

# BMJ Open Protocol for a systematic review and meta-analysis of culturally adapted internet- and mobile-based health promotion interventions

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**To cite:** Balci S, Spanhel K, Sander L, et al. Protocol for a systematic review and meta-analysis of culturally adapted internet- and mobile-based health promotion interventions. *BMJ Open* 2020;10:e037698. doi:10.1136/bmjopen-2020-037698

► Prepublication history and additional material for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2020-037698>).

Received 12 February 2020

Revised 10 July 2020

Accepted 02 October 2020



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## ABSTRACT

**Introduction** High rates of immigration pose challenges for the healthcare systems of many countries to offer high-quality care to diverse populations. Advancing health interventions with incorporating the cultural background of diverse populations can be helpful to overcome this challenge. First studies suggest that culturally diverse populations might benefit from culturally adapted internet-based and mobile-based interventions (IMI) to promote health behaviours. However, the effectiveness of culturally adapted IMIs for health promotion interventions has not been evaluated systematically. Therefore, the aim of this review is to assess the effectiveness of culturally adapted IMIs regarding health promotion. Additionally, the cultural adaptation features of these interventions will be outlined.

**Methods and analysis** Randomised controlled trials (RCTs) investigating the effectiveness of culturally adapted IMIs to promote health behaviours in the field of healthy eating, smoking cessation, alcohol consumption, physical activity and sexual health behaviour will be identified via a systematic search of the databases MEDLINE, Embase, PsycINFO, CENTRAL. The preliminary search has been conducted on the 26 August 2019 and will be updated in the process. Data will be pooled meta-analytically in case of at least three included studies reporting on the same outcome. Moreover, a narrative synthesis of the included studies will be conducted. The risk of bias will be assessed using the Cochrane Collaboration's tool for the Quality Assessment of RCTs V. 2.0. Publication bias will be assessed using funnel plots.

**Ethics and dissemination** Ethical approval is not required for this study. The results of this study will be published in a peer-reviewed international journal.

**PROSPERO registration number** PROSPERO;  
CRD42020152939

## INTRODUCTION

Non-communicable diseases (NCDs) accounted for 71% of the global deaths in 2016.<sup>1</sup> NCDs are also a major barrier in the reduction of the total burden of these diseases and achieving good health for all people.<sup>2</sup> Minority populations suffer from NCDs more than the general population.<sup>3</sup> Furthermore, compared with non-immigrant populations, immigrants show a higher prevalence of

## Strengths and limitations of this study

- This is the first comprehensive systematic review of culturally adapted internet-based and mobile-based health promotion interventions.
- This review only includes randomised controlled trial studies to maintain a high methodological standard.
- This review covers the internet-based and mobile-based health promotion interventions in the areas of healthy eating, physical activity, sexual health behaviour, smoking cessation and alcohol consumption.
- Our search yielded only studies written in English, which might be indicative of a selective reporting bias.
- We are expecting a substantial heterogeneity in study designs and outcomes which might challenge firm conclusions.

diabetes, cardiovascular diseases (CVDs), HIV/AIDS<sup>4</sup> and high blood pressure.<sup>5 6</sup> The burden and prevalence of NCDs are on the rise in low-income countries as well as in middle-income and high-income countries.<sup>7</sup> Furthermore, the risk is higher for people with a migration background living in middle-income and high-income countries.<sup>3 8–10</sup>

One approach to preventing NCDs and improving peoples health constitutes health promotion interventions.<sup>11</sup> Health promotion interventions can modify behavioural risk factors by targeting healthy eating, exercising,<sup>12</sup> not smoking, sexual health behaviour, namely condom use and HIV testing, and avoiding the harmful use of alcohol.<sup>13–15</sup> These behaviours are related to morbidity and mortality globally<sup>16</sup> and promoted by WHO to decrease the chances of developing NCD and to keep a healthy life.<sup>17 18</sup> Additionally, socioeconomic factors and migration itself play an important role in accessing and benefiting from healthcare interventions.<sup>19 20</sup> The access of immigrants and minority populations to health services

can be hindered owing to several factors such as the health beliefs of the respective groups, language and cultural barriers, low health literacy, perceived stigma and limited financial means.<sup>21</sup> To tackle the problems related to the accessibility of health services for immigrants and minority populations and to decrease the risk of developing NCDs, it might be essential to offer culturally sensitive health behaviour interventions to assure a more relevant and appealing practice to culturally diverse populations.<sup>3 22 23</sup>

An approach to making interventions more suitable for culturally diverse groups is to adapt existing interventions for the target group, which is called cultural adaptation. Cultural adaptation refers to systematic modifications of evidence-based practice by taking into account language, culture, and the context to make the intervention more suitable with the target group's cultural patterns, meanings and values.<sup>24</sup> To guarantee the scientific excellence of the research and guide future researchers with the adaptation of interventions regarding public health, various frameworks for adaptations have been presented. A review identified 13 frameworks and eight common steps to adapt an intervention, among others: assessing the population of interest, understanding the original intervention and deciding on the aspects to adapt, the last two being the most commonly illustrated steps.<sup>25</sup> More frameworks specifically addressing cultural adaptations are Ecological Validity<sup>26</sup>; Cultural Sensitivity Framework<sup>27</sup>; Tool Kit of Adaptation Approaches<sup>28</sup>; Intervention mapping framework<sup>29</sup>; Cultural Accommodation Model.<sup>30</sup> However, these frameworks were developed for face-to-face interventions.

Whereas face-to-face interventions are widely used, advances in internet technology and its increasing availability all around the world lead researchers to use this source to offer health behavioural change interventions digitally.<sup>31</sup> Internet-based and mobile-based interventions (IMIs) are used to enhance health behaviour promotion and result in promising positive effects for general and minority populations.<sup>32–35</sup> According to previous reviews, IMIs concerning health promotion are potentially effective in altering lifestyle factors and sporting medical treatments,<sup>35 36</sup> health behavioural change,<sup>32 34</sup> losing weight,<sup>33 37</sup> HIV prevention,<sup>38</sup> CVD prevention,<sup>39</sup> smoking cessation<sup>40</sup> and physical activity.<sup>41</sup> Furthermore, IMIs have been culturally adapted in order to reach culturally diverse populations. For example, culturally adapted IMIs yielded beneficial results for individuals with NCDs, namely obesity, CVDs and diabetes.<sup>42–59</sup> While the number of studies regarding culturally adapted IMIs is increasing, it is important to explore these studies' effectiveness and herewith contribute to the development of evidence-based culturally adapted IMIs to promote health behaviours in these underserved populations. Unlike previous reviews, we aim to investigate in a systematic review and meta-analysis whether IMIs can be provided effectively to diverse populations if they are culturally adapted.

## Objectives

The aim of this systematic review and meta-analysis is to investigate the effectiveness of culturally adapted internet-based and mobile-based health promotion interventions. The following questions will be systematically pursued:

1. Are culturally adapted internet-based and mobile-based health promotion interventions effective in the targeted populations?
2. How are culturally adapted IMIs realised and what kind of adaptation features and approaches have been used?

## METHODS AND ANALYSIS

The planned systematic review and meta-analysis has been preregistered at International Prospective Register of Systematic Reviews and follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA) 2015 statement.<sup>60</sup>

### Eligibility criteria

#### Population

The target population should differ in terms of cultural background from the target population that the intervention has been originally developed for.

#### Interventions

We will include interventions that were culturally adapted, that is, interventions that were modified in at least one aspect in order to make them more culturally appropriate for the target population. Interventions that have only been translated will not be included. The interventions addressing the following health promotion topics will be included: healthy eating, physical activity, alcohol consumption, sexual health behaviour and smoking cessation. These health promotion areas are endorsed by WHO to improve overall health and fight against the development of NCDs and can be effectively delivered online.<sup>17 36</sup> Health promotion refers to a process which constitutes efforts to enhance overall health and manage its determinants and risk factors.<sup>61</sup> Furthermore, the intervention has to be delivered predominantly or completely in an internet-based and/or mobile-based setting. By that, we understand the majority (>50%) of the content of the intervention has been delivered via the internet and mobile technologies.

#### Comparators

Randomised controlled trials (RCTs) comparing a group that receives a culturally adapted IMI with a control group that receives no treatment, treatment as usual, or placebo, as well as with a waitlist or active control group will be included.

#### Outcomes

Health behaviour-specific outcomes of interest are:

- For healthy eating interventions: body mass index.
- For physical activity/exercise interventions: time spent exercising (assessed via self-report or mobile/wearable technological devices, eg, pedometers).
- For sexual health behaviour: change in condom use.

- For smoking cessation: level of smoking.
  - For alcohol consumption: level of alcohol consumption.
- Cross health behaviour outcomes of interest are:
- Health-related quality of life.
  - Self-efficacy.

Outcomes may be reported subjectively (eg, self-reported in questionnaires) or objectively (eg, pedometers, HbA1c (hemoglobin A1c) levels). If more than one measure for an outcome is reported, we will prioritise objective measures over subjective measures.

## Study design

RCTs will be included in order to answer the first research question.

## Information sources and search strategy

Systematic searches were conducted in the following electronic databases to identify eligible studies for the review: Cochrane Central Register of Controlled Trials (CENTRAL), EbscoHost/MEDLINE, Ovid/Embase and EbscoHost/PsychINFO. The search strategy included a combination of keywords and database-specific terms, including the medical subject headings terms that cover culturally adapted IMIs in the field of health promotion interventions (see online supplemental file 1). The search terms also cover the topic of a parallel conducted a systematic review on culturally adapted IMIs for mental health conditions.<sup>62</sup> We did not add any date limitation to the search and the preliminary search has been conducted on the 26 August 2019. The search will be updated in the process.

## Study records

The results of the search will be uploaded to Covidence,<sup>63</sup> reference management software. After removal of duplicates, titles and abstracts of the articles will be screened by two independent reviewers (SB and KS) to identify studies with regard to the inclusion criteria. Identified articles will then be reviewed in full text by the two reviewers (SB and KS) according to the inclusion criteria. Any disagreement between the two reviewers regarding eligibility will be resolved by discussion with a third reviewer (HB). Reasons for exclusion will be recorded.

The study selection process is illustrated in a PRISMA flow diagram (see figure 1).<sup>64</sup>

## Data items

Data will be extracted in duplicate by two independent reviewers (SB and KS) in Covidence software.<sup>63</sup> Extracted data will include publication details, information about the study participants (demographics and cultural background, baseline characteristics), study design, study setting, the country where the intervention was conducted, characteristics of the original and the adapted interventions, and health behaviour-specific and generic outcome measures, the form of cultural adaptation of the intervention, content of the intervention and

utilisation of theoretical or evidence-based components of the interventions.

## Quality assessment and risk of bias

The risk of bias will be assessed by two independent reviewers using Cochrane Collaboration's Risk of Bias tool V 2.0 through in following domains: bias arising from the randomisation process, bias from deviations from the intended interventions, bias from missing outcome data, bias due to measurement of the outcome, bias from the selection of the reported results.<sup>65</sup>

## Data synthesis

### Meta-analysis

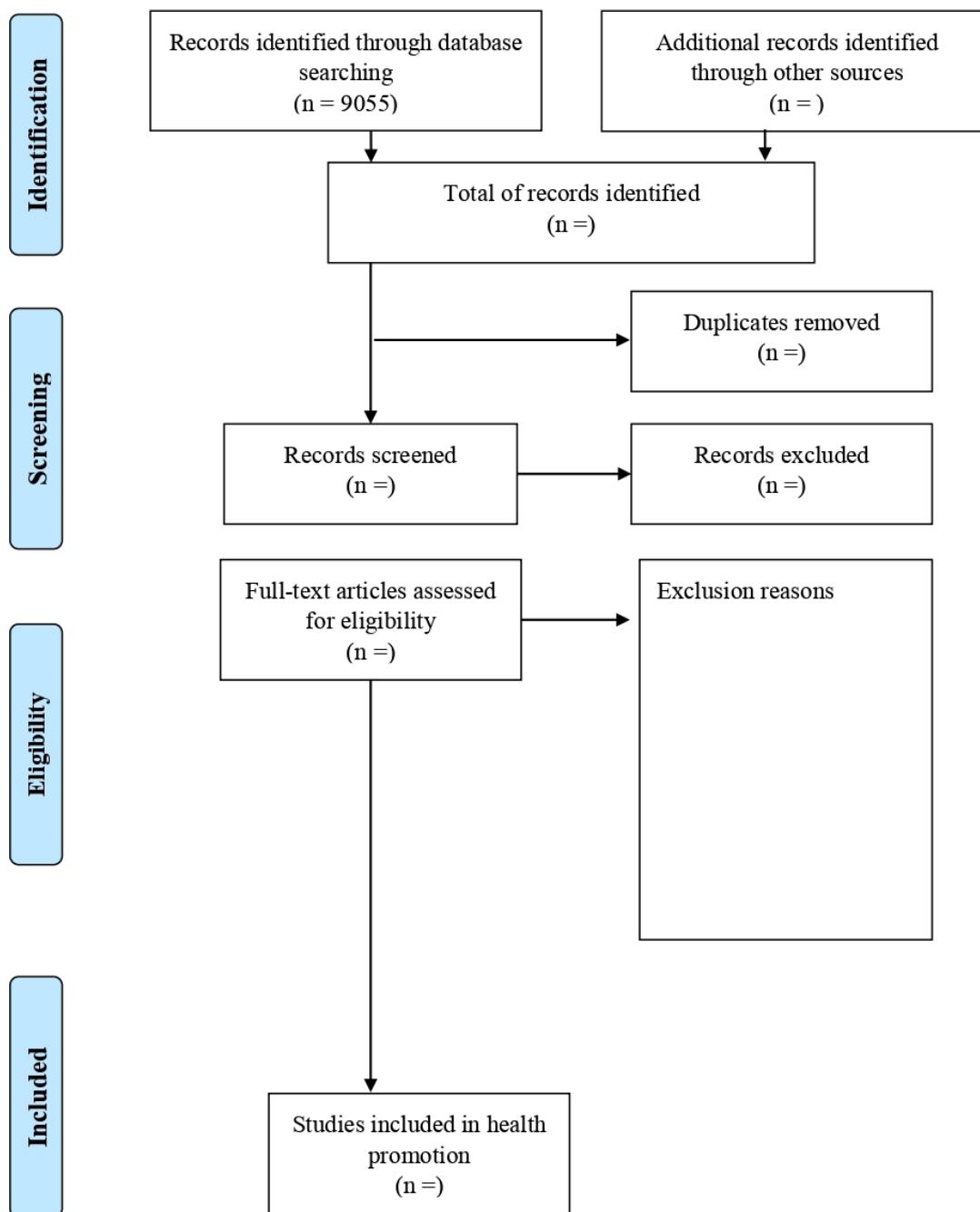
Data will be meta-analytically pooled in case of at least three included studies reporting data on the same outcome. Else findings of included studies will be described descriptively. In order to quantify the heterogeneity,  $I^2$  test will be performed for the subgroups, which will be formed based on the intervention outcome of each domain. If heterogeneity is significant, the meta-analysis will be performed using random-effect models.<sup>66</sup> Review Manager V.5 will be used to conduct the analysis.<sup>67</sup> In the case of multiple outcome measures reported for one primary outcome, then we will use the objective measure over subjective measures. Postintervention scores of intervention and control groups will be used to calculate the between-group effect sizes of each study. For each outcome domain, the meta-analytical effect will be calculated with standardised mean differences and 95% CIs for continuous outcomes, whereas for dichotomous outcomes, ORs will be used. The effect sizes will be descriptively categorised according to Cohen's rule of thumb with  $d=0.20$  considered a small effect,  $d=0.50$  a medium effect and  $d=0.80$  a large effect.<sup>68</sup> Publication bias will be assessed using funnel plots.

## Heterogeneity

With an assumption of the random-effects model, heterogeneity will be measured with  $I^2$  statistics. In order to interpret the results of this, guidelines from the Cochrane Handbook will be used. According to the guidelines, 0%–40% refers to no heterogeneity, 30%–60% moderate, 50%–90% substantial and 75%–100% considerable heterogeneity.<sup>69</sup> In the presence of substantial heterogeneity, we will conduct subgroup analyses to explore possible sources of heterogeneity. If we have sufficient data, subgroup analyses will be conducted across studies based on: population (healthy vs diagnosed), duration of the intervention, technology (internet-based vs app/mobile-based) and presence of guidance. Sensitivity analyses will be conducted to explore the impact of the risk of bias on study findings. Studies rated as high risk of bias will be excluded and the meta-analysis will be conducted again.

## Qualitative synthesis

A narrative synthesis of all included studies will be conducted, and the relevant characteristics of the studies defined in the Data Items section will be qualitatively



**Figure 1** PRISMA flow diagram. Mohar D et al.<sup>64</sup>

described. This synthesis will address the cultural adaptation process, theoretical background and adapted components of the intervention. Moreover, findings of the studies, namely acceptance and adherence rates, will be outlined. A table summarising the objectives, methods, and outcomes of each included study will be provided.

#### Patient and public involvement

No patient involved.

#### ETHICS AND DISSEMINATION

Since the collected data in this review are based on secondary analyses of published data, no ethical approval

is needed. After completing the review and meta-analysis, the results will be published in a peer-reviewed international journal. Moreover, the results will be presented in conferences and workshops. Updates regarding the current status of this review will be available in PROSPERO.

#### DISCUSSION

The present planned review is the first to explore the effectiveness of culturally adapted IMIs concerning health promotion interventions and will address a significant lack of research concerning the cultural adaptation of



IMIs. It is expected to inform future research by providing a summary of the literature in this area and describing the features of existing culturally adapted IMIs. Moreover, this review might communicate practices whether culturally adapting IMIs is a necessary effort to make and may guide future investment. Nonetheless, due to the expected heterogeneity of effects across studies, the findings from this review should be treated with caution.

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**Contributors** SB, KS, HB and LS conceived the study design. SB, KS and LS developed the search strategy. SB wrote the draft of the manuscript. All authors read, provided feedback and approved the final version. The guarantor of the review is SB.

**Funding** This research has been funded by the SB's Ph.D. scholarship, which is granted by the Ministry of Education in Turkey.

**Disclaimer** The funder had no involvement in this study and manuscript.

**Competing interests** HB received consultancy fees, reimbursement of congress attendance and travel costs as well as payments for lectures from Psychotherapy and Psychiatry Associations as well as Psychotherapy Training Institutes in the context of E-Mental-Health topics. He has been the beneficiary of study support (third-party funding) from several public funding organisations. LS reported receiving personal fees from Psychotherapy Training Institutes and clinics in the context of e-mental-health and supervision outside the submitted work.

**Patient consent for publication** Not required.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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