

REVIEW ARTICLE

Internet-based interventions for parents with children 0–5 years: A scoping review

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Abstract

Aim: This study aims to review the existing literature on Internet-based health interventions directed to support parents of children aged 0–5 years.

Methods: We systematically searched electronic databases between January 2000 and 2018. The search consisted of terms describing eHealth, intervention and families and/or children.

Results: Internet-based parent support interventions were most often directed at rehabilitation and selective prevention, and we identified more studies on mental health (57%) than somatic health (41%). Developmental disorders were the most frequently studied mental health condition ($n = 33$), while interventions for obesity (15%) were the most studied somatic health condition. Forty-four percent of mental health studies were RCTs and 65% of interventions were theory driven. Interventions most often used a behavioural approach, included guidance and delivered content via text-based information.

Conclusion: Several significant gaps were identified such as the need for more research outside of English-speaking countries, more systematic reviews and effect studies. This review also elucidates the need for researchers to improve reporting on the theoretical approaches employed in interventions, and to focus on determining the importance of guidance. Finally, program developers should consider using more audio-visual technology to avoid reinforcing social inequalities in access to healthcare.

KEYWORDS

children, eHealth, mental health, parent support, parenting, somatic health

1 | INTRODUCTION

Young children (aged 0–5 years) depend on the relationship with their primary caregivers for survival and development. Most parents do the best that they can to nurture and care for their children;

however, some are limited by their educational, mental health, economic, social and/or family circumstances.¹ Educational interventions and support for improving parents' skills and practices have the potential to promote supportive behaviours, parenting confidence and the well-being of their children. Thus, evidence-based parenting

Abbreviations: ADHD, Attention deficit hyperactivity disorder; ARB, attachment- and relationship-oriented approach; ASD, autism spectrum disorder; CBT, cognitive-behavioural therapy; DC:0–5, The diagnostic classification of Mental Health and Developmental Disorders of Infancy and Early Childhood Manual; N/A, not applicable; NRCT, non-randomised controlled trial; RCT, randomised controlled trial; SCT+, social cognitive theory combined with other theoretical approaches; SCT, social cognitive theory.

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support, which aims to strengthen parenting, can be highly beneficial in terms of preventing childhood emotional, behavioural and social difficulties, which have been associated with later serious mental and somatic health difficulties.^{2,3}

The prevalence rates of sub-clinical and clinical symptoms of various mental health problems in children 0–3 years in Europe and the United States is about 12%–18% (see e.g., Refs.[4,5]). From the age of 3 years, it is estimated that 15%–20% of older children suffer from reduced functioning due to symptoms commonly associated with anxiety, affective, and behavioural disorders,⁶ and that, at least, 7% of pre-school and school-aged children have symptoms that are compatible with a psychiatric diagnosis at any time of examination.^{7–10} Serious mental health problems obviously require treatment; however, mild-to-moderate problems can also influence the individual child and family life and may become disruptive. Considering that the lifetime prevalence rate of mental disorders among 6- to 8-year-olds has been found to be 45% in Europe and the United States,^{7,11} providing early intervention is appropriate for these children and families.

The magnitude of the required need for universal services, prevention and treatment exceeds the capacity of primary and secondary healthcare services, and many children are undertreated. For example, in Norway, about 5% of children (0–17 years) receive treatment in child and mental health clinics each year,⁶ which is lower than the estimated prevalence of psychiatric disorders.^{8,9} In the United States, less than half of those with a mental health disorder sought treatment,^{12,13} and, in the Netherlands, only 5% of parents whose child met criteria for a disorder, reported a need for help.⁷ At the same time, labour market projections suggest a future shortage of certain professions (e.g., public health nurses) that may play an important role in the prevention and treatment of mental health problems in young children,¹⁴ while professional labour unions and healthcare services report concerns about a lack of health professionals in key positions and downsizing of services.^{15,16} Thus, relying solely on traditional modes of intervention delivery will likely not suffice to meet the demand for child mental health services.

As the majority of the population in childbearing age in Western countries has daily access to the Internet (see e.g., Refs. [17,18]), it can be argued that Internet interventions may contribute to meet the need for early intervention and increase service capacity (see e.g., Refs. [19,20]). Previous research has demonstrated that most parents use the Internet to search for information about their child's health and/or development.^{21–24} Many also report an interest in or preference for Internet interventions.^{25,26} Internet interventions may increase access to treatment, remove or reduce travel time and costs, the need for childcare arrangements, and increase parent empowerment and participation in parenting programs (e.g., less stigma than face-to-face services and creative uses of engaging educational materials).^{27,28}

Several systematic reviews and meta-analyses demonstrate favourable outcomes of technology-based interventions for mental and health behaviour problems such as anxiety, depression and obesity, among children.^{29–32,33} These reviews include interventions

Key Notes

- Internet-based interventions for parents with children aged 0–5 years are most frequently directed at rehabilitation followed by selective prevention.
- More studies on mental health compared to somatic health were identified.
- There is a need for more systematic reviews on areas with identified knowledge gaps such as breastfeeding and general parenting support, and more effect studies on all areas of Internet-based mental health interventions for parents with young children.

that employ technologies such as CD-/DVD-ROM, virtual reality and computer games, of which not all capitalise on the accessibility and ubiquity of the Internet. Furthermore, the reviews comprise older children (i.e., aged 5–25 years), except for Baumel et al.³² who found that digital parent training was superior to control conditions in 4- to 7-year-old children with a clinical range of disruptive behaviours. Besides this, there is a wide range of Internet-based parent support interventions, delivered across the entire continuum of care (i.e., from health promotion to rehabilitation).^{32–34} The field appears overwhelming, and no one has conducted an overview of mental and somatic health interventions aimed at the youngest children. Thus, it is important to provide a broad review of the field and examine the characteristics and content of Internet interventions, to better understand how these interventions have been used and to identify which factors may be important for producing such favourable outcomes.

A review of 119 technology-based interventions for children aged 0–18 years,³⁵ found that most programs were theory-based and relied on empirically validated psychological methods. Most included informational or education strategies, but many also used a behavioural approach to intervention, aiming directly at changing parenting behaviours, skills and the use of active coping strategies.³⁵ In fact, according to another review,³⁶ 47% of programs included action tasks that entailed either skills practice or homework for implementing behaviours. One meta-analysis found that technology-based interventions which incorporate behavioural methods (e.g., goal-setting and self-monitoring), are, generally, more effective than interventions based solely on education (i.e., at least, for health behaviour problems in children aged 18 years or younger).³³

Reviews have also found that more than half of included programs were structured, self-guided interventions, requiring parents to progress through modules in a sequential pathway.^{35,36} The majority used several technology components such as text, quizzes, skills training or coaching, to deliver program content. However, some technology components were utilised to a greater extent than others. For example, 79% of programs had audio or video components, while just 26% used animations, 16% had integrated games and 16% included discussion boards.³⁶ Also, considering the effect of guidance (e.g., therapist-support) in adult-focused Internet

interventions as compared to either face-to-face therapy^{37,38} or self-guided Internet interventions,^{39–41} it is notable that 58% of technology-based family interventions integrated human-based interactions, of which 37% provided families with an assigned coach, either through videoconferencing or phone calls.³⁶ However, studies also suggest that there is little benefit to therapist guidance for Internet interventions,^{42–44} indicating that the effect of guidance is still unsettled.

Although there have been many reviews demonstrating favourable outcomes of technology-based interventions for mental and health behaviour problems, most of these reviews have summarised literature within certain disease groups (e.g., anxiety, depression, behaviour problems or obesity) or focused on outcomes related to therapeutic orientation, intervention level and use of technology components. In contrast, this scoping review is intentionally broad, summarising the literature across specific disorders and therapeutic orientations. This scoping review will also include outcomes associated with research design and level of professional support. This will help to identify knowledge gaps, yet to be addressed by a review, as it is important for researchers, clinicians and healthcare decision makers to be aware of accumulated knowledge in this area, and what the knowledge gaps are (e.g., to avoid research waste).⁴⁵

1.1 | Aims of this study

The aim of this study is to review the existing literature on Internet-based interventions directed to support parents of young children aged 0–5 years. More specifically, this paper poses the following research questions: (1) What intervention level and mental and somatic health conditions do these programs target? (2) What research designs have been employed to study Internet-based parent support programs for mental health? (3) What are the main theoretical and therapeutic approaches used for promoting, preventing, or treating mental health conditions? (4) What level of professional support and which main technology components are implemented in supporting parents online?

2 | MATERIALS AND METHODS

We conducted a scoping review, which has the purpose of identifying gaps in the literature by systematically assessing the breadth of the literature in a particular area, rather than the narrower and more specific research questions typical of systematic reviews.⁴⁶ Due to this, the appraisal and inclusion of evidence in a scoping review is not limited by the methodological quality of the evidence,⁴⁷ and we did not aim to select studies according to their methodological or evidence quality. We based the structure of this scoping review on Arksey and O'Malley's methodological framework for scoping reviews.⁴⁶ This framework contributes to the rigour and transparency of scoping reviews and helps to enhance the reliability of the findings.

2.1 | Identifying relevant studies

A comprehensive literature search was conducted in the following scientific databases: (1) PubMed, (2) Ovid Medline, (3) PsycInfo, (4) ISI Web of Science, (5) CINAHL, (6) Embase, (7) Eric, (8) Cochrane Library, (9) Campbell Library and (10) ProQuest. We searched for grey literature in Open Grey (www.opengrey.eu). The search strategy was developed in collaboration with a medical research librarian who performed the database searches on January 24, 2018. The PsycINFO search strategy (for the complete search strategy, see Multimedia Appendix S1) was tailored to other databases using appropriate subject headings and terms; hence, search strings varied slightly depending on the indexing and descriptors used in the various databases. The search strategies consisted of a combination of index and free text terms describing (1) eHealth, (2) intervention and (3) families and/or children. After duplicate checks, the search results were imported in to Covidence (www.covidence.org), which is a systematic review management tool, for the study selection process. After the initial screening process, we also hand-searched reference lists in identified reviews and meta-analyses.

2.2 | Study selection

A two-stage screening process was carried out whereby all references were, first, considered for inclusion based on their title and abstract by two members of the research team independently. Second, all included references were retrieved in full text and screened independently by two raters. Any disagreements were resolved by discussion or a third rater. Eligible articles had to include (1) an Internet-based (2) parenting support intervention for parents with (3) children aged 0–5 years. We included all empirical studies and systematic reviews fulfilling the inclusion criteria, and excluded non-empirical references such as editorials, study protocols, viewpoints and theoretical or methodological articles. Relevant and partially relevant systematic reviews (e.g., those including broader age groups) were included for hand-searches of included studies. We also excluded studies of purely offline interventions such as desktop- or computer-based, DVD-/CD-ROM and mobile phone interventions used solely for telephone conversations or text messaging, as these were not considered to utilise Internet-based technology or considered using outdated technology.

We excluded studies that only used websites or social media to recruit participants or collected data to study a phenomenon (e.g., breast-feeding or illness perception). Studies that used passive strategies for engaging parents were also left out. Examples regarding the latter might include monitoring or reminder systems or tangible pamphlets (e.g., pdf files) simply made available online. Interventions that typically targeted parent outcomes were also excluded, unless the intervention or outcomes were related to parent support or parenting (e.g., physical activity for mothers to promote emotional bonding between parent and child).

Our review focused on published (or in-press) articles written in peer-reviewed journals and published in English or Scandinavian languages. Studies published prior to 1999 were not included due to the rapidly changing landscape of technology that would limit the generalisability of those studies to current capabilities. Articles clearly containing information about more than one study, were treated as separate studies. Hence, we included 237 articles (incl. Follow-up studies), but report on a total of 238 studies.

2.3 | Data extraction

Four of the authors (FD, SMH, KTH and HTS) extracted data from the included studies. To systematically extract data, we developed a codebook and data sheet in Microsoft Excel with data validation to ensure consistency and reliability in data extraction. Nonetheless, extracted data were also reviewed by a member of the team (FD) to assure the data quality. The extracted data for each of the 238 studies included first author, title, year of publication, country, intervention level, mental and somatic health condition, design, control group, level of guidance, theoretical/therapeutic approach and technology components. The codebook can be found as supplementary material to this article (see Table S1).

Intervention level was coded as health promotion (interventions targeting parents in general community samples for strengthening or increasing child health, that is, promoting healthy lifestyle or behaviours), universal prevention, selective prevention, treatment, rehabilitation (i.e., families in need of re-training or re-education following significant child illness or injury), multiple levels of intervention (i.e., a combination of two or more intervention levels), while condition was defined as the mental or somatic health condition for which the intervention was developed to prevent or treat (i.e., mental or somatic health, combined mental and somatic health, or health behaviour). Mental health conditions were further coded according to the broad categories in the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood manual (DC: 0–5).⁴⁸ Type of research design used in the study was coded as review, randomised controlled trial (RCT), non-randomised controlled trial (NRCT), longitudinal, pre-post and other. Furthermore, type of comparator or control group used in RCT studies was coded as care as usual, waitlist, web-based control and other concurrent control. Approach was defined as the primary theoretical or therapeutic strategy for intervention content and coded as (1) attachment- and relationship-based, (2) behavioural, (3) cognitive and (4) other approaches. Guidance was defined as the level of human support and involvement in the delivery of the intervention and coded as unguided self-help without any form of support, asynchronous or synchronous guidance via technology, or blended care (i.e., a self-help program combined with some level of in-person therapist or lay support). Technological components considered as the main features used for the delivery of the intervention were based on the m-health toolbox devised by Danaher and colleagues,⁴⁹ which was expanded for the purposes of this review to accommodate Internet technologies and technologies more commonly

applied in Internet interventions: (1) audio, (2) audio, image or video recording, (3) discussion forum and blogs (4) e-mail, (5) homework (6) mobile/portable devices, (7) sensor functionality, (8) social media, (9) text messaging (i.e., SMS), (10) telephone calls, (11) onscreen text, (12) video, (13) videoconferencing and (14) other technologies.

2.4 | Data analysis

Data were extracted and coded using a deductive approach to data analysis. All included articles were read with the aim of extracting and coding data to fit into the pre-existing coding scheme (see Table S1) to answer the research questions for this study. Each of the variables, except first author, title and year of publication, could be coded on a single code or multiple codes (e.g., cognitive and behavioural intervention approach or onscreen text, e-mail and audio technology). Data that would not fit into any of the pre-defined codes, were coded as 'other'. In such cases, we retrieved data from the articles to describe the 'other' categories (e.g., 'other approach' described as 'social cognitive theory') and analysed these inductively. All data were summarised using descriptive statistics in pivot tables in Microsoft Excel.

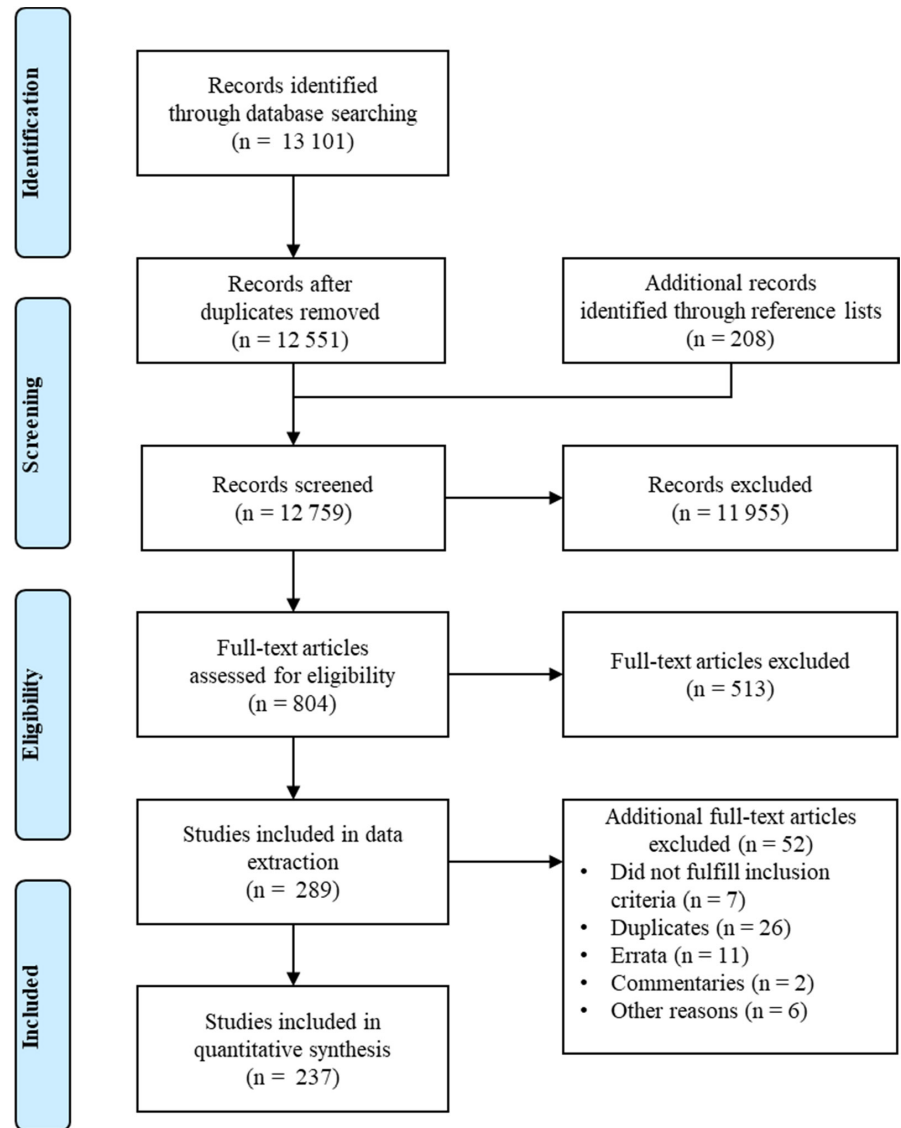
3 | RESULTS

Figure 1 shows the flowchart of the article selection process. The search results yielded a total of 12 759 records. Eight-hundred and four of these were assessed in full text, of which 513 were excluded. The main reason for exclusion of full-text articles ($n = 226$, 44%) was that the studies did not use the Internet for interventions (e.g., face-to-face intervention studies using electronic data collection). Two-hundred and eighty-nine studies were included for data extraction while the final list included 237 journal articles, and 238 unique studies (for a complete list, see Table S2). The main reasons for the exclusion of full-text articles were that these did not meet our inclusion criteria, were duplicates, errata or commentaries.

Articles on Internet-based parenting support programs were published from 1999 and up to the date of our final search on January 24, 2018. Figure 2 shows that there were less than 10 articles published per year between 1999 and 2011, but that Internet-based programs have been a growing strategy in the domain of parenting support in recent years. Since 2012, the number of publications has increased markedly, reaching the highest number of publications thus far in 2017 ($n = 59$; 24.9%).

Based on the affiliation of the first authors of the included publications written in English or Scandinavian language, most publications originated from the United States and other English-speaking countries such as Australia, the United Kingdom and Canada (57 articles, 24%). In total, 177 published articles originated from an English-speaking country, which amounts to 75% of all published research on Internet-based parenting interventions (see Figure 3).

FIGURE 1 Flow diagram of selection of articles on Internet-based parent support interventions from 1999 to January 24, 2018



Sixteen percent of the included studies were from other countries such as South Korea ($n = 4$), Spain ($n = 4$), Singapore ($n = 3$) and Iceland ($n = 3$), and, among the 237 included articles, a total of 26 countries were represented. Only 2% were multi-national studies. That is, studies where it was clearly stated in the article that the study was conducted in 2 or more countries.

3.1 | Intervention level and health-related conditions

Table 1 shows that most interventions targeted a specific point of the continuum of care (96.2%), although a few studies included interventions across multiple intervention levels (3.8%). Furthermore, there were more studies on mental health (57%) than somatic health (41%), while only two studies combined mental and somatic health (0.8%) and one study targeted parental smoking cessation as a health behaviour that may have a direct impact on the child's health.⁵⁰ Overall, interventions were most frequently directed at

rehabilitation followed by selective prevention. However, 49 out of 74 (66%) studies directed at rehabilitation targeted somatic conditions, while studies directed at health promotion (24/34, 71%), universal prevention (16/26, 62%) and selective prevention (48/65, 74%) mostly targeted mental health conditions.

Table 2 shows the mental and somatic health conditions targeted by Internet-based parent support interventions. In general, there were few studies within each condition and interventions typically addressed a single condition; that is, only five interventions addressed multiple conditions. The most frequently studied mental health conditions were developmental disorders ($n = 33$), of which autism spectrum disorder (ASD) accounted for most of this research (76%). This was followed by research on, in descending order, general parent support, behaviour problems, breastfeeding, nutrition or healthy eating and attachment or parent-child relationship. Internet-based interventions for somatic health targeted 24 various conditions, of which interventions for obesity (15%) were most frequently studied, followed by respiratory diseases, paediatric brain injury, preterm births, vaccination and cancer.

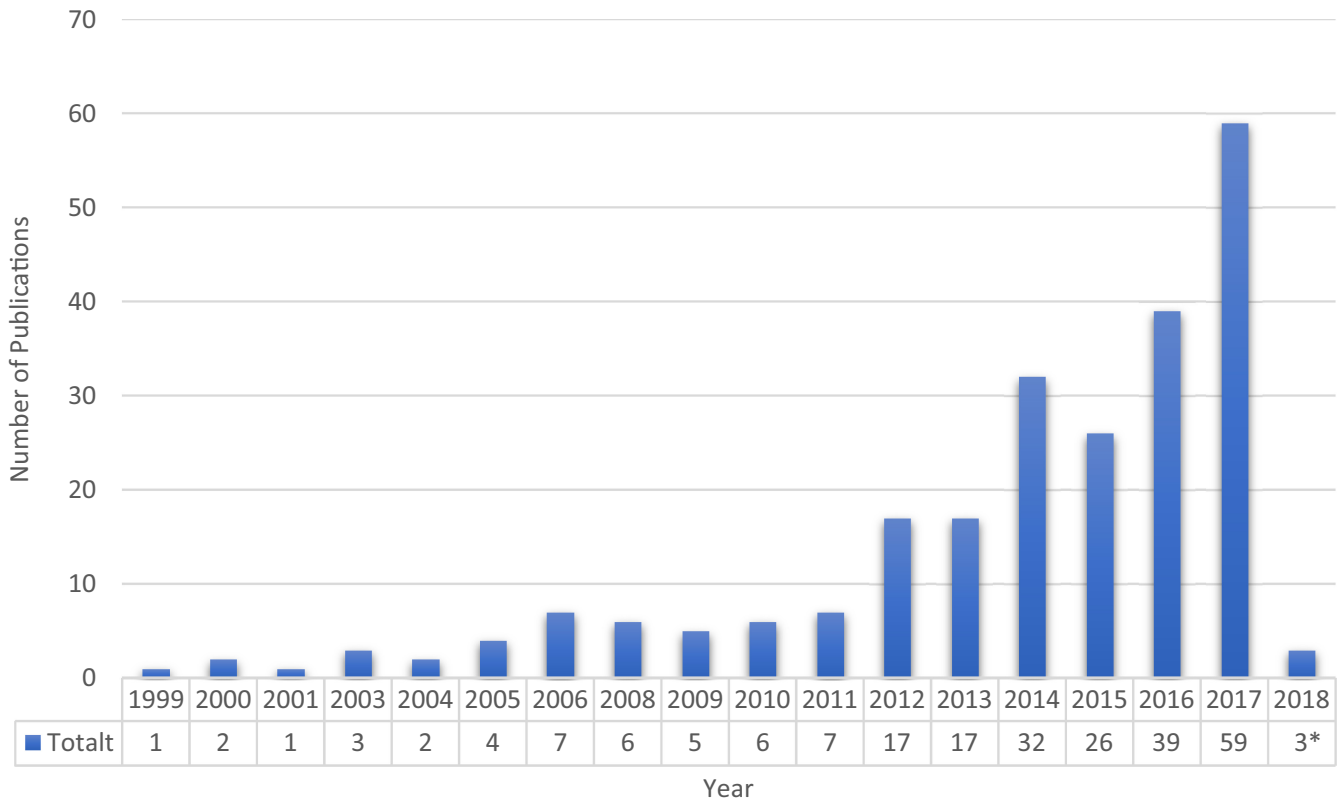


FIGURE 2 Number of publications per year on Internet-based parent support interventions. *The number for 2018 is up to the final search date (January 24)

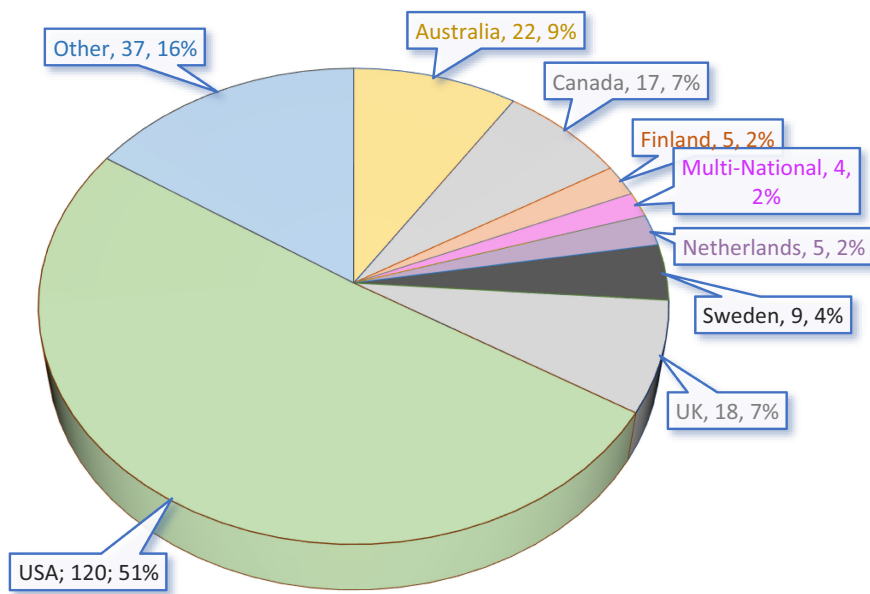


FIGURE 3 Number and percentage of publications on Internet-based parent interventions for parents with children aged 0–5 years, by country, 1999 to January 24, 2018

3.2 | Research design

A large portion of studies were randomised controlled trials (RCTs; 44%) and, most often, these were studies of interventions for behaviour problems, general parenting and ASD. Four out of five studies on anxiety were also RCTs. In contrast, there were no RCTs on

developmental delays or disorders beyond ASD and attention deficit hyperactivity disorder (ADHD). However, these were conditions in which only a few studies were done (e.g., cerebral palsy and fragile x syndrome). We identified only one relevant systematic review; for behaviour problems (see Table 3).³² It should also be noted that many studies used research designs, such as qualitative, mixed methods

TABLE 1 Intervention level targeted by the programs

Intervention level	Mental	Somatic	Mental and somatic	Health behaviour	N/A	Total
Health promotion	24	8			2	34
Universal prevention	16	10				26
Selective prevention	48	15		1	1	65
Treatment	17	10				27
Rehabilitation	23	49	2			74
Multiple levels of intervention	5	4				9
N/A	2	1				3
Total	135	97	2	1	3	238

Abbreviation: N/A, not applicable.

TABLE 2 Mental and somatic health conditions targeted by the programs

Mental health	Studies (n = 135)	Somatic health	Studies (n = 97)
Anxiety	5	Atopic dermatitis/eczema	4
Attachment or parent-child relationship	8	Blood disorders	1
Behaviour problems/disorders	21	Burns	1
Breastfeeding, nutrition or healthy eating	18	Cancer	7
Developmental delays	1	Chronic kidney disease (CKD)	5
Developmental disorders		Congenital malformations	1
Attention deficit hyperactivity disorder	4	Congenital heart disease	2
Autism spectrum disorder	25	Deafness and hearing impairments	2
Cerebral palsy	1	Diabetes	3
Developmental coordination disorder	1	Fetal alcohol spectrum disorder (FASD)	2
Fragile X syndrome	1	Fetal and child malformations	2
Rett syndrome	1	Fever	1
General parenting and/or parenting support	22	Food allergies	2
Maltreatment and trauma	3	Neurosurgery	1
Sleep	5	Newborn babies in need of intensive care	3
		Obesity	15
Other		Oral health	2
Child distress to medical procedures	3	Palliative care	1
Divorce, separation and/or family disruption	3	Paediatric brain injury	11
Lying and sexualized behaviours	1	Preterm	8
Parents with mental health problems	7	Respiratory diseases (e.g., asthma, cystic fibrosis)	13
Multiple conditions		Transplant	1
Attachment or parent-child relationship, Other	2	Tumour	2
Behaviour problems/disorders, Other	1	Vaccination	7
Obesity, Breastfeeding, nutrition or healthy eating	1		
Sleep, Breastfeeding, nutrition or healthy eating	1		

and cross-sectional designs, to evaluate Internet-based parent support interventions (31%).

Of the 60 publications on randomised, mental health trials, waitlist was the most utilised control condition (24; 40%) while 22 (37%) compared an Internet-based parent support intervention

against care as usual, and 18 (30%) included comparisons to web-based control groups (e.g., access to online traumatic brain injury resources).⁵¹ Remaining publications reported using other concurrent control groups such as print materials (9; 15%). Of the included publications, 51 (85%) described two-armed randomised trials and 9

TABLE 3 Study design by mental health conditions

Mental health conditions	Review	RCT	NRCT	Longitudinal	Pre-Post	Other	Total
Anxiety		4			1		5
Attachment or parent-child relationship		3	1	1	3		8
Behaviour problems/disorders	1	11		4	1	4	21
Breastfeeding, nutrition or healthy eating		6	1		1	10	18
Developmental delays						1	1
Developmental disorders							
Attention deficit hyperactivity disorder		2			1	1	4
Autism spectrum disorder		7	1		7	10	25
Cerebral palsy						1	1
Developmental coordination disorder						1	1
Fragile X syndrome						1	1
Rett syndrome						1	1
General parenting and/or parenting support		8	3	1	1	9	22
Maltreatment and trauma		3					3
Sleep		3			1	1	5
Other							
Child distress to medical procedures		2				1	3
Divorce, separation and/or family disruption		2			1		3
Lying and sexualised behaviours					1		1
Parents with mental health problems		6			1		7
Multiple conditions							
Attachment or parent-child relationship, Other		1			1		2
Behaviour problems/disorders, Other						1	1
Obesity, Breastfeeding, nutrition or healthy eating		1					1
Sleep, Breastfeeding, nutrition or healthy eating		1					1
Total	1	60	6	6	20	42	135

Abbreviation: NRCT, non-randomised, controlled trial.

(15%) included three or more control groups. The latter explains why the number of identified control conditions exceeded the number of publications.

3.3 | Theoretical and therapeutic approaches

The use of a theoretical or therapeutic approach was stated in 88 (65%) studies. In general, parenting programs used a specific theoretical or therapeutic approach. Parenting programs were, however, most frequently grounded in a behavioural approach targeting conditions such as behavioural problems and ASD (Table 4). Furthermore, all five studies targeting anxiety used a cognitive-behavioural approach. More than one third of studies did not clearly report on any theoretical or therapeutic orientation, suggesting a clear improvement potential. To give but a few examples, over half of studies on general parenting, and quite a few studies on ASD and breastfeeding, were coded as 'not applicable' (i.e., N/A).

3.4 | Level of support and technological components

Table 5 shows that most interventions were unguided, self-help interventions, without any form of support. Guided support, where parents were provided support online or by telephone, most often by a therapist, were mostly used for ASD, general parenting support and behaviour problems. Blended care, where the family also received some level of in-person contact, was least used, and mainly for attachment and parent-child relationships. Four studies consisted of interventions that provided different levels of support. These studies were coded as both unguided and guided and entailed that parents were, for example, randomised to receive either a clinician-supported or an unguided version of the program.^{52,53}

This review shows the use of a wide range of technological components. Most programs used a combination of technologies (82.2%), while 17.8% were single-component interventions. Most programs relied on text-based information delivery as a main feature, whether these were single- or multi-component interventions

TABLE 4 Theoretical and therapeutic approaches used for promoting, preventing or treating DC: 0–5 conditions

Mental health conditions	ARB (n = 2)	Cognitive (n = 3)	Behavioural (n = 31)	CBT (n = 12)	SCT (n = 5)	SCT+ (n = 6)	Combined (n = 17)	Other (n = 12)	N/A (n = 47)
Anxiety				5					
Attachment/parent-child relationship	1	1		1			4		1
Behaviour problems/disorders			11	2		4	3		1
Breastfeeding, nutrition or eating			3		3	1		3	8
Developmental delays								1	
Developmental disorders									
Attention deficit hyperactivity disorder			2						2
Autism spectrum disorder			6				5	4	10
Cerebral palsy								1	
Developmental coordination disorder									1
Fragile X syndrome				1					
Rett syndrome									1
General parent support		1	2		2			3	14
Maltreatment and trauma	1						1		1
Sleep			2				1		2
Other									
Child distress to medical procedures									3
Divorce, separation or family disruption									3
Lying and sexualised behaviours							1		
Parents with mental health problems		1	2	3		1			
Multiple conditions									
Attachment/parent-child relationship, Other			1				1		
Behaviour problems/disorders, Other			1						
Obesity, Breastfeeding, nutrition or eating							1		
Sleep, Breastfeeding, nutrition or eating			1						

Abbreviations: ARB, Attachment- and relationship-oriented approach; CBT, Cognitive-behavioural therapy; SCT+, Social cognitive theory combined with other theoretical approaches.

(Table 6). Furthermore, our results show that just over half of the interventions used video (51.1%), and none of the interventions used sensor functionality (Table 6).

4 | DISCUSSION

This scoping review included 237 articles. Overall, Internet-based parent support interventions were most often directed at rehabilitation and selective prevention, and we identified more studies on

mental health (57%) than somatic health (41%). Developmental disorders were the most frequently studied mental health condition ($n = 33$), of which ASD accounted for most of this research (76%). Internet interventions for somatic health targeted 24 different conditions, of which interventions for obesity (15%) were most studied. Forty-four percent of mental health studies were randomised controlled trials (RCTs) and 65% of interventions were theory driven. Interventions most commonly used a behavioural approach, included some form of guidance, and delivered content via text-based information.

TABLE 5 Level of support used for promoting, preventing or treating mental health conditions

Mental health conditions	Unguided (n = 71)	Guided (n = 37)	Blended (n = 14)	Unguided, Guided (n = 4)	N/A (n = 9)
Anxiety	3	1		1	
Attachment or parent-child relationship	1	3	4		
Behaviour problems/disorders	11	6	2	1	1
Breastfeeding, nutrition or healthy eating	11	3	2		2
Developmental delays		1			
Developmental disorders					
Attention deficit hyperactivity disorder	2		1		1
Autism spectrum disorder	9	10	2	1	3
Cerebral palsy	1				
Developmental coordination disorder	1				
Fragile X syndrome				1	
Rett syndrome	1				
General parent support	13	7	2		
Maltreatment and trauma	1	1			1
Sleep	4				1
Other					
Child distress to medical procedures	3				
Divorce, separation or family disruption	3				
Lying and sexualised behaviours	1				
Parents with mental health problems	4	3			
Multiple conditions					
Attachment or parent-child relationship, Other		2			
Behaviour problems/disorders, Other	1				
Obesity, Breastfeeding, nutrition or eating	1				
Sleep, Breastfeeding, nutrition or eating			1		

Existing systematic reviews that met our predefined criteria were included in our scoping review. We identified several potentially relevant reviews, but only one with results concerning children aged 0–5 years specifically (relating to behaviour problems).³² Nevertheless, we identified several areas such as breastfeeding, ASD and general parenting support, which featured enough research to perform systematic reviews and hence to potentially conduct meta-analyses. We did not identify any systematic reviews comparing Internet-based interventions towards care as usual, web-based control and other concurrent control. The only relevant systematic review identified (i.e., Baumel et al.³²), compared Internet-based parent support interventions towards a waitlist. Our scoping review identified several studies comparing Internet-based parent support interventions towards care as usual, web-based control and other concurrent control conditions, that is control conditions that are more relevant for real life practice than wait-list control. On this basis, we argue, there is enough studies to justify carrying out a systematic review where the effect of Internet-based interventions is compared to other active interventions. There is also a need for more effect studies (e.g., RCTs) in virtually all areas of Internet-based mental health

interventions for parents with young children, with different types of control groups.

This review also shows the need to improve reporting on the theoretical/therapeutic approaches to intervention, as only 65% of studies included such information. In some studies, the theoretical/therapeutic approach was clearly stated, while it was more implicit in others. This is like the finding by Barros and Greffin.³⁵ An absence of any descriptions of theory or therapeutic approaches may have important implications for intervention development and research. The use of theory has an integral role in the understanding of the problem targeted by the intervention, the systematic design and development of interventions, specification of change models and outcomes, and of studies aimed at evaluating their effects.⁵⁴ Reporting the theoretical or therapeutic approach will also enhance replicability of studies, which is important given the recent replication crisis in psychology and other fields.⁵⁵

A high proportion of interventions were grounded in behavioural principles and techniques. This is promising considering that behavioural methods are generally more effective than educational strategies.³³ Behavioural methods are known to be accessible, acceptable, and easy to disseminate,³⁵ and thus easier to digitalise

TABLE 6 The frequency of the use of technology components in Internet-based mental health interventions

Technology	N	%
Audio	28	20.7
Audio, image or video recording	14	10.4
Discussion forums and blogs	38	28.1
E-mail	41	30.4
Homework	37	27.4
Mobile/portable devices	17	12.6
Sensor functionality	0	0.0
Social media	4	3.0
Telephone calls	19	14.1
Text messaging (SMS)	13	9.6
Text-based information delivery	104	77.0
Video	69	51.1
Videoconferencing	10	7.4
Other	6	0.4
Not applicable (N/A)	10	7.4

than other approaches. However, it is still important to investigate how technology can enhance the applicability and efficacy of other psychological approaches or even develop new methods of intervention, to reach parents that may prefer other methods over behavioural ones.

There was a preponderance of studies on selective prevention, treatment and rehabilitation. It was, therefore, surprising that most interventions were unguided, with no form of (professional) support, as we would have expected more interventions at a higher intervention level to be guided. Research on adult-focused Internet interventions has demonstrated that guidance (i.e., either via technology or face-to-face) is important for their effect.^{42–44} However, more recent research shows that guided Internet interventions are not necessarily more cost-effective.^{20,56} It is important to remember that guidance adds on-going costs and reduces scalability, which makes it necessary to carefully consider how much guidance should be provided and whether this is cost-effective. In this scoping review, we identified only four studies that compared different levels of support. For this reason, future research should focus on determining the level of guidance needed to achieve positive outcomes to design and deploy cost-effective Internet-based parenting interventions, and whether programs at higher intervention levels can be conducted without or with minimal guidance and yet achieve clinically relevant results. Moreover, the effect of unguided Internet interventions is also a question of the quality of the intervention itself. Thus, further research on the working mechanisms of Internet interventions, and qualitative studies into what works for whom with what problems and how, may be another important route of investigation.

In line with previous research,^{35,36} most parent support interventions for mental health utilised onscreen text for content delivery. Several other frequently used delivery methods were also primarily text-based such as email, homework, discussion forums

and blogs. In contrast, technology that does not require any reading skills such as sensor technology, telephone, audio and images, were rarely used. Unfortunately, being able to use the Internet is predicated on the ability to understand online (health) information, which will have little or no effect on parents who are functionally illiterate (e.g., cannot use reading, writing and calculation skills for his/her own development).⁵⁷ Although previous research shows that vulnerable groups (e.g., low-income parents of children with special healthcare needs) have access to and use the Internet as a source of information, some are unable to distinguish between high- and low-quality information and are not confident in using the Internet.⁵⁸ As this review indicates, there is an underutilised potential to use technology that does not require much reading skills and functional literacy. Without taking such considerations into account in the development of interventions, e-health will only serve to consolidate or increase social inequalities in (access to) health(care).⁵⁹

Finally, it is also apparent that there is a need for more research on Internet-based parent support interventions outside of English-speaking countries and cultures. We know little about such parenting interventions taking place online in, for example, the Middle East, Eastern Europe and Africa. Our knowledge about Internet-based parent support interventions is mostly based on the premises of Anglo-Saxon culture and parenting practices. However, this finding may be a consequence of our inclusion criteria, where only articles published in English or Scandinavian language were assessed. To allow for more cross-cultural knowledge one suggestion is that research from other parts of the world is published in English, or at least with an English abstract.

This scoping review has some limitations. First, the scoping review methodology is effective in mapping the state-of-the-art and identifying knowledge gaps. However, it emphasises the breadth rather than depth of knowledge and does not include any quality assessment of studies.⁶⁰ Second, we constructed a comprehensive search strategy, but Internet-based parent support interventions are a relatively new area of scientific inquiry. Thus, the terminology is not standardised, which made the study selection process difficult. Consequently, although supplementary hand-searches were made, it is possible that some relevant articles were not identified. Third, the level of detail in intervention reporting in the included studies varied significantly, which occasionally made it difficult to identify, assess and code information from the published studies. We did not contact authors for detailed information where this was missing. In several studies, the boundaries between different levels of guidance were not evident, so that it was impossible to determine whether, for example, a home visit was a part of the intervention or the study per se. Due to this challenge, some data may have been incorrectly classified and analysed. However, we have identified and included an extensive number of studies and text materials, making any misclassification less likely to influence the results substantially. Finally, our search was conducted in January 2018. Based on the increasing number of studies over time, in addition to eHealth being a good option to maintain parent

support and child treatment during the SARS-CoV-2 outbreak,⁶¹ we assume that several new, relevant studies have been published since our search. New digital behaviours, for example more extensive use of video conferencing and increased or altered use of technological components, may also have evolved during the pandemic. Hence, inclusion of articles published after 2018 can potentially lead to changes in our results. Due to the large amount of included studies, extensive hand-searches and time needed to extract data for our scoping review, we have not been able to provide a more recent and up-to-date search. For this reason, we recommend that systematic reviews in this field are undertaken on a regular basis.

5 | CONCLUSION

The number of different programs found in the scoping review confirm that Internet interventions represent an increasingly popular strategy for parenting support. However, several significant gaps were identified such as the need for more research outside of English-speaking countries, more systematic reviews, and effect studies, especially comparing different levels of support and utilizing different comparator conditions. This review also elucidates the need for researchers to improve reporting on the theoretical/therapeutic approaches employed in interventions, and to focus on determining the importance of guidance to achieve positive outcomes and the optimal level of support to design and deploy cost-effective Internet-based parenting interventions. Finally, program developers should consider using more audio-visual technology. It may create more engaging user experiences, but also avoid reinforcing social inequalities in access to healthcare, given that most interventions rely on text-based delivery.

AUTHOR CONTRIBUTIONS

H.T.S, F.D and S.M.H contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript. K.T.H, and H.J contributed to the study selection process, and with the writing of the manuscript.

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CONFLICT OF INTEREST

The authors have no conflicts of interests to declare.

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