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Use of technology to provide mental health services to youth experiencing homelessness: a scoping review protocol

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ABSTRACT

Introduction Despite the importance to address mental health issues as early as possible, youth experiencing homelessness (YEH) often lack prompt and easy access to health services. Recently, there has been a surge of studies focusing on leveraging technology to improve access to mental health services for YEH; however, limited efforts have been made to synthesise this literature, which can have important implications for the planning of mental health service delivery. Thus, this scoping review aims to map and synthesise research on the use of information and communication technologies (ICTs) to provide mental health services and interventions to YEH.

Methods and analysis A scoping review of the literature will be conducted, following Arksey and O'Malley's proposed methodology, the Preferred Reporting Items for Systematic reviews and Meta-Analyses Extension for Scoping Reviews and recent guidelines from the Joanna Briggs Institute. All peer-reviewed papers using ICTs as a means of intervention will be considered, as well as grey literature. Only documents in English or French will be included in the analysis. First, 10 electronic databases will be consulted. Next, all data will be extracted into Covidence. Then, two reviewers will independently conduct the screening and data extraction process, in the case of discrepancies, a third reviewer will be included. Finally, data will be synthesised according to our objectives.

Ethics and dissemination Ethics approval is not required, as data will be collected from published literature. Findings will be disseminated through conference presentations and peer-reviewed journals.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This review addresses the youth homeless population, a population that is often neglected in terms of mental health services innovations.
⇒ This review follows updated guidelines for scoping reviews and includes a comprehensive search strategy (available in English and French) building from previous work in the field.
⇒ Given the emerging nature of the field, it is possible that heterogeneity among the studies may limit the results.
⇒ Only English or French studies will be included, potentially limiting generalisability of the results.

INTRODUCTION

Homelessness is a growing and worrisome public health phenomenon. It has been reported that at least 2.1 million people worldwide are homeless. However, this figure only represents data reported by 36 countries and it might be far from the actual numbers due to considerable variation in the definition of homelessness, and hence, the variation in the reported incidences across countries.[1] Another major concern is the increasing number of youth experiencing homelessness (YEH); it has been reported that adolescents and young adults represent 20–32% of the homeless population in developed countries (ie, Canada, Australia).[2 3]

Homelessness in youth is often a result of different factors such as: family conflict, poor schooling history, economic difficulties, mental health problems such as difficulties with emotional regulation, history of trauma, physical abuse, history of foster care, non-heterosexual orientation and poor schooling history.[4] YEH's precarious situation restrains them from acquiring or developing the skills required for a healthy and secure transition to adulthood.[5] Some of the consequences of homelessness in youth are: nutritional vulnerability, psychological problems, exposure to premature sexual activity, criminal victimisation, dropping out of school and poor access to the resources needed to maintain a satisfactory standard of living.[6]

The longer a young person remains homeless, the fewer opportunities to be among individuals with whom they can maintain healthy and positive relationships and more likely to engage with antisocial peers.[7] As a result, YEH will have a greater number of ties with antisocial and risk-taking peers which may lead to the adoption of unhealthy activities (eg, drug use, premature sexual activity and so on)[7–10]; these street-based relationships are a risk factor for anxiety and depressive symptoms.[11] Moreover, a large proportion of

this population has experienced physical and/or sexual abuse, which is associated with the development of psychiatric disorders.[12 13] In general, research has shown that homeless youth are more likely to experience mental health disorders compared with their housed peers,[14] highlighting the need to identify interventions that can address mental health issues in this specific population.

Despite the abovementioned need for mental health services, health practitioners have historically experienced many challenges in engaging YEH.[15] In reality, the traditional paradigm of the healthcare system does not align with the nomadic lifestyle of individuals experiencing homelessness, rendering services highly inaccessible.[16] Research has shown that individuals experiencing homelessness that access hospital emergency departments for various health and social needs report a similar rate of access to technology (eg, cell phones) as housed patients.[17] Access and use of technology among younger populations is also prevalent[18]; for example, a recent scoping review[19] found high percentages (ranging from 46.7 to even 100%) of mobile phone ownership among 16 samples of YEH. In addition, this review found that on average 77.1% (range of 57–90.7%) of the samples used social media and that YEH are receptive to using information and communication technologies (ICTs) in their daily lives and for health purposes.

Rationale for conducting this review

Given the popularity of ICTs and their increasing accessibility, several researchers have explored various forms of ICTs (eg, videoconferencing, text messaging, mobile apps) for delivering mental health services.[20 21] It has also been shown that the use of technology could improve and maintain communication with homeless youth,[22] for example, in the context of interacting with social workers.[23] Thus, technology has the potential to be an advantageous tool for improving access to health services for YEH,[19] including mental health-related interventions.[19 22 24] However, limited attention has been given to synthesising this literature, which is important to inform future policy, practice and research. Hence, given the emerging literature published on this topic, the objective of this scoping review is to identify what is known about the use of technology to provide mental health services and interventions to YEH. The scoping review method has been chosen to synthesise the existing literature on the topic and to identify gaps in the research to better guide future research.

Objectives

This review aims to answer the following research question: what is known about the use of technology to provide mental health services and interventions to YEH between the ages of 13 and 29?

To answer this research question, our scoping review aims to achieve the following objectives:

1. Describe the type of ICTs, goal and type of service/intervention (eg, information/education, therapy, peer-support), prescribed frequency of use, characteristics (eg, self-directed, coached, type of professional delivering the service) and technology type (eg, phones, web-based applications).
2. Describe the available evidence on technology-based mental health interventions (including acceptability, feasibility, security, effectiveness and so on).
3. Document the quality of the available evidence.
4. Identify the implications of this evidence for mental health services.

METHODS

This review will follow the framework for conducting scoping reviews suggested by Arksey and O'Malley[25] and methodological guidelines from Levac *et al*[26] and the Joanna Briggs institute.[27] The final document will be reported according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension tool for Scoping Reviews.[28] Moreover, this protocol has been developed in accordance with guidelines for reporting on protocols for systematic reviews and meta-analyses[29] (the completed checklist is included as a online supplemental file 1).

Eligibility criteria

Studies will be included if they meet the following inclusion criteria: study (a) includes participants with a mean age between 13 and 29 inclusive, (b) includes youth with any mental health issue who are experiencing homelessness and/or living in a shelter, (c) uses ICTs as a means of intervention to address mental health treatment, mental health promotion, socioeconomic determinants pertinent to mental health or daily activities such as maintaining housing, returning to school or work and so on and (d) includes a description of the technology used. Studies using technology that is not interactive (eg, CDs, projectors, television) and literature written in languages other than French and English will be excluded from our scoping review.

Regarding age, based on various definitions,[6 30–32] we define youth as individuals between the ages of 13 and 29. Regarding the concept of homelessness, we will use the following definition from the Canadian Observatory on Homelessness: 'the situation of an individual, family or community without stable, safe, permanent, appropriate housing or the immediate prospect means and ability of acquiring it'.[33] Using this definition, we will be able to target homelessness in the broadest sense, including individuals without a fixed abode, unsheltered individuals and those living in shelters.

Information sources

A search will be conducted for peer-reviewed and grey literature, from 2005 to present, in English and French and without methodological restrictions in the following electronic databases: CINAHL, MEDLINE, Embase, Cochrane, Web of Science, Google scholar and Maestro mainly for peer-reviewed articles. The

following grey literature databases were also consulted to search for grey literature: ProQuest, Open Access theses and Dissertations, Papyrus (Institutional Repository) from the Montreal University and Homeless hub. Abstracts and conference presentations (eg, study summary posters) will also be included in our research, if they include sufficient detail to address the research objectives.

Search strategy

In consultation with an information specialist, we adapted a search strategy from a previous scoping review[19] that was focused on access and youth of technology among YEH, by adding the concept of mental health. The final search strategy was applied for peer-reviewed databases (see online supplemental tables S1 and S2 in supplemental file 2) and adapted for the grey literature search; the list of keywords pertain to the following concepts: (a) mental health in general, (b) mental health disorders (eg, psychosis, depression, mood disorder, stress disorders, anxiety and panic disorders, phobia-related disorders, self-harm, attention deficit disorders, bipolar disorder, substance abuse, conduct disorders, obsession and compulsion disorders, trauma-related disorders, eating disorders, autism, pathological gambling, personality disorders, paranoia, schizophrenia and any other mental health), (c) ICTs (eg, e-mental health, telephone, mobile, computer, smart, tech, techno, online, line, link, web, virtual, artificial intelligence and electronic) and finally (d) YEH. Further details are presented in online supplemental file 2. We will also include a translated list of the keywords especially for the databases that contain almost exclusively French literature (eg, Papyrus).

Data management and study selection process

The resulting studies obtained from the electronic search will be exported into Covidence.[34] After duplicates are removed, all titles and abstracts will be independently screened by two reviewers to identify relevant studies according to our inclusion and exclusion criteria (level-1 screening). Papers will be classified as 'yes' (include the article), 'no' (exclude article) or 'maybe' (more information is needed). In the event of any discrepancy of the classifications between the two reviewers, a discussion will be held to resolve them; a third member of the research team will be consulted if consensus cannot be achieved. Once all discrepancies are resolved, studies labelled as 'yes' and 'maybe' will undergo full-text screening by each reviewer and will be classified as 'include' or 'exclude' (level-2 screening). All discrepancies at this stage will also be discussed between reviewers. In the case of any disagreement or uncertainty, a third reviewer will be included in the discussion until consensus is reached. The screening process and its results will be summarised in a Preferred Reporting Items for Systematic reviews and Meta-Analyses flowchart.

Data extraction

A data extraction form has been developed using Excel. This form was adapted from a previous scoping review[19] and includes all the items that relate to the research objectives. Table 1 presents details on the data items that will be extracted from the included studies. The data extraction form will be piloted by two reviewers who will independently extract data from a minimum of three of the included studies. The results of this pilot will be compared to address observed differences and arrive at a common extraction method.[26] After the data extraction form has been finalised, all included studies will be randomly divided into two groups. Next, each reviewer will be assigned a group of studies to extract data from. The data extraction files will be interchanged between the same two reviewers to validate the extraction, and make revisions as needed.

We will use Bowen's feasibility study framework[35] to organise study outcomes. This framework includes, for example, the following parameters of relevance to this review: acceptability (satisfaction, intent to continue use, perceived appropriateness, fit within organisational culture); demand (perceived positive or negative effects, actual use, expressed interest or intention of use) and implementation (degree and success or failure of execution, amount and type of resources, factors affecting implementation ease or difficulty).

Finally, to describe the methodological quality of included studies (considering risk of bias when pertinent), the critical appraisal tools provided by the Joanna Briggs Institute will be used according to each study design.[36] Meta-biases such as publication bias and selective reporting will not be reported because the intention of this scoping review is to provide an overview of the current literature rather than a critical appraisal of cumulative evidence.[28] A hierarchy of levels of evidence[37] will also be used to categorise the type of study designs identified in the review. Note that the quality of studies from the grey literature will not be assessed, unless there is sufficient detail on the methodology to complete the assessment.

Data synthesis

We will summarise information from the data extraction form using tables and a narrative synthesis organised by themes in relation to the objectives of the scoping review. The first theme will address the interventions themselves describing their study design, objectives, type of intervention, type of technology, sample characteristics, duration and frequency. A second theme will address the available evidence on these technology-based interventions and will include a summary of outcomes pertaining to acceptability, feasibility, effectiveness, security and any other instruments or measures that were used to assess the outcomes of each intervention. A table will also be used to summarise the quality of the studies and to rank them according to their level of evidence. Information related

Table 1 Data items

General category	Information to be extracted
Study identification	► Full title ► Authors' names ► Publication year ► Publisher ► Study context such as care setting (eg, in vivo, in clinic) ► Geographical region (eg, Canada, international) ► Study objectives
Study quality	► General type of evidence (eg, peer-reviewed, grey literature and so on) ► Study design (eg, randomised control trial, systematic review, thesis, website, experimental vs descriptive and so on) ► Level in the hierarchy of evidence[37] ► Level of patient or public involvement
Sample description	► Age (mean age or range of years) ► Number of participants in the study+additional info (eg, gender identity per category) ► Mental health disorder or psychiatric diagnosis or other condition ► Other demographic characteristics such as income sources, history of employment, level of education, housing situation, dependents (eg, children) ► Lost to follow-up participants
Intervention using technology	► General type of technology (eg, cell phone, app, computer, platform) ► Technology features (eg, social media platform, medical records, phone calls, blog) ► Description of the technology: – Type of professional who implemented the intervention (eg, profession) – Provided by researchers or belongs to youth? – Frequency of delivery of intervention (or prescribed use) – Psychometric qualities of the intervention such as reliability (eg, correlation coefficient, Cronbach) and validity (eg, golden standard) ► Implementation of the intervention
Intervention outcomes	► Outcome measurement (eg, by observation, through a questionnaire, with an interview, mobile app reports and so on) ► Frequency of use (eg, percentage of youth who use or intend to use the technology) ► Acceptability rates (eg, perceived usefulness of the intervention by youth and their practitioners, intention of use of the technology) ► Effectiveness (most significant outcomes such as measure of improvement in mental health disorder)
Study outcomes	► Key conclusions ► Implications for research and professional practice ► Study limitations

to the quality of the studies will be briefly described in the narrative synthesis.

Patient and public involvement

This is a scoping review protocol. The completion of this scoping review will involve analysis of existing research studies with no patient or public involvement. We will assess the studies reviewed in terms of level of patient or public involvement. We also plan to engage stakeholders with lived experience and organisations working with YEH during the process of disseminating results.

DISCUSSION

This scoping review will explore the use of technology to deliver mental health services in YEH. It will not only synthesise information and identify gaps in the field, but also highlight the relevance of using ICTs for mental health service delivery with this population. This is particularly relevant considering the context of the COVID-19 pandemic and its negative mental health impact on marginalised populations. As such, the advancement of knowledge on how to optimise access and engagement with mental health services among YEH during and beyond the pandemic is of critical importance.

One of the strengths of this scoping review is that our search strategy and data extraction builds on previous research, thereby enhancing the comprehensiveness of the review. Also, this review follows updated guidelines for scoping reviews to ensure scientific rigour. However, some limitations apply, for instance, only papers in English or French will be included and this may therefore reduce the generalisability of our findings for certain international contexts. The review will also be limited by publication year; the reason to restrict the search from 2005 is that the research will have limited applicability given the evolution of technology. Another limitation that we may

encounter is the methodological heterogeneity of study designs and the variations in terms of technologies and interventions used, which will make it difficult to compare results across studies. This is why we plan to summarise information through tables organised by themes. Finally, it is possible that some relevant examples of technology used to address mental health of YEH will not be identified through our search strategy, especially in the case of publication bias where only favourable outcomes may be published. It is also possible that our grey literature strategy may have omitted certain websites that could have helped to identify additional studies.

Ethics and dissemination

This work will synthesise available literature and does not require ethical approval. The results will be shared through conference posters and presentations and will be submitted for publication in a peer-reviewed journal. Our findings will enhance awareness about the use of technology to deliver mental health interventions to YEH.

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REFERENCES

1 OECD. Affordable Housing Database-Homeless population [Internet], 2021. Available: https://www.oecd.org/els/family/HC3-1-Homeless-population.pdf [Accessed 15 Dec 2021].
2 Gaetz S, O'Grady B, Kidd S. *Without a home: the National youth homelessness survey*. Toronto: Canadian Observatory on Homelessness Press, 2016. http://deslibris.ca/ID/10065874
3 Census of population and housing: estimating homelessness 2016. *Australian Bureau of Statistics [Internet]* 2018 https://www.abs.gov.au/statistics/people/housing/census-population-and-housing-estimating-homelessness/latest-release
4 Grattan RE, Tryon VL, Lara N, *et al*. Risk and resilience factors for youth homelessness in Western countries: a systematic review. *Psychiatr Serv* 2022;73:425–38.
5 Kovarikova J. Exploring youth outcomes after aging-out of care. Provincial Advocate for Children & Youth; 2017. https://cwrp.ca/publications/exploring-youth-outcomes-after-aging-out-care
6 Canadian Observatory on Homelessness. Canadian Definition Of Youth Homelessness [Internet]. *Homeless Hub* 2016 www.homelesshub.ca/youthhomelessdefinition
7 Rice E, Stein JA, Milburn N. Countervailing social network influences on problem behaviors among homeless youth. *J Adolesc* 2008;31:625–39.
8 Marshall CA, Davidson L, Li A, *et al*. Boredom and meaningful activity in adults experiencing homelessness: a mixed-methods study. *Can J Occup Ther* 2019;86:000841741983340.
9 Marshall CA, Roy L, Becker A, *et al*. Boredom and homelessness: a scoping review. *J Occup Sci* 2020;27:107–24.
10 Rice E, Milburn NG, Rotheram-Borus MJ. Pro-social and problematic social network influences on HIV/AIDS risk behaviours among newly homeless youth in Los Angeles. *AIDS Care* 2007;19:697–704.
11 Rice E, Kurzban S, Ray D. Homeless but connected: the role of heterogeneous social network ties and social networking technology in the mental health outcomes of street-living adolescents. *Community Ment Health J* 2012;48:692–8.
12 Cauce AM, Paradise M, Ginzler JA. The characteristics and mental health of homeless adolescents: age and gender differences. *Journal of Emotional and Behavioral Disorders* 2000;8:230–9.
13 Ryan KD, Kilmer RP, Cauce AM, *et al*. Psychological consequences of child maltreatment in homeless adolescents: Untangling the unique effects of maltreatment and family environment. *Child Abuse Negl* 2000;24:333–52.
14 Gewirtz O'Brien JR, Edinburgh LD, Barnes AJ, *et al*. Mental health outcomes among homeless, Runaway, and stably housed youth. *Pediatrics* 2020;145:e20192674.
15 Slesnick N, Meyers RJ, Meade M, *et al*. Bleak and hopeless no more. engagement of reluctant substance-abusing runaway youth and their families. *J Subst Abuse Treat* 2000;19:215–22.
16 Edidin JP, Ganim Z, Hunter SJ, *et al*. The mental and physical health of homeless youth: a literature review. *Child Psychiatry Hum Dev* 2012;43:354–75.
17 Post LA, Vaca FE, Doran KM, *et al*. New media use by patients who are homeless: the potential of mHealth to build connectivity. *J Med Internet Res* 2013;15:e195.
18 Rice E, Monro W, Barman-Adhikari A, Adhikari AB, *et al*. Internet use, social networking, and HIV/AIDS risk for homeless adolescents. *J Adolesc Health* 2010;47:610–3.
19 Lal S, Halicki-Asakawa A, Fauvelle A. A scoping review on access and use of technology in youth experiencing homelessness: implications for healthcare. *Front Digit Health* 2021;3:782145.
20 Naslund JA, Marsch LA, McHugo GJ, *et al*. Emerging mHealth and eHealth interventions for serious mental illness: a review of the literature. *J Ment Health* 2015;24:321–32.
21 Santesteban-Echarri O, Piskulic D, Nyman RK, *et al*. Telehealth interventions for schizophrenia-spectrum disorders and clinical high-risk for psychosis individuals: a scoping review. *J Telemed Telecare* 2020;26:14–20.
22 Schueller SM, Glover AC, Rufa AK, *et al*. A mobile phone-based intervention to improve mental health among homeless young adults: pilot feasibility trial. *JMIR Mhealth Uhealth* 2019;7:e12347.
23 Bender K, Schau N, Begun S, *et al*. Electronic case management with homeless youth. *Eval Program Plann* 2015;50:36–42.
24 Adkins EC, Zalta AK, Boley RA, *et al*. Exploring the potential of technology-based mental health services for homeless youth: a qualitative study. *Psychol Serv* 2017;14:238–45.
25 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
26 Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5:69.
27 Peters MDJ, Godfrey CM, McInerney P, *et al*. Chapter 11: Scoping reviews. In: JBI Manual for Evidence Synthesis [Internet] 2020 https://synthesismanual.jbi.global
28 Tricco AC, Lillie E, Zarin W, *et al*. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.

29 Moher D, Shamseer L, Clarke M, *et al*. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev* 2015;4:1.
30 Government of Canada SC. A Portrait of Canadian Youth: March 2019 Updates [Internet], 2019. Available: https://www150.statcan.gc.ca/n1/pub/11-631-x/11-631-x2019003-eng.htm [Accessed 02 Dec 2021].
31 Public Health Agency of Canada. Chapter 3: The Chief Public Health Officer's Report on the State of Public Health in Canada 2011 – The health and well-being of Canadian youth and young adults [Internet], 2021. Available: https://www.canada.ca/en/public-health/corporate/publications/chief-public-health-officer-reports-state-public-health-canada/chief-public-health-officer-report-on-state-public-health-canada-2011/chapter-3.html [Accessed 02 Dec 2021].
32 United Nations [ONU]. Definition of Youth [Internet], 2013. Available: https://www.un.org/en/global-issues/youth [Accessed 02 Dec 2021].
33 Canadian Observatory on Homelessness. Canadian definition of homelessness [Internet], 2012. Available: https://www.homelesshub.ca/sites/default/files/attachments/Definition%20of%20Homelessness.pdf [Accessed 02 Dec 2021].
34 Covidence [Internet]. Covidence, 2020. Available: https://www.covidence.org/ [Accessed 02 Dec 2021].
35 Bowen DJ, Kreuter M, Spring B, *et al*. How we design feasibility studies. *Am J Prev Med* 2009;36:452–7.
36 Aromataris E, Munn Z. JBI manual for evidence synthesis, 2020. Available: https://synt hesismanual.jbi.global
37 Fortin MF, Gagnon Jéducation C, ed. *Fondements et étapes du processus de recherche : méthodes quantitatives et qualitatives*. 3e édition. Montréal, Québec, 2016: 518. ISBN: 9782765050063.