Classification of Digital Mental Health Interventions: A Rapid Review and Framework Proposal

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Abstract. The modern context of mental health interventions asks for an inclusion of digital solutions to the face-to-face approach, providing better access and reduced inequity for patients. The current classification of digital mental health interventions can be system specific (mobile apps) or general (virtual therapy), which causes inadequacy in applications. The goal of this study was to develop a framework to improve digital mental health interventions classification. We performed a rapid review of the literature on existing digital mental health interventions frameworks. We identified four existing frameworks, extracted their purpose, categories and items, completed a thematic analysis and formulated a four domains framework proposal. This framework allows to classify digital mental health interventions on their system, function, time and facilitation, which should facilitate our understanding of the effect of singular characteristics on patient outcomes.

Keywords. Digital health, digital interventions, mental health, classification

1. Introduction

Technologies in healthcare have received an unpreceded interest amidst the COVID-19 pandemic. Many people living with a chronic physical or mental health condition experienced follow-up disruption with care providers during the pandemic [1]. People living with a chronic disease are at a higher risk of developing mental health problems [2]. In a pandemic context affecting particularly the elderly and chronically ill people, combined with public health measures that limit social interactions, mental health status is particularly affected [3].

In Canada, common chronic conditions are mostly managed in primary care by care teams including physicians, nurses, social workers and psychologists. While some services could be maintained at distance during the pandemic, mostly with personalized digital solutions, in many instances neither patients nor providers were prepared for this digital shift. Most clinicians had never provided digital health services before, and healthcare managers and decision makers did not know which digital health interventions

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should be implemented. Although digital health was seen as an opportunity to maintain care continuity for people living with chronic conditions, the lack of knowledge about digital health solutions, their safety and effectiveness limited their implementation.

A knowledge synthesis was conducted to gather evidence regarding safe and effective digital mental health interventions (DMHI) for people living with a chronic condition [4]. This project was funded by the Canadian Institutes of Health Research (CIHR), and involved a team of researchers with expertise in content and methods, and knowledge users (clinicians, managers and patients). To provide knowledge users with effectiveness evidence for different types of DMHI, we were faced with the lack of consensus and comprehensiveness of current classification of DMHI.

The aim of this paper is to present the development of a classification framework for DMHI to provide answers to knowledge users on digital solutions that could be implemented for the prevention, detection and management of mental health conditions in primary care. Given the lack of a comprehensive classification framework, our systematic approach provides a basis to organize knowledge on DMHI and compare different interventions.

2. Methods

This parallel methodological study was conducted in the context of a larger knowledge synthesis of digital mental health interventions in primary care [4]. We performed a rapid review, applying the process and methods of a systematic review in a streamlined and accelerated way [5]. We limited the search to two main databases, MEDLINE and PsycInfo with the following strategy: ("mental health" OR "anxiety" OR "depression") AND ("telemedicine" OR "eHealth" OR "mHealth" OR "telehealth") AND ("classification" OR "taxonomy" OR "framework"). We included any peer-reviewed research paper describing a classification of any sort for digital mental health intervention, published in the last 10 years in French or in English. Publications were excluded if they did not describe their classification method or if they targeted a specific domain other than mental health. One researcher screened the title and abstract and the full-text was appraised by two researchers and discussed before inclusion. Data from the classifications identified were extracted. We used a thematic analysis to do a theme reduction and structure [6]. Second, we identified classification themes using thematic content analysis, and provided their definitions and attributes. Third, we conducted a targeted literature search of definitions of identified digital technologies to provide a common understanding of the terms used in the classification system. Fourth, the framework was validated through research team discussions. Finally, we applied the proposed classification framework to the DMHI found in the systematic review.

3. Results

The search strategy yielded 671 results in the database, from which 146 were duplicates. An additional record was included from the WHO website. We completed a full-text evaluation of 16 papers, from which 4 were retained (Figure 1).

3.1. Existing Classifications

The WHO Digital Health Intervention (DHI) framework proposes system categories that represent the types of technological applications and information systems designed to deliver one or more digital health interventions [7]. Liverpool et al. conduct a review of
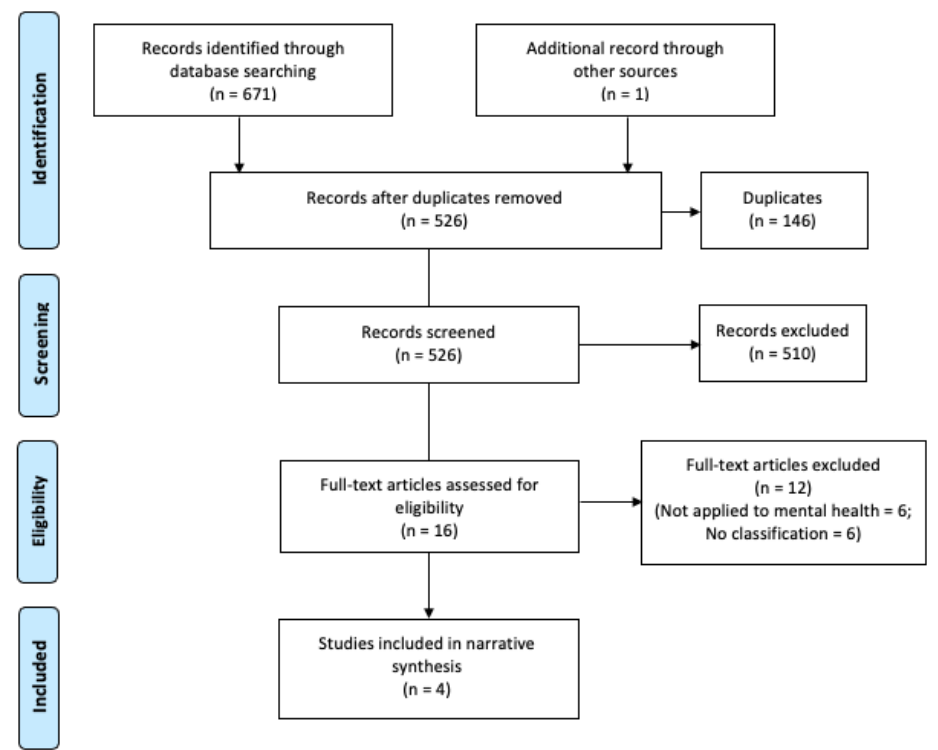

Figure 1. PRISMA flow diagram.

the literature to identify modes of delivery and goals of DMHI. They used a classification based on six modes of delivery and seven goals [8]. Grajales et al. offer a description of ten types of services in relation with social media [9]. The goal of this study was to conduct a narrative review of the literature to present how social media are being use in digital mental health interventions. Chan et al. described seven goals of mobile apps [10]. The purpose of this article was to present a framework to adequately evaluate mobile applications used in mental health. This framework is based solely on experts' opinions, but considers current policies and guidelines.

There was a total of 55 categories proposed in the four retained frameworks. Most of the frameworks classified items relying on one level category, except for Liverpool et al. that detailed modes of delivery apart from goals of the intervention. The frameworks from Liverpool et al. and the WHO are general purpose frameworks. For their part, Grajales et al. detailed subtypes of social media, and Chan et al. detailed functions of mobile applications. For all identified frameworks, they lacked important aspects related

to mental health interventions, such as the role of the therapist and whether the intervention was synchronous or asynchronous.

From the available evidence reviewed, we propose a four-dimensional framework. It comprises the notions of System, Function, Time and Facilitation (Table 1). The proposed classification allowed for targeted analysis to gather information on unique features (use of prompts and alerts) or general criteria (self-administered interventions). However, some interventions could fit in more than one category, pointing to the need for a classification system that could adapt to multifaceted interventions.

Table 1. Proposed classification framework of digital mental health interventions

System	Function (*sub-function*)	Time	Facilitation
1. Internet or Website 2. Computer (software) 3. Mobile app	A. Decision support *a) Screening* *b) Prompts and alerts*	=. Synchronous	&. Entirely supported by healthcare providers
4. Electronic messaging (email, SMS) 5. Electronic health record 6. Telehealth (telemedicine, telepsychiatry)	B. Communication *a. Transmission of information (one way)* *b. Communication (with healthcare provider)* *c. Communication (peer to peer, e.g., virtual peer group for clients)*	+. Asynchronous	@. Partially supported by healthcare providers #. Self-administered
7. Virtual reality/ augmented reality 8. Robot 9. Connected devices 10. Social media 11. Other system	C. Therapy *a. Cognitive Behavioural Therapy (CBT)* *b. Other psychotherapy* *c. Gamification* D. Monitoring a. *Provider monitoring* b. *Self-monitoring* E. Other function		

4. Discussion

We developed a classification framework for DMHI for digital mental health solutions that could be implemented in primary care. This work aimed to answer a specific need of knowledge users about which digital interventions could be used to ensure the prevention, detection, or management of common mental health issues in people living with a chronic condition. Limits of current classifications were highlighted, and a new framework was developed to allow knowledge users access more specific evidence about DMHI that could be implemented.

This project was conducted in a very short turnaround, and we limited the number of databases consulted to only the most relevant, while following rapid review guidelines. Thus, it is likely that other relevant classification frameworks exist but were not considered.

5. Conclusion

A classification framework for digital mental health interventions was developed through a rapid review. We propose four dimensions (System, Function, Time and Facilitation) that can be used to describe and compare digital interventions aimed at the prevention, detection, or management of common mental health issues.

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