



City Research Online

City St George's, University of London

Citation: Moore, D. & Ayers, S. (2011). A review of postnatal mental health websites: help for healthcare professionals and patients. *Archives of Women's Mental Health*, 14(6), pp. 443-452. doi: 10.1007/s00737-011-0245-z

This is the unspecified version of the paper.

This version of the publication may differ from the final published version. To cite this item please consult the publisher's version.

Permanent repository link: <https://city-ref-test.eprints-hosting.org/id/eprint/2038/>

Link to published version: <https://doi.org/10.1007/s00737-011-0245-z>

Copyright and Reuse: Copyright and Moral Rights remain with the author(s) and/or copyright holders. Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, unless otherwise indicated, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way. For full details of reuse please refer to [City Research Online policy](#).

A review of postnatal mental health websites: Help for healthcare professionals and patients

Donna Moore and Susan Ayers

City University London

Please cite this paper as:

Moore, D., & Ayers, S. (2011). A review of postnatal mental health websites: help for healthcare professionals and patients. *Archives of Women's Mental Health*, 14(6), 443-452.

Abstract

Purpose The internet offers an accessible and cost-effective way to help women suffering with various types of postnatal mental illnesses and also can provide resources for healthcare professionals. Many websites on postnatal mental illness are available but there is little information on the range or quality of information and resources offered. The current study therefore aimed to review postnatal health websites and evaluate their quality on a variety of dimensions. **Methods** A systematic review of postnatal health websites was conducted. Searches were carried out on four search engines (Google, Yahoo, Ask Jeeves and Bing) which are used by 98% of web users. The first 25 websites found for each key word and their hyperlinks were assessed for inclusion in the review. Websites had to be exclusively dedicated to postnatal mental health or have substantial information on postnatal mental illness. Eligible websites ($n = 114$) were evaluated for accuracy of information, available resources and quality. **Results** results showed that information was largely incomplete and difficult to read; available help was limited and website quality was variable. **Conclusions** The top five postnatal mental illness websites were identified for (1) postnatal mental illness sufferers and (2) healthcare professionals. It is hoped these top websites can be used by healthcare professionals both for their own information and to advise patients on quality online resources.

Keywords: postpartum depression, postnatal depression, internet, websites, web-based education

Introduction

For many women and their families, pregnancy and birth are a time of excitement and great joy. Unfortunately, some new mothers suffer beyond the typical concerns of parenthood and experience varying degrees of antenatal and postnatal mental health problems. Studies show that 10-15% of new mothers are diagnosed with postnatal mental illnesses, and potentially 1 in 4 women may have significant distress without meeting criteria for a disorder (Baker et al. 2009; Czarnocka and Slade 2000). There are many different types of psychological disorders associated with the postpartum period (Brockington, 2004). Historically, the majority of research has focused on postpartum depression (PPD), which has a prevalence of 10-15% (Baker et al. 2009). However, there is now increasing evidence that anxiety disorders are also prevalent in between 3 and 43% of women in the postpartum period (Glasheen et al. 2009). Postpartum anxiety disorders can include generalised anxiety disorder, panic, obsessive compulsive disorder and post-traumatic stress disorder (PTSD) (Brockington 2004). Both anxiety and depressive disorders are associated with negative impacts on women, their infant and families (Glasheen 2009; Reissland 2006; Burke 2003). It is therefore essential that research continues to investigate new ways of treatment and education.

One issue that is relevant to treatment is how postpartum psychological disorders are conceptualised. First, it is important to note that there are no diagnostic categories specific to the postpartum period in the two main classification systems – the Diagnostic and Statistical Manual Mental Disorders, Forth Edition, Text Revision (DSM-IV-TR American Psychiatric Association 2000) or ICD-10 (WHO 1993). The term postpartum or postnatal depression is often used by the general public and health professionals to describe the array of mood disturbances in the postpartum. Moreover, classifications of postpartum disorders can be confusing, as they can be co-morbid with each other and other illnesses. For example, studies show that most women with PTSD following childbirth also have depressive symptoms (Alcorn et al. 2010), and women with depression often have anxiety problems (Matthey et al. 2003). In addition, many women may experience debilitating symptoms synonymous with one or more disorders, yet fail to meet all the diagnostic criteria. For example, Czarnocka and Slade (2000) reported that 24.2% of their sample of mothers showed significant symptoms in one of the three main symptom clusters of PTSD. Therefore, potentially 1 in 4 women could be suffering mental distress after childbirth but might not be identified by healthcare providers because they do not fit criteria for a ‘disorder’. The way in which postpartum psychological illnesses are classified therefore has implications for screening and treatment. Hence, the current paper uses the term postnatal mental illness to cover PPD, postpartum anxiety disorders, PTSD after childbirth and postpartum psychoses.

Indeed, there are other reasons women often fail to get the help or treatment they require. Despite increased awareness about postnatal mental illness, many women feel it still retains much of its stigma and consequently are less likely to report any negative feelings after birth and avoid treatment (Wisner et al. 2002; Shakespeare et al. 2003). Other

barriers to reporting postnatal mental illness include concern about being regarded as a bad mother (McCarthy and McMahon 2008), symptoms being dismissed by healthcare providers and family and problems accessing services (Dennis and Chung-Lee 2006). In light of this, it is important to consider whether postpartum interventions and treatments are regarded as acceptable by women. If the treatment is seen as acceptable then the patient is more likely to seek help and adhere to treatment offered.

Given the popularity and accessibility of the world wide web (WWW), it may be a viable and cost-effective way to offer information and help to women suffering various types and levels of postnatal mental illness, many of whom would not otherwise receive the treatment (Christensen and Griffiths 2004). Indeed, evidence shows that web users who frequently search for health information for themselves tend to be women (Atkinson et al. 2009). Women can easily access information and self-help on postnatal illness while retaining their anonymity. Christensen and Griffiths (2004) found that increased knowledge of depression and interventions delivered via the internet were associated with reduced depressive symptoms. Furthermore, many studies support the efficacy of online interventions (Andersson and Cuijpers 2008; Barak et al. 2008) and online support for depression (Griffiths et al. 2009). The WWW could have the potential to help women self-diagnose, seek support and empower them to be an active participant in overcoming their condition.

The WWW is therefore potentially a valuable resource for women with postnatal mental illness in terms of providing them with information, support and occasionally online interventions. However, women and healthcare professionals need information on which websites are reliable. Research has shown that patients are more likely to trust websites recommended by their physicians (Griffiths and Christensen 2006). The WWW is also a potential resource for healthcare professionals in terms of building knowledge of postnatal mental illness, accessing screening and treatment skills. However, health information on the WWW tends to be unevenly dispersed and users can struggle to find, understand, and use the information (Benigeri and Pluye 2003). Research on the quality of information on depression is conflicting, but there is a general consensus that more evidence-based information and advanced tools for assessing websites are needed (Griffiths and Christensen 2000).

Research into the quality of websites for postnatal mental illness is extremely limited. Heringhausen and Montgomery (2002) selected four websites on PPD for review that they regarded as the best resources available for healthcare professionals. All websites were reported as easy to navigate, up-to-date, readable, informative, and had unique features to help consumers and healthcare professionals. Summers and Logsdon (2005) found that Google listed 83,600 websites when the term “postnatal depression” was entered. This term was entered into 11 search engines and the first 10 websites were assessed for inclusion. Thirty four of the 36 websites found were assessed for content, technology and readability. Nearly a third of websites contained an unacceptably small quantity of information on postpartum

depression and only 14.7% provided more than 75% accurate information as assessed by the web depression tool (WDT). Moreover, 11.8% of websites included misleading information, such as advocating herbal treatments over medical care. The technology of websites was generally poor with out of date links, poor graphics, no references and disorganised or overwhelming information. The Flesch-Kincaid Grade Level score found that all websites had eight-grade or higher readability. This means that for many users information would be difficult to comprehend. This study is the most comprehensive review of websites for PPD to date. However, websites were assessed only for information on depression and not other types of postnatal mental illness. The rapidly expanding nature of the internet also means many more websites are likely to have been created since this review in 2005.

The WDT comprises of 33 content questions with yes or no answers, for example, “Depression is treatable” and 11 technology questions on a scale from not applicable to strongly agree, for example “the information contained in the site is presented in a clear manner”. As Summers and Logsdon note, the WDT has serious shortcomings when evaluating web-based information specific to postnatal mental health. To date, there is no web tool that measures postnatal mental health sites specifically for postnatal mental illness information. This study aimed to develop a new rating system using evidence-based research and current thinking on postnatal mental illness. Furthermore, both accuracy of information and technology of sites were considered separately, unlike the WDT that adds scores together. This study extends the work of Summers and Logsdon (2005) by (1) carrying out a more recent review of websites and (2) using a more extensive, multidimensional rating scale.

In conclusion, there is a need for an up-to-date, systematic review of websites on postnatal mental illness that uses clear rating criteria and is evidence based. Also, little is known about self-help, online support services and resources for sufferers and this could be a useful adjunct to treatment. This study therefore conducted a systematic review of websites on postnatal mental illness. Information specific to postnatal mental illness was evaluated including symptoms, risk factors and impact of the illness. In addition, the study looked at screening and treatment resources for healthcare professionals and support services, self-help and further resources for mothers. Website technology was rated on attributes considered to be important for usability and accuracy. There were *authority*, *contact-ability*, *up-to-date*, *navigation*, *presentation*, *advertisements*, and *accessibility* (Kapoun 1998). Results provide the top five websites recommended for (1) postnatal mental illness sufferers and (2) healthcare professionals.

Method

To identify relevant websites, a search of the WWW was conducted using the top four search engines (Google, Yahoo, Ask Jeeves and Bing) which are used by 98% of web users (SEO Consultants Directory 2009). The key words “postnatal depression”, “postnatal illness”, “postpartum depression” and “postpartum illness” were entered into each

search engine. The first 25 websites found for each key word and their hyperlinks were assessed for inclusion in the review.

Inclusion criteria were that websites had to be exclusively dedicated to postnatal mental health or have substantial information on postnatal mental illness (defined as >500 words). Blogs were excluded from review as they are typically maintained by one individual presenting an online diary. Of the 117 websites that met criteria for assessment, two had expired and one was under construction. This resulted in 114 websites being available for review. Websites were evaluated between November 2009 and April 2010 for accuracy of information, available help and website quality. All websites were reviewed again at the end of the evaluation period to check for updates. Five websites were noticeably different in data or presentation and were rated again.

Measures

Rating scales were devised to measure accuracy of information, available resources and quality of websites. These are described below and given in full in the Appendix.

Accuracy of information

Information on symptoms, risk factors and impact of postnatal mental illness was assessed using a combination of DSM-IV-TR (American Psychiatric Association 2000), existing high quality postnatal mental illness websites (www.step-ppd.com) and current literature on postnatal mental illness. In addition to DSM-IV-TR criteria for major depressive disorder, the STEP_PPD website lists symptoms specific to postnatal mental illness. A total score for information was calculated (range 0 - 76) on the basis of the subscales below. Means of subscales were used to determine the frequency and distribution of information.

Websites were scored for information presented, with three subscales: (1) symptoms, (2) risk factors and (3) impact. *Symptoms* examined whether information was given about common symptoms of depression, anxiety, periparturient psychosis and post traumatic stress disorder. Websites that listed a symptom scored 1 point per symptom with a range of 0-15 for depression, 0-6 for anxiety, 0-7 for periparturient psychosis and 0-2 for post traumatic stress disorder. Thus the range for all symptoms was 0-30.

Risk factors comprised of psychosocial, medical history and additional considerations in predisposition to postnatal mental illness. Websites that listed a risk factor scored 1 point per risk factor with a range of 0-12 for psychosocial, 0-8 for medical history and 0-6 for additional considerations. Thus the range for all risk factors was 0-26.

Impact was divided into mother, infant and partner/family. Websites that listed an impact scored 1 point per impact with a range of 0-19. Impact on mother ranged 0-9, impact on infant ranged 0-5 and impact on partner/family ranged 0-5.

Treatment and screening information was recorded as a simple yes/no as the majority of websites had limited or no information. In this area, websites that had inaccurate or unsafe information that advocated alternative treatments over medical help were scored negatively (-1).

Additional resources for healthcare professionals was noted yes/no. For websites to be included in top ranking for healthcare professionals they had to include correct information on *treatment, screening* and *additional resources*.

Further points of interest were noted as a yes/no, such as, encouragement to seek professional help, assurance of recovery, prominent information on what to do if experiencing thoughts of harming themselves or their infant, prevalence, and recognising that fathers can also experience postnatal mental illness.

Readability was assessed using the Flesch-Kincaid Grade Level score for each website. This is a widely used, reliable measure of the literacy level needed for a person to understand a specific text. The first paragraph of the website homepage was imported into Microsoft Word. Flesch 2.0 for windows was used to assess the text was for reading age (Flesch 2007).

Available resources

Websites were also scored on the number of support resources offered for mothers and comprised of *self-help tools for mothers, support for mothers* and *additional resources*. *Self-help tools for mothers* refers to self-help information for mothers, such as how to seek help, letters to doctors and coping strategies. Websites were awarded 1 point for each tool and scored out of 16. *Support for mothers* referred to online and offline support and included email counselling, helplines and group meetings. *Additional resources* were classed as any other resource that might assist mothers and included links, book reviews and leaflets. These categories were compiled through an initial assessment before the review commenced. Any extra tools, support or additional resources that were observed during the review were added to the criteria. Subsequently, all previously reviewed websites were re-assessed on this criterion.

Website quality

Websites were rated on website quality, examining attributes important to usability and accuracy. There were seven subscales; *authority, contact-ability, up-to-date, navigation, presentation, advertisements, and accessibility*. *Authority* of the site was scored according to whether the creators of the websites were specified or not, with 1 point if websites acknowledged site creators and 0 for non-specified. *Contact-ability* referred to whether users could contact the site owner. Websites scored 1 point if contact details were presented.

Up-to-date referred to the website being maintained regularly; websites were scored on working links, date of information and cited sources. Websites scored 1 if all links worked. When information was dated on most pages the site

scored 1. When sources were cited websites were awarded 1 point.

Navigation referred to the ease with which users could navigate a site. Websites with a clear index on the home page that linked to all pages on the site were awarded 2 points. Websites that were relatively easy to navigate, but needed several clicks from the home page to access all pages scored 1. Websites were rated poor and scored 0 when it was very difficult to navigate the site, due to no index, confusing or hidden links, or requiring the viewer to use the search option to find all the information.

Presentation referred to the visual presentation of the website. Websites with clear text, uncluttered and a picture on most pages were awarded 2 points. Mediocre websites where information was well presented, but less clearly than top websites and had little if any pictures scored 1 point. Poor websites that were confusing with too much information on a single page, had disorganised layouts and no pictures scored 0.

Advertisements can affect *navigation* and *presentation* and also distract or mislead viewers. Two points were awarded to websites without any advertisements, 1 point to mediocre websites that had relevant advertisements and poor websites had advertisements that were irrelevant to postnatal mental illness or made it difficult to navigate and/or in the way of the text scored 0.

Accessibility referred to how much of the site was readily accessible to users. Websites that required no fees or special software to access information were awarded 1 point.

To ensure the reliability of ratings, approximately 10% of websites were rated by an independent researcher. Using a random number generator programme, 11 random websites were selected and rated using the same rating system and instructions (Daniels 2010). A kappa test showed a moderate agreement ($\kappa=0.46$, $p<0.001$). Discrepancies between ratings were largely due to poor site navigation which meant the independent rater missed information on some sites. In some cases, whole sections of sites were missed as there was no link from the “home page”, instead, sections were found by following various hyperlinks on different pages or using the search feature. There were also minor discrepancies due to raters rating sites at different times.

Results

The most frequently occurring sites using Google were www.pni.org.uk, www.apni.org and www.patient.co.uk.

Accuracy of information and available help

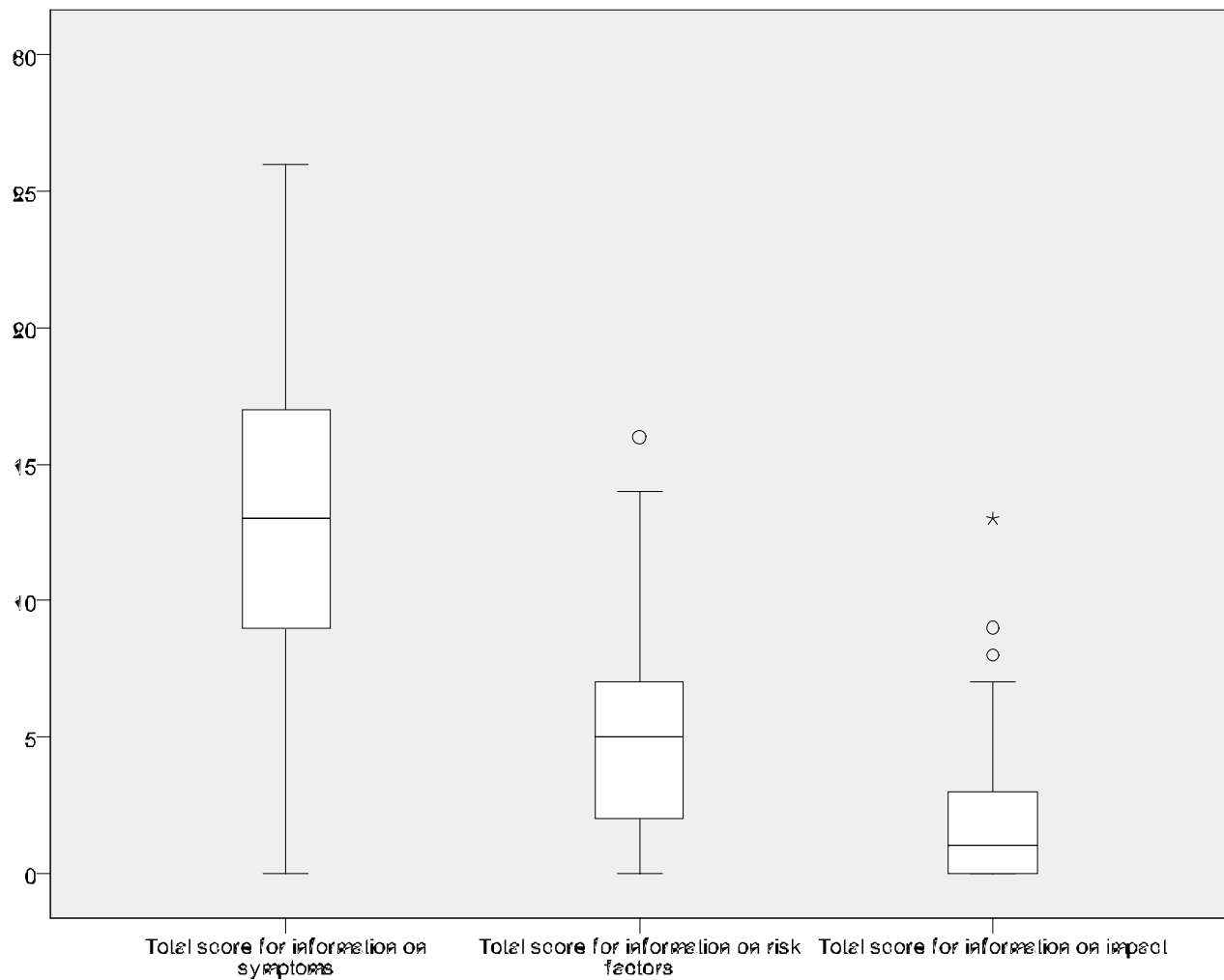
Figure 1 shows the distribution of scores for information on symptoms, risk factors and treatment given by websites. Seventy five percent or more of sites reported ≥ 9 symptoms (range of 0-26, $M=13.05$, $SD=5.71$). Most frequently mentioned symptoms on sites were depressive ($M=8.65$, $SD=3.55$) with tearfulness being reported by 82.5% of sites and

sleep disturbances reported by 76.3%. There were noticeably fewer instances of anxiety symptoms being described ($M=2.19$, $SD=1.48$) or puerperal psychosis symptoms ($M=2.03$, $SD=2.01$). The majority of sites (86.8%) did not mention PTSD symptoms ($M=0.18$, $SD=0.51$).

Seventy five percent or more of sites listed ≥ 2 risk factors ($M=4.73$, $SD=3.28$). Only one site included all the risk factors and 19.3% of sites had none. The most common risk factors listed were personal or family history of psychiatric disorders (66.7%), lack of social support (62.3%), and recent stressful life events (53.5%). Psychosocial factors accounted for most results ($M=2.74$, $SD=2.07$), closely followed by medical history ($M=1.75$, $SD=1.52$). Additional risks were largely absent with 83.3% of sites not reporting any ($M=0.24$, $SD=0.72$). One website was a notable outlier that covered a lot of risk factors, www.postpartumdads.org.

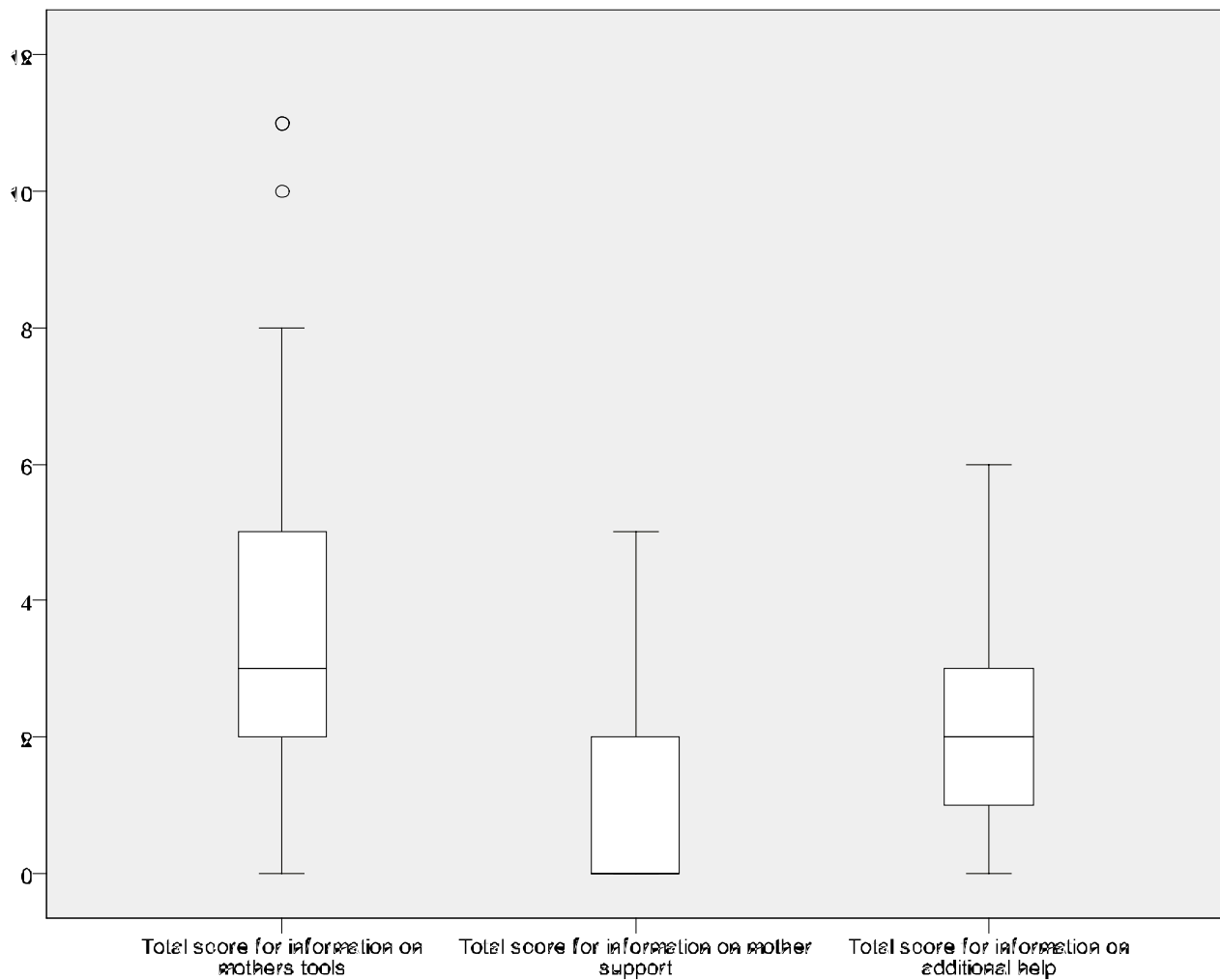
Impact was the least occurring type of information with 38.6% of sites failing to report anything about the impact of postnatal mental illness on mothers, infants or the family ($M=1.95$, $SD=2.36$). One or more impacts on the mother was recognised by 43.9% of sites ($M=0.92$, $SD=1.31$); 30.7% of sites recognised ≥ 1 impact on the infant ($M=0.61$, $SD=1.08$); and 28.9% of sites recognised ≥ 1 impact on the family ($M=0.41$, $SD=0.75$). The most frequent impacts mentioned were delayed infant development of cognitive skills, social skills, and expressive language (26.3%) and increased instability in marital and family relationships (20.2%). Outliers for impact were most notably www.mededppd.org, www.birthtraumaassociation.org.uk and www.medicinenet.com (see Figure 1). Overall, the range of information given by websites was low. Total score for information was the sum of symptoms, risk factors and impact and had a possible range of 0-76. However, actual range observed was 0-40 ($M=19.73$, $SD=8.39$).

Figure 1. Boxplots of information on postnatal mental illness symptoms, risk factors and impact



A range of help was provided for postnatal mental illness. These included 15 different types of tools for mothers (e.g. screening tests, how to access medical notes, advice, relaxation, coping strategies), 8 support services (e.g. forums, chat rooms, telephone helplines, support groups, home visits) and 9 additional resources (e.g. links, downloads, podcasts, book recommendations, information leaflets). Full details of tools found are given in the appendix. The range and median number of tools provided by websites is shown in Figure 2. In *tools for mothers*, $\geq 75\%$ of sites reported ≥ 2 tools for mothers out of 16 ($M=3.10$, $SD=2.31$). The predominant tool was standard self-help (58.8% of sites). Outliers were www.postpartumstress.com, www.patient.co.uk and www.panda.org.au. In *support for mothers* $\geq 75\%$ of sites offered ≥ 1 support out of 8, with 54.4% having 0 services ($M=0.89$, $SD=1.20$). Telephone support was the predominant support (28.9%). In *additional resources*, $\geq 75\%$ of sites offered ≥ 1 resources out of 10 ($M=2.08$, $SD=1.5$), with *links* being the most frequent (59.6%). Total score for available help was the sum of mothers' tools, mother support and additional help ($M=6.06$, $SD=3.65$). There were two outliers, www.patient.co.uk and www.panda.org.au.

Figure 2. Boxplots of self-help tools, support and additional help offered by websites



Website quality and additional considerations

Most sites scored high on website quality, *authority*; 91.2%, *contact-ability*; 98.2%, *navigation*; very good 56.1% (mediocre 28.1% and poor 15.8%), *advertisements*; very good 67.5% (7% adverts and 25.4% inappropriate/in the way) and *accessibility*; 91.2%. Sites tended to score lower on *Up-to-date* quality; 17.5% (links working 60.5%; info dated 53.5%; sources cited 28.9%); *presentation*; very good 27.2% (mediocre 57% and poor 15.8%). The top 25% and 50% of sites scored 9 out of 11 ($M=8.18$, $SD=1.93$). Outliers with poor quality were www.mededppd.org and www.babyworld.co.uk.

Many sites had information on treatment (71.9%); 16.7% had screening information and 22.8% had additional resources for healthcare professionals. Only one site had inaccurate information (www.answers.com), which was due to user-generated content. Many sites encouraged users to seek professional help (80.7%) and assured users of recovery

(75.4%). However, few had prominent information on what to do if thinking of harming self or infant (9.6%). Eighty four percent of sites stated the prevalence of postnatal mental illness but this ranged from 10 to 50%. Two sites were aimed exclusively at fathers who had postnatal mental illness, or whose partners had postnatal mental illness (www.postpartumdads.org and home.comcast.net/~ddklinker/mysite2/Welcome_page.htm). These were separate sites but had largely identical information. Reading level ranged from 5.54 to 24.08 and had a mean of 12.86 (SD 4.71). Only 10.5% of sites had a reading level of 8 or below as recommended by health education experts (Comerford Freda 2004).

Top websites

To be rated as a top website for healthcare professionals, sites had to rank in the top 25% for information, top 25% for website quality and also include information on assessment, treatment and additional resources for healthcare professionals. Only two sites met these criteria, so sites without assessment, treatment or additional resources were then included. To be rated as a top site for women suffering with postnatal mental illness, websites had to rank in the top 25% for information, website quality, tools for mothers, support for mothers and additional resources. Top websites are given in Table 1.

To check the reliability of website rankings, results were scored again with slightly different criteria, where presentation was given a stronger weighting. Results showed only a small variation from the top websites initially identified thus lending support to the validity of the rating scale (see Appendix table 3).

Discussion and conclusion

This review identified over a hundred websites on postnatal mental illness, although the content and quality of websites varied widely. Information on most websites was incomplete and focused on symptoms, rather than risk factors or impact. Few websites had tools, support or additional resources for mothers. Many websites had information on treatment, but it was generally superficial. Moreover, websites infrequently presented screening and additional resources for healthcare professionals. Most websites assured users of recovery and encouraged seeking medical help, nonetheless sites rarely had prominent information on what the user should do if they have thoughts of harming themselves or their infant.

Half of the websites reviewed were of good technological quality, but not always good for information or support services. There were many useful websites on postnatal mental illness, but no one website was found that

covered everything i.e. accurate and detailed information, support and website quality. This study highlights those current websites that would be most useful for healthcare professionals and sufferers. Healthcare professionals can use the recommended websites to increase their understanding of postnatal mental illness and advise patients on quality online resources.

Information was often incomplete and tended to be about symptoms, predominantly depressive symptoms, such as tearfulness. Coverage of other symptoms of anxiety, puerperal psychosis or PTSD was minimal. This could reinforce the misconception that postnatal mental illness is solely depression or simply an extension of the “baby blues”. Information for healthcare professionals and women self-diagnosing should also present anxiety and PTSD symptoms which also affect many sufferers. Accurate information on all symptoms is essential for healthcare professionals screening for postnatal mental illness and sufferers and their families deciding whether to get help.

Information on risk factors and impact could help with screening and prevention of postnatal mental illness. Unfortunately, websites did not commonly include information on risk factors and this could have repercussions for antenatal populations looking for information on prevention. Impact was even more infrequent, which means websites are failing to inform users of the consequences of untreated postnatal mental illness. For example, information on the detrimental effect of postnatal mental illness on the mother, infant and family may make women more likely to seek help. Similarly, the level of resources for healthcare professionals was poor, information on treatment was generally superficial and screening and additional resources were infrequent. Encouragingly, most websites assured users of recovery and encouraged seeking medical help.

Websites often presented basic information on self-help. This type of self-help was usually advice on self-care e.g. sleep whenever possible, eat healthily, exercise, and rest. There were some sites with potentially more useful information - these provided practical help and tools for mothers to actively tackle their illness. Practical help included online tests, letters to healthcare professionals, how to gain access to/understand medical notes, what to say to healthcare professionals, how to seek help, tips for family and prevention. Other tools included relaxation techniques, coping strategies and positive thinking. Future research should explore if and how such tools help women. For example, research could examine how women use true stories, myths of motherhood and stigma information. Research could also explore if and how information on the myths of motherhood help women develop a more realistic idea of what a “good mother” is and what role information on stigma plays in encouraging women to seek professional help and help from friends and family.

Nearly half of websites offered one or more support services, with telephone support predominating. Referrals, home visits, personal messaging and chat were largely absent. Nearly a quarter of websites offered group meetings and a few offered forums and email/letter support. Online support was mostly run by volunteers from professional and

personal postnatal mental illness experience backgrounds. Given the disabling nature of postnatal mental illness, the WWW has the potential to inform and support sufferers in their own homes, provide anonymity and is readily accessible. There is a striking need for more online support, although one obstacle is cost. During the study one site stopped their services due to lack of funding. However, given the cost of postnatal mental illness to the health service, the WWW has the potential to be a cost effective means of treatment. Further research is needed into the efficacy of online tools and support.

Many websites scored high on website quality, but were not always accompanied by high quality content. Some websites that scored highly for information and resources had to be excluded from recommendation due to poor website quality. For example, MedEdPPD had outstanding information and unique multi-media resources for healthcare professionals, including slide libraries, patient videos, interactive case studies, screening tools and teleconferences. However, it scored exceptionally low for website quality. Interestingly, the site was divided into two sections; professional information and mothers and others. The 'Mothers and others section' would most likely be confusing and discouraging for sufferers due to poor navigation, presentation, some dead links and advertisements that hinder use. The professional section had easier navigation, but still scored poorly on quality. Despite not being recommended on the basis of poor quality, healthcare professionals who do not mind overcoming the technology difficulties could benefit from its features and resources. Future research should examine the purpose of sites and their intended audience.

Another site that could have been in the top five was STEP_PPD, the site used for its up-to-date evidence based knowledge of postnatal mental illness and top quality website technology. The site did not meet criteria as it did not present in the search engine results. In fact, further investigation showed it was not present in the first 60 pages of Google search when the search terms were entered. However, the site had outstanding information and resources for healthcare professionals. If the creators have not already done so, it is recommended that they register their site with the top search engines, ask similar websites to link to their page, and write articles for other websites that would provide a link back to their site to increase hits. Search Engine Optimisation (SEO) should also be considered. Search engines determine the results of a search based on the relevance of pages to the search terms entered. SEO means that to optimise the volume of traffic a site gets, namely by presenting in the top results of a search, sites have to register relevant keywords.

Summers and Logsdon found 83,600 websites when entering "postnatal depression" into Google search. The same search in this study yielded 1,360,000 results. Therefore the internet and interest in postnatal mental illness has grown considerably. Nevertheless, the findings of the present review broadly confirm Summers and Logsdon's findings that information was incomplete and had problems with technology. Interestingly, Postpartum Support International (www.postpartum.net) was one of the top rated websites in both Summers and Logsdon's study and the current review.

Furthermore, in the present review only one site presented misleading information compared to four in the Summers and Logsdon study. Further research into sufferer's experiences of using the internet and website resources will reveal if this increased choice is helpful or makes searching and choosing websites even more daunting.

The recommended reading age for health information for the general public is 13-14 years, yet 89.5% of the websites exceeded this (Comerford Freda 2004). Indeed, the majority of websites required the reader to have college graduate or higher literacy skills. These results have striking implications in that many readers would find these websites incomprehensible.

Before drawing conclusions a number of limitations must be considered. The first is that the WWW is constantly changing and expanding (Berland 2001). Therefore, this review provides information on websites that are likely to change over the next few years. Recommendations of top websites may therefore date quickly and regular updates will be necessary. Related to this is the second limitation, which was the moderate inter-rater reliability for ratings of websites. This was mostly due to poor navigation of some sites and minimal attribution to websites being further developed or modified in the time between the researchers and the external rater evaluating them. Other minor limitations are that websites were scored for support services offered, but the quality of these services was not investigated. Also, the country of origin was not considered in scoring and some support services are area specific. Sponsored articles, such as information that promoted drug companies, were not accounted for. Future research should address these limitations and provide a detailed account of services offered and how users utilise website features. For instance, there has been no investigation into the search terms mothers with postnatal mental illness use or how the use of search engines might vary with demographics.

Research in the future using the web tool we developed would be advised to address other considerations in its refinement. Given that there is little research supporting the efficacy of using online support, should a measure of whether a website encourages user to access local services over internet resources be included? Can sites be scored specific to symptom severity and advice offered? How should sites that are interactive be measured? What are important features of sites that address antenatal mental health or perinatal mental health as a whole? Would it be helpful to list symptom-specific sites, i.e. for PTSD? Furthermore, it would be interesting to compare the WDT and our rating scale.

The strengths of this review are that it examined a large sample of websites, scored information specific to postnatal mental illness, and was the first to examine available help for sufferers and healthcare professionals. The top five websites for healthcare professionals and sufferers have been recommended. Key findings were that information was largely incomplete and difficult to read, available help was limited and website quality variable. Websites need to be created with accurate and more detailed information, support and website quality. These websites should also be constructed around knowledge of how sufferers use web resources.

Acknowledgements

We would like to thank Rose Meads for her time as an additional website reviewer and Richard de Visser for his advice.

Conflict of interest

The authors declare that they have no conflict of interest.

References

- Alcorn K, O'Donovan A, Patrick J, Creedy D, Devilly G (2010) A prospective longitudinal study of the prevalence of post-traumatic stress disorder resulting from childbirth events. *Psychol Med* 11:1-11
- American Psychiatric Association (2000) Diagnostic and statistical manual of mental disorders, Forth Edition, Text Revision: DSM-IV-TR. American Psychiatric Association, Washington, DC
- Andersson G, Cuijpers P (2008) Pros and cons of online cognitive-behavioural therapy. *Br J Psychiatry* 193:270-271
- Atkinson NL, Saperstein SL, Pleis J (2009) Using the internet for health-related activities: findings from a national probability sample. *J of Med Internet Res* 11:1
- Baker CD, Kamke H, O'Hara MW, Stuart S (2009) Web-based training for implementing evidence-based management of postpartum depression. *J Am Board Fam Med* 22(5):588-589
- Baker CD, Kamke H, O'Hara MW, Stuart S (2009) STEP PPD. Available at <http://www.step-ppd.com>. Accessed October 2009
- Barak A, Hen L, Boniel-Nissim M, Shapira N (2008) A comprehensive review and a meta-analysis of the effectiveness of internet-based psychotherapeutic interventions. *J Technol Hum Services* 26(2-4):109-160
- Benigeri M, Pluye P (2003) Shortcomings of health information on the internet. *Health Promot Int* 18(4):381-386
- Berland G, Elliott M, Morales L (2001) Health Information on the Internet: Accessibility, Quality, and Readability in English and Spanish. *JAMA* 285(20):2612-2621
- Brockington IF (2004) Postpartum psychiatric disorders. *Lancet* 363:303-310
- Burke L (2003) The impact of maternal depression on familial relationships. *Int rev Psychiatry* 15(3):243-255
- Christensen H, Griffiths KM (2004) Delivering interventions for depression by using the internet: randomised controlled trial. *Br Med J* 328:265-268
- Comerford Freda M (2004) Issues in patient education. *J of Midwifery and Womens Health* 49(3):203-209
- SEO Consultants Directory (2009) Top 10 search engines. Available at <http://www.seoconsultants.com/search-engines/>. Accessed 23 Oct 2009
- Czarnoka J, Slade P (2000) Prevalence and Predictors of post-traumatic stress symptoms following childbirth. *Br J Clin Psychol* 39:35-51
- Daniels M (2010) Random number generator. Available at <http://www.psychicscience.org/random.aspx>. Accessed April, 28 2010
- Dennis CL, Chung-Lee L (2006) Postpartum depression help-seeking barriers and maternal treatment preferences: A qualitative systematic review. *Birth* 33(4):323-331
- Flesch (2007) Flesch-Kincaid reading scale. Flesh 2.0 for windows [software]. Available at <http://flesh.sourceforge.net/>.

Accessed April, 19 2010

Glasheen C, Richardson GA, Fabio A (2009) A systematic review of the effects of postnatal anxiety on children. *Arch Womens Ment Health* 13(1):61-74

Griffiths KM, Christensen H (2000) Quality of web based information on treatment of depression: cross sectional survey. *Br Med J* 321:1511-1515

Griffiths KM, Christensen H (2006) The quality and accessibility of Australian depression sites on the world wide web. *Med J Aust* 176:S97-S104

Griffiths K.M, Catear CL, Banfield M, Tam A (2009) Systematic review on internet support groups (ISGs) and depression: What is known about depression ISGs? *Journal of Medical Internet Research* 11(3). Available at <http://www.jmir.org/2009/3/e41/>. Accessed February 10, 2010

Heringhausen J, Montgomery KS (2002) Websites that address postpartum depression. *J Perinat Educ* 11(3):48-50

Kapoun J (1998) Teaching undergrads WEB evaluation: A guide for library instruction. *C&RL News* (July/August 1998):522-523

Matthey S, Barnett B, Howie P, Kavanagh DJ (2003) Diagnosing postpartum depression in mothers and fathers: whatever happened to anxiety? *J Affective Disord* 74(2):139-147

McCarthy M, McMahon C (2008) Acceptance and experience of treatment for postnatal depression in a community mental health setting. *Health Care Women Int* 29(6):618-637

Reissland N, Shepherd J (2006) The effect of maternal depressed mood on infant emotional reaction in a surprise-eliciting situation. *Infant Ment Health J* 27(2):173-187

Shakespeare J, Blake F, Garcia J (2003) A qualitative study of the acceptability of routine screening of postnatal women using the Edinburgh postnatal depression scale. *Br J Gen Pract* 53(493):614-619

Summers AL, Logsdon MC (2005) Web sites for postpartum depression. *MCN Am J Maternal/Child Nursing* 30(2):88-96

WHO (2000) The ICD-10 Classification of mental and behavioural disorders diagnostic criteria for research. Geneva

Wisner KL, Parry BL, Piontek CM (2002) Clinical practice: postpartum depression. *N Engl J Med* 347:194-199

Appendix

Appendix. Rating scales for evaluating websites

Dimension	Subcategories	Items
Symptoms	Depression	Tearfulness, feelings of sadness Irritability Decreased interest in usual activities Changes in appetite, inability to eat Sleep disturbances Low energy or fatigue Poor concentration Feelings of guilt or shame Suicidal ideation Anxiety
	Anxiety	Somatic complaints Obsessive thoughts (e.g. about the baby's safety) Ambivalent or negative feelings toward the baby. Wanting to flee Doubts or feelings of inadequacy about caring for the baby Thoughts of harming the baby or self Persistent, unjustified worry (e.g. about the baby) Irritability Obsessive thoughts (e.g. about the baby) Difficulty concentrating Sleep disturbances Panic attacks
Risk factors	Peuperal psychosis	Restlessness, agitation Irritability, rapid mood swings Insomnia Disorientation Erratic or disorganized behaviour Delusional beliefs, usually regarding the baby Hallucinations Inability to distinguish reality
	PTSD	Avoidance of reminders or talking about the birth Disturbing images, flashbacks or nightmares about birth
Risk factors	Psychosocial	Unplanned/unwanted/mistimed pregnancy Unemployment, either the woman or her partner, not by choice Young maternal age, especially adolescence Lack of social support Recent stressful life events within 2 years of pregnancy, such as a death, divorce, or relocation Perceived stress of parenting Fetal anomaly or infant illness Trauma related to the pregnancy or birth Interpersonal violence (current or past) Difficulty breastfeeding History of sexual abuse
	Medical history	Previous postnatal illness Symptoms or anxiety during pregnancy Personal or family history of psychiatric disorders, including alcoholism History of menstrual-related mood disorders (e.g. premenstrual dysphoric disorder) Symptoms of mood disorders during past use of hormonal contraceptive methods Severe postpartum fatigue History of miscarriage, neonatal death, stillbirth, or sudden infant death syndrome History of infertility, infertility treatment and/or multiple pregnancy
	Additional	Maternal low socio-economic status

Impact	considerations	Living in rural areas Women from ethnic minority groups Mothers who partner with women Mothers with disabilities Mothers whose infants are hospitalized after birth
	Impact on the mother	Difficulty fulfilling family roles Diminished responsiveness to infant cues Attachment difficulties with their baby/other children Fear of having another baby Financial worries due to inability to work Poor self-care, including following through with healthcare recommendations Increased risk of substance abuse Increased risk for suicidal behaviours or attempts Increased risk for future episodes of depression
	Impact on the infant	Feeding problems and poor weight gain Increased fussiness and sleep problems Delayed development of cognitive skills, social skills, and expressive language Problems with behaviour, conduct and attention Poor emotional attachment
	Impact on the partner/family	Feelings of fear, helplessness or lack of control Feelings of anger or resentment Guilt over the suffering of the new mother Increased instability in marital and family relationships Higher risk of divorce
Available help	Mothers tools	Tests (e.g. Edinburgh Postnatal Depression Scale) Myths about motherhood (dispelling unrealistic expectations of mothers that compound PNI symptoms such as guilt) Letters to healthcare professionals Stigma surrounding PNI (i.e. confronting stigma and promoting help-seeking behaviour) How to gain access to/understand medical notes What to say to healthcare professionals How to seek help Standard self-help (i.e. limited advice on nutrition, sleep, exercise and asking others for help) Tips for family Relaxation techniques Coping strategies How to think (e.g. advice on positive thinking) PNI issues Prevention Stories
	Mothers support	Forum Email/letter Chat Personal messaging (a private message sent to another user in a forum or chat room) Telephone Group meetings Home visits Referrals
	Additional resources	Links Downloads Audio/visual Podcasts Contacts Articles/research Book recommendations Quotes/poems

Table 1. Top five websites for healthcare professionals and postnatal mental illness sufferers when presentation was more strongly weighted

1st Rating Criteria		2nd Rating Criteria
Healthcare Professionals		
1	www.postpartum.net	www.postpartum.net
2	www.postpartumhealthalliance.org	www.postpartumhealthalliance.org
3	www.babybluesconnection.org	www.babybluesconnection.org
4	www.postpartumsupport.com	www.postpartumva.org
5	www.postpartumeducationandsupport.com	www.postpartumsupport.org
Postnatal mental illness sufferers		
1	www.panda.org.au	www.panda.org.au
2	www.hapis.org.uk	www.postpartum.net
3	www.postpartumhealthalliance.org	www.pndsa.co.za
4	www.postpartum.net	www.babybluesconnection.org
5	www.pndsa.co.za	www.rcpsyche.ac.uk