Review

Gender differences in computer-mediated communication: A systematic literature review of online health-related support groups

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1. Introduction

1.1. Gender differences in health care

Gender differences in how men and women seek help and support for health-related concerns are well documented in the literature. A growing body of research suggests that men of different ages, ethnicities and social backgrounds are less likely to seek help from health care professionals than women for a variety of physical and mental health problems [1–5]. Furthermore, in situations where men do seek medical advice, they are less likely to report feelings of distress or psychosocial problems during consultation when compared with women [6]. These differences also extend to interactions with friends, family and peers, for instance men have been found to be more reluctant to seek lay support for mental health issues such as feelings of distress and depression [7,8]. In addition, it has been noted that while women typically have a large network of individuals who they can confide in and turn to for social support when faced with health problems; in adulthood men tend to rely exclusively on their partner as their sole source of emotional support [9].

In keeping with these findings, numerous studies have shown that patient support group participants are more likely to be female, for instance within the cancer literature women have been found to outnumber men at a rate of four to one in many support groups [10,11]. Furthermore, differences have also been observed in how men and women utilize support groups. Research shows that while females show a strong preference for support groups that focus on emotional expression and friendship. This mirrors findings from the wider literature on gender differences which, indicates that when faced with a problem men
value concrete assistance or activities that distract them from their problems far more than the discussion of their emotions [13]. From a sociological perspective, the differences apparent in how men and women deal with illness may be linked to variations in gender norms [14]. Traditionally, male behavioural norms emphasise self-reliance, decisiveness and emotional control, whereas female behavioural norms promote emotional sensitivity, compassion, nurturing, and supportive activities [15,16]. Consequently, when faced with health-related concerns, men may feel particularly uncomfortable discussing highly emotional and sensitive issues within their wider social networks. In comparison, women, who are more accustomed to sharing personal experiences, are likely to feel at ease seeking support within a larger network of individuals.

In addition to the difference in dealing with illness, gender role socialisation may also explain men’s reluctance to seek professional help for health problems [1]. Help seeking behaviour essentially involves admitting a need for support and relying on others for assistance, thus by asking for help men may feel they are highlighting an area of personal weakness, which contradicts core aspects of male gender identity that emphasise self-reliance and emotional control [17]. For example, Chapple et al. [18] report that some men delayed seeking treatment for testicular cancer due to a fear of appearing weak and lacking in masculinity. In a similar vein, Moynihan et al. [19] conclude that male cancer survivors experiencing anxiety or depression were reluctant to seek help for their problems due to a desire to appear controlled and silent about their emotions. This suggests that men and women’s help seeking behaviour for health-related concerns may be constrained by traditional constructions of femininity and masculinity.

1.2. Gender and computer-mediated support

Over recent years there has been a proliferation in the size and number of computer-mediated patient support groups available to individuals experiencing various health-related problems. These online communities offer patients new opportunities to communicate and seek support for various concerns within a network of individuals who share similar experiences. In particular, a relatively unique characteristic of this medium is the lack of social and physical cues, which allows the opportunity for participants to keep their identities entirely anonymous if they wish to do so. This may encourage some individuals to disclose information that they may otherwise feel uncomfortable discussing openly due to fear of embarrassment or stigmatisation in face-to-face settings [20,21].

Online health-related support groups therefore have the potential to encourage participants to engage in behaviours that deviate from stereotypical gender norms. For instance, some men may feel that the anonymity provided by the Internet offers an ideal venue in which they can more openly share their concerns and thus break out of the traditional masculine role to ask for help [22]. Indeed several authors examining computer-mediated communication have suggested that online interaction may in fact mitigate gender differences observed in face-to-face communications. Bellman et al. [23] for instance, found that women in an anonymous online bulletin board were more likely to adopt an aggressive and assertive manner online than in face-to-face interactions. Likewise, in an analysis of 3000 newsgroup postings, Wittmer and Katzman [24] observed that women were sending more flames and challenges in their posts compared to men. It can thus be hypothesised that the unique features of the Internet (i.e. anonymity) might remove some of the gender differences that exist in face-to-face health-related communication and support seeking behaviour.

However, despite the evidence suggesting that gender might be less important in computer-mediated communication, findings from studies focusing specifically on health-related communities are inconsistent. While some authors argue that gendered patterns of communication are replicated online [25], others report striking similarities between the communication patterns of men and women [26]. A systematic integration and consolidation of findings is thus warranted to help understand the extent of gender differences in online health communications.

1.3. Research aims

In recent years a considerable body of research examining the content and communication processes in various online health-related support groups has emerged. However, to date we are not aware of any published work that has attempted to systematically synthesise findings across these research studies in order to explore the extent to which gendered patterns of communication occur in online health-related communities. Gaining a clearer understanding of gender differences in online health communication can serve as a guide for health care professionals when designing online interventions to ensure the needs and communication styles of male and female patients are met. The aims of the present study were therefore to identify, synthesise and evaluate research studies that have addressed gender differences in communication patterns within health-related online support groups.

2. Method

2.1. Identification of relevant studies

An extensive literature search was carried out in order to identify all studies relevant to the objectives of the review. Literature searches were conducted in accordance with the guidelines in place for traditional systematic reviews [27,28]. Initially a broad search strategy was developed under the following key concepts: online support group, gender, and message. To maximise the search in the different databases, various synonyms and combinations of the search concepts were used. Studies of all types, including journal articles, book chapters, and dissertations, were then searched in the following electronic databases: CINAHL, Embase, Education Resources Information Center (ERIC), Library and Information Science Abstracts (LISA), PsycINFO and Medline, on 19 November 2007. These databases were chosen because they covered not only social sciences databases, but also medical and communication databases. Further relevant studies were identified through examining the reference lists of the retrieved articles.

2.2. Selection of studies

The aims of the research were to review studies that examined gender differences in communication in online health-related communities. Studies that met the following criteria were therefore included for review: firstly, the study examined communication processes in an online community, defined as a group of individuals with similar or common interests and concerns who communicate via a computer-mediated network. Secondly, the online community under investigation focused on health or healthcare issues in their broadest sense, including studies focusing on emotional and social support, health education, or healthcare management and mental health and well-being. Thirdly, the study focussed on exploring gender differences in communications in the online community. Studies were excluded where the online community examined was not related to health and well-being, the study did not focus on communication patterns or gender differences were not examined.
2.3. Review process

Two reviewers independently screened all of the abstracts identified to decide whether the full paper should be obtained. Disagreements were settled by discussion. Full papers were then retrieved and screened independently to decide whether the study met the inclusion criteria and should be included for review. From the final sample of studies selected for review data were extracted regarding the characteristics and outcomes of the studies. Next each of the studies was critically examined by two independent reviewers. Following discussions between the reviewers key findings from the studies were summarised using a narrative approach. Narrative summary is a common method used in systematic reviews integrating qualitative and quantitative findings across various studies [29,30]. Consequently given the range of different methodological approaches adopted in the selected studies, i.e. qualitative vs. quantitative, narrative summary was considered an appropriate approach for the current review.

3. Results

3.1. Included studies

Based on the database search, a total of 1284 abstracts were identified from the databases (see Table 1 for results of database search). From the initial screening of the abstracts, sixteen articles that appeared to be relevant to the objectives of the research were identified and their full texts were retrieved for further examination. In total eleven studies met the inclusion criteria and were selected for review. Two of the five articles selected only explored a single sex online health community, while the remaining three examined mixed-gender online communities but did not explicitly explore gender differences. One additional study was included through the reference lists of the identified articles.

3.2. Synthesis of findings

Half of the studies examined gender differences in health communication by comparing the messages posted to male (i.e. prostate) and female (i.e. breast and ovarian) cancer support groups [31–36]. Five studies examined gender differences by comparing messages posted by males and females in a mixed gender support group [26,38–40]. One study compared messages posted by men in a female-dominated support group and women in a male-dominated support group [16]. The number of messages analysed in the studies ranged from 340 to more than 12,000. Data analysis was conducted using a range of data analysis techniques including content analysis, grounded theory, linguistic inquiry and thematic analysis. Specifically, five of the studies employed a deductive content analysis, which quantified the occurrence of a pre-determined coding framework [26,31,32,37,39]. Two studies quantified the occurrence of a set of coding categories that were inductively identified [34,38]. Two studies employed linguistic word inquiry to quantify levels of emotional and cognitive expression [35,40]. Two studies used comparative key word analysis, which involved examination the of a selection of keywords in their context and the classification of keywords into meaningful categories [16,36] and finally one study employed a purely qualitative phenomenological approach [33]. Results of the findings are presented in Table 2.

3.2.1. Studies comparing male and female support groups

Four studies examined gender differences in message content by comparing messages sent to male and female cancer support groups [31–34]. Blank and Adams-Blodnieks [31] compared the messages posted to a breast and a prostate cancer board and found that for the breast cancer group; most of the messages posted contained support (45.5%), followed by medical/treatment issues (28.9%). On the other hand, medical/treatment issues (43.2%) were the most prevalent category in the prostate cancer group, followed by support (36.1%). Similarly, Klemm et al. [32] compared messages posted to a prostate, breast, and mixed cancer support group using content analysis and found that while information giving-seeking was ranked the first in the prostate cancer group (36.4%), sharing of personal experience was most evident in the breast cancer group (27.9%). Another study comparing ovarian and prostate cancer support groups using phenomenological thematic analysis [33] revealed that members in the ovarian cancer group appeared to post messages that provided positive communication and emotional support. On the other hand, members in the prostate cancer group tended to share medical information predominately with regards to treatment-related issues. In contrast, Gooden and Winefield [34] compared the messages posted to a prostate and breast cancer support group using grounded theory and a quasi-numerative approach but did not find any significant differences in the number of informational or emotional support messages posted to the two groups.

Three studies examined gender differences in language used in messages sent to the male and female cancer support groups [34–36]. In the study of prostate and breast cancer support group by Gooden et al. [34], members in the prostate cancer group tended to engage in more discussion about sexual dysfunction, cite more medical findings, and use lengthier jokes or humorous exchanges compared to members in the breast cancer group. They were also more likely to imply their emotions, and use ‘battle-like’ terminology when offering encouragement. Seale et al. [36] analysed messages posted to breast and prostate cancer forum using comparative keyword analysis and found that consistent to the findings of Goodden et al., members in the prostate cancer group were more likely to use words associated with medical aspects (e.g. treatment, symptoms, side effects) of the disease, and to discuss findings of research studies. Members in the breast cancer group were, however more likely to use emotional words and were more likely to discuss feelings or issues related to their lifestyles. Another study comparing messages posted to breast and prostate cancer mailing list using Linguistic Inquiry and Word Count found that members in the breast cancer mailing list were more likely to use language related to emotional disclosure and cognitive processing compared to members in the prostate cancer mailing.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Results of database search.</th>
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<tr>
<td><strong>Databases</strong></td>
<td><strong>Database provider</strong></td>
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<tr>
<td>Cumulative Index to Nursing &amp; Allied Health Literature (CINAHL)</td>
<td>Ovid</td>
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<td>Education Resources Information Center (ERIC)</td>
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<td>Embase</td>
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<td>Library Information Science Abstracts (LISA)</td>
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<td>Medline</td>
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<td>PsycInfo</td>
<td>Ovid</td>
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### Table 2
Description of selected studies.

<table>
<thead>
<tr>
<th>Study-ID</th>
<th>Setting</th>
<th>Facilitator</th>
<th>Sampling methods</th>
<th>Number of messages selected</th>
<th>Data analysis</th>
<th>Sample characteristics</th>
<th>Key findings</th>
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</thead>
<tbody>
<tr>
<td>Blank and Adams-</td>
<td>One breast and one prostate cancer</td>
<td>NR</td>
<td>Messages sent to the two boards over a nine-month period were examined. Only</td>
<td>492</td>
<td>Messages were coded for two aspects: communicator (by whom the message was posted) and content (nature of issues addressed by the message)</td>
<td>For breast cancer, 87% of the messages were from the breast cancer survivor. For prostate cancer, only 54% of the messages were from the cancer survivor himself</td>
<td>For breast cancer group, 45.5% of messages included support, followed by medical/treatment (28.9%), emotional expression (22.8%), intimacy/sexuality (2.2%) and economic issues (0.6%). For prostate cancer, medical/treatment issues were the most referenced (43.2%), followed by support (36.1%) and emotional expression (12.3%) and intimacy/sexuality (8.4%). There were no group differences in informational vs. emotional support, vs. social support seeking vs. providing support, or positive vs. negative emotions expressed.</td>
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<tr>
<td>Blodnieks [31]</td>
<td>WebMD messageboard</td>
<td>NR</td>
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<td>Burri et al. [37]</td>
<td>A forum aimed at recent ex-smokers who quit</td>
<td>N</td>
<td>Messages posted during one month, 1033 in April 2005, on the “action” forum were</td>
<td>1033</td>
<td>Messages were coded based on 17 distinct content categories</td>
<td>There were 97 people who posted the selected message. 76% of them were women, the median age was 40 years, and participants had quit smoking for a median of two months</td>
<td>Most of the messages involved giving emotional support and encouragements (24.1%). Women were more likely than men to post messages on nicotine replacement therapy, congratulations and emotional support (women to men ratios of the three categories were 12.1, 10.8, and 7.5 respectively, though there were only 3.2 times more women than men in the group). Men were more likely to post general comments and practical advice. Both men and women appeared predominantly to engage in information support. Information support accounted for 60 percent of communications in breast cancer group and 64 percent in prostate cancer group. Emotional support accounted for 40 percent in prostate cancer group. There were gender differences in language styles of these communications, that men provided more lengthy accounts of findings of research, cited more medical reports, engaged in more discussion of overcoming sexual dysfunction, used lengthy series of jokes and humorous exchanges than did women. Regarding sharing distress, women clearly expressed emotions, whereas men tended to imply their emotions. When providing encouragement, women offered expressions of affection and nurturing, whereas men promoted strength and used battle-like terminology.</td>
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<tr>
<td>Gooden and Winfield [34]</td>
<td>(PCDB) one breast cancer (BCDB) discussion board</td>
<td>NR</td>
<td>Messages from a period of one month in 2004 were selected. Only communications</td>
<td>NR</td>
<td>Grounded theory and quasi-numerative approach</td>
<td>There were 79 participants who posted selected messages to the BCDB (71 who had BC; 8 spouses or widowers of sufferers) and 85 participants to the PCDB (77 with PC; 8 spouses or relatives of PC sufferers)</td>
<td>Both men and women appeared predominantly to engage in information support. Information support accounted for 60 percent of communications in breast cancer group and 64 percent in prostate cancer group. Emotional support accounted for 40 percent in prostate cancer group. There were gender differences in language styles of these communications, that men provided more lengthy accounts of findings of research, cited more medical reports, engaged in more discussion of overcoming sexual dysfunction, used lengthy series of jokes and humorous exchanges than did women. Regarding sharing distress, women clearly expressed emotions, whereas men tended to imply their emotions. When providing encouragement, women offered expressions of affection and nurturing, whereas men promoted strength and used battle-like terminology.</td>
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<td>Klemm et al. [32]</td>
<td>Prostate, breast, and mixed Internet cancer</td>
<td>NR</td>
<td>325 consecutive postings for each group between September 15, 1997 and October 25,</td>
<td>1541 (532 in prostate; 419 in breast; 590 postings were discarded. Postings of in mixed women on the prostate list and men/group)</td>
<td>Content analysis with line-by-line review</td>
<td>There were 141 participants who posted selected messages to the breast cancer group (126 women; 15 men), 143 participants to prostate cancer group (117 men; 17 women; 8 unknown) and 95 participants to the mixed group (49 women; 43 men; 3 unknown)</td>
<td>Nine categories were identified and categorical responses differed by gender***. Information giving/seeking was ranked first in the prostate group (36.4% in prostate; 22.6% in breast cancer; 26.4% in mixed group), and personal experience took priority in the breast group (23.3 in prostate, 27.9% in breast cancer, 13.3% in mixed group). Men were more than twice as likely to give information and women more than twice as likely to give encouragement and support.</td>
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<td>25, 1997 were printed out. Duplicated and unusable postings were discarded.</td>
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<td>Postings of in mixed women on the prostate list and men/group) on the breast list were excluded. Postings with participants whose gender could not be determined were excluded</td>
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<td>Study-ID</td>
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<td>Musambira et al. [39]</td>
<td>Electronic bulletin board for bereaved parents</td>
<td>NR</td>
<td>Initially, sample postings ($N = 380$) were generated from a population of 2277 postings using systematic sampling, and postings that were singly authored by either mothers or fathers were selected. However, as only 2% ($N = 6$) of the postings were singly authored by fathers, all postings by fathers from the entire population of postings were tapped. This resulted in 49 postings that were singly authored by fathers</td>
<td>148</td>
<td>Postings were coded using a coding instrument</td>
<td>99 postings were singly authored by mothers and 49 were singly authored by fathers</td>
<td>There were no significant gender differences in either instrumental or intuitive bereavement style of communication. However, mothers were more likely to direct messages to the deceased including expression of love. There were no gender differences in invoking spirituality, use of artistic expressions in their memorials, or recognising special powers held by the deceased child on the bulletin board</td>
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<td>Owen et al. [40]</td>
<td>University lab</td>
<td>NR</td>
<td>Facilitated by an automated “therapist” which posted questions to direct participants’ communication</td>
<td>167 undergraduates were enrolled in same-gender support groups to discuss the shared experience of having a loved one with cancer. Participants were randomized to one of the three preparations: minimal instruction (MI), detailed instruction with social modelling (DI + SL), and detailed instruction with social modelling and practice (DI + SL + PR)</td>
<td>NR</td>
<td>Linguistic Inquiry and Word Count was used to measure levels of emotional and cognitive expression in messages sent to the group</td>
<td>They had an average age of 21.9 years and 71.6% of them were female. 52.9% of them were Caucasian</td>
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<td>Owen et al. [35]</td>
<td>Test cancer discussion list and prostate problems mailing list</td>
<td>NR</td>
<td>Messages posted to each group between May 2, 2001 and June 30, 2001 that were in the public domain, were analysed. Only messages deemed to be sent by a cancer patient were included. Messages posted were analysed for content.</td>
<td>NR</td>
<td>Messages were content analysed using an augmented version of Linguistic Inquiry and Word Count</td>
<td>There were 325 individuals who posted messages to the Breast cancer list and 162 to the Prostate problem mailing list. Among the posts for which gender was identified ($n = 165$), 79% were from female. Most of the messages ($n = 118$, 35%) were posted by teens who were diagnosed at least 5 years prior</td>
<td>Breast cancer patients were more likely to make greater use of words related to emotional disclosure and cognitive processing compared with prostate cancer patients. Prostate cancer patients used nearly twice as many words pertaining to cancer information.</td>
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<td>Ravert et al. [38]</td>
<td>Public online forums (discussion forums and question/answer forums) for diabetes</td>
<td>NR</td>
<td>Forums were selected in which messages were publicly posted and no membership or passwords were needed to access the messages. Only messages with self-identified age between 11 and 19 years old (or teenager) with diabetes were collected</td>
<td>340 (55% from discussion forums and 46% from question/answer forums)</td>
<td>Content analysis with topics generated by constant comparative methods</td>
<td>Among the posts for which gender was identified ($n = 165$), 79% were from female. Most of the messages ($n = 118$, 35%) were posted by teens who were diagnosed at least 5 years prior</td>
<td>Social support messages accounted for half of discussion forum requests, while information/management requests were common in question/answer forums. Female posted messages most often at discussion forums, while males posted most often at question/answer forums. No significant gender difference was found in frequency of information requests, NS or topics of the posts, NS.</td>
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<td>Salem et al. [26]</td>
<td>Internet depression mutual-help group</td>
<td>NR</td>
<td>All postings during two, non-consecutive weeks (one month apart) were downloaded for study</td>
<td>1863</td>
<td>Content analysis using 13 coding categories</td>
<td>Postings were made by 533 persons (273 male; 173 female; 87 whose gender could not be identified). Most of the users (92%) indicated they were suffering from depression</td>
<td>No significant main effects on gender and level of participation, or interaction effects were found on social support variables (advice and information, cognitive guidance, and emotional support), amount of times agreement, disclosure, requests for feedback or help, disagreement, humour, professional knowledge, second-hand professional knowledge, or referent power. However, men made more experiential knowledge comments that women and women made more group structure/process comments than men</td>
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<tr>
<td>Research</td>
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<td>Seale [16]</td>
<td>Internet breast and prostate cancer forums</td>
<td>All current and archived postings to the online forums/message boards of the two most popular UK-based breast and prostate cancer websites were completed retrieved (on 20 April 2005). The study focused on postings made by people who identified themselves as opposite-sex relatives and friends of people with cancer.</td>
<td>There were 55 male relatives and friends who posted the selected messages in the breast cancer forum and 138 female relatives and friends to the prostate cancer forum. Women in the prostate cancer group reported a communication style that is similar to women elsewhere. They prioritized emotional over informational form of communication, provided warmer greetings and support and discussed a wider range of feelings than did the men with prostate cancer on the forum. Men on the breast cancer forum used language in a way that was more like women than men. They prioritized emotional and interpersonal communication and the emotional welfare of family members.</td>
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<tr>
<td>Seale et al. [36]</td>
<td>Two internet based support groups for people with cancer</td>
<td>All current and archived postings to the online forums/message boards of the two most popular UK-based breast and prostate cancer websites were completed retrieved (on 20 April 2005). The study focused on postings made by people with cancer (PWC).</td>
<td>There were 900 women who posted selected messages to the breast cancer forum and 153 men to the prostate cancer forum. Men with prostate cancer were more likely to use keywords associated with treatment, tests and diagnosis, symptoms, side effects, and actual and potential progression of disease. They cited other websites that contained information about cancer more frequently, and used more words reflecting discussion of research studies and their data. Women expressed interest in more pleasurable aspects of lifestyle, were more likely to use words associated with feelings, people, clothing and appearance. Their postings were more emotionally effusive.</td>
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<td>Sullivan [33]</td>
<td>Ovarian Problems Mailing List (OPML) and the Prostate Problems Mailing List (PPML)</td>
<td>Messages over one-week period were collected until a saturation point in data analysis, which new descriptions were unlikely to be reached, had been reached.</td>
<td>There were 170 participants who posted selected messages to the OPML. Women who had or have had ovarian cancer were the most active participants (78.8%). A total of 213 participants posted selected messages to the PPML. Men who had or have had prostate cancer were the most active posters (82.6%). Participants in the OPML posted messages that provided positive communication and support. Messages tended to provide emotional support in various forms, including giving compliments, gratitude and sending positive thoughts, hopes and prayers. Participants in the PPML tended to share medical information related to prostate cancer, its treatment and side effects. There were greater mentions of articles read, websites to locate and receipt of medical advice from online doctors.</td>
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The reported p-values for between-group differences (i.e. mostly examined by Chi square test) are summarized as follows: *p < .05, **p < .01, ***p < .00. NS, not significant; NR, not reported.
list, while members in the prostate cancer mailing list were twice as likely to use words related to cancer information [35]. One study compared messages posted by male relatives in a breast cancer forum and female relatives in a prostate cancer forum using comparative keyword analysis [16]. The study found that although women in the prostate cancer support group used fewer feeling words in their posts than other women on the whole they tended to use a communication style that was similar to women elsewhere, i.e. emotion focussed. However, men in the breast cancer support group were found to prioritise emotional and interpersonal communication and often spoke of feelings of loss they were experiencing arising from the recent or impending death of a partner. The authors conclude that the men in the breast cancer forum appeared to adopt a style of communication that was more characteristic of women than men, i.e. emotion-focussed. This suggests that for the men in this forum the support group appeared to be used as a venue for breaking away from traditional gendered styles of communicating.

3.2.2. Studies examining mixed gender support groups

Three studies examined gender difference in message content by comparing messages sent by males and females in a mixed gender group. Burri et al. [37] examined messages posted to an online forum for recent ex-smokers using content analysis. The study found that women were more likely to post messages on therapy and conveying congratulations and emotional support, whereas men were more likely to post general commentaries and practical advice. However, two studies did not report any significant gender differences in terms of content of messages [26,38]. Salem et al. [26] studied messages posted to an Internet depression support group using content analysis and did not find any significant main or interaction effects of gender on the topic of messages, except that men used more experiential knowledge than women and women made more structure/process comments than men. Interestingly, however it was observed that there was a higher proportion of male than female participants in the support group. Ravert studied messages posted to online forums for diabetes using content analysis of topics generated by constant comparative methods [38] and found that although females posted more often on the general discussion forums whereas males posted more often on the question/answer forums, there were no significant gender differences in frequency of information requests, or topics of the posts.

Two studies examined gender differences in use of language within mixed gender support groups. None of these studies showed a significant gender difference in use of language or style of communication [39,40]. Musambira et al. [39] explored messages posted to an online bulletin board for bereaved parents using a coding instrument and found that although mothers were more likely to direct messages to their deceased child, no significant gender differences were found in instrumental or intuitive bereavement style of communication. In fact, in one study of messages posted to an online group for students who had a loved one living with cancer, Linguistic Inquiry and Word Count revealed no significant gender differences in levels of emotional and cognitive expression. Furthermore both men and women used increasing levels of emotional and cognitive expression over time [40]. This suggests that styles of communicating may alter over time as individuals become more familiar with a community, leading both men and women to engage in more emotion-focussed communication.

4. Discussion and conclusion

4.1. Discussion

The current study aimed to explore whether the unique features of the online environment might remove some of the gender differences that exist in face-to-face health-related communication and support seeking, through a literature review of studies addressing the role of gender in communication processes within health-related online support groups. From the results of our review of the relevant literature it is apparent that there are conflicting and inconsistent findings regarding gender differences in communication patterns within online health-related support groups. While some studies report gendered styles of communicating [31–33,35–37], other studies suggest similarities in the ways in which men and women use and interact within online support groups [26,34,38–40]. On the whole, the results show that some gender differences were apparent in studies comparing messages posted to male and female support groups, where women were found to prioritise emotion-focussed issues, whereas men were found to focus largely on practical task and information related communication. However, for studies that analysed messages posted to mixed gender support groups, these differences were less evident.

4.1.1. Possible explanations

When interpreting these results there are a number of methodological issues surrounding the reviewed studies that need to be taken into account. Firstly, the studies differed greatly in their sampling strategies, i.e. the number of messages and time period analysed, which may have had an impact on the results. For instance, the extent to which the sampled messages reflect communication processes within the online communities at other times remains unclear. Consequently, it may be the case that the outcomes of the studies examined in this review would differ if a larger or smaller sample of messages had been selected. One possible strategy for overcoming this issue could be through adopting the approach used by Sullivan [33] whereby messages from online cancer support groups were analysed over one-week periods until it appeared unlikely that new descriptions would emerge, thus ensuring saturation point has been reached.

Secondly, half of the studies assessed gender differences through comparing postings to cancer support groups; predominantly prostate and breast or ovarian cancer communities. While this approach offers a convenient and accessible method for exploring gender differences in health-related online communications, it is important to note that different conditions may be accompanied by differing psychosocial needs that influence the type of social support sought by patients. In comparison to individuals diagnosed with breast cancer, prostate cancer patients have less well-defined treatment options and thus less readily available information concerning what to expect from treatment [35]. As a result, these individuals may be particularly interested in obtaining information on the medical and treatment-related side of cancer from patients who have been through similar experiences in order to gain a better understanding of what to expect. In contrast, since breast cancer patients already have access to a wealth of information regarding treatment options, these individuals may be likely to prioritise emotional expression and support when interacting with peers. Consequently, the differences identified between prostate and breast/ovarian cancer patients in the reviewed studies may in fact reflect the differing needs of the two groups rather than the gender of the participants alone.

In fact, some studies investigating single-sex online health support groups suggest that online support groups might remove some of the gender differences that exist in offline settings. For example, in a study exploring communication within a discussion board dedicated to men coping with infertility, Malik and Coulson [41] found that the men accessing the online support group were experiencing a range of negative emotions as a result of infertility and thus valued the online community as a useful venue in which
they could open up about their emotional experiences and concerns. In a similar vein, in a study of communication pattern within an online support group for fathers of children with Spina Bifida, Nicholas et al. [42] found that after an initial exchange of information men often switched the content of their messages to affective expression, or the provision of emotional support. Future research should thus endeavour to compare gender differences by examining online communities for various different health-related conditions, in order to explore the extent to which the current findings are replicated.

With the exception of Burri et al. [37], studies that addressed gender differences in mixed gender support groups did not find any noteworthy differences in the communication patterns of men and women. One possible explanation for this pattern of results may be attributed to the gender composition of the online community. In a series of studies by Savicki and Kelley [43], the variable with the strongest relationship to communication style was found to be the gender composition of the group within which the communication took place. Same sex groups illustrated gendered patterns of communication, while mixed sex groups varied between the two gender extremes. Through closer examination it was concluded that a group is likely to adopt the communication style of the predominant gender. Indeed, similar patterns have been observed in other areas of online communication. For example, Herring [44] noted that minority genders in academic discussion boards appeared to adapt to the dominant gender style of interaction. Likewise, Baym [45] found that men in a female dominated discussion adopted less aggressive styles of communication than men in male dominated discussions. In a similar vein, Wolf [13] found that when moving from same to mixed sex newsgroups, men's use of emotions increased significantly, thus indicating that men appeared to adapt to female norms of expressing emotion.

To some extent, this finding is also supported by Seale's [16] examination of postings by relatives of breast and prostate cancer patients. The research found that male relatives posting on a breast cancer forum adopted a style of communication very different to their gender stereotype through emphasising emotional communication and the welfare of family members. However, although female relatives posting on a prostate cancer forum were found to use fewer feeling words in their posts compared to other women, on the whole these women adopted a style similar to women elsewhere, i.e. emotion focussed. This difference may arise from the fact that there were a larger number of frequently posting women present in the prostate cancer forum, whereas in the breast cancer forum men were in a minority. As a result, women may have felt more comfortable adopting their normal style of communication. In addition, men using the breast cancer forum were often responding to the anticipated loss of a partner and therefore had a higher need for emotional expression and support. This again reinforces the importance of taking into account contextual factors when exploring communication patterns.

4.1.2. Research implications

The methodological limitations identified in the review offer some insights for future research to advance the understanding of gender issues in peer-to-peer online health communication. First, as previous studies mainly examined gender differences in health communication by utilising gender-specific cancer online support groups, future research should aim to assess the issue using diverse samples of online health support groups. This would increase the generalisability of findings and allow more robust conclusions to be drawn regarding the extent of gender differences in online health communication.

As discussed the gender composition of the online communities may account for the strong gender differences found in research comparing breast and prostate cancer forums and the lack of gender differences identified in other studies examining mixed gender groups [26]. There is thus a need for further research exploring gender dynamics in mixed gender settings. However, this poses a number of methodological challenges. For instance, due to the anonymous nature of an online support group, it is not always easy to accurately determine the gender of a poster. In addition, past research has shown many health-related online support groups are more densely populated by females than males, thus making it difficult to draw direct comparisons between male and female participants. Nevertheless future studies should seek to identify the male-to-female ratio of participants, through examining all available evidence including memberships profiles, introduction columns, and message content and history. This ratio should then be taken into account when interpreting research findings.

In addition there is a need for more in depth exploration of naturally occurring online communications in order to determine the conditions under which men and women adopt male and female styles of communicating in online health communities. Thus future work should consider the use of alternative methodologies such as Virtual Ethnography, which would allow for more in depth exploration of particular online communities and member interactions over longer periods of time.

It is also important to note that the studies reviewed in the current paper essentially examined sex differences (i.e. differences between the behaviours of men and women) rather than gender differences alone (i.e. the prevalence of behaviours and characteristics that different cultures associate with masculinity and femininity). For example, as noted in some of the studies discussed in this paper, it is possible for men to adopt communication styles that are more female-oriented and vice versa. Future research should therefore seek to move away from the examination of sex differences alone in order to explore the extent to which the online environment promotes and supports female vs. male-oriented ways of communicating.

Alongside differences in online communication, there has also been evidence that online support groups might encourage men to seek help. For instance, Salem et al. [26] observe that there were surprisingly a higher proportion of male participants in the online depression support group than female participants. This finding contrasts sharply with research exploring face-to-face communications, which suggests that men are less likely to admit and seek support for psychological problems. Further empirical investigations should thus seek to examine the extent to which the unique characteristics of the online environment might encourage those individuals who would not utilise traditional forms of support to seek help online. This would have important implications for researchers and health care professionals involved in the design of online health promotion interventions.

4.1.3. Limitations

The present review presents several limitations that should be noted; as is the case with most literature reviews, there remains a possibility that some relevant articles may have been overlooked, particularly if studies looked at gender differences without explicitly addressing this in their abstract or title. In addition there remains a risk of publication bias, as negative or insignificant results might be less likely to be published. However, in order to minimise these risks the current study searched several relevant databases that included book chapters, dissertations, conference abstracts, as well as journal articles using an extensive list of key words. Furthermore, the references lists of the retrieved articles were also reviewed to identify further relevant studies. Only one additional article was identified through this process, it can thus be concluded that our search strategy was relatively robust.
4.2. Conclusions

Results from the present review suggest that whether computer-mediated communication might mitigate some of the gender differences identified in face-to-face health-related communication and support seeking behaviour remains inconclusive. While the present study seems to suggest that the gendered styles of communicating observed in face-to-face settings are evident in single-sex online health-related support groups and less evident in mixed-sex online health-related support groups, results should be treated with caution due to the diversity across the studies as well as the methodological issues highlighted. Given the increasing numbers of patients turning to the internet for support, advice and information, further research is warranted to examine for whom and under which condition online support groups encourage individuals to break out of stereotypical gendered styles of communicating. In particular, the current review highlights that the examination of gender differences within online communities is complex and influenced by various contextual and situational factors. There is thus a need for future researchers to take into account how various factors such as the psychosocial needs presented by a particular illness and the male-to-female ratio of an online community may affect styles of communicating online.

4.3. Practice implications

As the number of health-related online support groups continues to grow, more empirical work is required to explore how men and women might utilise online support group differently. Understanding gender differences in online health communication can serve as a crucial guide for health care professionals in designing online interventions to meet the needs and communication styles of male and female patients. The results suggest that there is a need for health care professionals to take into account a range of situational and contextual factors that may affect how men and women use online health support groups. However, due to the heterogeneity of the reviewed studies, more work is needed to understand these factors before more concrete guidelines can be developed to help health care professionals develop effective online support interventions.

References