

## 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

<b>TITLE (PROVISIONAL)</b>	Effectiveness of mHealth/eHealth interventions on Obesity treatment: a protocol for umbrella review of meta-analyses
<b>AUTHORS</b>	Lei, Xiang-Guo; Huang, Zhongheng; Rashi, Tamrakar; Yang, Xi

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Vidmar, A Children's Hospital of Los Angeles, Center for Diabetes, Endocrinology, and Metabolism, Department of Pediatrics, Keck School of Medicine USC
<b>REVIEW RETURNED</b>	30-Jun-2021

<b>GENERAL COMMENTS</b>	<p>REVIEWER Comments</p> <p>Summary: This is a very timely and well written protocol paper proposing to conduct an umbrella review of meta-analyses related to mHealth intervention in obesity management.</p> <p>1. Abstract:</p> <p>a. Change to patient first language. Line 27: populations with overweight and obesity</p> <p>2. Introduction:</p> <p>a. Description of Intervention:</p> <p>i. This paragraph could use more definition of eHealth and mHealth and more descriptive terminology of what these interventions traditionally include and how they are implemented and disseminated.</p> <p>ii. Effectiveness and Efficacy in obesity treatment is difficult to define. Is this review looking specifically at weight reduction? Vs. behavior/habit change? May be important to clarify given the diversity of outcomes in obesity research.</p> <p>b. Overall the introduction is very underdeveloped and could include significantly more data regarding why this type of study is needed and what the outcomes could provide for the research and clinical communities.</p> <p>3. Methods:</p> <p>a. Appropriate for the proposed study design. Could include more detail of the actual meta-analysis structure and analysis</p> <p>4. Discussion:</p> <p>a. Although this is a meaningful idea, the discussion is very underdeveloped and does not include enough information to sell the argument of why this study needs to be conducted. Significant edits are required for this study to be appropriate for publication.</p>
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<b>REVIEWER</b>	Tully, Louise Royal College of Surgeons in Ireland, Obesity Research and Care Group, School of Physiotherapy
<b>REVIEW RETURNED</b>	02-Jul-2021

**GENERAL COMMENTS**

Thank you for the opportunity to review this manuscript which is a protocol for a review of systematic reviews to assess the effectiveness of mHealth and eHealth for obesity treatment. This is an important area of research especially given the move to digital healthcare delivery in many regions and I agree that an umbrella review may be warranted. The authors have identified a relevant research gap and planned an important review. This protocol is very broad, with some major details planned based on the topic area, however I do not feel that the authors have developed their research plan to a sufficient level of detail yet.

Major comments:

The study aim is not yet clear enough; specifically, it is unclear what the outcome of interest is for which the authors seek to assess the effectiveness of mHealth/eHealth. Currently the primary outcome stated is “weight loss, BMI change, waist change”. This needs further clarity for just one primary outcome, and the others should be listed as secondary outcomes.

The inclusion and exclusion criteria are also not yet finalised. The authors might consider referring to the PRISMA-P checklist <http://www.prisma-statement.org/documents/PRISMA-P-checklist.pdf> which provides details of elements that should be included in a protocol, including eligibility criteria.

The authors have not specified whether adults and children will be included. Further, they have not stated how overweight and obesity will be defined for eligibility, which (particularly for children) can vary widely by region. There are no details on the types of intervention that will be eligible, follow up time, comparison group. These are very important considerations for mHealth and eHealth for obesity treatment especially, as the level of delivery through technology can range from text reminders to fully digital programmes and it is vital to decide this in advance to make the process of screening possible.

Stage 4: the authors mention that several sub group analyses will be completed. These should be specified in advance.

Minor comments:

Stage 2: what software?

Line 15 & 16: suggest slight revision of wording “...and these two modalities have the effect to facilitate weight loss in overweight and obese populations”; perhaps amend to: “and these two modalities have the potential to effectively facilitate weight loss in overweight and obese populations”.

Aim: change to future tense “aims to”

Line 26 Description of the intervention: The authors state that “One previous reviews has described the development of mHealth and its utility for patients with obesity”, perhaps this should say “one previous review of reviews”?

Thank you for the opportunity to review. I think that this protocol warrants further focus before publication, but has the potential to contribute to an important research area.

## VERSION 1 – AUTHOR RESPONSE

Reviewer #1:

### 1. Abstract:

Question: a. Change to patient first language. Line 27: populations with overweight and obesity.

Answer: Thank you for your kind advice. We have corrected "overweight and obese populations" to "Adult population with overweight or obesity".

### 2. Introduction:

Question: a. Description of Intervention:

i. This paragraph could use more definition of eHealth and mHealth and more descriptive terminology of what these interventions traditionally include and how they are implemented and disseminated.

Answer: Thank you for the question. We've enriched the content "The WHO proposes eHealth as a facilitator of health, and mHealth is a component of eHealth. To date, mHealth/eHealth have no standard definition. In this study, we defined mHealth/eHealth as health practice or services supported by mobile phone, tablet and computer".

ii.a. Effectiveness and Efficacy in obesity treatment is difficult to define. Is this review looking specifically at weight reduction? Vs. behavior/habit change? May be important to clarify given the diversity of outcomes in obesity research.

Answer: Thanks for the suggestion. This review is looking specifically at weight reduction. The Internet and smartphones enhance communication between patients and providers and can facilitate changes in behavior and habits. One previous review of reviews has described the development of mHealth and its utility for patients with obesity. Nonetheless, their scope did not adequately address the effectiveness of eHealth for obesity treatment and without analyzing the findings from the original studies. At present, there are many meta-analyses about mHealth/eHealth and we are looking specifically at weight reduction between behavior change.

b. Overall the introduction is very underdeveloped and could include significantly more data regarding why this type of study is needed and what the outcomes could provide for the research and clinical communities.

Answer: Thanks for the suggestion. We've enriched the introduction. We consider this study very necessary. At present, there are many meta-analyses about mHealth/eHealth and we are looking specifically at weight reduction between behavior change. Therefore this umbrella review evaluated the effectiveness of mHealth/eHealth interventions and weighed the strength and validity of mHealth/eHealth interventions in the literature and we will discuss non-mHealth/eHealth interventions on Obesity treatment, including drug intervention and surgical intervention.

### 3. Methods:

Question: a. Appropriate for the proposed study design. Could include more detail of the actual meta-analysis structure and analysis

Answer: Thanks for the suggestion. We've enriched the content "BMI change, Waist change, Weight loss subgroup analysis (mobile phone base weight loss group, computer base weight loss group, tablet base weight loss group, mobile phone + computer base weight loss group, mobile phone + tablet base weight loss group, computer + tablet base weight loss group)" "we will discuss non-mHealth/eHealth interventions on Obesity treatment, including drug intervention and surgical intervention"

### 4. Discussion:

Question: a. Although this is a meaningful idea, the discussion is very underdeveloped and does not include enough information to sell the argument of why this study needs to be conducted. Significant edits are required for this study to be appropriate for publication.

Answer: Thanks for the suggestion. At present, there are many meta-analyses about mHealth/eHealth (1. L. S. Wieland, L. Falzon, C. N. Sciamanna, et al. Interactive computer-based interventions for weight loss or weight maintenance in overweight or obese people. COCHRANE DB SYST REV 2012(8) doi: 10.1002/14651858.CD007675.pub2.[ John Wiley & Sons, Ltd:\*2012-01-01].

2.M. M. Islam, T. N. Poly, B. A. Walther, Y. C. Jack Li. Use of Mobile Phone App Interventions to Promote Weight Loss: Meta-Analysis. JMIR MHEALTH UHEALTH 2020;8(7):e17039. doi: 10.2196/170392020-01-01].

3. Y. Lau, D. G. H. Chee, X. P. Chow, L. J. Cheng, S. N. Wong. Personalised eHealth interventions in adults with overweight and obesity: A systematic review and meta-analysis of randomised controlled trials. PREV MED 2020;132 doi: 10.1016/j.yjmed.2020.1060012020-01-01].

4. M. J. Hutchesson, M. E. Rollo, R. Krukowski, et al. EHealth interventions for the prevention and treatment of overweight and obesity in adults: A systematic review with meta-analysis. Diabetes Technology and Therapeutics 2016;18:S67. doi: 10.1089/dia.2016.25062016-01-01].)

We consider this study very necessary. Therefore this umbrella review evaluated the effectiveness of mHealth/eHealth interventions and weighed the strength and validity of mHealth/eHealth interventions in the literature and we will discuss non-mHealth/eHealth interventions on Obesity treatment, including drug intervention and surgical intervention.

Reviewer #2:

1. Question:The study aim is not yet clear enough; specifically, it is unclear what the outcome of interest is for which the authors seek to assess the effectiveness of mHealth/eHealth.

Answer: Thanks for the suggestion. The aim of the study was the impact of m-health/e-health on weight loss, with weight loss being the primary outcome. BMI, waist circumference were secondary outcomes.

2. Question: Currently the primary outcome stated is "weight loss, BMI change, waist change". This needs further clarity for just one primary outcome, and the others should be listed as secondary outcomes.

Answer: Thanks for the suggestion. Weight loss was the primary outcome, BMI and waist circumference were secondary outcomes.

3.Question:The inclusion and exclusion criteria are also not yet finalised. The authors might consider referring to the PRISMA-P checklist <http://www.prisma-statement.org/documents/PRISMA-P-checklist.pdf> which provides details of elements that should be included in a protocol, including eligibility criteria.

Answer: Thanks for the suggestion. Studies meeting the following criteria were included: (1) population: overweight or obese adults, We will define overweight as a body mass index (BMI) : 25 kg/m-squared and < 30 kg/m-squared (AAFP2013; WHO 2004). Obesity will be defined by a BMI : 30 kg/m-squared (AAFP 2013; WHO 2004); (2) intervention: mHealth/eHealth as health practice or services supported by mobile phone, tablet or computer; (3) comparison: Use other methods other than mHealth/eHealth or orthobiosis; (4) outcome: Weight loss, BMI change, Waist change, Weight loss subgroup analysis (mobile phone base weight loss group, computer base weight loss group, tablet base weight loss group, mobile phone + computer base weight loss group, mobile phone + tablet base weight loss group, computer + tablet base weight loss group); (5) type of studies: meta analyses; (6) follow-up duration: at least 4 weeks. Original studies and studies with no summary relative risks (e.g. systematic reviews), studies reported in languages other than English will be excluded.

4.Question:The authors have not specified whether adults and children will be included. Further, they have not stated how overweight and obesity will be defined for eligibility, which (particularly for children) can vary widely by region.

Answer: Thank you for the suggestion. The target population for our study is overweight and obese adult. We will define overweight as a body mass index (BMI) : 25 kg/m-squared and < 30 kg/m-squared (AAFP2013; WHO 2004). Obesity will be defined by a BMI : 30 kg/m-squared (AAFP 2013; WHO 2004)

5.Question: There are no details on the types of intervention that will be eligible, follow up time, comparison group. These are very important considerations for mHealth and eHealth for obesity treatment especially, as the level of delivery through technology can range from text reminders to fully digital programmes and it is vital to decide this in advance to make the process of screening possible.

Answer: Thanks for the suggestion. Types of intervention: mHealth/eHealth as health practice or services supported by mobile phone, tablet or computer. Follow up time: at least 4 weeks.

Comparison group: Use other methods other than mHealth/eHealth or orthobiosis.

6.Question: Stage 4: the authors mention that several sub group analyses will be completed. These should be specified in advance.

Answer: Subgroup analysis (mobile phone base weight loss group, computer base weight loss group, tablet base weight loss group, mobile phone + computer base weight loss group, mobile phone + tablet base weight loss group, computer + tablet base weight loss group)

7.Question:Stage 2: what software?

Answer: Stata software (version 12; StataCorp LP, College Station, Texas) and RevMan V.5.4 software provided by Cochrane Collaboration

8.Question:Line 15 & 16: suggest slight revision of wording "...and these two modalities have the effect to facilitate weight loss in overweight and obese populations"; perhaps amend to: "and these two modalities have the potential to effectively facilitate weight loss in overweight and obese populations".

Answer: Thanks for the suggestion. We are very sorry that our wording is not precise, and we have corrected it according to your suggestion. "these two modalities have the potential to effectively facilitate weight loss in overweight and obese populations."

9.Question:Aim: change to future tense "aims to"

Answer: Thanks for the suggestion. We are very sorry that our wording is not precise, and we have corrected it according to your suggestion. "This study aims to conduct an umbrella review of meta-analyses regarding the associations between mHealth/eHealth interventions and Obesity treatment, and reanalyze its strength and validity."

10.Question:Line 26 Description of the intervention: The authors state that "One previous reviews has described the development of mHealth and its utility for patients with obesity", perhaps this should say "one previous review of reviews"?

Answer: Thanks for the suggestion.We are very sorry that our wording is not precise, and we have corrected it according to your suggestion. "One previous review of reviews has described the development of mHealth and its utility for patients with obesity."

## VERSION 2 – REVIEW

<b>REVIEWER</b>	Vidmar, A Children's Hospital of Los Angeles, Center for Diabetes, Endocrinology, and Metabolism, Department of Pediatrics, Keck School of Medicine USC
<b>REVIEW RETURNED</b>	07-Dec-2021

<b>GENERAL COMMENTS</b>	That authors' addressed all the recommendations adequately.
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<b>REVIEWER</b>	Tully, Louise Royal College of Surgeons in Ireland, Obesity Research and Care Group, School of Physiotherapy
<b>REVIEW RETURNED</b>	15-Dec-2021

<b>GENERAL COMMENTS</b>	Thank you for this revised manuscript. The protocol has been developed and is now clearer. There are some minor typos and grammar issues which I think can be easily resolved. May I also suggest developing the search strategy further, for example to include 'systematic review' and additional phrases for eHealth (e.g. digital health, telehealth, virtual medicine). I think it would also be helpful to really clarify ahead of time, to what extent a digital component of a service will be included as the intervention - for example, some services may simply use a text messaging reminder for a face-to-face service, while others will be fully digital. Deciding this in advance will help with the screening process. Good luck with the review.
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## VERSION 2 – AUTHOR RESPONSE

Reviewer #1:

Thank you for your review.

Reviewer #2:

1. Question: May I also suggest developing the search strategy further, for example to include 'systematic review' and additional phrases for eHealth (e.g. digital health, telehealth, virtual medicine).

Answer: Thanks for your suggestion. We have developed it according to your suggestion. "We will use the search strategy with these specified keywords: (Overweight OR Obesity OR weight gain OR weight loss OR body mass index OR skinfold thickness OR waist-hip ratio OR Abdominal Fat) AND (mhealth OR ehealth OR telemedicine OR digital health OR telehealth OR virtual medicine) AND (Metaanalysis OR Meta OR meta-analys\* OR systematic review)."

2. Question: I think it would also be helpful to really clarify ahead of time, to what extent a digital component of a service will be included as the intervention - for example, some services may simply

use a text messaging reminder for a face-to-face service, while others will be fully digital. Deciding this in advance will help with the screening process.

Answer: Thanks for the suggestion. We have corrected it according to your suggestion. "In this study, we defined mHealth/eHealth as health practice or services supported by mobile phone, tablet and computer without using a text messaging reminder for a close physical proximity face-to-face service."

3. Question: There are some minor typos and grammar issues.

Thank you for your kind advice. We tried our best to correct it.