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Peer and Professional Parenting Support on the Internet: A Systematic Review

Christa C. Nieuwboer, MA,[1] Ruben G. Fukkink, PhD,[2] and Jo M.A. Hermanns, PhD[2]

Abstract

The Internet offers many opportunities to provide parenting support. An overview of empirical studies in this domain is lacking, and little is known about the design of web based parenting resources and their evaluations, raising questions about its position in the context of parenting intervention programs. This article is a systematic review of empirical studies ($n=75$), published between 1998 and 2010, that describe resources of peer and professional online support for parents. These studies generally report positive outcomes of online parenting support. A number of recent experimental studies evaluated effects, including randomized controlled trials and quasi-experimental designs (totaling 1,615 parents and 740 children). A relatively large proportion of the studies in our sample reported a content analysis of e-mails and posts (totaling 15,059 coded messages). The results of this review show that the Internet offers a variety of opportunities for sharing peer support and consulting professionals. The field of study reflects an emphasis on online resources for parents of preschool children, concerning health topics and providing professional support. A range of technologies to facilitate online communication is applied in evaluated Web sites, although the combination of multiple components in one resource is not very common. The first generation of online resources has already changed parenting and parenting support for a large group of parents and professionals. Suggestions for future development and research are discussed.

Introduction

THE INTERNET, WITH ITS MANY FACETS and features, offers parents all kinds of support: parents can gather information, share experiences, learn new skills, encourage each other, or request professional advice. Visitor numbers to parenting Web sites run as high as hundreds of thousands per month.[1–3] Following and intensifying the trend that parents are users of online resources, parenting professionals have begun to exploit the opportunities afforded by online technology. Several disciplines are involved in providing parental support and advice, such as psychology, counseling, pediatrics, and nursing, all of which have undertaken initiatives to employ the Internet as a tool for their work.[4] These initiatives go by different names, for example computer mediated interventions, web based therapy, e-health, online counseling, or cybertherapy. Several authors suggest that the Internet could be a tool for delivering parenting support in an accessible and beneficial way.[5–9] Parenting support on the Internet is a relatively new domain, and our current knowledge of its design and outcomes is limited. In spite of its claimed potential, the position of online support for parents is yet marginal in relation to traditional parenting training and intervention programs. Although previous reports have described the role of social networking in regard to health related support needs,[10,11] they do not show the specific characteristics of parenting services offered online, for example the types of online communication applied, the ratio between peer and professional support, and the opportunities for addressing a wide range of topics for a diversity of target groups. A systematic review of empirical studies on online parenting resources is currently lacking.

Web based programs offer various types of online communication, for example chat, confidential chat, e-mail consultation, e-mailing list, discussion boards, and information pages. In "chat," parents can exchange experiences and opinions, typing short alternating texts in small groups or pairs. A special form is "confidential chat," whereby a professional (e.g., a counselor or a therapist) is available for support and advice.[12,13] There are healthcare/mental

[1]Fontys School of Pedagogical Studies, Fontys University of Applied Sciences, Sittard, The Netherlands.
[2]Faculty of Social and Behavioural Sciences, University of Amsterdam, Amsterdam, The Netherlands.

healthcare providers that offer e-mail consultation services, such as "ask-a-nurse" or "helpline."[14,15] Information on specific themes can be distributed among registered group members via e-mailing lists.[16,17] Parents who share a specific experience in childrearing can organize themselves into an online forum or discussion board, and can exchange messages in groups. Finally, information pages can be seen as a digital library, giving access to all kinds of facts, explanations, and suggestions.[18–20] Thus, social networking, static online information, and professional consultation are all provided in different resources. Information pages and e-mailing lists can be seen as interaction from "one to many," group forums and group chat as interaction from "many to many," and confidential chat and e-mail consultations as "one to one" communication.[21]

Web based communication can be controlled by peers or professionals, or both. For instance, discussion boards typically offer peer support, while e-mail consultations provide professional support. Chat and e-mail are text based methods of delivering advice and support. It is plausible that online methods require skills other than those required for face to face support in order to, for instance, build rapport, interpret, reflect, confront, and summarize.[15,22–24] Further, trained professionals can help parents to use online resources by adapting an empowering attitude in designing and delivering online information and support.[2,19] Parenting support programs have been claimed to be more effective when they are provided by well-trained practitioners.[25,26] For now, we do not know to what extent professionals, like psychologists, are involved in providing online parenting programs and if they have been trained to do so.

One of the advantages of online dissemination of parenting programs is that many target groups can be reached. Use of the Internet has increased rapidly since it became widely available in 1995. Internet World Stats[27] reports a penetration of Internet access by 32.7% of the worldwide population in December 2011; access ranged from 13.5% in Africa through 78.6% in North America to 89.5% in the Netherlands, mounting each year. Professionally designed parenting programs usually aim to reduce family stress, strengthen parents' advocacy, and improve parenting self-efficacy and parenting competences by delivering resources for mutual support, offering professional consultation, and providing parent training. Traditional face to face parenting support focuses on the first stages of parenting as a period of transition and support needs[28] and on early intervention.[29,30] However, other developmental stages of children can be equally challenging to parents.[31] It is commonly acknowledged[32–34] that parenting can be a challenging task, be it at certain stages of child development (e.g., transition to parenthood, infancy, adolescence) or in difficult circumstances (e.g., low income, social isolation, divorce, single parenting, illness, disabilities). We do not know yet, however, which parents are the target groups of current online support.

Interestingly, a number of both large and small scale applications of online parental support have been evaluated. This interesting line of study includes resources with a wide variety of types of online communication and providers. An overview of scholarly research on these programs is needed to assess the evidence base in this area, to verify suggested benefits, and to describe implications for future intervention design.

By reviewing studies on online parenting resources in detail, we aim to answer two main research questions:

RQ1: What are the characteristics of online parenting resources? Which and how many types of online communication do they use? Do they offer peer and professional support? Which groups do they target on which topics?

RQ2: What are the outcomes of different types of evaluation studies for online parenting Web sites?

Method

Selection of studies

To find full text empirical studies on web based parenting services that were published before 2010, we conducted a multiple field search in the databases of the Social Science Citation Index, PsycINFO, and PubMed. The extensive search strategy included blocks of various root terms related to parenthood (parent, mother, father, child, famil*, or pediatr*), parental support (counsel, coach, support, empower, advice, or train), and the online context (Internet*, online, mail, chat, computer, Web site). Studies were also subsequently located in other sources by searching for additional references in the obtained studies.

There were three inclusion criteria for this review. First, the primary components of the studied resource were delivered online. Second, the primary target group of these resources exists of parents who had children aged between −9 months (pregnancy) and 21 years (adulthood). Finally, studied resources were actual sites on the Internet (some required registered login). Two original research reports, which were prepublished online in 2009, were included. We did not include descriptive articles on online information for parents. Editorials, commentaries, reviews, and conference papers were also excluded.

After screening for duplicates, 485 studies were rejected because they did not meet the criteria for the target group. We assessed 115 articles for eligibility. Of these, 40 studies were rejected because they were descriptive articles on online parenting information. After screening the studies with our inclusion and exclusion criteria, 75 research articles published between 1998 and 2010 comprised the final set of studies.

Coding

We developed a coding scheme to describe resource and user characteristics of the web based resources and to assess the methodological characteristics of their evaluations. Two independent coders (i.e., the first and the second author) coded each study.

Concerning resource characteristics, we coded types of online communication (i.e., e-mail consultation, e-mailing list, confidential chat, group chat, group forum, information pages); facilitation of professional or peer support; combinations with offline services; and guidelines for professional conduct. Further, parent and child demographics and risk factors were coded (i.e., on the parent level: pregnancy, first time parenthood, single parenthood, minority, low income, low social support; on the child level: preterm, physical handicaps, mental health problems, illness, preventive health checks). Finally, we coded the following methodological

Table 1. Characteristics of Online Support for Parents

First author	Year	Name of resource[a]	Resource characteristics		Parent characteristics				Child characteristics	
			Synchr.	Support	Pregnant parent	First time parent	Low income	Low social support	Physical handicap or illness	Mental handicap
Ahmed	2007	Antenatal Screening Web Resource (AnSWeR)	A	Pr	+	−	−	−	+	−
Anand	2005	Email communication in pediatric care	A	Pr	−	−	−	−	+	−
Askins	2009	Problem solving skills training[a]	A	Pr	−	−	−	−	+	−
Baggett	2009	Infant net[a]	A	Pr+P	−	−	+	−	−	−
Baum	2004	Internet parent support groups	A	P	−	−	−	−	+	−
Beck	2005	Research on Birth Trauma	A	Pr	−	−	−	−	−	−
Bergman	2009	New Model of Well-Child Care	A	Pr	−	−	−	−	+	+
Bert	2008	Adventures in Parenting[a]	A	Pr	−	−	−	−	−	−
Borowitz	1998	Email consultations	A	Pr	−	−	−	−	+	−
Brent	2009	Health physics Web site	A	Pr	+	−	−	−	−	−
Britto	2009	MyCare Connection	A	Pr	−	−	−	−	+	−
Buzhardt	2006	Training modules	A	Pr	−	−	−	−	−	−
Campbell	2009	New Mothers Network	A	Pr+P	−	+	+	+	−	−
Capitulo	2004	Perinatal Loss Listserv	A	P	−	−	−	−	−	−
Carpenter	2004	Parent–Adolescent Conflict Training PACT	A	Pr	−	−	−	−	−	+
Chan	2008	Happy Land	A+S	P	−	−	−	−	−	−
Christakis	2006	MyHealthyChild (Bright Futures)[a]	A	Pr	−	−	−	−	−	−
Christian	2005	Saafamilies.org	A	P	−	−	−	−	−	−
Cook	2003	Strategies for Preschool Interv. in Everyday Settings[a]	A	Pr	−	−	−	−	+	+
D'Alessandro	2004	Information Prescriptions	A	Pr	−	−	−	−	+	−
Deitz	2009	Youth Mental Health A Parent's Guide	A	Pr	−	−	−	−	−	+
Demaso	2006	E+perience Journal, Depression	A	P	−	−	−	−	−	+
Downing	1999	Missouri Development. Disability Resource Center	A+S	Pr+P	−	−	−	−	+	−
Drentea	2005	Mothering Board	A	P	−	−	−	−	−	−
Dunham	1998	Staying Connected	A	P	−	−	+	+	−	−
Erera	2009	alt.dads.rights	S	P	−	−	−	−	−	−
Ewing	2009	The Web site	A	Pr+P	−	−	−	−	+	−
Feil	2008	Infant Net (Playing and Learning Strategies, PALS)[a]	A+S	Pr+P	+	+	+	+	−	−
Fletcher	2007	New Fathers Information Project	A	Pr	+	+	−	−	−	−
Gray	2000	Baby CareLink	A	Pr	−	−	−	−	−	−
Hall	2009	Online group	A	Pr+P	+	−	−	−	−	−
Han	2001	N-BLASTOMA; PED-ALL; PED-ONC	A	P	−	−	−	+	+	−
Herman	2005	Healthy pregnancy Web site	A	Pr+P	+	+	+	+	−	−
Huang	2007	Breastfeeding Education Program	A	Pr	+	−	−	−	−	−
Hudson	1999	Young Parents Project	A	Pr+P	+	+	−	+	−	−
Hudson	2003	New Fathers Network	A	Pr+P	−	+	−	−	−	−
Hudson	2008	New Mothers Network	A	Pr+P	−	+	+	+	−	−
Huws	2001	An International List serv	A	P	−	−	−	−	−	+

(*continued*)

Table 1. (Continued)

First author	Year	Name of resource[a]	Resource characteristics		Parent characteristics				Child characteristics	
			Synchr.	Support	Pregnant parent	First time parent	Low income	Low social support	Physical handicap or illness	Mental handicap
Kibar	2009	Email consultations with specialists	A	Pr	+	−	−	−	+	−
Kokkonen	2009	A Finish Web site	A	P	−	−	−	−	−	−
Kouri	2006	Net Clinic	A	P	+	−	−	−	−	−
Kuo	2009	Internet newborn care education program	A+S	Pr+P	+	+	−	−	−	−
Leonard	2004	Rettnet	A	P	−	−	−	+	−	+
Mackert	2009	Childcare center Web site	A	Pr	−	−	−	−	+	−
Madge	2002	Babyworld	A+S	Pr+P	−	−	−	−	−	−
Madge	2005	Babyworld	S	P	−	−	−	−	−	−
Magee	2009	Ucanpooptoo	A	Pr	−	−	−	−	+	−
Mankuta	2007	Internet consultations forum Hadassah Medical Org.	A	Pr+P	+	−	−	−	−	−
Mertensmeyer	2000	Parentlink[a]	A+S	Pr	−	−	−	−	−	−
Na	2008	Kidz Grow Online	A	Pr	−	−	−	−	−	−
Nelson	2003	Healthy Steps over Telemedicine	S	Pr	−	+	+	+	−	−
Nicholas	2004	Spina Bifida Father Group	A	P	−	−	−	−	+	−
Nyström	2006	Parental Support e-meeting portal (mothers)	S	Pr+P	−	−	−	+	−	−
Nyström	2008	Parental Support e-meeting portal (fathers)	S	P	−	−	−	+	−	−
O'Connor	2004	Babyworld	A+S	Pr+P	+	+	−	−	−	−
Ritterband	2005	Ucanpooptoo	A	Pr	−	−	−	−	+	−
Rosen	2007	PPEM, patient–physician e-mail	A	Pr	−	−	−	−	+	−
Salonen	2008	Vauvankaa	A	Pr+P	−	−	−	−	−	−
Salovey	2009	Head Start Community Technology Centers	A	Pr	−	−	+	−	+	−
Sanders	2008	Triple P[a]	A	Pr	−	−	−	−	−	−
Sanghavi	2005	Bright Futures	A	Pr	−	−	+	−	−	−
Sarkadi	2005	FöräldraNätet	A	P	−	−	−	−	−	−
Scharer	2005	Internet discussion board	A	Pr+P	−	−	−	+	−	+
Scharer	2009	Web-based Social Support Group	S	Pr+P	−	−	−	+	−	+
Schinke	2009	Daughter–mother substance abuse program	A	Pr	−	−	−	−	−	−
Skea	2008	Mumsnet	S	P	−	−	−	−	−	−
Taylor	2008	Incredible Years Adapted[a]	A	Pr+P	−	−	−	−	−	+
Thomas	2007	Breastfeeding Support	A	Pr	−	−	−	−	−	−
Thompson	2007	Touchscreen Computer Kiosk	A	Pr	−	−	−	−	−	−
Thompson	2008	Parent–teacher e-mail communication	A	Pr	−	−	−	−	−	−
Wade	2006	Family problem solving group (FPS)	A+S	Pr	−	−	−	−	+	−
Wade	2009	I-InTERACT[a]	A+S	Pr	−	−	−	−	+	−
Wallace	2005	Vaccination Decision Aid	A	Pr	−	−	−	−	−	−
Wang	2006	VBAC program	A	Pr+P	+	−	−	−	−	−
Wilson	2003	Hepatitis B and You	A	Pr	+	−	−	−	−	−
Percentage			A 78.7% S 9.3% A+S 12%	Pr 49.3% P 22.7% Pr+P 28.0%	20%	13.3%	12%	17.3%	28%	13%

Note. Synchr. A/S=asynchronous/synchronous; Support. Pr/P=professional/peer. [a]Adaptation of or similar to a traditional parent training program.

Table 2. Methodological Characteristics of Research on Online Interventions and Support for Parents

First author	*Year of publication*	*Research period (days)*	n *Total*	n_{exp}	n_{con}	*Incentive*	*Random assignment*	*Pretest*	*Posttest*	*Follow up*	*Content analysis*	n-*ca*	*Satisfaction*	*Measured effects*
Ahmed	2007	–	69	–	–	1	–	–	–	–	–	–	+	–
Anand	2005	42	55	54	–	1	–	–	–	–	+	81	+	–
Askins	2009	56	524	93	104	4	+	+	+	+	–	–	+	+
Baggett	2009	180	38	19	19	3	+	+	+	–	–	–	+	+
Baum	2004	–	114	–	–	1	–	+	+	–	–	–	+	–
Beck	2005	540	–	–	–	1	–	–	–	–	+	40	–	–
Bergman	2009	–	–	–	–	1	–	+	–	–	–	–	+	–
Bert	2008	–	89	40	49	2	+	+	+	–	–	–	+	+
Borowitz	1998	924	–	–	–	1	–	–	–	–	+	1,239	–	–
Brent	2009	–	–	–	–	1	–	–	–	–	–	–	–	–
Britto	2009	–	16	–	–	2	–	–	–	–	–	–	+	–
Buzhardt	2006	14	27	17	–	2	–	+	+	–	–	–	+	+
Campbell	2009	180	12	–	–	4	–	–	–	–	+	72	–	–
Capitulo	2004	90	87	–	–	1	–	–	–	–	+	447	–	–
Carpenter	2004	42	6	–	–	1	–	–	–	–	–	–	+	–
Chan	2008	1,095	–	–	–	1	–	–	–	–	+	–	–	–
Christakis	2006	630	887	448	439	2	+	+	+	–	–	–	–	+
Christian	2005	60	–	–	–	1	–	–	–	–	+	69	–	–
Cook	2003	–	21	18	–	2	–	–	–	–	–	–	+	–
D'Alessandro	2004	52	250	97	100	1	+	+	+	+	–	–	+	+
Deitz	2009	14	99	50	49	2	+	+	+	–	–	–	+	+
Demaso	2006	–	69	38	–	1	–	+	+	–	–	–	+	–
Downing	1999	–	–	–	–	1	–	–	–	–	–	–	–	–
Drentea	2005	547	629	180	–	1	–	–	–	–	+	–	–	–
Dunham	1998	180	42	–	–	3	–	+	+	–	+	1,454	+	–
Erera	2009	90	–	–	–	1	–	–	–	–	+	450	–	–
Ewing	2009	–	51	–	–	3	–	–	–	–	–	–	+	–
Feil	2008	14	3	–	–	3	–	+	+	–	–	–	+	–
Fletcher	2007	–	253	105	–	3	–	–	–	–	–	–	+	–
Gray	2000	480	56	26	30	3	+	–	+	–	–	–	+	+
Hall	2009	–	40	–	–	1	–	–	–	–	+	292	–	–
Han	2001	–	73	–	–	1	–	–	+	–	–	–	+	–
Herman	2005	–	19	–	–	3	–	–	–	–	+	–	–	–
Huang	2007	120	130	60	60	1	–	+	+	+	–	–	–	+
Hudson	1999	365	9	–	–	3	–	–	–	–	+	512	+	–
Hudson	2003	42	34	14	20	1	–	+	+	–	–	–	+	+
Hudson	2008	–	–	–	–	2	–	–	–	–	–	–	–	–
Huws	2001	90	–	–	–	1	–	–	–	–	+	6,142	–	–
Kibar	2009	1,825	14	–	–	1	–	–	–	–	–	–	+	–
Kokkonen	2009	7	55	–	–	1	–	–	–	–	+	197	–	–
Kouri	2006	–	–	–	–	1	–	–	–	–	+	280	–	–
Kuo	2009	150	130	61	57	1	+	+	+	–	–	–	–	+

(*continued*)

Table 2. (Continued)

First author	Year of publication	Research period (days)	n Total	n_{exp}	n_{con}	Incentive	Random assignment	Pretest	Posttest	Follow up	Content analysis	n-ca	Satisfaction	Measured effects
Leonard	2004	90	119		–	1	–	–	–	–	–	–	+	–
Mackert	2009	–	43	–	–	1	–	–	–	–	–	–	+	–
Madge	2002	42	155	–	–	1	–	–	+	–	–	–	+	–
Madge	2005	–	–	–	–	1	–	–	–	–	+	–	–	–
Magee	2009	730	91	39	43	1	–	+	+	–	–	–	+	–
Mankuta	2007	900	–	–	–	1	–	–	–	–	+	2,000	–	–
Mertensmeyer	2000	–	–	–	–	1	–	–	–	–	–	–	–	–
Na	2008	180	821	145	273	1	+	+	+	–	–	–	–	+
Nelson	2003	–	38	–	–	1	–	+	+	–	–	–	+	–
Nicholas	2004	180	25	–	–	1	–	–	–	–	+	–	–	–
Nyström	2006	300	5	4	–	3	–	–	–	–	–	–	+	–
Nyström	2008	300	3	–	–	3	–	–	–	–	–	–	+	–
O'Connor	2004	42	155	–	–	1	–	–	–	–	–	–	+	–
Ritterband	2005	365	83	43	40	1	–	–	–	–	–	–	+	–
Rosen	2007	730	328	121	–	1	–	–	–	–	–	–	+	–
Salonen	2008	365	2,600	776	612	1	–	+	–	–	–	–	–	–
Salovey	2009	–	190	120	70	4	–	+	+	+	–	–	+	+
Sanders	2008	42	454	210	222	1	+	+	+	+	–	–	+	+
Sanghavi	2005	120	101	49	52	1	–	+	+	–	–	–	–	+
Sarkadi	2005	7	2,499	2,221	–	1	–	–	+	–	–	–	–	–
Scharer	2005	120	7	–	–	3	–	–	–	–	+	137	–	–
Scharer	2009	–	11	7	4	1	+	–	–	–	+	22	–	–
Schinke	2009	712	591	252	339	2	+	+	+	+	–	–	–	+
Skea	2008	–	–	–	–	1	–	–	–	–	+	617	–	–
Taylor	2008	–	380	90	88	2	–	–	–	–	–	–	+	–
Thomas	2007	–	–	–	–	1	–	–	–	–	–	–	–	–
Thompson	2007	180	1,846	–	–	1	–	–	–	–	–	–	+	–
Thompson	2008	180	341	–	–	1	–	–	–	–	+	1,008	–	–
Wade	2006	–	87	20	20	3	+	+	+	+	–	–	+	+
Wade	2009	–	9	5	–	3	–	+	+	+	–	–	+	+
Wallace	2005	280	1,277	158	–	1	–	–	–	–	–	–	+	–
Wang	2006	60	10	–	–	1	–	+	+	–	–	–	+	+
Wilson	2003	365	228	54	–	1	–	–	–	–	–	–	+	–
Percentage/mean		294	M: 278 Sd: 541	M: 174 Sd: 403	M: 128 Sd: 160	1: 66.7% 2: 12.0% 3: 17.3% 4: 4.0%	17.3%	34.6%	37.3%	10.6%	30.6%	836	56%	25.3%

Note. *n* Total = total number of online contacts; $n_{ex\ p}$ = sample size experimental group; n_{con} = sample size control group; Incentive = use of incentive for participants, 1 = no , 2 = yes, money, 3 = yes, technology, 4 = yes, money and technology; *n*-ca = number of posts/messages/pages coded; + indicates that the criterion has been met.

aspects of the research design: type of research (experimental, content analysis, satisfaction); research period; sample size; theoretical framework; allocation and randomization; use of incentive; and types of tests and experimental results.

Intercoder reliability was estimated by determining Cohen's kappa in the case of nominal variables and the intraclass correlation (*ICC*, two-way random, absolute agreement) for continuous variables, using 0.70 as the cut-off score for inclusion. Reliability proved satisfactory to excellent for the majority of the coded variables, with κ ranging from 0.72 to 1, and *ICC* ranging from 0.81 to 1. In the case of divergent codes, final codes were established by discussion.

Results

Since the Internet became available to a broad public in 1995, we expected that the first studies would have appeared shortly after that year. The first article in our sample was published in 1998. While a quarter of the research articles were published before 2005, the other studies were published more recently; a quarter were published in 2009 alone.

Types of online communication

Table 1 provides an overview of resource characteristics for the included studies. The vast majority of the web based resources in our sample offered one or two types of online communication. Information pages are a dominant feature (61.3%), followed by group forums (36%), and e-mail consultations between professional and parent (32%). E-mailing lists (13.3%) and chats with peers (13.3%) were less frequently reported; in one study, a confidential chat with a professional (1.3%) was examined.

Thus, our sample showed many different features of online communication. Further analysis revealed that 47 of the 75 studies examined web based programs for parents featuring a single type of online communication (62.6%), while 28 examined resources with multiple components of online communication (37.3%). In the latter studies, 15 programs featured two components and 11 featured three components. There were two resources that offered a combination of four types of online communication. Seventeen programs (22.6%) used a two layered interaction model, mostly offering a combination of information pages (one to many) and either e-mail consultation (one to one) or a group forum (many to many). Ten programs (13.3%) used a three layered interaction model, combining these three types of online communication.

The online parenting resources make use of a wide range of types of online communication. Use of multiple components and the facilitation of layered interactions in one online service are not common.

Professional involvement

Professionals were often involved in online parenting programs. Exclusively peer orientated online programs made up nearly one quarter of our studies; combinations of peer support with professional help were also frequently observed. Nineteen resources could be qualified as parenting interventions, aimed at the improvement of parenting competence. A large array of professional backgrounds were represented in these programs: clinical psychologists, coaches, developmental specialists, genetic counselors, healthcare professionals, midwives, nurses, parent coaches, pediatricians, physicians, psychologists, researchers, social workers, teachers, or therapists. In 11 studies (14.7%), we found explicit references to guidelines for providing professional support, mostly related to the quality of information pages. We found no clear instructions for professionals on how to provide text based professional support in confidential chat or e-mail consultations. Thus, although professional involvement in these resources is high, directives for professional conduct were scarcely reported.

Target groups

To clarify which topics and target groups were defined by the studies, we identified both parent characteristics (e.g., gender, specific themes) and child characteristics (e.g., age, health condition).

Many of the articles that specify parents' characteristics ($n = 36$) are specifically devoted to services for pregnant parents or first time parents. A relatively large proportion of the web based resources focused on parents with low social support (17.3%) or low income (12%). Parents' mean age, reported in 34 studies, was 32.3 years.

In addition to the characteristics of parents, we examined those of their children in order to describe the target group of the included online programs. Children's health was an important motive for designing online services to parents (54.3%). These were mostly offered in a pediatric hospital setting to the parents of children with physical disabilities or illness (28%) such as spina bifida, traumatic brain injury, or cancer, or mental health issues (13%) such as autism or ADHD. Ten online services (13.3%) were offered in combination with preventive health checks.

Twenty-four percent of the studies did not report data on the children's ages, whereas 15 studies concerned resources for the parents of all children, regardless of their age. In the studies that did report the age of the children, the minimum and maximum ages ranged from -9 months (i.e., pregnancy) to 21 years, with a median of 81.1 months (6.7 years). Parenting adolescent children (>12 years) was central in only one resource.[35]

To sum up: most of the resources in our sample were targeted at specific groups of parents and/or children. Half of them concerned child health topics, and a large part of the resources was designed to support pregnant and first time parents. A number of Web sites aimed at parents with low income or low social support. The majority of the web based programs were aimed at parents with preschool children.

Methodological characteristics of the studies

The studies (see Table 2 for an overview) can be divided into two main categories: content analytic studies and experimental studies.

Content analytic studies

Two thirds of the content analytic studies coded postings on e-mail lists, discussion boards, and group chatrooms, and thus focused on social networking among parents. Ten studies coded e-mail consultations and information pages provided by professionals. In total 15,059 online texts were analyzed. The sample size of evaluated messages differed

significantly among studies, varying from 22[36] to 6,142[37] analyzed messages. One third of these studies (30.4%) analyzed peer support combined with professional support, whereby a professional functioned as a moderator of a peer group, or a professional consultation was offered in addition to peer support. Four studies concerned resources that were provided exclusively by professionals (17.3%). Two of these studies mentioned the training of practitioners in social support theory and its application in an online chat forum for mothers of mentally ill children[36] and in e-mail consultations by nurses.[38]

Interactive forums and discussion boards often focus on a specific target group or parenting topic. There is a strong focus on children under the age of 12 (47.8%); pregnancy is also a frequent topic (13%) in this line of study.

Most authors were interested in emerging themes and topics that were frequently discussed online, like day to day challenges for mothers of young children.[38–40] Researchers also analyzed these peer orientated services for parents in challenging circumstances, like parenting children with spina bifida,[41] autism,[37] and mental illness.[8,36] They found that social networking was appreciated because it contributed actively in meaningful goals, for instance to be acknowledged, be empowered, adjust to changes, seek encouragement, seek a sense of belonging, or help others.

Almost half of the content analytic studies coded aspects, derived from theories on social support, providing a firm basis for the value of social networking in relation to parenting issues.

Experimental studies

Nineteen studies (25.3% of all studies) evaluated effects of online parental support. Twelve of these studies (16%) evaluated online parent training interventions. These evaluations show a wide variety in the effects studied and measures used, as well as in user characteristics and resource characteristics. The topics were highly diverse, including for example health and mental health, parenting skills, and parenting specific children groups with specific factors, such as adolescent substance use, newborn care, and social–emotional risks.

The parent and child characteristics of participants in the interventions that were evaluated, as well as the program features, differ slightly from those in the programs in the total sample of studies. First, the reported maximum age of children was 87.2 months (7.3 years) in 14 studies, which represents an even stronger emphasis on the parenting of young children. Further, professional support is a dominant characteristic of the evaluated programs (100% in experimental studies vs. 77.3% in all studies), which implies that programs that exclusively facilitate peer support have not been evaluated with experimental studies. However, three resources did offer peer support in adjunction to professional support. Thus, programs with professional support and a focus on relatively young children predominate in the experimental studies.

Although some other types of online communication—such as e-mail consultations (31.6%), group chat (5.3%), or group forums (31.6%)—were a part of the evaluated interventions, information pages were a common feature of all of them (100% in experimental studies vs. 61.3% in all studies). Two programs offered additional face to face support, and one offered telephone support in addition to online features; another one offered television broadcasts.[42] We found several creative uses of online media for online parent training, such as an animated character on a handheld device that guides mothers through a problem solving strategy,[43] videos demonstrating positive parenting behaviors,[44] web based training sessions,[45] multimedia training modules,[46,47] and interactive homework sessions.[48,49]

Although the number of experimental studies is low and they are based on small samples, the results are promising. All reports expressed optimism about the feasibility, acceptance, and effectiveness of the online service, often based on positive satisfaction reports. In total, effects showed a medium effect size. It should, however, be noted that all effects were self-reported, mostly with the use of validated instruments.

Discussion

Parenting has been changed by the Internet. Internet pioneers have developed web based programs that provide high quality information to enhance parents' knowledge, easy access to peers with whom to share experiences, and professional consultation and training. Parents can now find a huge amount of information and support on the Internet that is accessible, anonymous, cost-effective, and convenient.[5–7,9] Only a small number of these Internet resources have been evaluated in a scientific study, and the studies we reviewed represent only a fraction of the huge number of online services that are available to parents on the Internet.

The studies in this review show that, apart from parenting, parenting support has also been changed by the opportunities the Internet has to offer. The studies reported on services with a broad range of types of online communication. These programs vary widely in goals, design, and reach in order to respond to the different needs of parents.

The content analytic studies showed a strong focus on online exchanges and peer support, whereas information pages and professional training and support were frequent themes in the experimental studies. Content analytic studies of online parenting resources provide a firm theoretical and empirical basis for the value of online social networking. Parents were, without exception, satisfied with the resources offered to them. The experimental studies show some positive effects on parenting skills and child behavior. However, due to the small sample of experimental studies in this review, their wide variety, and their mixed outcomes, it is difficult to generalize conclusions to the many resources for parents on the World Wide Web.

This review shows a trend that scholarly interest in the subject of online resources for parents is growing. The application of asynchronous types of online communication, professional support, and young children's health topics are dominant characteristics of the studied resources. Specifically, such online resources may be designed by parenting practitioners to reach a large population and prevent problems with parenting.

We suggest several directions for future development for the innovation of traditional parenting programs and to enhance the quality of this field.

First, future developers may broaden the scope of online programs for parents. Research on online parenting resources

currently places a heavy emphasis on mothers, pregnancy, and young children, while less attention is paid to fathers and later developmental phases of children. The current state of the field likely reflects professional parenting support in general.[28–30] However, other developmental stages of children can be equally challenging to parents and, hence, developing online services for parents with older children seems an interesting and complementary domain to explore in the near future.[31,50] Some inspiring initiatives of online interventions for parents of older children and a variety in topics are described in this review.

Second, new technologies have recently become available for developers and parents. In this review, we found that information pages are currently a dominant format used in the programs. Combining types of online communication may enrich interventions, but the positive effects of layered interactions have not yet been demonstrated. Multimedia innovations might offer new ways of supporting parents that differ from traditional programs. New types of online communication (e.g., videochat, microblogging, wiki, ping) have been introduced, and also new hardware has been developed (e.g., smartphones, digital tablets, personal digital assistants). These technological innovations may inspire practitioners and developers to offer additional highly interactive opportunities for parenting support in combination with social networking.

Further, this review reveals some limitations in the current knowledge base. First, scientific evaluation of professionally designed online parenting interventions for a wide range of target groups is essential, and more programs should be evaluated in future research to establish their effects. Although large effects are perhaps not to be expected in the field of parenting education in general,[30] this review shows some interesting examples of effective parenting support. Promising innovations are interactive technologies, which facilitate sharing experiences, demonstrating parenting behavior and guiding parents through training sessions.

Finally, we found that clear guidelines for professional skills or conduct were not included in the reports. However, parenting practitioners and healthcare providers are essential for disseminating information and providing support online in a proactive, professional, and ethical manner.[19] Professional training for the text based support of parents should therefore be developed and encouraged, and should be included in evaluation reports.

To summarize, enhancements to this line of study could include, on the resource level, the application of multicomponent and multilayered types of online communication, the professionalization of online support, and the dissemination of resources to meet a wider range of parental needs. As a result, online resources may acquire a firm position in the domain of parent intervention programs in the near future. On the level of study design, more online parenting interventions should be evaluated to substantiate claims about the efficiency and effectiveness of online support programs and raise their accountability.

Several authors have described online parenting and patient support as a service "in its infancy."[4,9,51–53] If one views these interventions as being part of the "first generation," it is fair to say that research on these interventions is first generation research. With the rapid evolvement of Internet technologies, providing online services seems a given, rather than a choice, in future intervention design. This review shows some creative examples of online parenting programs after 15 years of scientific evaluation in this relatively new domain.

Both the inspiring results of many of the pioneering studies we reviewed and the high satisfaction rates suggest that there is much to be gained by exploiting the potential of the Internet to provide parents with the best possible support, in conjunction with a more thorough approach to program design, professional training, and evaluation. The studies from our review have shown that the first generation of online resources has changed parenting and parenting support for a large group of parents and professionals.

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Address correspondence to:
Christa Nieuwboer
Fontys School of Pedagogical Studies
Fontys University of Applied Sciences
Mgr. Claessenstraat 4
6131 AJ Sittard
The Netherlands

E-mail: c.nieuwboer@fontys.nl