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

Shalini Lal,[1,2,3] Sarah Elias,[1] Vida Sieu,[1] Rossana Peredo ![ORCID] [1,2]

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¹School of Rehabilitation, Faculty of Medicine, University of Montreal, Montréal, Québec, Canada
²Youth Mental Health & Technology Lab, Innovation and Evaluation Hub, University of Montreal Hospital Research Centre (CRCHUM), Montréal, Québec, Canada
³Douglas Mental Health University Institute, Montréal, Québec, Canada

Correspondence to
Dr Shalini Lal;
shalini.lal@umontreal.ca

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.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

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ORCID iD
Rossana Peredo http://orcid.org/0000-0002-2153-8227

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PRISMA-P Completed Checklist for: The Use of Technology to Provide Mental Health Services to Youth Experiencing Homelessness: A Scoping Review Protocol (Lal, Elias, Sieu, Peredo, 2022)

Reporting checklist for protocol of a systematic review and meta analysis.

Based on the PRISMA-P guidelines.

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Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

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		Reporting Item	Page Number
Title			
Identification	#1a	Identify the report as a protocol of a systematic review	1
Update	#1b	If the protocol is for an update of a previous systematic review, identify as such	NA
Registration			
	#2	If registered, provide the name of the registry (such as PROSPERO) and registration number	Registered in OSF
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Contact	#3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contribution	#3b	Describe contributions of protocol authors and identify the guarantor of the review	8
Amendments			
	#4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	NA
Support			
Sources	#5a	Indicate sources of financial or other support for the review	8
Sponsor	#5b	Provide name for the review funder and / or sponsor	8
Role of sponsor or funder	#5c	Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol	8
Introduction			
Rationale	#6	Describe the rationale for the review in the context of what is already known	4
Objectives	#7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	5
Methods			
Eligibility criteria	#8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5-6
Information sources	#9	Describe all intended information sources (such as electronic databases, contact with study authors, trial	6

PRISMA-P Completed Checklist for: The Use of Technology to Provide Mental Health Services to Youth Experiencing Homelessness: A Scoping Review Protocol (Lal, Elias, Sieu, Peredo, 2022)

		registers or other grey literature sources) with planned dates of coverage	
Search strategy	#10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	6
Study records - data management	#11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Study records - selection process	#11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	6
Study records - data collection process	#11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	7
Data items	#12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	#13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	7
Risk of bias in individual studies	#14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	7
Data synthesis	#15a	Describe criteria under which study data will be quantitatively synthesised	NA
Data synthesis	#15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from	NA

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		studies, including any planned exploration of consistency (such as I2, Kendall's τ)	
Data synthesis	#15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	NA
Data synthesis	#15d	If quantitative synthesis is not appropriate, describe the type of summary planned	7
Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	NA
Confidence in cumulative evidence	#17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	7

Supplements

Table S1. Search strategy (English).

Mental health (general)
"mental health" OR "mental health issue*" OR "mental health needs" OR "mental disorder*" OR "mental illness*" OR "mental hygiene" OR "intellectual disabilit*" OR "psychological disturbance" OR psychopatholog* OR psychological OR "psychological disabilit*" OR "psycholog* dysfunction*" OR "psychiatric illness*" OR "psychiatric disorder*" OR "cognitive impairment*" OR "cognitive health" OR "dual diagnosis" OR "mental health comorbidit*"

Mental health disorders[a]
psychosis OR psychotic OR "psychotic disorder*" OR "first episode psychosis" OR "depression" OR "major depressive disorder" OR "persistent depressive disorder" OR "depressive symptom*" OR "mood disorder*" OR "disruptive mood dysregulation disorder" OR "seasonal affective disorder" OR "cyclothymic disorder*" OR stress OR "acute stress disorder*" OR "stress disorder*" OR anxiety OR "anxiety disorder*" OR "generalized anxiety disorder*" OR hypervigilance OR "social anxiet*" OR "separation anxiety" OR "panic disorder*" OR phobia* OR "agoraphobia" OR "phobic disorder*" OR "self harm" OR suicidal OR "suicidal behavi?r*" OR "suicide attempt*" OR "suicidal attempt*" OR "suicidal ideation*" OR "suicidal thought*" OR "self-injur*" OR "self-harm*" OR "attention deficit hyperactivity disorder*" OR adhd OR "attention deficit disorder*" OR "bipolar adj1 disorder" OR "manic-depressive" OR "manic state*" OR mania* OR "manic disorder*" OR "bipolar depression" OR "substance abuse" OR "substance dependence" OR "substance use" OR "substance misuse" OR "chemical substance abuse" OR "psychoactive substance abuse" OR "substance-related disorder*" OR "substance-induced disorder*" OR "drug addiction" OR "drug abuse" OR "drug use" OR "drug dependence" OR "marijuana" OR "alcohol addiction" OR "alcohol abuse" OR "alcohol use" OR "alcohol dependence" OR "alcohol-related disorder*" OR "conduct disorder*" OR "conduct problem*" OR "behavio?r disorder*" OR "oppositional adj1 disorder*" OR "obsessive compulsive disorder*" OR "obsessive compulsive personalit*" OR "tic disorder*" OR "post traumatic adj1 disorder*" OR ptsd OR "trauma-related disorder*" OR "physical abuse" OR "sexual abuse" OR "emotional abuse" OR "eating disorder*" OR anorexia OR "anorexia nervosa" OR bulimia OR "bulimia nervosa" OR "binge-eating disorder*" OR "food addiction*" OR "autism" OR "asperger's syndrome" OR "autism-spectrum disorder*" OR gambling OR "gambling disorder" OR "compulsive gambl*" OR "dissociative adj1 disorder*" OR "personality disorder" OR "antisocial personalit*" OR "antisocial adj1 disorder*" OR "borderline personalit*" OR "borderline adj1 disorder*" OR "compulsive personalit*" OR "compulsive adj1 disorder*" OR "dependent personalit*" OR "dependent adj1 disorder*" OR "avoidant personalit*" OR "avoidant adj1 disorder*" OR "histrionic personalit*" OR "histrionic adj1 disorder*" OR "passive-aggressive personalit*" OR "passive-aggressive adj1 disorder*" OR paranoia OR "paranoid disorder*" OR "paranoid adj1 disorder*" OR schizophrenia OR "schizophrenic disorder*" OR delirium OR "schizoid personalit*" OR "schizoid adj1 disorder*" OR "schizoaffective disorder*" OR "delusion* disorder*" OR "reactive attachment disorder" OR apathy OR "premenstrual dysphoric disorder" OR "social isolation" OR "low self-esteem"

Information and communication technologies (ICTs)[b]
ehealth, e-health OR "e-mental health" OR "emental health" OR "e-mental health services" OR mhealth OR m-health OR tele* OR telehealth OR TeleHealth OR tele-health* OR "telehealth network*" OR "telehealth consultation*" OR telepsychiatry OR tele-psychiatry OR teleconferencing OR "tele counselling*" OR teleconferencing OR "tele-mental health" OR "tele-mental-health" OR telemedicine OR teleconsultation* OR telepsychology OR tele-psychology OR teletherapy OR tele-therapy OR telemedicine OR tele-medicine OR telerehabilitation OR tele-rehabilitation OR phone* OR phone-based OR "phone line" OR telephone* OR "telephone counselling" OR "telephone screening" OR "cell phone*" OR cellphone* OR mobile* OR "mobile phone*" OR "mobile device*" OR "mobile health" OR computer* OR laptop* OR "laptop computer*" OR "desktop computer*" OR "personal computer*" OR "user-computer interface*" OR "computer simulation*" OR smartphone* OR "smart phone*" OR smartwatch* OR "smart watch*" OR technolog* OR "technology-based" OR "technology-based service*" OR "technology based solution*" OR "information technolog*" OR "communication technolog*" OR "information and communication technolog*" OR "health technolog*" OR "e-health technolog*" OR "technology-based intervention*" OR "communication technolog*" OR "technological solution*" OR "distance technolog*" OR "emerging technolog* OR "evolving technolog*" OR "social networking technolog*" OR mobile technolog* OR Online OR "online health" OR "online counselling" OR "online information*" OR "online cognitive behavioural therap" OR "online adj1 support*" OR "online training*" OR "online program*" OR "online option*" OR "online deliver*" OR "online resource*" OR "online gateway*" OR "online adj1 hub*" OR "online psychotherap*" OR "online platform*" OR "online director*" OR "online adj2 support*" OR "online knowledge exchange" OR "online access point*" OR "online adj1 treatment*" OR "online tool*" OR "online module*" OR "online prevention" OR "online application*" OR "online chat capabilit*" OR "online experience" OR "online access" OR "online system*" OR Line* OR "phone line" OR "distress line*" OR "crisis line*" OR "crisis helpline*" OR "helpline*" OR Link OR "electronic link" OR "health link" OR Web OR "websites" OR web-based OR "web resource" OR "mental health website*" OR "web browser*" OR Virtual OR virtually OR "virtual resource*" OR "virtual counselling" OR "virtual solution" OR virtual reality" OR "virtual reality exposure therapy" OR VR OR "artificial intelligence" OR Electronic OR electronically OR "electronic link" "electronic adj1 record" OR EHR OR "electronic client record" OR "electronic adj1 information and support" OR "electronic case* management" OR electronic-case-management OR electronic-medical-record OR EMR OR "medical record* system*" OR "electronic patient*" OR electronic-patient* OR e-patient OR "e patient*" OR cyber* OR cyber-psychology OR "cyber psychology" OR cyberspace OR cyber-space OR "social media" OR social-media OR "social media communications" OR Facebook OR "social network" OR avatar* OR video* OR "video conference" videoconferencing OR "video teleconferencing" OR "consultation video" OR videohealth OR video-health OR "video mental health" OR video-mental-health OR "video psychiatry" OR video-psychiatry OR videopsychology OR video-psychology OR videotherapy OR "video recording" OR "video-audio media" OR app* OR application OR "mobile app" OR "mobile application" OR "online app*" OR "online application" OR "website application" OR "web app" OR "web application" OR messag* OR "text, text messag*" OR "electronic messag*" OR "instant messag*" OR SMS OR Chat OR "online chat" OR "web-based chat" OR "live chat" OR live-chat OR chatter OR Mail OR "electronic mail" OR email* OR e-mail* OR platform* OR "online platform" OR "health platform" OR Net OR internet OR Digital OR "digital therapy" OR electronic OR Device OR "wearable adj1 device*" OR wearable-device* OR "portable device*" OR portal* OR "web-based portal" OR Bots OR chatbot* OR "chat bot*" OR robot* OR robotic* OR sensor* OR biosensor* OR bio-sensor* OR "biosensing technique* OR "bio sensing technique*" OR ereferr* OR e-referr* OR "e-referr* tool*"

Youth experiencing homelessness
homeless* OR "homeless person*" shelter-based OR "street youth*" OR "street adolescen*" OR "homeless adolescen*" OR "homeless young adult*" OR street teen*, "runaway youth*" OR "runaway adolescen*" OR "runaway teen*" OR "street living youth*" OR "street living asolescen*" OR "street living teen*" OR "youth homelessness" OR "individual* experiencing homelessness" OR "youth experiencing homelessness" OR "young adj1 experiencing homelessness" OR "transition-age".

a: Mental health disorders include: 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/ Other mental health

b: ICTs includes: E-mental health/ Tele /Phone/ Mobile/ Computer/ Smart/ Tech/techno/ Online/ Line/ Link/ Web/ Virtual/ Artificial intelligence/ Electronic/ Cyber/ Social media/ Avatar/ Video/ App/ Message/Chat/ Mail/ Platform/ Net/ Digital/ Electronic/ Device/ Portal/ Bots/ Sensor/ E-referral/

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Table S2. Search strategy (French).

Mental health (general)
"santé mentale" OR "troubl* menta*" OR "maladie mentale" OR "hygiène mentale" OR "déficience* intellectuelle*" OR "perturbation psychologique" OR "problème* de santé mentale" OR psychopathologie* OR "handicap* psychique*" OR "dysfonctionnement* psychologique*" OR "maladie* psychiatrique*" OR "trouble* psychiatrique*" OR "trouble* cognitif*" OR "santé cognitive" OR "double diagnostic" OR "comorbidité* adj2 santé mentale"
Mental health disorders[a]
"psychose*" OR "psychotique" OR "trouble* psychotique*" OR "premier épisode psychotique" OR dépression OR "symptôme* dépressif*" OR "trouble* de l'humeur" OR stress OR "trouble* de stress aigu" OR "trouble* adj1 stress" OR anxiété OR "trouble* d'anxiété généralisée" OR hypervigilance OR "anxiété sociale OR "angoisse de séparation" OR "trouble* panique" OR phobie* OR agitation* OR phobie* OR agoraphobie OR "trouble* phobique" OR automutilation OR suicid* OR "comportement* suicidaire*" OR "tentative* de suicide" OR "idée* suicidaires*" OR "pensée* suicidaire*" OR "auto-mutilation*" OR "autodestruction*" OR "trouble* déficitaire de l'attention/hyperactivité" OR "trouble déficitaire de l'attention" OR "trouble bipolaire" OR "maniaco-dépression" OR "état* maniaque*" OR "manie*" OR "trouble* maniaco-dépressif*" OR "dépression bipolaire" OR "abus de substance*" OR "dépendance adj2 substance" OR "consommation de substances" OR "abus de substances chimiques" OR "abus de substances psychoactives" OR "trouble* adj1 à une substance" OR "toxicomanie" OR "toxicomane*" OR "abus de drogues" OR "usage de drogues" OR "dépendance* aux drogues" OR "marijuana" OR "alcoolisme" OR "abus d'alcool" OR "usage d'alcool" OR "dépendance à l'alcool" OR "trouble* lié à l'alcool" OR "trouble* de la conduite" OR "trouble* du comportement" OR "trouble* oppositionnel* adjoint*" OR "trouble* obsessionnel compulsif" OR "TOC" OR "trouble* adj1 post-traumatique*" OR "trouble* post-traumatique*" OR "trouble* liés à un trauma*" OR "violence physique" OR "abus physique" OR "violence sexuelle" OR "abus sexuel" OR "violence émotionnelle" OR "abus émotionnel" OR "trouble* du comportement alimentaire" O "TCA" OR anorexie OR "anorexie mentale" OR boulimie OR "boulimie mentale" OR "hyperphagie boulimique*" OR "addiction* à la nourriture" OR "autisme" OR "syndrome d'asperger" OR "trouble* du spectre autistique" OR jeu de hasard OR "trouble* du jeu" OR "jeu* compulsif*" OR "trouble dissociatif" OR "trouble* de la personnalité" OR "personnalité* antisociale*" OR "trouble* de la personnalité antisocial*" OR "personnalité limite" OR "trouble de la personnalité limite*" OR "personnalité* compulsive*" OR "personnalité dépendante*" OR "trouble* dépendant*" OR "personnalité histrionique" OR histrionique OR "personnalité passive-agressive*" OR "passif-agressif" OR paranoïa OR "trouble* paranoïaque* " OR schizophrénie OR " trouble* schizophrénique*" OR délire OR "personnalité schizoïde*" OR "personnalité* schizoïde*" OR "trouble* schizoïde*" OR "trouble* schizo-affectif*" OR "trouble* délirant*" OR "trouble réactionnel de l'attachement" OR apathie OR "isolement social" OR "faible estime de soi"
Information and communication technologies (ICTs)[b]
"e-santé mentale" OR "santé numérique" OR "gestion de cas électronique*" OR "dossier* médica* électronique*" OR télésanté OR télé-santé OR télé-consultation OR "télé consultation*" OR "télé médecine" OR télé-médecine OR télémédecine OR "télé santé mentale" OR "télé-santé mentale" OR "télé psychiatrie" OR télé-psychiatrie OR télépsychiatrie OR télé psychologie OR télé-psychologie OR télépsychologie OR "télé thérapie" OR télé-thérapie* OR téléthérapie* OR téléphone* OR "consultation* téléphonique*" OR cellulaire* OR "téléphone* mobile*" OR "appareil* mobile*" OR "santé mobile" OR msanté OR m-santé OR m-Santé OR ordinateur* OR "ordinateur* portable*" OR ordinateur-portable OR portable* OR "téléphone* intelligent*" OR "montre* intelligente*" OR tech* OR technologie* OR "technologie* mobile*" OR "technologie* de l'information et de la communication" OR "technologie adj2 santé" OR en ligne OR "santé en ligne" OR "information* en ligne" OR "thérapie cognitivo-comportementale en ligne" OR "soutien en ligne" OR "formation* en ligne" OR "programme* en ligne" OR "ressource* en ligne" OR "ressouce* en ligne" OR "psychothérapeute* en ligne" OR "plateforme* en ligne" OR "soutien en ligne" OR "échange* en ligne" OR "traitement* en ligne" OR "outil* en ligne" OR "module* en ligne" OR "prévention en ligne" OR "application* en ligne" OR "expérience* en ligne" OR ligne* OR "ligne* téléphonique*" OR "ligne* de détresse" OR "ligne* de crise" OR "ligne* d'aide" OR lien* OR "lien* électronique*" OR "lien* de santé" OR Web OR site-web OR "site* web" OR "site* internet" OR "réalité virtuelle" OR RV OR "intelligence artificielle" OR Électronique OR "santé mentale électronique" OR "patient électronique" OR "Cyber" OR "cyber psychologie" OR "cyberpsychologie" OR "cyber-psychologie" OR "cybersanté mentale" OR "cyber-espace" OR "cyber espace" OR "médias sociaux" OR "réseaux sociaux" OR "facebook" OR avatar* OR "video santé" OR vidéo-santé OR "vidéo santé mentale" OR "vidéo psychiatrie" OR vidéo-psychiatrie OR vidéopsychiatrie OR "vidéo psychologie" OR vidéo-psychologie, vidéopsychologie OR vidéothérapie OR "vidéo thérapie" OR vidéo-thérapie OR appli* OR application* OR "application* en ligne" OR messag*OR "messagerie instantanée" OR "message* texte*" OR texto* OR SMS OR Chat OR "chat en ligne" OR "chat en direct" dialogue* OR "agent conversationnel" OR clavardage OR "clavardage en ligne" OR courriel*OR courrier électronique OR email* OR e-mail* OR Plateforme OR plate-forme OR Net OR internet OR toile OR Digital OR Electronique OR appareil* OR "appareil* portable*" OR "portable*" OR "appareil* portatif*" OR portail* OR Bots OR robot* OR senseur* OR référence* électronique*
Youth experiencing homelessness
Itinérance OR itinérant* OR sans-abri* OR sans abri*OR "sans domicile" OR "sans domicile fixe" OR "jeune* de la rue" OR "jeune* adj1 sans abri" OR "jeune* itinérant*" OR fugueur*OR "adolescent* itinérant*" OR "vivant* dans la rue" OR "âge de transition"

a: Mental health disorders include: 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/ Other mental health
b: ICTs includes*: E-mental health/ Tele /Phone/ Mobile/ Computer/ Smart/ Tech/techno/ Online/ Line/ Link/ Web/ Virtual/ Artificial intelligence/ Electronic/ Cyber/ Social media/ Avatar/ Video/ App/ Message/Chat/ Mail/ Platform/ Net/ Digital/ Electronic/ Device/ Portal/ Bots/ Sensor/ E-referral/*