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User engagement with technology-mediated self-guided interventions for addictions: scoping review protocol

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ABSTRACT

Introduction Technology-mediated self-guided interventions (TMSGIs) for addictive disorders represent promising adjuncts and alternatives to traditional treatment approaches (eg, face-to-face psychotherapy). However, meaningful evaluation of such interventions remains elusive given the lack of consistent terminology and application. Preliminary findings suggest that TMSGIs are useful but engagement remains modest for various reasons reported by users, including lack of personalisation. The aim of this review is to explore how TMSGIs have been defined and applied in addictions populations with an emphasis on technical and logistical features associated with greater user engagement.

Methods and analysis This scoping review protocol was developed in accordance with the Arksey and O'Malley framework. Articles from electronic databases (ie, PsycINFO, Embase, MEDLINE and CINAHL) will be included if they targeted adolescents or adults with one or more substance or behavioural addictions, excessive behaviours or aspects thereof (eg, cravings) using a privately accessible technology-mediated intervention. Two independent reviewers will screen titles and abstracts for relevance before commencing full-text reviews. Extracted data will be presented in descriptive, tabular and graphical summaries as appropriate.

Ethics and dissemination Ethics committee approval is not required for this study. Review findings will be used to guide the development of preliminary recommendations for real-time addiction intervention development and provision. Emphasis will be placed on practical considerations of user engagement, accessibility, usability and cost. Knowledge users, including clinicians, researchers and people with lived experience, will be engaged for development of one such intervention following publication of review findings.

Registration This scoping review was registered with the Open Science Framework on 15 April 2022 and can be located at http://www.osf.io/3utp9/.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The comprehensive search strategy was developed in consultation with three librarians to ensure relevance and sensitivity of searches.
⇒ A broad definition of addiction will help to ensure breadth of coverage of the extant literature.
⇒ In accordance with best practices for open and transparent science, this review protocol has been pre-registered with the Open Science Framework.
⇒ The current lack of clarity in technology-mediated self-guided intervention definitions limits the degree of specificity possible in this review protocol.
⇒ The exclusive focus on self-directed interventions is unlikely to capture the full extent of technology-mediated addiction interventions.

INTRODUCTION

Technology-mediated self-guided interventions (TMSGIs) represent promising low intensity supplements and alternatives to traditional treatment approaches[1 2] and have demonstrated practical utility when applied to numerous physical and psychological health conditions, including substance-related and behavioural addictions.[3] Broadly, TMSGIs are self-directed psychosocial interventions delivered via technologies that can be privately owned, such as smartphones or personal computers. Often, they take the form of independently accessed online activities, but a range of formats exist.[4] The demand for TMSGIs is high among both treatment users and providers for several reasons[5 6] and appears to be outpacing robust scientific evaluation.[7] Some reasons for the high demand include cost-effectiveness,[8] accessibility and privacy[1 2] and lowered threshold for treatment access.[9]

There have been some efforts to review and map the technical structure of TMSGIs. According to Naughton,[10] intervention content within TMSGIs can be triggered by users, servers or contexts. User-triggered content is dependent on users deciding whether and when to access support (eg, texting HELP to an advice line or opening an application to access content). Server-triggered content is delivered according to fixed schedules, random timing or a combination of both; delivery timing can be generalised or tailored to users' needs and preferences. Finally, context-triggered contact involves the use of sensors to respond

based on triggers in users' environments; geolocation is the most common form of data used for this purpose.[10] These methods are increasingly combined to deliver interventions characterised by three core features: (a) proactive content that directly corresponds to real-time needs when users are at risk of engaging in negative health behaviours; (b) content and timing that is tailored based on ecological data collected and (c) inclusion of content that is not solely user-triggered.[11]

The addiction field in Canada and worldwide is ripe for applications of TMSGIs given the large degree of unmet needs[12–14] and increasing accessibility to substances and addictive behaviours.[15 16] Using contemporary technology (eg, sensors, global positioning system, audiovisual input/ output), TMSGIs offer a new way to measure and respond to symptoms that fluctuate over short periods of time within individuals,[17] which is particularly relevant in the treatment of addictive disorders. For instance, proximal and transient factors (eg, cravings, mood lability, fluctuations in motivation, triggers) exert large influences on addiction maintenance, exacerbation and relapse[18] and represent optimal treatment targets.

Conceptualisation and development of TMSGIs remains challenging given the inconsistent definitions and applications.[19] Various forms of TMSGIs, for example, have been referred to as ecological momentary interventions, ambulatory interventions and just-in-time adaptive interventions (JITAIs), among others. One systematic review[20] exemplifies the challenges associated with evaluations of TMSGIs. In this review, the authors evaluated the use of JITAI for substance use disorders and found mixed evidence for their effectiveness. However, most of the evidence was based on pilot studies with very small sample sizes. The authors thus did not draw any substantive conclusions for the use of JITAI in the treatment of substance use disorders. They did, however, conclude that it remains unclear what defines such interventions and how best to develop them for addiction populations. Understanding the differences among various types of TMSGIs thus remains an ongoing challenge. Despite this challenge, however, other reviews have found support for various forms TMSGIs. For instance, in their review of technology-assisted self-help programmes for addictions, Newman and colleagues[21] found that these interventions are often helpful in reducing both consumption and severity of various addictions, with medium to large effect sizes. Danielsson and colleagues observed similar patterns when including analysis of both telephone and web interventions.[4] Taken together, these findings suggest that TMSGIs are promising, yet the lack of clarity on their definitions and applications precludes meaningful evaluations of them.

While preliminary evidence demonstrates support for TMSGIs, successful treatment outcomes are often critically impeded by a lack of user engagement.[21 22] For example, a recent trial reported that over 40% of treatment-seeking individuals with gambling problems never logged in to the no-cost online self-help workbook they signed up for despite rating the content itself highly.[23] More broadly, engagement reflects a combination of objective and subjective markers of treatment uptake, such as number of activities completed and subjective interest, respectively. These engagement factors then influence treatment success. There are several reasons that disengagement may occur, such as lack of treatment progress, lack of intervention personalisation, individual differences (eg, forgetfulness) or treatment goal changes or successes.[24] In sum, the low burden of TMSGIs may counteract obstacles to entering treatment but may also give rise to variable user commitment and utilisation.[25] Research is needed to elucidate which technical features facilitate or discourage treatment engagement in these highly demanded interventions.

Objectives

The aim of this review is to clarify and summarise the extant literature on TMSGIs in addictions and provide a foundation for subsequent development.[26] Given the limited amount and variability in focus of the existing research, we will employ scoping review methodology to identify and describe TMSGIs for people with various substance-related and behavioural addictions. The definition of addiction will be broad to ensure all relevant articles are included (eg, TMSGIs that target 'heavy drinking' but do not explicitly refer to addiction). Interventions need not target addictions in their entirety but may instead focus on one or more aspects of them (eg, cravings, triggers). Specific emphasis will be placed on technical and logistical aspects of TMSGIs and their hypothesised impact on subjective or objective treatment engagement. Research findings will be aggregated in pursuit of a common glossary[19] and to make preliminary recommendations to guide development of future addiction TMSGIs with an emphasis on technical and logistical features that maximise user engagement (eg, frequency of notifications, medium of delivery).

METHODS AND ANALYSIS

The review protocol was developed based on traditional frameworks and associated revisions[26–28] and in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for review protocols.[29] Any protocol amendments will be documented in the Open Science Framework pre-registered project alongside the full protocol (online supplemental file 1) and manual (online supplemental file 2). Articles will be imported from electronic databases and reviewed in Covidence.[30] Results will be reported in accordance with the scoping review extension of PRISMA.[31]

Research questions

The research questions were developed for broad identification of studies. The population of interest is adults and adolescents with one or more substance or behavioural addictions, excessive behaviours or aspects thereof (eg,

cravings, triggers). Addictions need not be defined specifically by diagnostic criteria. Excessive behaviours will also be included even if the term 'addiction' is not explicitly used (eg, heavy drinking, binge eating). Interventions of interest should offer technology-mediated non-pharmaceutical support, education, prevention, assessment or treatment for one of the aforementioned problems. Interventions must be delivered in the context of treatment users' natural environments via technology that is privately owned, accessed or operated, and not exclusive to professional settings. Outcomes must include both of the following: (a) at least one psychological construct directly related to the problem (eg, behaviour, cognition, emotion, motivation) and (b) at least one measure of participant engagement.

Question 1. What types of TMSGIs for addiction-related concerns exist?

Question 2. What impact do various technical and logistical features of TMSGIs have on user engagement?

Relevant literature identification

In consultation with librarians, the search strategy was developed to encompass all empirical articles that evaluate TMSGIs for addictions. Search terms were selected to identify English-language articles on PsycINFO, Embase, MEDLINE and CINAHL (online supplemental file 3). Boolean operators were applied to combine and refine search terms. The initial search strategy was developed in PsycINFO and adapted to the remaining databases. Articles from each database were searched from inception to 5 April 2022; a second iteration will follow after full-text screening is initially completed to cover the period between 5 April and the date of the second search. Following full-text review, the reference sections of all included articles will be manually searched for other relevant articles to ensure completeness of results. A reflexive and iterative approach will be taken to refine search criteria and data extraction throughout the review process (ie, databases will be searched multiple times). This approach is critical given the rapidly evolving research base on treatments that incorporate new and emerging technologies and inconsistent use of terms to define such interventions.

Study selection

Eligibility criteria were developed a priori by the research team. Two independent reviewers will apply these eligibility criteria to screen article titles and abstracts following automatic deduplication within Covidence. No reason for exclusion at this stage will be indicated as the purpose is only to remove clearly irrelevant articles. To pass title and abstract screening, articles must satisfy the following general criteria: (a) focus on one or more problems with substance use, behavioural addiction, excessive behaviour or aspect thereof (eg, cravings, triggers); (b) use of technology as a means to deliver non-pharmaceutical support, education, prevention, assessment or intervention for the problem defined in (a); (c) intervention technology

hardware must be privately owned, accessed or operated (eg, smartphone, watch, tablet, sensor, computer) and not exclusive to professional settings (eg, fMRI, other medical equipment); (d) focus on psychological constructs such as behaviour, cognition, emotion or motivation (ie, not genetic, animal or pharmaceutical studies) and (e) reported in the English language.

Following title and abstract screening, the review manual for full-text review will be tested on the first 20 articles to assess criteria and agreement with two independent reviewers. Then, these reviewers will commence full-text reviews. In addition to the eligibility criteria for title and abstract screening, articles in full-text review must satisfy the following conditions: (a) original empirical study that is not solely qualitative; (b) sample exclusively comprised of adults or adolescents aged 16 years or greater; (c) intervention is delivered at least partially without professional, clinical, social or technical support and (d) study measures and reports on at least one outcome associated with subjective or objective user engagement (eg, quality ratings, number of logins, number of completed activities, proportion of users that completed all activities). Articles that otherwise satisfy eligibility criteria will be discussed separately from the evidence synthesis if they are qualitative, non-empirical or grey literature. In the event that studies contain duplicate samples with different follow-up durations, only the study reporting the longest follow-up will be retained.

The pre-registered review manual contains specific instructions to be provided to independent reviewers. After both title and abstract screening and full-text review, disagreements that arose will be resolved through consultation with a third reviewer (author BB) until consensus is achieved. Interrater agreement for both title and abstract screening and full-text review will be assessed and reported with Cohen's kappa.[32] A kappa cut score of 0.80 will be used for both phases of article selection, indicating a substantial level of agreement.[33]

Data extraction

Once articles have been selected for inclusion within Covidence, data will be extracted, exported and compiled in Microsoft Excel following recommended practices.[26] The following information will be extracted from each eligible article: (a) reference type (eg, peer-reviewed article, preprint); (b) publication year; (c) country or location; (d) research objectives; (e) research design (eg, two-arm randomised controlled trial); (f) sample size; (g) sample information, including eligibility criteria, mean age, ethnicity and sex/gender; (h) context and setting; (i) type of addiction(s) targeted; (j) whether the intervention was delivered in a standalone or supplementary manner; (k) intervention details, including theoretical orientation, content, features, software and operating system; (l) addiction-related measures and outcomes; (m) engagement-related measures and outcomes; (n) reported study limitations and (o) author conclusions related to the development and provision of relevant

interventions, particularly technical features (vs intervention content). The review protocol (online supplemental file 1) contains further details on the data that will be extracted from articles.

Results collation, summary and reporting

A descriptive overview of the findings will be provided in tabular and graphical forms as appropriate. Narrative summaries will be provided alongside tables and graphics and directly reflect the information extracted from eligible articles. Results will be discussed from a transdiagnostic perspective, although significant differences that emerge among addictions will be noted. Important discrepancies in operational definitions will be highlighted (eg, differences in conceptualisation of TMSGIs or addictions). Recommendations will be derived based on the review findings to guide future research on the development and provision of TMSGIs with an emphasis on technical and logistical features associated with greater user engagement.

Patient and public involvement

The overarching aim of our research programme is to develop a transdiagnostic addiction TMSGI delivered in real-time via smartphone application. Although the scoping review itself does not entail consultation or engagement with knowledge users, subsequent stages of this research programme will incorporate these strategies. Specifically, development and usability testing will solicit and address feedback from multidisciplinary addiction clinicians and researchers as well as individuals with past or present lived experience. Quantitative and qualitative feedback will be used to refine the intervention prior to deployment in the context of pilot testing.

Ethics and dissemination

Ethics committee approval is not required for this review. The findings elucidated via this scoping review will be published in an open-access peer-reviewed academic journal and presented at an international conference. The generated preliminary recommendations will be framed not only to guide our own research programme but more broadly to guide research, development and practical implementation of TMSGIs for addiction-related concerns (eg, suggestions for optimising frequency of smartphone notifications). Considerations of accessibility, feasibility and cost will be central to the development of these recommendations. As previously mentioned, stakeholder engagement will help refine and apply these recommendations to our own research programme.

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