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Do Digital Health Interventions Improve Mental Health Literacy or Help-seeking Among Parents of Children Aged 2–12 Years? A Scoping Review

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Abstract. Background: Digital Health Interventions (DHIs) can improve mental health literacy (MHL) and help-seeking behaviour in teens and adults. However, it is unclear whether DHIs improve parental MHL, help-seeking behaviour or access to mental health services for their children. **Objective:** To perform a scoping review of DHIs aiming to improve MHL, help-seeking behaviour or access to mental health services among parents of 2-12-year-olds with behavioural and emotional problems (BEP). **Method**: A search of Ovid MEDLINE found four original articles meeting inclusion criteria. **Results**: One of the four articles was a randomised controlled trial, which showed a significant improvement in some measures of MHL, but no change in help-seeking attitudes. The other three studies evaluated interventions, in uncontrolled pre-test and post-test evaluations, on attention-deficit/hyperactivity disorder knowledge. Two of these studies showed a significant change in ADHD knowledge. There was no consistency in MHL measures between studies. **Conclusions**: There is preliminary evidence that DHIs may improve MHL in parents of children with BEP. How this translates to help seeking, access to mental health services or improved outcomes is unknown.

Keywords. Mental health literacy, help-seeking, digital health, behavioural and emotional problems, parents

1. Background

Mental health disorders, such as anxiety, conduct disorder, and attention-deficit/hyperactivity disorder (ADHD), are common in primary-school aged children.(1) Additionally, many more children will experience mental health symptoms such as stress, feeling depressed or disruptive behaviour, but not reach diagnostic criteria for a disorder.(2) The term behavioural and emotional problems (BEP) captures both those with a mental health disorder meeting the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* criteria, and those whose mental health problems causing symptoms and functional impairment but not reaching disorder criteria.(1–3) These BEPs affect one in three Australian children.(1)

Despite a wealth of evidence-based treatments for BEP, many families do not seek help. In Australia, just over half of the children aged 4—11 years who met criteria for a

mental health disorder had sought professional help in the last 12 months.(1) Left untreated, these problems usually don't resolve and can become entrenched and harder to treat.(4) A family's ability to identify their child's mental health problem and seek help is a function of mental health literacy (MHL).(1) MHL is defined as the knowledge and beliefs around mental health disorders, including attitudes to treatment.(5) Interventions improving MHL have been suggested as a means to improve use of mental health services and hence improve outcomes.(6)

Consumer facing Digital Health Interventions (DHIs) pose some promise in improving MHL and access to health services. DHIs have been trialled in adults and teenagers, with some positive effects on MHL and reducing depression, but less effects on help-seeking behaviour.(6,7) There is a paucity of evidence on DHIs targeting parents' MHL and, to the best of our knowledge, there have been no review articles specifically examining parents of young children and help-seeking behaviours.

To facilitate the development of a DHI that aims to improve parental MHL and access to health services, we sought to understand (1) can digital health interventions, targeting parents of children aged 2-12 years old with behavioural and emotional problems, improve parent MHL, and (2) are there any effects from these DHIs on help-seeking behaviours or access to mental health services?

2. Methods

Search terms and search strategy was developed by lead author (DP) and a research librarian. A rapid review was undertaken as it was thought there was a paucity of randomised controlled trials (RCT) in this population.

We searched the Ovid MEDLINE databases in March 2019. Search results were limited to publications in the English language, peer-reviewed, from developed countries, and published between 2000 and March 2019. Studies were identified by the following key terms: Parent (parent or caregivers) AND behavioural and emotional problems (anxiety or depression or "disruptive, impulse control and conduct disorders" or ADHD or mental disorder or mental health, mental disease) AND digital health intervention (digital or online or web or social media or internet or software or mobile applications or email or etherapy or mHealth) AND mental health literacy (health education or literacy or health behaviour or help-seeking behaviour or consumer health information).

Studies needed to involve parents or caregivers of children with a BEP, and a DHI aiming at improving MHL, help-seeking behaviour or access to mental health services. Studies that included some participants within the given child age range (2-12 years old) were included. We excluded studies that focused post-traumatic stress or an eating disorder, or only reported qualitative data. For mixed methods studies, we analysed quantitative data only.

3. Results

The search returned 125 studies for review. Article titles were initially reviewed by DP to determine relevance. Where there was doubt regarding relevance, full text copies were reviewed to determine if the article met inclusion or exclusion criteria. Overall, 12 full text articles were reviewed and four were included in the final review. References were checked for potentially relevant inclusions, but none were included.

Table 1. The interventions and study design

Study	Primary problem	Intervention	Study design	Follow up	Comparison
Deitz et al (8)	Anxiety and depression	Web-based program with modules	RCT with pretest—postest comparison	2 weeks	Waitlist control group
Ossebaard et al (9)	ADHD	Online decision aid	Pretest—postest comparison	Not reported	None
Ryan et al (10)	ADHD	Information based website.	Pretest—postest comparison	1 month	None
Montoya et al (11)	ADHD	Reviewing websites for quality using the DISCERN tool (12)	Pretest—postest comparison	Not reported	None

The four articles were assessed for type of intervention, participants, country, outcome, measure of MHL, measure of help seeking behaviour or access to mental health services, and mental health problem targeted by the intervention.(8–11) Of the included studies, three focused on ADHD and one on depression and anxiety (see Table 1). Only one study was a RCT, with the control group randomised to waitlist, without clear explanation of what the waitlist entailed. The three ADHD studies were all uncontrolled, pre-post studies. Follow up time frame was reported only for Deitz et al (8) and Ryan et al (10) as two weeks and four weeks, respectively.

Most participants in the studies were Mothers, with the exclusion of Deitz and colleagues (8), who targeted parents at work (see table 2). Children were mostly aged six-12 years. Two studies reported ethnicity of participants with over 90% identifying as Caucasian or white/British.

For the study by Deitz et al (8), participants were not restricted to parents with a child *diagnosed* with a mental health problem. Rather, 37 parents self-reported their children to have a known or suspected mental health problem. More than 95% of respondents completed follow up.

Montoya et al (11) enrolled all 35 parents of children with ADHD who were invited to participate in the study. Physicians or local advocacy groups invited families to participate, which resulted in 70% of participants having at least four years of university education.

Ossebaard et al (9) had significant difficulty retaining respondents, with only 12 of the initial 195 respondents completing the second post-test survey. With approximately 7500 individuals visiting the ADHD website over the 3 months the study ran, there were very few who engaged with the survey and the results should be interpreted with caution.

Table 2. Participant characteristics

	Country	Total Participants	Gender of parent	Age of parent (range/mean in years)	Child age (range/mean in years)
Deitz et al (8)	USA	99	Female 45 Male 54	Mean 42	Range 5-21
Ossebaard et al (9)	Netherlands	195	Female 145 Male 25 Other 16	Mean 38	Range 6-10
Ryan et al (10)	UK	172	Female 130 Male 42	Mean 41	Mean 10
Montoya et al (11)	Spain	35	Female 24 Male 11	28 (30-50yo) 7 (>50yo)	3-6yo (11), 7-12yo (13), >12yo (11)

Table 3. Measures used for MHL or help-seeking

Study	*Measure*	*Previously published?*	*Significant effect post intervention*
Deitz et al (8)	1. Knowledge of childhood depression and anxiety	No	Yes
	2. Attitudes about seeking psychological help, and about emotional and mental health problems	Yes, adapted (13)	None
	3. Treatment seeking self-efficacy and confidence	Not described	Yes
Osseebard et al (9)	1. Stage of decisional process	No	None
	2. Decisional conflict	No	None
	3. Knowledge	No	None
Ryan et al (10)	1. ADHD knowledge and willingness to pursue treatment	Yes, adapted ADHD Knowledge and Opinion Scale – (AKOS-R)(14)	Yes
Montoya et al (11)	1. ADHD knowledge and motivation for treatment (ADHD-KMT)	Yes (15)	Yes

Ryan et al (10) approached participants, invited by their treating physician or community nurse in a paediatric outpatient clinic across three sites. 158 agreed to participate and completed the study, of whom 91 accessed the website intervention.

The interventions ranged from a web-based program delivering parent education modules to reviewing popular information websites (Table 1).

Deitz et al (8) was the only study to utilise modules to educate families, with four modules delivered via a web-based program containing interactive, narrated information. The authors of this program were the only ones to comment on the behaviour change theory (social cognitive theory). Eleven of 99 (22%) participants in the intervention group did not view the online program.

Ossebaard et al (9) evaluated an online decision aid, available to patients and families in the Netherlands, designed to assist them in making informed choices about treatment options.

Ryan et al (10) evaluated a website, developed by professionals at the pharmaceutical company Shire Ltd. The website was designed to provide ADHD information to support, advise and educate UK families, patients, educators and provide information for clinicians. Forty per cent of participants never accessed the website. Of those that did, the majority did so just once or twice.

For Montoya and colleagues' study (11), participants were required to evaluate, using the DISCERN tool, the quality of 10 popular Spanish ADHD websites – a mixture of government, private and non-profit informative websites.

Of the four interventions, three used validated measures that had previously been published, or were adapted from previously published literature (see table 3). Deitz and colleagues (8) used a total of six measures to assess outcomes, including parent reaction to the program. They developed a questionnaire just for this study to assess childhood depression and anxiety knowledge. It is not mentioned if the self-efficacy measure was developed for this study or had been published previously. In the intervention group compared to the control group, there was a significant increase in parents' total knowledge and, on one of the subscales, knowledge of treatment. There was also a significant difference between experimental and control groups in parent reported self-efficacy in handling their child's mental health issues.

Four MHL measures, all unvalidated and previously unpublished, were used by Ossebaard et al (9) to measure stage of decisional process, decisional conflict, knowledge and acceptability. From the minority of participants who completed both surveys, they noted no significant difference in stage of decisional process, decisional conflict and knowledge.

For Ryan et al (10), they adapted a single, validated and previously published measure of ADHD knowledge, the ADHD Knowledge and Opinion Scale – (AKOS-R).(14) This consisted of 30 true/false questions assessing knowledge of ADHD and attitudes to treatments, modified to reflect the website content. Accessing the website resulted in a significant improvement in knowledge scores.

Finally, Montoya et al (11) used the previously published and validated measure, the ADHD-KMT questionnaire, comprising 37 questions on three scales (basic knowledge, specific knowledge and motivation for treatment).(11,15) They recorded a significant improvement on the basic knowledge subscale, however there was no report on the other subscale scores measured by the ADHD-KMT.

4. Discussion

Overall, most of the identified studies used a consumer facing DHI and reported some improvement in self-reported mental health literacy for parents of children with behavioural and emotional problems. However, the study methodology was poor with only one RCT, which focused on parents in general, of which some self-reported that their child had previously suffered, was suffering, or could be suffering a mental health problem.

Considering there were three studies that focused on ADHD knowledge, it was surprising that none used the same measure of ADHD knowledge. From a pragmatic perspective, it is difficult to foresee families, outside of the research setting, rating the quality of information available on popular websites with the DISCERN tool, though it would likely lead to an increase in MHL among a well-educated population.

No studies found any effect from their various interventions on help-seeking attitudes. Deitz et al (8) did find an improvement in self-efficacy in dealing with mental health problems, but no change in attitudes toward seeking mental health services. No studies measured actual help-seeking behaviours or access to mental health services.

None of these consumer facing interventions were co-designed with parents as is the current expectation for a user-centred DHI. Nor were any of the interventions tailored to individual users, based on their preferences. It is worth noting the intervention developed by Ryan et al featured four separate sections (parents, healthcare professionals, individuals with ADHD and education staff). However, there may have been additional benefit to tailoring for literacy levels, stage of diagnosis or age of the child.

A consistent use of MHL measures would help to understand and research the role of MHL in improving mental health outcomes.(16) Furthermore, evaluations of DHIs should include outcome data on help seeking behaviours and access to mental health services. Improving access among the 50 per cent of Australian children with mental health disorders, who do not currently access professional services, may have significant long-term effects.

Furthermore, most of the studies in this review involved participants with above average education levels. It is worth researching, particularly with a focus on equity, how

these DHIs might improve MHL in those with below average education or low health literacy levels.

There are some potential limitations to this review, as there was only a single reviewer, this may have increased the likelihood of relevant studies being missed in the review process. One database was searched, Ovid MEDLINE. Studies in other databases may have been missed. Grey literature was also not searched. Papers published in a language other than English were excluded. Bias was not formally assessed using systematic methods, as it was outside the scope of the rapid review.

In conclusion, consumer facing DHIs designed to improve parental MHL, show promise. However, further research, using co-design and validated measures with a focus on help-seeking behaviour and access to mental health services, is needed. Such research should evaluate interventions using a rigorous design, such as a randomised controlled trial. Researchers would benefit from consistent measures of MHL to compare interventions and including parents across socioeconomic groups.

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