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Préférences, usages et représentations des interventions de e – santé mentale des enfants, adolescents et de leurs parents : une étude de portée.

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Abbreviations:

DHI: Digital Health Intervention

WHO: Worl Health Organization

WHOCC: World Health Organization Collaborating Centre

ICT: Information and Communication Technologies

CBT: Cognitive Behavioural Therapy

ADHD: Attention deficit with or without Hyperactivity Disorder

ASD: Autism Spectrum Disorder

SUD: Substance Use Disorder

RCT: Randomized-Controlled Trials

Abréviations:

ISD: Intervention de Santé Digitale

OMS: Organisation Mondiale de la santé

TIC: Technologies de l'Information et des Communications

Table des matières

Résumé (version française)

Contexte : la prévalence des troubles de santé mentale chez les enfants et adolescents est élevée. Ces difficultés peuvent impacter fortement leur trajectoire développementale. Le recours aux soins est faible pour ces troubles. Les interventions de santé digitale (ISD) offrent une opportunité dans la résolution de ce problème. Cependant, davantage de recherches sont nécessaires afin d'étayer leur implémentation. La prise en considération des représentations, des usages, et des préférences des populations cibles est notamment identifiée comme une étape indispensable à l'utilisation de ces nouvelles modalités d'accompagnement et de soins.

Objectifs : Notre objectif était d'établir un état des lieux des représentations, des usages et des préférences des ISD chez les enfants, adolescents et leurs parents.

Méthode : Une étude de la portée de la littérature portant sur les bases de données MEDLINE, EMBASE et PsycINFO a été réalisée, à l'aide de trois concepts clés : « enfants et adolescents usagers des services de santé mentale », « interventions de santé mentale digitale » et « représentations, préférences et usages ». Les critères PRISMA adaptés aux études de portée ont été respectés. Les données pertinentes relatives à la publication, la méthode, la population concernée, les ISD utilisées ainsi que les principaux résultats, ont été extraites et analysées.

Résultats : Cette étude a permis d'identifier cinq thématiques parmi les résultats de 30 articles sélectionnés : les besoins, les usages, la satisfaction, les préférences et les représentations. Les enfants et adolescents recherchaient des ISD adaptées à leur culture, personnalisables, facilement utilisables, et permettant une certaine connectivité. Les préférences d'usage dépendaient du contexte et de l'avantage

donné par les ISD. Les rapports aux ISD étaient médiés par la confiance et par la peur de la stigmatisation liée à la santé mentale.

Conclusion : Cette étude contribue à mieux comprendre les facteurs influençant l'intérêt que portent les enfants et adolescents aux ISD. Le développement croissant des ISD peut aider à réduire le défaut d'accès aux soins des troubles de santé mentale. Les futures recherches pourraient s'attacher à mieux comprendre les besoins et attentes de leur public cible afin d'améliorer leur implémentation et d'en assurer une utilisation adaptée et pérenne.

Introduction (version française)

Les difficultés de santé mentale des enfants et des adolescents peuvent sévèrement affecter leur vie et leur trajectoire développementale (1). La prévalence mondiale de ces troubles dans cette population est estimée à 10 à 20% (2). En 2015, une méta-analyse internationale a trouvé une prévalence de 13,4% pour les problèmes de santé mentale parmi les enfants et les adolescents, les symptômes ou problèmes les plus fréquents étant les troubles anxieux et les comportements perturbateurs (3). La santé mentale des enfants et des adolescents est un enjeu de santé publique, mais fait face à un défaut d'accès aux soins (4,5). La stigmatisation des troubles mentaux, la confidentialité, la confiance, le stress lié au fait de chercher de l'aide ou la peur de la source de l'aide ainsi que le manque d'accessibilité sont, parmi d'autres, les raisons du manque d'accès aux soins (5). L'intérêt grandissant pour la technologie parmi les enfants et les adolescents peut offrir une opportunité unique pour résoudre le manque d'accès aux traitements (6). La *santé connectée* fait référence aux informations et aux actes de soins fournis par l'intermédiaire des technologies de l'information et des communications (TIC) (7). Les Interventions de Santé Digitales (ISD) sont des programmes sur internet, des applications, des environnements virtuels ou des systèmes robotiques qui offrent la possibilité d'être efficace, avec l'avantage d'être anonyme, accessible et réactif (8). Plusieurs organismes de santé publique ont déjà reconnu les ISD comme étant une solution coût-efficace et évolutive pour aider à résoudre les problèmes d'accès aux soins en santé mentale (9). En 2015, une étude de l'Organisation Mondiale de la Santé (OMS) a montré que 29% de 15.000 applications de santé proposaient un diagnostic, un traitement ou une aide en santé mentale, pourvoyant une offre pléthorique (10). Cependant, en dépit de l'intérêt croissant dans l'utilisation des outils de santé digitale, davantage de recherche est

nécessaire pour étayer l'implantation des ISD (8). Les chercheurs ont identifié plusieurs limites, telles que le peu d'engagement des usagers dans l'utilisation des ISD, un haut taux d'abandon d'usage ou des besoins insuffisamment respectés (8). Afin de mieux comprendre ces problèmes, nous avons parcouru la littérature existante en lien avec les *usages*, les *préférences* et les *représentations* des enfants et adolescents envers les ISD qu'ils utilisent. Les *usages* reflètent le comportement de l'usager avec l'ISD, tel que le temps passé dessus, la fréquence d'usage ou l'utilisation de l'intégralité de l'ISD (11). Les représentations s'attachent à décrire les prédispositions d'agir ou de penser envers un objet. Les préférences font référence à ce qui satisfait les besoins d'un utilisateur. Cette étude de portée vise à cartographier la littérature et à guider les futures recherches dans la compréhension de ces concepts clés liés à l'engagement des usagers dans l'utilisation des ISD. Nous avons cherché à répondre à la question suivante : *« Comment les représentations, les usages et les préférences impactent l'engagement dans les interventions de santé digitale ? »*

Notre objectif était d'établir un état des lieux des représentations, des usages et des préférences des ISD chez les enfants, adolescents et leurs parents.

Introduction

Children's and adolescents' mental health problems can severely impact several areas of the child's life and its developmental trajectories (1). Worldwide, it is estimated that the prevalence those difficulties range from 10% to 20% in this population (2). In 2015, an international meta–analysis found a prevalence of 13,4% of mental health problems among children and young people, the most frequent symptoms or problematic behaviour being anxiety and disruptive behaviours (3). Children's and adolescents' mental health problems are a public health issue but face professional's help-seeking reluctance (4,12). Stigmatisation of mental problems, confidentiality and trust, stress about the act to seek help or fear of the source of help and lack of accessibility, are, among others, reasons for low seeking behaviour (12). The growing interest for technology among children and adolescents may offer a unique opportunity to fill this treatment gap (6). *Electronic health* refers to health services and information delivered through information and communication technologies (ICT) and its related technologies (7). Digital Health Interventions (DHI) are website interventions, mobile applications, mobile text messages, virtual reality environments or computer programs that offer the promise to be effective, with advantages of accessibility and anonymity (8). Several public health organizations have already recognized DHI as a cost - effective and a scalable solution to help solve the treatment gap for mental health problems (9). In 2015, a World Health Organization's (WHO) survey revealed that 29% of 15.000 health apps focused on mental health diagnosis, treatment or support, providing a bloated offer (10). However, despite the growing attention in using electronic health, more research is needed to sustain the implementation of DHI (8). Researchers have emphasised several limitations, like low patient engagement, high dropout rates or inadequate tailoring of interventions to patient needs (8). In order to

better understand these problems, we sought the existing literature related to the *preferences, usages* or *attitude* of children and adolescents towards the DHI they use. The *Usages* reflects the user's behaviours with the DHI, such as time spent on the DHI, frequency or depth of use (11). *Attitude* is defined by NCBI's MeSH as a "*predisposition to behave toward a given class of objects*" (13). *Preferences* refer to what satisfies best the users' needs while using a DHI. This scoping review aims to map the existing literature and guide future research in the understanding of these key concepts related to users' engagement. We sought to answer the following question : "*How does the attitude, the usages and the preferences impact the engagement in digital health intervention ?"*

Our objective was to establish an inventory of children's, adolescents' and their parents' attitude, preferences and usages regarding DHI.

Methods

The protocol of the scoping review followed the PRISMA (Preferred Reported Items for Systematic Review and Meta Analysis) extension recommendations regarding scoping reviews (14). It was established within the research team of the French world organisation collaborating centre for research and training in mental Health (WHOCC Lille, France) composed of one resident in psychiatry, one researcher in social sciences and one senior psychiatrist. The protocol wasn't declared nor registered.

Identifying relevant studies

The search strategies consisted of identifying key concepts related to digital health intervention targeted towards children and adolescents, and how they are perceived by their users. We developed provisional syntax for each database to pre-test and determine the definitive Boolean equations used. Boolean equations were structured around three domains: “digital mental health intervention”, “child or adolescent mental health service user” and “preferences, usages, attitude”. The keywords used came from everyday vocabulary and thesaurus terms.

We used three data bases : Medline, Embase and PsycINFO. The database covered the fields of medicine, psychology, behavioural science and digital health intervention. Results were filtered to provide articles concerning children and adolescents, using Medline’s age limits for children (0-18-year-olds). The syntax and limits used for each database searched can be consulted in Appendix 1.

Including and excluding criteria

Articles had to be in English, published between 1/01/2007 (year when the first smartphone was released) and 8/07/2021, date of the last search. The digital health intervention had to be directed toward children or adolescents (age group: 0-18-year-olds). The population interrogated in the studies could be children, adolescents and/or their parents. Articles included in the analysis were to explore usages, preferences or attitude as their primary objective.

Background articles regarding the implementation of digital health intervention, efficacy studies, studies exploring the attitude of solely professional mental health care provider were excluded.

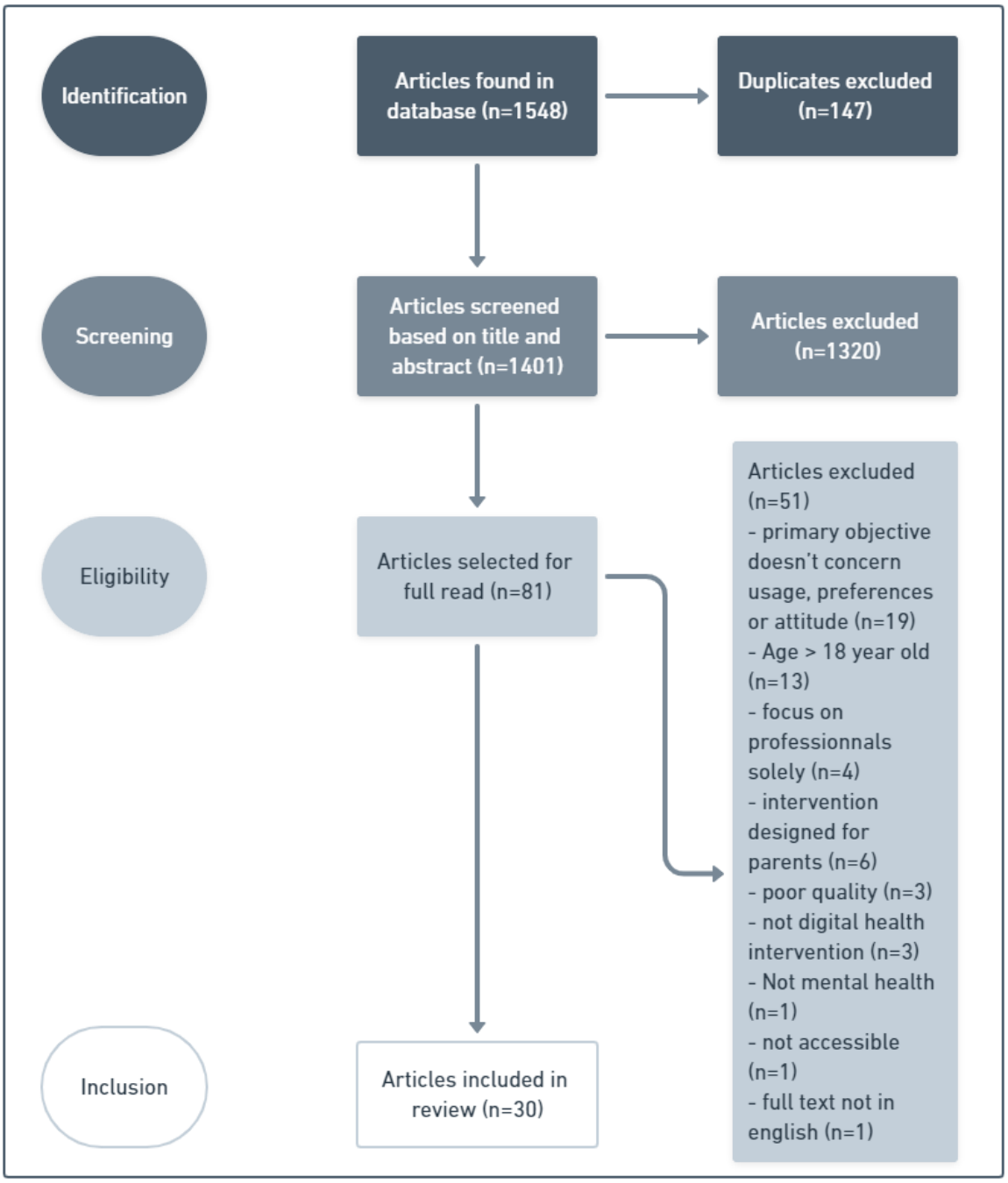
Selecting studies

The research provided 1548 articles, 147 of which were duplicates. We screened titles and abstracts using the free web-tool RAYYAN for eligibility. We deemed eligible 81 articles for full read, from which 51 articles were excluded. 30 articles were included in the review. Selection process is presented in the PRISMA flow chart (Figure 1). The first author carried out the whole process of defining syntax for the search of database and inclusion or exclusion of the articles. The first author carried out the risk of bias assessment. The second and third authors studied and assent to the final included studies.

Data extraction

A form was developed in Microsoft Excel to retrieve pertinent information from selected articles. It included 15 items. First, we collected general information about the articles: first author, year of publication, and country of publication. Then, we gathered information about the methodology: primary objective, research design and means of data collection. We searched the information related to the population concerned: means of recruitment, number, gender and age of children or adolescents concerned, number and gender of parents. Finally we sought information about the DHI itself : technology, mental disorder or problematic behaviours concerned and main significant results.

Figure 1. PRISMA flow chart.



Results

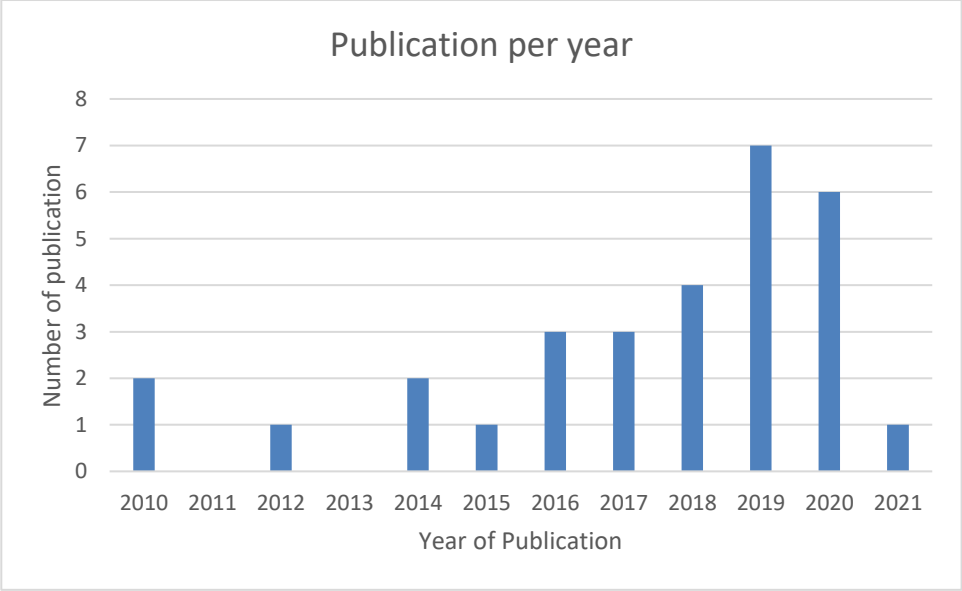
General information

Country of publication

Articles originated in 10 countries or regions: USA (n=13), United Kingdom (n=3), Canada (n=3), Finland (n=2), Netherlands (n=2), Australia (n=2), Sri Lanka (n=2), Austria (n=1), New Zealand (n=1) and Europe (n=1). As to the articles from Europe, data and authors came from different countries among the European Union.

Year of publication

Articles included here stretch from 2010 to 2021. We observe a growth in published articles, with a peak in 2019 (Figure 2).



Digital health technologies

We identified 8 different means of delivering a DHI, as mentioned by the authors of the articles : videoconference (n=8), mobile application (n=7), serious game (n=5),

computer (n=1), electronic diary (n=1), internet site (n=1), mobile phone to take photo/videos (n=1), and virtual environment (n=1). 7 articles did not investigated one DHI in particular.

Act of care

In the studies included, we identified eight different therapies delivered through DHI: cognitive behavioural therapies (CBT) (n=9), psycho and health education (n=5), medical examination (n=5), group therapy (n=1), contingency management (n=1), social skill (n=1), alternative and augmentative communication (n=1) and mood monitoring (n=1). Five studies presented medical examination through videoconference, and six did not specify the type of therapy delivered by DHI.

Mental health disorders and problematic behaviours

DHI can target a specific mental disorder or a more general transdiagnostic behaviour. We identified several mental disorders or problematic behaviours, as mentioned by the authors of the articles: anxiety disorder (n=5), autism spectrum disorder (n= 3), depressive disorder (n=2), substance use disorder (n=4), sleep behaviour (n=2), attention deficit with or without hyperactivity disorder (n=1), risk taking behaviour (regarding drug or sex) (n=2), psychosis (n=1), non suicidal self injury (NSSI) (n=1) and neurodevelopmental disorder (n=1). One article mentioned anxiety, depressive and eating disorders. One article was about mental health well-being in general, and six didn’t mention any specific mental health disorder.

Recruitment

We identified six means of recruitment: community care (n=15), schools (n=10), social services (n=4), community activities (n=2), public advertising (n=2) and university hospitals (n=3). Studies could have several means of recruitment.

Community care included proximity or general non-university hospitals, general practitioners, community mental health services, non-university mental health clinics, mental health consultations within schools and mental health consultations. Populations concerned were inpatients or outpatients. Schools ranged from middle to high schools. One article mentioned a special school for children with specific needs regarding communication skills. Social services grouped school counsellors, social counsellors or community counsellors. Public advertising included posters in community events, school conferences, local conferences or street and social media advertising. University hospitals were inpatients and outpatients from university consultations.

Seven articles devoted specific attention in their recruitment toward rural and underprivileged minorities, as a part or as the total of the studied population. Four articles recruited population from rural areas and five did from underprivileged communities. Underprivileged communities included low to middle incomes, ethnic or coloured minorities.

Age of participants

Overall, 1891 children and teens were consulted. Several studies did not provide the mean of participants, making us unable to make global statistics. From the criteria of inclusion of the articles, we were nevertheless able to identify four age clusters: 13-18-year-old adolescents (n=22), 6-12-year-old children (n=9), 2-5-year-old preschool children (n=1) and 0-23-month-old infants (n=1). Several articles included multiple age clusters.

Children's and adolescents' gender discrimination

Out of the 26 studies providing children's and adolescents' populations, four did not specify gender discrimination or provided incomplete data. We have counted 397 (24%) males and 1215 (66%) females. It is noted that one single exploratory survey including a population of teenaged girls provided 775 females to the total count.

Parents' participation

Eleven studies consulted parents on attitude, usages or preferences regarding the DHI used by their children and adolescents. We identified parents' consultation in five feasibility studies, three qualitative studies, two participative studies, and 1 survey study. Overall, 310 parents were consulted. Only five studies included gender discrimination: among 73 parents, 60 were mothers and 13 fathers only.

Themes of articles.

We gathered the articles in five groups, according to the themes approached in the results, as defined in box 1. Needs were the least evaluated theme, with only nine articles providing information about users' need, whereas usage theme can be found in 20 articles (table 1). Overall, articles provided results from one to four themes (Table 2 and 3).

Satisfaction's information were found in exploratory studies (n=8), trials (n=2), randomized-controlled trials (RCT) (n=2) and participatory research (n=1). Data was gathered using surveys and semi-structured interviews. Authors asked if the users or their parents were satisfied with the service, whether they would "recommend it to their friends" or whether they would "use it in the future", using a Likert-scale measurement.

Box 1. Identified themes in the articles.

Satisfaction grouped articles providing satisfaction rates, acceptability measures, and information on the alliance to treatment.
Usage included articles dispensing completion rate, attendance rate, comments about how easy or difficult the existing DHI were, information regarding barriers or facilitators to care of existing intervention.
Preferences encompassed articles giving preferences of users regarding different means of treatment or features in the interventions.
Perceptions covered articles delivering information over the attitude toward the intervention, motivation to use, perceived helpfulness and credibility of the DHI.
Needs grouped articles giving information regarding features, content or design for future interventions.

Information about the *usages* was found in exploratory studies (n=7), observational studies (n=8), trials (n=3), RCT (n=2) and participatory research (n=2). Data was gathered using semi-structured interviews, focus groups, surveys, attendance, completion and usage rate. The *usages* were investigated in regard to current use of ICT, current use of any DHI, accessibility of a DHI evaluated in an article or with completion or attendance rate. Authors used surveys, questionnaires, semi structured interviews or focus groups to gather data about usage. Overall, adolescents reported a wide use of ICT, for entertainment, information, and social communication. Some of them used the internet to find help about problems related to their mental wellness they were encountering. ICT usage could reveal opportunity for care, like recovery information that could be spread on social media to better reach adolescents and counterbalance drugs cues (15). In regard to existing usage of DHI, one exploratory study found that 16,1% of adolescent girls with mental health symptoms already used a mobile application for support (16). When appreciating a DHI, adolescents judged the aesthetic, whether it was easy to use, and if the intervention features could be customizable.

Table 1 : Article's repartition according to theme.

Themes	References	Age	Technology	Problematic behaviour
Satisfaction	(19–31) N=13	Toddler Child Adolescent	Mobile application Mobile phone (photo) Serious game Videoconference Virtual Environment	ADHD Anxiety disorder in ASD Anxiety disorder ASD Depressive disorder Sleep behaviour Social anxiety disorder SUD
Usage	(15,16,19,21–25,27,29,30,32–40) N=24	Toddler Child Adolescent	Computer Electronic Diary Internet site Mobile application Mobile phone (photo) Serious game Videoconference Virtual Environment	Anxiety disorder in ASD Anxiety disorder Depressive disorder Eating Disorder ASD Mental health well-being Psychosis Risk taking behaviour Sleep behaviour Social anxiety disorder SUD
Preferences	(16–21,28,33,34,37,39,41–43) N=14	Child Adolescent	Mobile application Internet site Mobile application Serious game Videoconference	NSSI ADHD Anxiety disorder Depressive disorder Eating Disorder ASD Risk taking behaviour Mental health well-being Risk taking behaviour Sleep behaviour SUD
Perceptions	(15–18,28,30,36,37,39,40,42,44) N=11	Child Adolescent	Computer Internet site Virtual Environment Mobile application Serious game Videoconference	ADHD Anxiety disorder Depressive disorder Eating Disorder ASD Neurodevelopmental Disorder Risk taking behaviour Social anxiety disorder SUD
Needs	(18,21,33,35,36,38,41–43) N=10	Child Adolescent	Mobile application Internet site Serious game	NSSI Anxiety disorder ASD Psychosis Risk taking behaviour Sleep behaviour SUD

Information regarding the *preferences* of the users were found in observational studies (n=6), exploratory studies (n=5) and participatory studies (n=3). Data was gathered using focus groups, semi-structured interviews and surveys. Information about

preferences in the results overlapped two distinctive concepts. First, in some article adolescents and children stated they preferences regarding the intervention or technology's features. Secondly, other articles asked if users preferred the care delivered in – person or via DHI. Four studies found that adolescents preferred DHI over in-person setting, as it allowed to avoid stigma related to mental health care (41) and would reduce anxiety when encountering a psychiatrist (36). Two studies found that adolescents would prefer in-person setting rather than a digital intervention (14,37).

Information about *perception* was found in observational studies (n=5), exploratory studies (n=5) and participatory research (n=1). Gata was gathered using surveys, semi-structured interviews and focus groups. Authors scaled the global attitude, eagerness to use, curiosity or concerns of adolescents and their parents in using digital interventions. Engagement in mental health treatment with DHI required effort, as well as with in-person treatment (17). Privacy was a frequent concern, regarding the security of the DHI used.

Adolescents' and parents' *needs* were found in exploratory studies (n=3), observational studies (n=3) and participatory studies (n=4). Data was gathered with surveys or using focus groups and semi-structured interviews. In participatory studies, elicitation of users' needs could happen early in the design process and help scope the objectives of the future intervention. As in 2020, it was found that ASD children wanted a serious game that can help them connect to their peers, while professionals were more focused on social skills (18). In general, adolescents and children expressed that digital intervention should be customizable, facilitate social connection, aesthetics and be easy to use, in a similar fashion as when providing feedbacks about the usages.

Table 2 : themes retrieved in the articles (part one)

Author	Country	Date	Themes	Type	Age	Parents	Technology	Problematic behaviour	Act of care	Results
Čuš, A	Austria	2021	needs preference	Exploratory, semi-structured interviews	adolescents	no	mobile application	Non suicidal self injury (NSSI)	CBT	The intervention should offer specific features regarding NSSI, it should be customizable, suitable for adolescents.
Lopez, C	USA	2020	satisfacion, usage, preference	Observational, survey, semi-structured interviews	adolescents	no	Videoconference	SUD	Psycho /Health Education	Users were satisfied and program was usable. Strentgh were mobility and social connection.
Mayworm, AM	USA	2020	satisfaction , preference	Observational, survey	NA	YES (n=125)	Videoconference	Not specified	medical examination	Parents' and users' satisfaction was high. No difference of satisfaction between videoconference and in-person.
Hettiarachchi, S	Sri Lanka	2020	perception	Observational, semi-structured interviews, focus groups	NA	YES (n=16)	mobile application	Neurodeveloppemental disorder	Augmentative and Alternative Communication	Digital interventions are perceived as a mainstream technologies, accessible, as a learning tool, they challenge stigma, concerns were raised regarding cost.
Widnall, E	United - Kingdom	2020	perception, needs, preference	Observational, focus groups	NA	no	mobile application	not specified	mood - monitoring	8 major themes : accessibility, flexibility, representation of mood, users' request, reflecting on mood, technical features, design, health promotion,
Newton, A	Canada	2020	needs , preference, usage, satisfaction	Participatory research, surveys, semi-structured interviews	adolescents	no	mobile application	anxiety disorder	CBT	App should fit users' needs and preferences, be easy to use, have relevant contents, be aesthetic. Users' satisfaction was high.
Terlouw, G	Netherland	2020	needs, preference , perception	Participatory research, focus groups, interviews	children	YES (n=6)	Serious Game	ASD	Social Skill	Children's perception were summoned around 3 main topics : everyday life, social skill training and video games. Participants helped the creation of three personas. Children with ASD have different goals then their parents' and professionals'.
Metsäranta, K	Findland	2019	usage	Trial, usage rate, writes analysis	adolescents	no	Electronic diary	Depressive disorder	Not specified	Half did not use the e - diary. Adolescents used it to describe their symptoms, relationships and identity
Werner-Seidler, A	Australia	2019	satisfaction, usage	Trial, feasibility, survey, semi-structured interviews	adolescents	no	mobile application	sleep Behavior	CBT	users were satisfied and the intervention was feasible. Users recommended several improvements. Reasons for non adherence are documented.
Quante, M	USA	2019	needs, usage, preference	Observational, focus groups	adolescents	no	mobile application	sleep behavior	Not specified	Adolescents were reluctant to change behaviour, but were open to counselling. They suggested improvement on usability and customization.
Gigantesco , A	Europe	2019	usage, preference	Exploratory, focus groups, semi-structured interviews	children adolescents	no	Not specified	mental health well-being	Psycho/Health education	The majority preferred smartphones to communicate and used tablets at school. Collaborative games were considered more useful.
Bagot K	USA	2019	usage, needs	Exploratory, focus groups	adolescents	no	Not specified	SUD	Not specified	Themes were : youth value rewards to reduce usage, self monitored progression, peer social support, privacy, customization
Soysa, AI	Sri Lanka	2019	perception , needs, usage	Exploratory, semi-structured interviews, focus groups	NA	YES (n=32)	Not specified	ASD	Not specified	Parents mostly used passive learning technologies. Technologies were used to teach academic skills. Future applications should fit Sri Lanka culture and be customizable.
Curtis, BL	USA	2019	usage , perceptions	Exploratory, survey	adolescents	no	Not specified	SUD	Not specified	53 adolescents and 111 young adults completed the survey. Adolescents used the features of social media more. Many were exposed to drug cues on social media, fewer observed recovery information. They felt that social media, smartphone apps, texting or websites would be useful in delivering support.
Juárez, AP	USA	2018	usage, satisfaction	Observational, survey	toddlers pre-school children	YES (n=41)	Videoconference	ASD	Medical examination	high satisfaction. Usage showed that intervention saved time.

Table 2 : themes retrieved in the articles (part two)

Author	Country	Date	Themes	Type	Age	Parents	Technology	Problematic behaviour	Act of care	Results
Carpenter, AL	USA	2018	usage, satisfaction	Observational, feasibility	children adolescents	YES (n=11)	Videoconference	Anxiety Disorder	CBT	Intervention was feasible, and acceptable. Results include barriers to care.
Clark, LH	Australia	2018	perception, preference	Exploratory, semi-structured interviews, focus groups	adolescents	no	Internet site	Anxiety Disorder	CBT	Major themes were "risks", "efforts" and "need for human connection"
Grist, R	United Kingdom	2018	perception, usage , preference	Exploratory, survey	adolescents	no	mobile application	anxiety, depressive and eating disorder	Not specified	775 responses were gathered. 98,7% and 97,4% used the internet and apps. Only 6% used mental health mobile applications. Within those with symptoms, 15 - 17% used a mental health apps. Young female adolescents massively use the internet and apps but not for mental health purposes.
Kong, G	USA	2017	usage, satisfaction	Trial, feasability, survey	adolescents	no	Mobile phone to take photo/video	SUD	Contigency Management	feasible, acceptable. Usage could be difficult.
Roberts, N	Canada	2017	satisfaction, usage	Observational, survey	adolescents	no	Videoconference	Not specified	medical examination	high satisfaction
Hepburn S	USA	2016	satisfaction, usage	RCT, feasability, survey	children and adolescents	YES (n=17)	Videoconference	anxiety disorder in ASD	Group Therapy	Parents' and users' satisfaction was high. Intervention was feasible and acceptable. Users made suggestions for improvement.
Pendergrass , TM	USA	2016	perception, preference, usage	Observational, semi-structured interviews	adolescents	YES (n=8)	serious game	risk taking behavior	Psycho/Health education	4 themes were identified : teaching about sex, alcohol and drugs wasn't done at school, a videogame was a viable option, it would fit in several settings, addition tools could be useful.
Sockolow, P	USA	2016	needs, preference	participatory research, focus groups	adolescents	no	serious game	Risk taking behavior	Psycho/Health education	Participants helped develop the story, reflecting their needs. Need-elicitation reflected the patient - centered care approach. Game fitted adolescents.
Laine, A	Findland	2016	needs, usage	Participatory research, interviews	adolescents	YES (n=12)	Internet Site	psychosis	Psycho/Health education	Adolescents' and professionals' needs were related to the contents, the usability and design. Program was modified to satisfy adolescents' needs.
Bul , KC	Netherlands	2015	perception ,needs, satisfaction	Observational, survey	children	no	serious game	ADHD	CBT	Game development and scientific background behind the game are described. Users were satisfied and provided reviews for further development.
Stasiak, K	New Zealand	2014	satisfaction, usage	RCT, feasability, survey, semi-strucutred interviews	adolescents	no	Serious Game	Depressive disorder	CBT	feasible, acceptable; Strenght was mobility, useful, it fitted adolecsents. Weakness was usage difficulties.
Sarver, NW	USA	2014	satisfaction, usage	Observational, feasibility, attendance usage, survey	children	no	Virtual Environments	Social Anxiety Disorder (SAD)	CBT	Intervention was feasible, acceptible and credible.
Jacob, MK	USA	2012	usage, satisfaction	Observational, feasibility, survey	children adolescents	YES (n=11)	Videoconference	Not specified	medical examination	high satisfaction
Boydell, KM	Canada	2010	perception preference usage	Observational, semi-structured interviews	children adolescents	no	Videoconference	Not specified	medical examination	4 themes arose : the encounter with the psychiatrist, the helpfulness, a sense of choice and technology
Stallard, P	England	2010	usage perceptions preferences	Exploratory, survey	children adolescents	YES (n=31)	Computer	Not specified	CBT	68 responses (37 young people and 31 parents) were gathered. Young people reported high level of computer usage and online seeking behaviour. Parents were positive about computerized therapy whereas young people expressed caution.

Discussion:

We conducted a rigorous scoping review exploring children's, adolescents' and parents' attitude, usages and preferences regarding DHI. We mapped and identified the relevant studies, and provided information on how the research is conducted and show preliminary results. A thorough research of literature provided 1548 articles, among which 30 were analysed. We extracted the information related to the publication of the article, its methodology, the population concerned and the DHI explored. We identified five themes approached in the results: satisfaction, usages, preferences, perception and needs.

Population, recruitment and countries of origin

All ages were identified in our sample, with a clear majority of adolescents being interrogated. This is coherent with the fact that children and adolescent have more access to the internet and spend more time online as they grow (6). Unsurprisingly, attitude, usages and preferences of toddlers and young children are very few investigated. However, the design of our study allowed us to gather one article concerning these ages (23). This low result could be explained by the fact that vulnerable people do use DHI but to a small extent (45). It may be also because there are too few DHI destined to those very young ages(46). For example in 2019 a scoping-review of DHI and mental health literacy for 2-12-year-old children only found 4 results (46). To our knowledge, there is no previous review exploring engagement of families of toddlers and preschools children in DHI.

Seven out of 30 studies specifically mentioned rural area or underprivileged minorities. Only one study happened in a non-western country. Other studies have documented

the lack of DHI access in low and middle-income countries (8,47). One of the main advantages of DHI is to provide care to underserved population such as a minority or remote area, as it is accessible and cost-effective (8,48). The low prevalence of DHI in low or middle-income country could be because of limited resources, shortage of skilled personnel, poor internet connectivity or lack of children and young mental health policy (8).

Preference between in-person and DHI

We found two articles where the adolescents and children would prefer in-person intervention over DHI (16,40). Those two studies were exploratory studies, thus the lack of exposition to a DHI in those studies could explain the preference toward in-person interventions (40). Maybe an initial meeting with the clinician could provide opportunity to explain the potential benefit and better engage patients in DHI (40). Meanwhile, we found three studies where adolescents and children preferred DHI over in-person intervention. The first was a videoconference for medical examination, preferred as it diminish the encounter's anxiety (39). The second was a internet site, preferred as its personal usage avoided mental health stigma (17). The third was a videogame to deliver psycho and health education, as its playability was preferred over a traditional class (37). Logically, the preference between in-person and DHI should only be explored when the service proposed already existed in-person setting. In that regard, to be adopted DHI should offer more features to offer an advantage, and thus be *useful*. Previous knowledge already explored the usefulness of interventions as a factors influencing the motivation to use a DHI in a review by Liverpool and al (8).

Factors influencing the usages of DHI

Participatory research or exploratory studies provided numerous data on the needs and the preferred features sought by children and adolescents. Such information can be found in three themes : *usage*, *needs* and *preference*. With the help of co-design focus group, developers can ensure a user-centred design (49).

In our review, users sought interventions that were *usable* , meaning they were easy to use, flexible, customizable, and had good aesthetics (42). The *suitability* of the intervention to children and adolescents culture was important. Features such as the tone of the intervention or the design of videogame's characters were appreciated (18,36,43). Suitability and usability were identified as influencing factors in the engagement of children and young people in Liverpool's review (8).

Finally, we found that social connection was a feature sought by adolescents (17,19,35). Adolescents stated that help-seeking implied *others,* the same way as the feeling of connection to other offer help in itself (17). The support of others experiencing the same type of difficulties was esteemed helpful (35). It was reached via an anonymous social messaging, to provide both connection and privacy (35). Finally, the opportunity given by a videoconference to meet other adolescents and discuss psycho and health education was appreciated (19). The sense of connectedness was already identified as a major feature that DHI should provide to ensure a better engagement of adolescents and children in DHI (8). Connectedness should allow to seek support near professionals and peers, in a way that allow privacy and security (8).

Attitude toward DHI is related to trust and fear of stigmatization

In our review, we gathered data showing that adolescents, children and their parents were amazed by the technologies, the capability it offers and its features. Studies often reported that users were eager to use the DHI. Moreover, the privacy offered by the DHI could help soothe the fear of mental health stigma, in line with the hope that it can help improve the accessibility to treatment for children and adolescents. However, trust is a key feature in facilitating the engagement in a DHI, as some expressed concerns about security and confidentiality. Adolescents and children sometimes revealed the fear of being seen with a mobile application installed on their smartphone (35). Others were concerned about the data registered, and who might access it (42). Trust, anonymity and stressors such as stigma have been found to promote the engagement in DHI (8).

Implications and recommendations

Effective use of DHI by their attendant audience relies on numerous factors. We understand that engagement in DHI depends from their users' needs, and the ability of the intervention to successfully answer it. More precisely, the success of an intervention rely on the comprehension of the audience's culture and lifestyle, the difficulties encountered by the targeted population facing mental health symptoms and the usefulness of the intervention. Interventions should be suitable, usable, customizable, facilitate connectedness, as well as be secured and trustworthy. The scope and objectives of the intervention should be understandable by the user, and its usage accompanied. Future research should explore their targeted audience's needs and specificity. Researchers should work with their audience and professionals to

better elicit features able to be helpful and useful. This scoping review could be the first step towards a thorough systematic literature review regarding children's, adolescents or their parents' attitude, usages and preferences regarding the DHI they use.

Strength and limitations of the study

This review followed established guidelines for scoping reviews (14). We effectively mapped the literature, and identified the themes approached. We considered the type of publications, the technologies used, the problematic behaviour in scope and the population concerned. This study allows a better understanding of the existing literature, and how the research is conducted. However, this work isn't lacking limitations. The first author carried alone the selection of the studies and the extraction of relevant information, carrying the risk of bias assessment. Some studies may have been missed, despite our best effort to include as many papers as possible. We tried to best group the results of the articles by themes approached, however they may be some variation or inconsistency as the definition of each theme may overlap.

Conclusion

DHI could help address the treatment gap in children's and adolescents' mental health, as users and professionals could benefit from it. This review showed that attitude, usages and preferences were related to the experience of the users with the DHI. As the interest in DHI grows, researchers and programmers should investigate these themes to ensure a better engagement of their users, and thus, a better outcome to the problems they sought to treat.

Discussion (version française)

Nous avons conduit une rigoureuse étude de portée explorant les représentations, les usages et les préférences des ISD auprès des enfants, adolescents et de leurs parents. Nous avons identifié et cartographié les études pertinentes, nous avons montré comment les recherches étaient conduites, ainsi que leurs résultats préliminaires. Une recherche complète de la littérature a fourni 1548 articles, parmi lesquels 30 furent analysés. Nous avons extrait les données relatives à la publication de l'article, à sa méthodologie, aux populations concernées et à l'ISD étudiée. Nous avons identifié cinq thèmes abordés dans les résultats : la satisfaction, les usages, les préférences, la perception et les besoins.

Population concernée, recrutement et pays d'origine des études

Tous les âges de zéro à 18 ans ont été identifiés dans notre échantillon d'articles, avec une majorité claire d'adolescents interrogés. Cela est cohérent avec le fait que les enfants et les adolescents investissent d'avantage internet et les interfaces connectées quand ils grandissent (6). Sans surprise, les représentations, les usages et les préférences des nourrissons et jeunes enfants n'ont été que peu explorés. Cependant, la méthodologie de notre étude a permis de récupérer un article concernant ces tranches d'âge (23). Ce faible résultat peut s'expliquer par le fait que si les personnes vulnérables utilisent les ISD, elles le font peu intensément (45). Cela peut aussi être parce qu'ils n'y a que trop peu d'ISD destinées aux très jeunes âges (46). Par exemple en 2019 une étude de portée sur les ISD et la connaissance des troubles en santé mentale pour une population de deux à 12 ans n'a trouvé que quatre

résultats (46). A notre connaissance, il n'y a pas de revue de la littérature explorant spécifiquement l'engagement des familles de très jeunes enfants dans les ISD.

Sept études sur les 30 ont mentionné avoir porté une attention aux zones rurales ou aux minorités défavorisées dans leur recrutement. Une seule étude a eu lieu en dehors d'un pays occidental. D'autres études ont documenté le manque d'accès aux ISD dans les pays à faible ou moyen taux de revenus (1,8). L'un des principaux avantages des ISD est qu'elles permettent d'offrir des soins aux populations défavorisées ou sous dotées, telles que les minorités ou les zones rurales, éloignées (8,48). La faible présence des ISD dans les pays à faible et moyen taux de revenus peut être à cause de ressources limitées, de manque de personnels qualifiés, une faible connectivité internet ou d'un manque de politique publique orientée vers les enfants et les adolescents (8).

Préférence entre les interventions en présentiel et les ISD

Nous avons trouvé deux articles où les adolescents et les enfants ont déclaré préférer les interventions en présentiel plutôt que les ISD (16,40). S'agissant d'études exploratoires, le défaut d'exposition des enfants et adolescents aux ISD pourrait expliquer leur préférence envers les interventions en présentiel (40). Peut être qu'un entretien initial avec un clinicien pourrait permettre d'expliquer le bénéfice potentiel et ainsi favoriser l'utilisation d'ISD (40). Nous avons également trouvé trois études où les adolescents et les enfants ont préféré les ISD par rapport aux interventions en présentiel. La première était une intervention via vidéoconférence offrant un examen médical, préférée car elle permettait de diminuer l'anxiété en lien avec la rencontre d'un professionnel de santé (39). La seconde était un site internet, préférée car son usage personnel permettait d'éviter la stigmatisation en lien avec la santé mentale

(17). La troisième était un jeu vidéo qui offrait une intervention de psychoéducation, son ludisme étant préféré à une classe traditionnelle (37). Logiquement, la préférence entre une intervention en présentiel et une ISD ne devrait être explorée uniquement lorsque l'intervention existe déjà en présentiel. Dans ce sens, pour être adoptées les ISD devraient offrir un avantage par rapport à l'intervention en présentiel, et être ainsi utiles. De précédentes études ont déjà remarqué que l'utilité d'une ISD était un profond motivateur de son utilisation (8).

Les facteurs influençant les usages des ISD

Les études participatives ou exploratoires ont fourni de nombreuses informations sur les besoins et les caractéristiques recherchés par les enfants et les adolescents. De telles données peuvent être retrouvées dans trois thèmes : les usages, les besoins et les préférences .Avec l'aide de focus groups, les chercheurs et développeurs peuvent co-construire une intervention centrée sur l'usager (49).

Dans notre revue, les usagers recherchaient des intervention qui étaient *utilisables ,* signifiant qu'elles étaient faciles à utiliser, flexibles, personnalisables et esthétiques (42). La *correspondance* de l'intervention à la culture des enfants et des adolescents était également importante. Des caractéristiques telles que le ton de l'intervention ou la conception des personnages d'un jeu vidéo étaient appréciées (18,36,43). L'accord entre une intervention et le public cible, ainsi que l'utilisabilité d'une intervention ont déjà été identifiés comme des facteurs influençant l'engagement des enfants et des adolescents dans les ISD (8).

Finalement, nous avons trouvé que la *sociabilité* était une caractéristique que les adolescents recherchaient (17,19,35). Des adolescents ont déclaré que chercher de

l'aide signifier impliquer d'autres personnes, un sentiment de connexion à l'autre étant une aide (17). L'aide d'autres expérimentant des difficultés similaires était également jugée aidante. Cette aide pouvait être obtenue par l'aide d'une messagerie anonyme, offrant ainsi une aide et de l'intimité (35). Enfin, l'opportunité donnée par une intervention de psychoéducation via une visioconférence de rencontrer et de discuter avec d'autres jeunes était appréciée (19). Le sentiment de connexion a déjà été identifié comme un facteur majeur de l'engagement des enfants et adolescents dans les ISD (8). La connectivité des ISD devrait permettre de chercher de l'aide auprès de pairs et de professionnels, en respectant la sécurité et l'intimité (8).

La confiance et la peur de la stigmatisation impactent les représentations des ISD

Dans cette revue, nous avons réuni des données montrant que les enfants, adolescents et leurs parents étaient agréablement surpris par les technologies, les possibilités qu'elles offraient et leurs caractéristiques. Les études rapportaient souvent que les usagers étaient volontaires pour utiliser l'ISD. De plus, l'intimité offerte par l'ISD pouvait aider à diminuer la peur de la stigmatisation de la santé mentale, confirmant l'espoir que cela pouvait aider à améliorer l'accès aux soins des enfants et des adolescents (9). Cependant, certains adolescents ou enfants ont exprimé leur crainte concernant la sécurité et la confidentialité, la confiance étant de fait une caractéristique clef dans l'engagement dans une ISD. Certains adolescents ou enfants ont expliqué leur crainte d'être vus avec une application mobile installée sur leur téléphone (35). D'autres étaient inquiets à propos des données enregistrées, et de qui pourrait y avoir accès (42). La confiance, l'anonymité et des facteurs stressant tel que la stigmatisation sont des facteurs reconnus comme modifiant l'engagement dans les ISD (8).

Implications et recommandations

L'utilisation effective des ISD par leur audience repose sur de nombreux facteurs. Nous comprenons que l'engagement dans les ISD dépend des besoins de l'utilisateur, et de la capacité de l'ISD à y répondre. Plus précisément, le succès d'une intervention repose sur la compréhension de la culture et du style de vie des populations ciblées, des difficultés rencontrées à cause des problèmes de santé mentale et de l'utilité de l'intervention. Les interventions devraient être facilement utilisables, personnalisables, sécurisées, dignes de confiance. Elles devraient être également accordées à la culture de ses futurs usagers et devraient faciliter la communication. L'étendue et les objectifs d'une intervention devraient être compréhensibles par l'utilisateur, et son utilisation accompagnée. Les futures recherches devraient explorer les besoins et les spécificités de leurs futurs utilisateurs. Les chercheurs devraient travailler avec le public de leur ISD et les professionnels, afin de mettre en valeur les caractéristiques qui seront perçues comme aidantes et utiles. Ce travail de revue de la portée pourrait également être un prélude à une revue systématique de la littérature à propos des représentations, des préférences et des usages des ISD que les enfants et adolescents utilisent.

Forces et faiblesses de l'étude

Cette revue a suivi les lignes directrices PRISMA pour les revues de portée (14). Nous avons cartographié la littérature et repéré les thèmes abordés dedans. Nous avons identifié la nature des études, les technologies utilisées, les problématiques de santé mentale visées ainsi que les populations concernées. Cette étude permet de mieux comprendre la littérature existante, et comment la recherche est conduite

actuellement. Cependant, ce travail n'est pas dépourvu de limites. Le premier auteur a réalisé seul la sélection des études et l'extraction des données pertinentes. Cela fait courir le risque qu'un biais de jugement ne fausse la sélection des études et la présentation des données probantes. Certaines études ont peut-être été oubliées, bien que nous ayons fait notre possible pour en inclure un maximum. Nous avons essayé au mieux d'identifier et de regrouper les résultats des articles sélectionnés. Cependant il peut y avoir des variations parce que les définitions utilisées pour retrouver les thèmes pouvaient se superposer.

Conclusion (version française)

Les ISD peuvent aider à résoudre les difficultés d'accès aux soins de santé mentale des enfants et des adolescents. De même, les usagers et les professionnels peuvent directement profiter de leur utilisation. Cette revue de la portée a montré que les représentations, les usages et les préférences jouent un rôle dans l'engagement des enfants et des adolescents dans les ISD. Tandis que l'intérêt pour les ISD continue de grandir, les chercheurs et concepteurs d'ISD devraient s'approprier ces thématiques afin que leur public s'engage plus facilement dans les outils qu'ils conçoivent, facilitant ainsi le rétablissement des difficultés qu'ils cherchent à résoudre.

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Appendix 1

MEDLINE database. From 1/01/2007 to 8/07/2021 ; age filter of 0 – 18. 1043 results found		
digital mental health intervention	child or adolescent mental health service user	preferences, usages, attitude
(("Distance Counseling"[Mesh]) OR ("Telemedicine"[Mesh]) OR ("Videoconferencing"[Mesh]) OR ("Internet-Based Intervention"[Mesh]) OR ("Computers"[Mesh]) OR ("Cell Phone"[Mesh]) OR ("Mobile Applications"[Mesh]) OR ("Biomedical Technology"[Mesh]) OR ("Software"[Mesh]) OR («Virtual Reality Exposure Therapy»[mesh]) OR («Virtual Reality »[mesh]) OR ("Information Technology"[Mesh]) OR "e-mental health"[tw] OR "e-mental health"[ot] OR "digital technology"[tw] OR "digital technology"[ot] OR "Digital health"[tw] OR "Digital health"[ot] OR « e-health »[tw] OR « e-health »[ot])	AND (« mentally ill persons »[mesh] OR (« Child »[mesh] or « adolescent »[mesh] or patient[mesh] or user[ot] or user[tw]) AND (« mental Health »[mesh] OR « psychiatry »[mesh] OR « mental disorders »[mesh]))	AND ((("Motivation"[Mesh]) OR ("Attitude"[Mesh]) OR (perspective[ot]) OR preference[tw] OR preference[ot] OR « need* »[tw] OR « need* »[ot] OR "expect*"[tw] OR "expect*"[ot] OR perspective[tw] OR "intention to use"[tw] OR "intention to use"[ot]))
EMBASE database, from 1/01/2007 to 8/07/2021. 131 results found. Age filtration was obtained with the following syntax: AND ([embryo]/lim OR [fetus]/lim OR [newborn]/lim OR [infant]/lim OR [child]/lim OR [preschool]/lim OR [school]/lim OR [adolescent]/lim)		
digital mental health intervention	child or adolescent mental health service user	preferences, usages, attitude

('e-counseling'/exp OR 'telemedicine'/exp OR 'telehealth'/exp OR 'video consultation'/exp OR 'videoconferencing'/exp OR 'web-based intervention'/exp OR 'computer'/exp OR 'mobile phone'/exp OR 'mobile application'/exp OR 'software'/exp OR 'virtual reality exposure therapy'/exp OR 'virtual reality'/exp OR 'information technology'/exp OR 'digital technology'/exp OR 'digital health')	AND (('mental patient'/exp) OR (('mental health'/exp OR 'mental health service'/exp OR 'psychiatry'/exp OR 'mental disease'/exp) AND ('patient'/exp or user.mp OR child*.mp or adolescen*.mp)))	AND ('motivation'/exp OR 'attitude'/exp OR perspective OR prefer*.mp OR need.mp OR expect*.mp OR 'satisfaction'/exp)
PsycINFO database, from 1/01/2007 to 8/07/2021, with general filter : “peer – reviewed journal only”, excluding “memoir” and “book” Two separate research were performed using different age filter : Childhood (birth – 12) : 148 results found. adolescence (13-17) : 226 results found.		
digital mental health intervention	child or adolescent mental health service user	preferences, usages, attitude
(DE "Telemedicine" OR DE "Online Therapy" OR DE "Teleconferencing" OR DE "Teleconsultation" OR DE "Telepsychiatry" OR DE "Telepsychology" OR DE "Telerehabilitation" OR DE "Electronic Health Services" OR DE "Digital Interventions" OR DE « Mobile » OR DE "Computer Assisted Therapy" OR DE "Internet" OR DE "Online Therapy" OR DE "Computer Applications" OR DE "Computer Assisted Therapy" OR DE "Computer Applications"	AND ((DE "Psychiatric Patients" OR DE « clients ») OR ((DE "Patients" OR DE "Hospitalized Patients" OR DE "Medical Patients" OR DE "Outpatients" OR TX « user » OR TX « child* » OR TX « adolesce* ») AND (DE "Mental Health" OR DE "Mental Status" OR DE "Mental Health Services" OR DE "Community Mental Health Services" OR DE "Psychiatry" OR DE "Adolescent Psychiatry"	AND (TX "Computer Attitudes" OR TX "Computer Usage" OR TX "Internet Usage" OR TX "Smartphone Use" OR TX "Motivation" OR TX "Needs" OR TX "Attitudes" OR TX "Preferences" OR TX "Expectations" OR TX "Client Attitudes" OR TX "Client Satisfaction" OR MM "Needs Assessment")

OR DE "Computer Simulation" OR DE "Computer Software" OR DE "Mobile Applications" OR DE "Computers" OR DE "Computer Peripheral Devices" OR DE "Microcomputers" OR DE "Mobile Devices" OR DE "Mobile Phones" OR DE "Smartphones" OR DE "Text Messaging" OR DE "Mobile Devices" OR DE "Mobile Phones" OR DE "Tablet Computers" OR DE "Mobile Health" OR DE "Mobile Technology" OR DE "Wearable Devices" OR DE "Virtual Reality" OR DE "Augmented Reality" OR DE "Computer Simulation" OR DE "Virtual Reality Exposure Therapy" OR DE "Information and Communication Technology" OR DE "Digital Technology" OR DE "Health Information Technology" OR DE "Digital Interventions")	OR DE "Biological Psychiatry" OR DE "Child Psychiatry" OR DE "Community Psychiatry" OR DE "Consultation Liaison Psychiatry" OR DE "Forensic Psychiatry" OR DE "Geriatric Psychiatry" OR DE "Military Psychiatry" OR DE "Neuropsychiatry" OR DE "Orthopsychiatry" OR DE "Social Psychiatry" OR DE "Transcultural Psychiatry" OR DE "Mental Disorders" OR DE "Affective Disorders" OR DE "Anxiety Disorders" OR DE "Autism Spectrum Disorders" OR DE "Bipolar Disorder" OR DE "Borderline States" OR DE "Chronic Mental Illness" OR DE "Dissociative Disorders" OR DE "Eating Disorders" OR DE "Gender Dysphoria" OR DE "Mental Disorders due to General Medical Conditions" OR DE "Neurocognitive Disorders" OR DE "Neurodevelopmental Disorders" OR DE "Neurosis" OR DE "Paraphilias" OR DE "Personality Disorders" OR DE "Psychosis" OR DE "Serious Mental Illness" OR DE "Sleep Wake Disorders" OR DE "Somatoform Disorders" OR DE "Stress and	

	Trauma Related Disorders" OR DE "Substance Related and Addictive Disorders" OR DE "Thought Disturbances")))	

Abstract

Background: the prevalence of mental health problems among children and adolescents is high. These difficulties can impact their developmental trajectories. Mental health problems are a public health concern, but help-seeking behaviour is low. Digital health intervention (DHI) offer the opportunity to tackle the treatment gap. However, more research is needed to better engage children and adolescents in DHI. Knowledge of their attitude, usages and preferences regarding DHI can help their implementation.

Objective: To establish an inventory of children's, adolescents' and their parents' attitude, preferences and usages regarding DHI.

Method: a scoping review following PRISMA's recommendations was performed on MEDLINE, EMBASE and PsycINFO databases. The research was performed using three key concepts : "children and adolescents mental health service users", "digital health intervention" and "attitude, usages and preferences". The relevant data was extracted regarding publication, methodology, population, DHI and principal results.

Results: This study identified five themes within the 30 articles selected : needs, usages, satisfaction, preferences and perception. Children and adolescents sought DHI suitable to their culture, customizable, usable and allowing connectedness. The preferences regarding the DHI relied on their feature and the advantage it gave on in-person treatment. The attitude toward DHI was related to trust and fear of mental health stigma.

Conclusion: this study contributed to better understand the factors influencing the interest children and adolescents gave to DHI. The continuing growth of DHI can help

to reduce barriers to care for mental health treatment. Future research should investigate the needs of their targeted audience to better engage in DHI.

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Date de soutenance : 21/09/2021

Titre de la thèse : Préférences, usages et représentations des interventions de e – santé mentale des enfants, adolescents et de leurs parents : une étude de portée.

Thèse - Médecine - Lille 2021

Cadre de classement : *santé digitale*

DES + spécialité : *psychiatrie*

Mots-clés : enfants, adolescents, usage, préférence, représentation, intervention digitale de santé

Contexte : la prévalence des troubles de santé mentale chez les enfants et adolescents est élevée. Ces difficultés peuvent impacter fortement leur trajectoire développementale. Le recours aux soins est faible pour ces troubles. Les interventions de santé digitale (ISD) offrent une opportunité dans la résolution de ce problème. Cependant, davantage de recherches sont nécessaires afin d'étayer leur implémentation. La prise en considération des représentations, des usages, et des préférences des populations cibles est notamment identifiée comme une étape indispensable à l'utilisation de ces nouvelles modalités d'accompagnement et de soins. **Objectifs :** Notre objectif était d'établir un état des lieux des représentations, des usages et des préférences des ISD chez les enfants, adolescents et leurs parents. **Méthode :** Une étude de la portée de la littérature portant sur les bases de données MEDLINE, EMBASE et PsycINFO a été réalisée, à l'aide de trois concepts clés : « enfants et adolescents usagers des services de santé mentale », « interventions de santé mentale digitale » et « représentations, préférences et usages ». Les critères PRISMA adaptés aux études de portée ont été respectés. Les données pertinentes relatives à la publication, la méthode, la population concernée, les ISD utilisées ainsi que les principaux résultats, ont été extraites et analysées. **Résultats :** Cette étude a permis d'identifier cinq thématiques parmi les résultats de 30 articles sélectionnés : les besoins, les usages, la satisfaction, les préférences et les représentations. Les enfants et adolescents recherchaient des ISD adaptées à leur culture, personnalisables, facilement utilisables, et permettant une certaine connectivité. Les préférences d'usage dépendaient du contexte et de l'avantage donné par les ISD. Les rapports aux ISD étaient médiés par la confiance et par la peur de la stigmatisation liée à la santé mentale. **Conclusion :** Cette étude contribue à mieux comprendre les facteurs influençant l'intérêt que portent les enfants et adolescents aux ISD. Le développement croissant des ISD peut aider à réduire le défaut d'accès aux soins des troubles de santé mentale. Les futures recherches pourraient s'attacher à mieux comprendre les besoins et attentes de leur public cible afin d'améliorer leur implémentation et d'en assurer une utilisation adaptée et pérenne.

<u>Composition du Jury</u> :

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Assesseur : Docteur Charles-Edouard NOTREDAME
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