfortable, changing lifestyle is extremely difficult. For weight loss to have a positive impact on health, it needs to be sustainable and especially long-term lifestyle changes (defined as more that 12 to 18 months) have proven difficult.1 One of the major challenges for lifestyle change seems to be that social relationships that are often challenged by peers, who do not understand the importance of the lifestyle change to the person.2 This might be one of the reasons why patients find it difficult to acknowledge the complexities and ambivalences that are part of using collaborating e-health tools.3

Regarding the sentence "In accordance with social cognitive theory, physical expectations and proximal goal setting are important" there is a need for more elaborations of this. What were the patients' outcomes and how did the goal setting take place in the intervention?

The whole section is rewritten:
Several key theories of change from the field of behavioural science are employed in many lifestyle change and E-health tools, and have been used in this study as well In accordance with social cognitive theory (SCT), a number of constructs come into play when patients try to change lifestyle. SCT has five constructs: (1) measurable outcome i.e. steps, (2) proximal goal setting i.e. daily breakfast, (3) procedural knowledge instead of content knowledge i.e. to walk 10000 steps daily instead of "live healthy", (4) perceived self-efficacy through experiences of reaching planned goals,

and (5) social structural factors i.e. the influence of experiencing support (or obstruction) for a healthier lifestyle from a partner or spouse.10 The Social Action Theory (SAT) takes it one step further and explains how goal-directed action can lead to cognitive change that ultimately restructures the environmental context, including social relations, for long-term lifestyle change.11 Finally, the theory of triadic influence (TTI) outlines that to be successful, three streams of information need to be recognised: the intrapersonal stream, the interpersonal stream and the social environmental stream, indicating the complexity of helping a patient change from an unhealthy lifestyle to a healthy lifestyle.12

Re Methods
The intervention should be described more in details. Could you give some examples of the content of the intervention?

Appendix included

You chose a phenomenological approach. There is a need for more elaboration of this choice and a reference.

Thanks for this comment. We have discussed this issue in the author group and agreed to take it out. This is mainly done because two of the authors are GPs themselves and especially CJB who has performed the interviews could have an effect on the patients answers through his pre-understanding so even though a phenomenological approach were used the pre-understanding came in the way and we have therefore changed it so it just say:

The semi-structured interviews followed an interview guide, which resulted in an iterative approach, for emerging themes and perspectives to be explored[8].

At the end of the third paragraph, something is missing about Sampling.

Deleted: Sampling

There seems to be some confusion about the terms role and support. In the research questions, you are
asking for the role of peers etc., whereas in the interviews you are focusing on support. The terms or 2 concepts are not the same, and I would therefore suggest that you use the same concepts to provide consistence between these.

Changed throughout document

Regarding the analysis: This section needs a more detailed description. What kind of data base did you use? Why did you choose a thematic analysis and how did you use this? You also need to have some references to this choice. An example of the analysis process would help the reader to understand the identification of your themes. It is also confusing that you in this section include your theoretical
framework. It would be better to remove this to the introduction section.

Deleted:

Interviews were transcribed after each interview and uploaded to a common database. Transcripts were analysed by the researchers (CJB, JC, JBN and JS) using thematic analysis and data saturation were met. The identified themes were compared between the different researchers. Overlap and consistency were reached. The findings were then related to the Social Action Theory (SAT) (Ewart, 2009), the Theory of Triadic Influence (TTI) (Flay et al., 2009) and the Social Cognitive Theory (SCT) (Bandura, 2004). Coinciding themes of importance were then put into a common framework to try to establish an understanding of the identified drivers in relation to psychosocial determinants for health behaviour.

Inserted:
Analysis
Interviews were transcribed and uploaded to a common database verbatim. Transcripts were analysed by the researchers (CJB, JC, JBN and JS) using thematic analysis. An explorative approach was applied for systematic text condensation.16 17 The process began with reading the transcripts. After the initial 4 interviews, the authors conducted an overview of the transcripts and identified themes of importance. The authors then agreed on codes across ideas and themes that could be categorized. CJB then coded all transcripts in accordance with the agreed codes. The coded transcripts were shared and discussed. Data from each theme were condensed and summarized into concepts and generalized descriptions. Several times throughout the process, identified themes were compared between the different researchers. Overlap was identified and consistency was reached. Coinciding themes of importance were then put into a common framework. Data collection was terminated due to saturation when no new themes emerged. The quotes that best illustrated the different themes and subthemes were selected and translated from Danish to English by CJB. All quotes were then evaluated by the remaining authors and changes were made to reach agreement among all authors.

You need to include something about ethical considerations in the Method section.

Inserted in the method section:
Before every interview, CJB briefly explained the purpose and nature of the research, answered questions, and provided participants with a description of the study in layman's terms. CJB explained to the patients that the interview data would be anonymized, and an informed consent document was signed by both the patient and CJB. The ethics committee for the Region of Southern Denmark reviewed the protocol and found that the Medical Research Involving Human Subjects Act does not apply to this study. A formal approval was therefore not required for this study. We did obtain written consent nevertheless, due to the sensitivity of the subject matter.

Re Results
Table 1 gives a good description of your results, but I would suggest to provide a short description of the table in the text with reference to this.

Done.

The different titles of the themes described in the text below the table are not the same as in Table 1.

Corrected.

I would suggest that the titles here should correspond with the themes in Table 1.

Done.

Re Discussion
More information is needed regarding the three different theories used in the study. Please see comments above about where to present the theories.
More details in this presentation would make the correspondence with the results more clear.

Now presented in Background (Introduction) - see above under Re Introduction.

In the last sentence in this section, the authors argue that the findings will be included in future development of e-Health solutions and tested in studies based on these new e-Health solutions. This needs some more elaboration about how this could be done.

Inserted in the last part of the conclusion:
The present findings are probably generalizable to the use of collaborative e-health tools and have formed the basis of the later development of a collaborative e-health tool using focus group interviews in a 'thinking aloud' protocol where the patients and healthcare professionals interact with the app and the backend control panel,21 that is going to be used in a future study.22

One last question, are there any other implications for research that you have identified?

Strength and limitation section added:
Strengths and limitations of this study
This is the first qualitative research study exploring drivers for successful long-term lifestyle change using a collaborative online e-health approach in general practice. The digital revolution makes it difficult to detect general principles for successful e-health tools before they are out-dated; instead, this qualitative study explores themes of importance across various persuasive technologies and collaborative e-health platforms that could not be highlighted in a quantitative study. It is a potential weakness that we do not know if our sample was more technically savvy than the average population, which should be addressed in future studies. On the other hand the access to new technologies becomes easier all the time why we believe the principles outlined in this applies study to most patients.
This study mainly included patients with successful long-term lifestyle change, meaning reasons for lack of engagement and non-adherence might have been overseen.
The study did not look at perspectives of individuals in relation to their outcomes; with more individuals and methodological triangulation, this might have revealed the quantitative importance of the identified themes. The result of this study is probably generalizable and supports the notion that the implementation of collaborative e-health tools might have the potential to change patient lifestyles via low-cost support for healthy living. The preconception of the authors' CJB and JS, who are GPs, might have compromised the objectivity of the data, in interviews and analysis even though it was taken into account in the analysis. Future research needs to examine the perspectives of GPs and healthcare professionals who assist patients using collaborative e-health tools, in order to better understand the perspectives of all stakeholders.

And to and as mentioned in the conclusion:
The present findings are probably generalizable to the use of collaborative e-health tools and have formed the basis of the later development of a collaborative e-health tool using focus group interviews

in a ‘thinking aloud’ protocol where the patients and healthcare professionals interact with the app and the backend control panel,21 that is going to be used in a future study.22

Generally, the paper needs to follow the reference style of the journal as well as the instruction of the authors.
Corrected

VERSION 2 – REVIEW

REVIEWER	Professor Bjørg Karlsen University of Stavanger, Norway
REVIEW RETURNED	03-Jan-2018

GENERAL COMMENTS	General comments: Your manuscript about drivers for successful long-term lifestyle change, the role of eHealth has improved a lot and it is much better to read. However, I still have some minor comments that I want you to consider. 1. It would help to have a reference to the ethical considerations at page 4. 2. Re results. I find the subtheme Support from family and peers on page 9 a bit confusing. I cannot see how this subtheme is illustrating the main theme?

VERSION 2 – AUTHOR RESPONSE

Dear Editor and Reviewer,

Thank you for your decision to publish and your relevant comments.

ad 1. a relevant reference has been added.
ad 2. Re. Results. The sub-theme "Support from family and peers" has been changed to: "Support from partner/spouse" and smaller adjustments have been done to illustrate that this sub-theme en-captures the experience of proximal support or lack of it from partner/spouse (close family).

Apart from this a couple of minor clarifying changes have been made.

Kind regards,
Carl J. Brandt