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Health Anxiety in Women With Early-Stage Breast Cancer: What Is the Relationship to Social Support?

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Health anxiety is a multidimensional construct referring to worry about health, reassurance seeking, hypervigilance to bodily sensations, and beliefs that health concerns are not taken seriously by others. Research suggests health anxiety can be triggered by a diagnosis of a health condition such as breast cancer. Social factors are postulated to be involved in the occurrence and maintenance of health anxiety, but little empirical evidence is available in this area. The present study tested the role of perceived adequacy of social support and unsupportive social interactions in health anxiety relative to general anxiety, depression, and demographic/cancer-related variables. Canadian women diagnosed with early stage breast cancer within the last 10 years ($N = 131$) completed a web-based survey. Social factors contributed to significant variance in health anxiety and its 4 dimensions, even after taking other variables into account. The results underscore the importance of social support to health anxiety and highlight a need to assess social factors when assessing and treating health anxiety in this population.

Keywords: health anxiety, social support, breast cancer, anxiety

Health anxiety is characterised by excessive fear or worry about ill health, which is believed to result from a preoccupation with the incorrect belief that one has, or is in danger of developing, a serious disease or medical condition (American Psychiatric Association, 2000; Salkovskis & Warwick, 2001). Taxometric analysis suggests that health anxiety is best conceptualised as a dimensional construct (Longley et al., 2010), with concerns ranging from a lack of attention to health to strong health-related fears and constant worry about bodily sensations (Salkovskis & Warwick, 2001). Health anxiety involves affective, cognitive, behavioural, and perceptual features (Longley, Watson, & Noyes, 2005).

Recently, researchers have recognised the significance of health anxiety in individuals with various medical conditions (e.g., Hadjistavropoulos et al., 2011), including women previously diagnosed with breast cancer. It is now documented that severe health anxiety affects a proportion of women in this population. While the presence of adequate social support may help reduce health anxiety following breast cancer diagnosis and treatment, there is currently a lack of research on the role social support may play in mitigating health anxiety. To help clarify these associations, this study investigates how social support and unsupportive social interactions are related to health anxiety and its four dimensions in a sample of women previously diagnosed with early stage breast cancer.

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Breast Cancer, Health Anxiety, and Social Support

Breast cancer is the most common type of cancer affecting women worldwide (Jemal et al., 2011). Receiving such a diagnosis often elicits acute distress and fear and may lead to severe forms of psychopathology, such as anxiety or depressive disorders (Kissane et al., 2004). Research also demonstrates that 38% of women diagnosed with breast cancer of any stage in the prior 18 months report elevated health anxiety (Grassi, Rossi, Sabato, Cruciani, & Zembelli, 2004), and roughly 20% of women with early stage breast cancer have strong worries about their future health at 6- and 12-weeks postsurgery (Wade, Nehmy, & Koczwara, 2005). Another study found substantial health anxiety in 33% of a sample of 95 breast and testicular cancer patients within 2 years postdiagnosis (Stark et al., 2004).

Of note is that preliminarily research suggests that increased health anxiety among women with breast cancer is associated with reduced quality of life (Grassi et al., 2004). A major concern is that elevated health anxiety may lead women to constantly monitor their bodies for signs of cancer recurrence and interpret any symptoms in that light, and this may also result in increased requests for medical reassurance (Stark & House, 2000). Research in general suggests that, when clinically elevated, health anxiety is associated with increased disability, psychological and physical impairment, and medical utilization (Looper & Kirmayer, 2001; Noyes Jr., Happel, & Yagla, 1999), as well as a greater probability of being unable to work (Barsky, Wyshak, Klerman, & Latham, 1990).

Of concern at this time is that current research on health anxiety in breast cancer populations is limited by the use of a single-item to assess illness worry (Wade et al., 2005), or a tool with minimal

information available on its reliability and validity (Stark et al., 2004). Sample sizes have ranged from only 44 to 105 participants and are typically mixed in terms of stage or type of cancer under study (Grassi et al., 2004; Stark et al., 2004; Stefanek, Shaw, DeGeorge, & Tsottles, 1989; Wade et al., 2005). Such limitations indicate a need for more rigorous research in this area.

Several theoretical models suggest that social factors are linked to health anxiety. The cognitive–behavioural model of health anxiety states that health anxiety results from, and is maintained by, dysfunctional beliefs about illness and physical sensations, and these beliefs are partly shaped by interactions with, and support from, the person's social circle (Salkovskis & Warwick, 2001). Likewise, the interpersonal model of health anxiety suggests that social variables (e.g., attachment styles) contribute to health anxiety, whereby those with insecure attachment engage in health anxious behaviours (e.g., health-related reassurance-seeking) as a way to elicit support from others (Stuart & Noyes, 1999).

The value of social support after a breast cancer diagnosis is well-documented. Women with breast cancer who have more confidants available (i.e., persons with whom one may discuss personal problems) (Maunsell, Brisson, & Deschênes, 1995) or who have lower social isolation (Kroenke, Kubzansky, Schernhammer, Holmes, & Kawachi, 2006) have greater chances of survival. The absence of social support networks is also linked to decreased immune function (Lutgendorf et al., 2005) and to increased cancer progression (Nausheen, Gidron, Peveler, & Moss-Morris, 2009), underscoring the importance of an available support network. Notable in the literature on social support are the negative consequences of unsupportive social interactions, which may occur when even well-intentioned people respond in unhelpful or distressing ways to a person who is experiencing a life crisis (Figueiredo, Fries, & Ingram, 2004). Some women with breast cancer report social support is either not available to them or is inappropriate or unhelpful, such as when others are responding critically to how the patient copes with cancer (Dakof & Taylor, 1990) or are overly optimistic or protective (Chantler, Podbilewicz-Schuller, & Mortimer, 2005). Overall, research indicates that these responses may intensify patient distress (Manne, Winkel, Ostroff, Grana, & Fox, 2005), leading to elevated anxiety and depression (Iwamitsu et al., 2005).

Given the above findings, it is plausible that perceiving less adequate support and/or experiencing more unsupportive interactions following breast cancer may also be associated with elevated health anxiety. However, few studies have tested if social support is tied to health anxiety after a diagnosis of breast cancer. One study of a mixed cancer population indicated that illness-related worry was more likely to be a problem among patients with less social support (e.g., difficulty confiding in others), and this relationship was strongest among female cancer patients (Stefanek, Shaw, DeGeorge, & Tsottles, 1989). This promising initial finding highlights the need for further study of the link between health anxiety and social factors.

Objectives of the Present Study

This study sought to extend the research on the links between health anxiety and social support, while also addressing several methodological shortcomings of prior research. First, health anxiety was examined in a large sample of women so as to increase the power of our statistical tests. Second, we focused on women with a prior diagnosis of early stage breast cancer (stage 0, I, or II) in order to specifically understand health anxiety and social support in a homogeneous group. Third, to be consistent with empirical research indicating that health anxiety is a dimensional construct (Longley et al., 2010), health anxiety was assessed using a multifaceted measure that captures four main health anxiety dimensions, including affective, cognitive, behavioural, and perceptual. Finally, both the perceived adequacy of social support and the experience of unsupportive social interactions were assessed to take into account positive and negative aspects of social support that may be related to health anxiety. Because illness worry was associated with less social support in a prior study (Stefanek et al., 1989), it was hypothesised that perceiving less adequate support and reporting a higher incidence of unsupportive interactions would be related to elevated health anxiety and its dimensions, even after controlling for general anxiety, depression, and demographic and cancer-related variables.

Method

Participants

Women were eligible to take part in this study if they resided in Canada, were aged 18 years and older, and were diagnosed with early stage breast cancer in the past 10 years. The sample was restricted to early stage cancer because of differences in health status and prognosis between early and advanced breast cancer and the potential for discrepancy regarding health worries (e.g., concerns about impact of metastases on pain and mortality for those with late-stage cancer vs. worries about the likelihood of recurrence for those with early stage cancer). Although most research has evaluated psychological outcomes of women immediately after treatment or within 5 years of diagnosis (e.g., Burgess et al., 2005), one study suggests anxiety is higher in women 2–10 years postdiagnosis of breast cancer than compared with community norms (Hodgkinson et al., 2007). The 10-years postdiagnosis timeframe thus allowed for a broader sample and let us explore the experiences of women recently diagnosed and of those who are long-term survivors of breast cancer.

In total, 131 women who met the study's inclusion criteria responded to the survey. A range of methods were used for recruitment. Individuals responsible for cancer websites (e.g., Canadian Cancer Society) or e-mail lists for breast cancer survivors (e.g., fundraising or support groups) were contacted by phone or e-mail and asked to distribute an e-mail invitation to group members on the researcher's behalf or post advertisements of the study in newsletters. Posters were also mailed to local physicians. An article about the study was published in a local newspaper and several live radio interviews were conducted describing the study. Snowball sampling was also used by asking participants to forward the study website to other eligible individuals, a method commonly used in Internet research (e.g., Kehler & Hadjistavropoulos, 2009). Women reported finding out about the study primarily through support group e-mail lists or by group facilitators ($n = 73$), a friend/family member ($n = 20$), cancer e-mail lists ($n = 16$), cancer websites ($n = 3$), and/or other means ($n = 19$), including the radio and newspaper article.

Procedure

With approval from the research ethics board of our institution, data were collected using a password protected Internet survey, which was used to obtain a larger sample of participants than could be obtained otherwise. Although some researchers have expressed concerns that Internet samples are unrepresentative (Skitka & Sargis, 2006), research shows that participants' responses are comparable when obtained from Internet studies versus paper-based studies (Huang, 2006). In the present study, only individuals who obtained the password included in a study advertisement and/or contacted the researcher were able to complete the survey. Respondents' Internet addresses were collected to eliminate multiple completions of the questionnaires by the same participant. Informed consent was established when participants checked a box indicating consent and continued to successive pages of the survey. Upon completion of the survey, participants were given the option to provide their e-mail address for a draw of one of four $25 gift cards. To protect confidentiality, participants' e-mail addresses were not linked to the survey responses.

Outcome Measures

Background. Participants were asked about their age, ethnicity, province of residence, employment status, education, relationship status, and current living arrangements. In addition, participants were asked about stage of cancer, duration since diagnosis, type of treatment(s) undergone, time since treatment, and any other known health conditions.

Health anxiety. The Multidimensional Inventory of Hypochondriacal Traits (MIHT; Longley et al., 2005) assesses four key symptom clusters of health anxiety using 31 statements that are rated by participants on a Likert scale ranging from 1 (*strongly disagree/definitely false*) to 5 (*strongly agree/definitely true*). Total scores may range from 31 to 155. The MIHT was selected for this study because it conceptualizes health anxiety from both a cognitive and interpersonal perspective and is the only known measure with distinct scales that assess health anxiety dimensionally (Longley et al., 2010). Confirmatory factor analyses indicate that the MIHT can be conceptualised as hierarchical in nature, with four lower-order dimensions loading onto a global health anxiety factor (Stewart, Sherry, Watt, Grant, & Hadjistavropoulos, 2008). The subscales are: (a) affective, or the tendency to worry excessively about illness and health; (b) cognitive, or the tendency to believe one is ill despite disbelief by others; (c) behavioural, or the tendency to seek reassurance for perceived health concerns; and (d) perceptual, or the tendency to focus on bodily sensations. The MIHT subscales showed satisfactory reliability in a medical patient sample (α = .80–.87) and excellent construct validity according to correlations with other measures of health anxiety (Longley et al., 2005).

Anxiety and depression. The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) is a 14-item self-report scale that assesses overall severity of anxiety and depression. This instrument limits items measuring somatic symptoms of anxiety and depression that may be better accounted for by a medical condition. Each item has four multiple choice response options, generating total Anxiety and Depression scores that each range from 0 to 21. Moderate correlations between the HADS and other commonly used measures of anxiety and depression suggest good concurrent validity (Bjelland, Dahl, Haug, & Neckelmann, 2002).

Perceived social support. The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item self-report scale measuring perceived adequacy of support from three sources: family, friends, and significant other. Ratings are made on a 7-point Likert-type scale, ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*). Items can be summed to create a total score that range from 12 to 84. The MSPSS has good convergent and divergent validity (Clara, Cox, Enns, Murray, & Torgrudc, 2003).

Unsupportive social interactions. The Unsupportive Social Interactions Inventory (USII; Ingram, Betz, Mindes, Schmitt, & Smith, 2001) assesses the occurrence of unsupportive responses a participant has received from important people in her social network regarding her breast cancer diagnosis using a 0 (*none*) to 4 (*a lot*) scale. The 24-item inventory yields a total score (range 0–96) that captures several different types of unsupportive interactions: (a) distancing, which reflects behavioural or emotional disengagement; (b) bumbling, which reflects behaviours that are awkward, uncomfortable, or inappropriately focused on fixing the person; (c) minimising, which represents attempts to force optimism or downplay the importance of concerns; and (d) blaming, which reflects criticism and finding fault. Evidence supports both its reliability and construct validity (Ingram et al., 2001).

Data Analysis

In conducting research on health anxiety and social factors, we recognised the importance of examining the relationships relative to other key variables. Such variables included demographic and cancer-related variables and general anxiety and depression, given their potential to be relevant to health anxiety. In terms of demographics, age and education were selected based on prior research that found younger (Stanton et al., 2000) and less formally educated (Epping-Jordan et al., 1999) women with breast cancer reported poorer psychological adjustment. Current relationship status was also deemed a relevant social factor. Cancer-related variables of interest in terms of their association with health anxiety were time since diagnosis and stage of breast cancer. General anxiety and depression were also controlled for, because research suggests these variables are significantly related to health anxiety in other medical groups (Kehler & Hadjistavropoulos, 2009).

Variables with nonnormal distributions were transformed using square-root transformations. These were the MIHT Cognitive and Perceptual subscales, the USII and MSPSS total scores, and the HADS-Depression subscale. To make interpretation easier, means, standard deviations, and reliability coefficients of the skewed variables are reported prior to transformation in Table 1.

Five separate hierarchical linear regression analyses were conducted with global health anxiety (as measured by the MIHT total score) and its four dimensions (as measured by MIHT subscale scores) as the dependent variables. The following demographic variables were entered into the first step of the regression: (a) age, (b) education (coded as 0 = *some university or college certificate or less*, 1 = *postsecondary degree or higher*), and (c) current relationship status (coded as 0 = *not married or not common-law*,

Table 1
Means, Standard Deviations, and Reliability Coefficients for Outcome Measures

Measure (range of scores)	*M*	*SD*	α	95% CI
MIHT Total (37–134)	93.50	16.72	.90	[.88, .93]
Diagnosed ≤ 5 years (n = 88)	95.35	17.81		
Diagnosed ≥ 5 years (n = 43)	89.72	13.65		
MIHT Behavioural (8–37)	24.76	5.78	.81	[.79, .86]
MIHT Cognitive (7–32)	16.24	5.59	.86	[.82, .90]
MIHT Perceptual (15–44)	33.26	5.27	.83	[.78, .87]
MIHT Affective (7–34)	19.24	6.00	.81	[.79, .88]
MSPSS Total Score (20–84)	67.63	15.17	.96	[.95, .97]
USII Total Score (0–78)	22.76	18.30	.94	[.93, .96]
HADS-A (0–19)	6.92	4.05	.86	[.82, .90]
HADS-D (0–14)	3.70	3.38	.83	[.78, .87]

Note. MIHT = Multidimensional Inventory of Hypochondriacal Traits; MSPSS = Multidimensional Scale of Perceived Social Support; USII = Unsupportive Social Interactions Inventory; HADS-A = Hospital Anxiety and Depression Scale-Anxiety; HADS-D = Hospital Anxiety and Depression Scale-Depression; CI = Confidence interval for Cronbach's alpha coefficients.

1 = *married or common-law*). At step two, cancer-related variables were entered: (a) time since diagnosis (in months) and (b) stage of breast cancer (0/I or II). At the third step, the following psychosocial variables were entered: (a) perceived adequacy of social support (as measured by MSPSS total score), (b) unsupportive social interactions (as measured by USII total score), (c) general anxiety (as measured by HADS-Anxiety subscale), and (d) depression (as measured by HADS-Depression subscale). The significance value for regression analyses was set at $p < .05$.

Results

Background of Sample

The average age of participants was 54.6 years (SD = 9.13), with ages ranging from 24 to 74 years. Nearly three quarters of the participants were currently married and were living with their spouse/partner (n = 65; 49.6%) or their spouse/partner and children (n = 38; 29.0%). The majority identified themselves as Caucasian (n = 129; 98.5%). Participants were all Canadian and were largely from the provinces Ontario (n = 40; 30.5%), British Columbia (n = 25; 19.1%), and Saskatchewan (n = 28; 21.4%). Most participants had at least one university degree (n = 58; 44.3%) and nearly one half of the participants reported being currently employed full-time (n = 38; 29.0%) or part-time (n = 27; 20.6%).

Stage II was the most frequently cited stage of breast cancer (n = 74; 56.5%), followed by stage I (n = 42; 32.1%), and stage 0 (n = 12; 9.2%). The average time since diagnosis and treatment was 47.78 months (SD = 37.01) and 33.94 months (SD = 33.85), respectively. Nearly all participants underwent some form of surgery (n = 127; 96.9%), including mastectomy (n = 55; 42.0%), lumpectomy (n = 51; 38.9%), or both (n = 21; 16.0%). Over half of the participants reported undergoing chemotherapy (n = 75; 57.3%) and/or radiation (n = 67; 51.1%).

Close to one half of the participants reported having one or more health conditions or problems other than cancer (n = 60), including rheumatoid arthritis, osteoarthritis or some related disease (n = 24), chronic back pain (n = 20) and/or chronic pain in another location (n = 17), ulcerative colitis, Crohn's disease or gallbladder disease (n = 18), respiratory problems (n = 11), type II diabetes (n = 6), a neurological disorder or diagnosis (n = 7), heart problems (n = 4), liver problems (n = 2), kidney disease (n = 3), and stroke (n = 1).

Multivariate Analyses

Correlations of all variables are presented in Table 2. The correlations demonstrated a significant positive association between the total MIHT score and the four MIHT subscales and unsupportive social interactions, while perceived adequacy of support correlated positively with the MIHT Behavioural dimension and negatively with the MIHT Cognitive dimension. Both general

Table 2
Correlations Among Study Variables

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. MIHT Total	—													
2. MIHT-B	.70**	—												
3. MIHT-C	.70**	.22*	—											
4. MIHT-P	.70**	.33**	.34**	—										
5. MIHT-A	.83**	.47**	.49**	.47**	—									
6. MSPSS	–.02	.37**	–.36**	.08	.02	—								
7. USII	.52**	.18*	.60**	.39**	.36**	–.24**	—							
8. HADS-A	.43**	.09	.38**	.30**	.51**	–.32**	.41**	—						
9. HADS-D	.22*	–.02	.31**	–.14	.21*	–.33**	.44**	.62**	—					
10. Age	–.14	–.04	–.05	–.20*	–.14	.01	–.12	–.26**	–.24**	—				
11. Education	–.06	–.11	–.06	.03	–.05	–.12	.11	–.06	.10	–.15	—			
12. Relationship	.06	.18*	.01	–.04	.05	.34**	–.13	–.09	–.13	.10	.01	—		
13. Stage	.01	.03	–.01	.02	–.06	.07	.08	–.08	–.09	.16	–.06	–.10	—	
14. Diagnosis	–.13	–.10	–.01	–.21*	–.08	–.08	.05	–.14	–.15	.29**	.06	.01	–.05	—

Note. MIHT = Multidimensional Inventory of Hypochondriacal Traits; MIHT-B = MIHT-Behavioural; MIHT-C = MIHT-Cognitive; MIHT-P = MIHT-Perceptual; MIHT-A = MIHT-Affective; MSPSS = Multidimensional Scale of Perceived Social Support; USII = Unsupportive Social Interactions Inventory; HADS-A = Hospital Anxiety and Depression Scale-Anxiety; HADS-D = Hospital Anxiety and Depression Scale-Depression; Relationship = Married/common-law versus not; Stage = Stage 0/I versus Stage II; Diagnosis = Time since diagnosis in months.
* $p < .05$. ** $p < .001$.

anxiety and depression were positive correlates of the total MIHT score and MIHT Cognitive and Affective dimensions, with general anxiety also being associated with the MIHT Perceptual dimension.

The results of the hierarchical regression analyses along with the beta values and semipartial correlations for all variables when entered at the third step in each regression equation appear in Table 3. All regression equations were significant with 39% of the variance accounted for in the total MIHT score and 22–40% of the variance accounted for in the various health anxiety dimensions. Differences existed in the variables that were uniquely related to the total MIHT score and its four lower-order dimensions.

In terms of social factors, unsupportive interactions were a robust predictor of the MIHT total score and all of the health

Table 3
Predictors of Health Anxiety and Its Dimensions

Dependent variable	*B*	*SE*	β	Part	*F*	R^2
MIHT Total					9.97**	.39
Age	–.07	.15	–.01	–.01		
Education	–2.69	2.35	–.08	–.08		
Relationship status	–1.66	2.99	–.04	–.04		
Stage of breast cancer	–.74	2.41	–.02	–.02		
Time since diagnosis	–.04	.03	–.09	–.08		
Social support	–2.36	.77	–.25*	–.21		
Unsupportive interactions	3.70	.68	.45**	.38		
General anxiety	1.92	.39	.46**	.34		
Depression	–3.68	1.71	–.20*	–.15		
MIHT Affective					7.93**	.33
Age	–.02	.06	–.03	–.03		
Education	–1.04	.90	–.09	–.08		
Relationship status	–.03	1.14	–.01	–.01		
Stage of breast cancer	–.45	.92	–.48	–.04		
Time since diagnosis	3.65	.01	.01	.01		
Social support	–.69	.30	–.20*	–.18		
Unsupportive interactions	.62	.26	.21*	.18		
General anxiety	.94	.15	.62**	.46		
Depression	–1.32	.65	–.20*	–.14		
MIHT Behavioural					4.96**	.22
Age	.02	.06	.02	–.01		
Education	.27	.92	.02	.06		
Relationship status	–.08	1.16	–.01	–.03		
Stage of breast cancer	–.14	.94	–.01	.05		
Time since diagnosis	–.01	.01	–.06	.04		
Social support	1.66	.30	.51**	.44		
Unsupportive interactions	.59	.26	.21*	.18		
General anxiety	.39	.15	.27*	.24		
Depression	–.71	.66	–.12	–.03		
MIHT Cognitive					10.34**	.40
Age	.01	.01	.05	.04		
Education	–.17	.10	–.13	–.12		
Relationship status	.10	.12	.06	.06		
Stage of breast cancer	–.03	.10	–.02	–.02		
Time since diagnosis	.01	.01	–.02	–.02		
Social support	–.09	.03	–.22*	–.19		
Unsupportive interactions	.17	.03	.50**	.42		
General anxiety	.03	.02	.18	.13		
Depression	–.04	.07	–.06	–.04		
MIHT Perceptual					5.70**	.25
Age	–.01	.01	–.42	–.04		
Education	.12	.13	–.08	–.08		
Relationship status	–.28	.16	.15	.14		
Stage of breast cancer	.02	.13	.01	.01		
Time since diagnosis	–.01	.01	–.21*	–.19		
Social support	.11	.04	.23*	.20		
Unsupportive interactions	.16	.04	.42**	.35		
General anxiety	.06	.02	.28*	.20		
Depression	–.19	.09	–.21*	–.16		

Note. MIHT = Multidimensional Inventory of Hypochondriacal Traits; Unsupportive Interactions = Unsupportive Social Interactions Inventory total score; General anxiety = Hospital Anxiety and Depression Scale-Anxiety; Social Support = Multidimensional Scale of Perceived Social Support total score; Depression = Hospital Anxiety and Depression Scale-Depression; Part = Semi-partial correlations.
* $p < .05$. ** $p < .001$.

anxiety dimensions. Not only did unsupportive interactions contribute the most variance to overall health anxiety, it was the strongest predictor of the MIHT Cognitive and Perceptual dimensions, contributing 42% and 35% unique variance, respectively. Perceived adequacy of support was also a significant covariate in all of the regression models and was the strongest predictor of the MIHT Behavioural dimension, contributing 44% unique variance.

General anxiety was a significant predictor of the total MIHT score and three of its dimensions. While general anxiety accounted for the most unique variance in predicting the MIHT Affective dimension, it was not a significant predictor of the MIHT Cognitive dimension. Depression was a significant negative predictor of the total MIHT score and the MIHT Affective and Perceptual dimensions, which was opposite in sign from its correlation, indicating that there was a suppressor effect (Conger, 1974; Cohen & Cohen, 1975). While time since diagnosis was negatively associated with the MIHT Perceptual dimension, stage of breast cancer did not contribute variance to health anxiety or its four dimensions. Similarly, demographic variables (i.e., age, education, and relationship status) did not emerge as significant in any of the regression models.

Discussion

Previous research suggests that a proportion of women experience health anxiety after diagnosis of breast cancer at all stages (Grassi et al., 2004); however, the relationship of health anxiety to social factors is unknown. The present investigation used an established dimensional measure to study health anxiety in a sample of women diagnosed with early stage breast cancer within the past 10 years. The results demonstrated that perceived adequacy of support and unsupportive interactions were both significant predictors of overall health anxiety and its four dimensions. In fact, social factors were among the strongest predictors of overall health anxiety, and the cognitive, behavioural, and perceptual dimensions of health anxiety. Together, these results support the study's hypothesis that social factors would be related to health anxiety above and beyond that of other important variables.

Experiencing unsupportive social interactions was the most robust predictor of overall health anxiety, suggesting that negative interpersonal exchanges may have particular relevance for health anxiety in women with a previous diagnosis of breast cancer. Specifically, we found greater endorsement of unsupportive interactions was most strongly associated with the perceptual and cognitive dimensions of health anxiety. The findings suggest that when a woman experiences negative social interactions regarding her breast cancer diagnosis, she is more likely to be preoccupied with her body and believe that others are either not responsive to her illness or are not taking her illness concerns seriously. These results resonate with previous research indicating how unsupportive interactions may lead women to feel as if their concerns about cancer are being dismissed (Chantler et al., 2005). Such unhelpful exchanges have been tied to an inability to disclose negative emotions (Figueiredo et al., 2004) and contribute to anxiety and depression (Iwamitsu et al., 2005). Thus, it is possible that being unable to openly discuss illness fears or worries with a social network also intensifies one's health-related concerns.

Adding to the above findings, we found that perceived adequacy of social support was also related to health anxiety in this study. In particular, we found that perceiving adequate support was most strongly associated with a tendency to turn to others for reassurance for health-related concerns. On the other hand, perceiving inadequate support was negatively related to the cognitive dimension of health anxiety or the belief that others are not taking one's health concerns seriously. These results indicate that when one's social network is perceived as available to support and help, women may be more likely to depend on their network for reassurance when feeling health anxious, but when they perceive their support as unavailable, they may have beliefs that their health concerns are not being listened to. The findings are in line with past research showing a link between increased abnormal illness behaviour (e.g., disease conviction) and low social support in newly diagnosed cancer patients (Grassi & Rosti, 1996).

A noteworthy point concerning the positive relationship between perceiving adequate support and seeking out reassurance is that, in retrospect, it appears the MIHT items may not measure maladaptive reassurance-seeking. Items did not ask about repeated reassurance-seeking or unresponsiveness to reassurance, but instead captured a desire to be around or close to others (e.g., "I turn to others for support when I do not feel well"). As a result, this subscale may not have adequately represented the maladaptive reassurance-seeking behaviour often observed in severely health anxious individuals. Also, the scale does not account for other behaviours known to be involved in health anxiety, such as body checking. As suggested by Fergus and Valentiner (2011), researchers might address this issue by making adjustments to the MIHT. It would be valuable to explore the impact of social factors on these other types of behaviours in the future.

While social factors were significant predictors of health anxiety, general anxiety and depression also contributed unique variance to health anxiety and several of its dimensions. Of note, however, is that depression appeared to be a negative predictor of health anxiety. Given that depression was a positive correlate of health anxiety, its negative sign in the regression models may suggest that there was a suppressor effect. Specifically, these results involving depression are consistent with a "negative" (Conger, 1974) or "net" (Cohen & Cohen, 1975) suppressor effect, indicating a differential effect for depression when the other variables shown in Table 2 (e.g., general anxiety) are controlled. We suggest this seeming suppressor effect, and our results involving depression in Table 3, should be regarded with caution.

With that said, it is worthwhile to note that both general anxiety and depression contributed the most unique variance to having elevated worry about illness and health, even with a suppressor effect. Such a finding is intuitive, because a person who endorses affective symptoms more generally might also be prone to have specific worries about one's health or illness. This is consistent with Noyes Jr. and colleagues' (1994) contention that health anxiety may share common diatheses with general anxiety and depression (e.g., neuroticism). Overall, our study suggests emotional distress is an important predictor of health-anxious affect.

Some variables that were anticipated to be related to health anxiety in the present study were not. Demographic variables such as younger age and lower education level have been associated with worse psychological adjustment to cancer (Epping-Jordan et al., 1999; Stanton et al., 2000). In the current study, age, education level, and current relationship status were unrelated to health anxiety. Time since diagnosis was negatively related to the per-

ceptual dimension of health anxiety, indicating that women who were diagnosed for shorter periods had a higher tendency to be preoccupied with their bodies. Stage of breast cancer, however, was unrelated to whether women endorsed health anxiety. These findings were surprising but parallels research on other patient groups (e.g., multiple sclerosis), where psychosocial variables as opposed to features of the medical condition appear to play a stronger role in predicting health anxiety (Kehler & Hadjistavropoulos, 2009).

Strengths, Significance, and Implications

Using an online survey allowed us to access women in the community rather than limiting our study to women presenting at a medical clinic for treatment of breast cancer as has been done in past studies. Moreover, rather than having participants report either the presence or absence of social support, information on the social interactions themselves was gathered in an attempt to understand how negative exchanges between the patient and her social network relate to health anxiety. Distinguishing these factors allowed us to determine that perceived support and unsupportive interactions both contribute variance to health anxiety. A further strength of the study was the use of the MIHT. Use of this measure was fundamental as it revealed how social factors had more robust relationships with certain dimensions of health anxiety than others. Furthermore, this study served to identify how the MIHT is not necessarily capturing maladaptive reassurance-seeking in the manner it typically presents in individuals with severe health anxiety.

Studying the links between social support and health anxiety was also novel, given that literature on this topic is scarce. To date, cognitive factors such as inflexible assumptions about health and negative interpretations of the likelihood or awfulness of illness, combined with behavioural components such as reassurance-seeking and avoidance, have been predominant features of the cognitive-behavioural model of health anxiety (Salkovskis & Warwick, 2001). Results from the present study suggest a need to attend to social factors in this model.

Likewise, it is interesting to interpret the findings from this study in light of the interpersonal model of health anxiety (Stuart & Noyes, 1999), which posits that individuals with health anxiety chronically and excessively seek support for their perceived health problems from family, friends, and medical personnel. In doing so, individuals with health anxiety often elicit rejecting interpersonal responses, leading to further physical complaints as a means of relating to others. The positive link between health anxiety and unsupportive social interactions in the present research provides some support for this theory. Currently it is known that providing spontaneous medical reassurance to individuals with cancer who have high health anxiety predicts increased anxiety over time (Stark et al., 2004). It would be useful for future researchers to extend research on reassurance-seeking to understand how this process unfolds between cancer populations and their partners, family members, and friends.

Clinically, the results underscore the need for practitioners to obtain information regarding a breast cancer patient's social network should she present with health anxiety. Specifically, clinicians should gain an understanding of the nature and extent of her social network and how members have responded to her cancer diagnosis and health anxiety. Clinicians may also help patients' social networks reflect on how they may respond more supportively to a patient's health concerns (e.g., practicing empathic listening).

Limitations and Future Directions

A potential limitation of this study was the use of recruitment through websites and mailing lists, which required participants to self-identify as having a diagnosis of breast cancer. Other than the participants' self-report of breast cancer information (e.g., date of last oncology treatment), we cannot identify the actual medical state of participants. This may have resulted in inaccurately recalled information and it is possible that some women's cancer may have advanced to stage III or IV unknowingly at the time of the survey. In addition, this study used a cross-sectional design, thus, we cannot determine the direction in which these relationships may operate. Nevertheless, given that health anxiety and social factors have not been examined in this population, a cross-sectional online study offered a suitable starting point for understanding connections among these variables. The findings underscore the need for future study of causal relationships and use of health information obtained through medical files.

This study's sample was predominantly comprised of highly educated Caucasian women with access to a computer, thus potentially limiting the generalizability of the findings to participants of this ethnicity and socioeconomic status. Likewise, the majority of participants were referred by group facilitators. Results of the present study may differ in women who are limited by the time they have to seek external support and who also may have reduced access to accurate material and educational resources regarding breast cancer. Adding to the legitimacy of our data collection method, however, our sample's characteristics were similar to a recent in-person study of Canadian women with breast cancer ($N = 285$), who were 55 years old on average ($SD = 11$), with 70.2% being married or common-law (MacLean et al., 2010).

As noted above, further research on the relationship between social support and other health anxious behaviours (e.g., monitoring one's body) is needed. Furthermore, the examination of other measures of health anxiety and social factors would serve to confirm the study findings. Moreover, researchers should also study health anxiety and social factors in a longitudinal design to determine how preoccupation with illness and health changes over time. This would be particularly helpful given that it is known that psychiatric disorders are most prevalent in the year after breast cancer diagnosis, with rates declining in the years following (Burgess et al., 2005). Establishing whether changes in social support coincide with elevations or reductions in health anxiety symptoms would be beneficial. For instance, if a social network member is unsupportive emotionally or is absent, does this then contribute to more physical strain for the patient, thereby worsening her health status and health anxiety? It would also be worthwhile to determine the effect of unsupportive interactions on women with breast cancer, depending on whether they occur with a health care professional, a partner, family member, or friend.

Conclusion

Few researchers have explored the relationships between health anxiety and social factors in individuals with a medical condition

such as breast cancer. Results from this study contribute to the literature by demonstrating that perceiving an adequate support system is associated with lower health anxiety overall, greater support-seeking behaviour to alleviate health worries, and fewer concerns that others are not taking one's health concerns seriously. In contrast, when network members are unsupportive of a person with cancer, disease conviction, preoccupation with bodily symptoms, and worry and anxiety about health may ensue. These findings underscore the relevance of social support to health anxiety even when general anxiety and depression are accounted for and highlight the importance of assessing social factors to adequately treat health anxiety in women with early stage breast cancer.

Résumé

L'anxiété par rapport à la santé est un construit multidimensionnel référant aux inquiétudes à propos de la santé, la recherche de réassurance, l'hyper vigilance aux sensations corporelles et aux croyances que ses soucis de santé ne sont pas pris sérieusement par les autres. Les recherches suggèrent que l'anxiété par rapport à la santé peut être précipitée par le diagnostic d'une condition de santé comme le cancer du sein. Il est postulé que les facteurs sociaux sont impliqués dans l'occurrence et le maintien de l'anxiété face à la santé, mais peu de preuves empiriques sont disponibles à ce sujet. La présente étude visait à tester le rôle de la perception d'un soutien social adéquat et des interactions sociales sans soutien sur l'anxiété face à la santé par rapport à l'anxiété en général, la dépression et des variables liées à la démographie et au cancer. Des femmes canadiennes diagnostiquées à un stade précoce de cancer du sein dans les 10 dernières années ($N = 131$) ont complété une enquête en ligne. Les facteurs sociaux ont contribué à une part de variance significative dans les scores d'anxiété par rapport à la santé et à ses quatre dimensions, même après avoir tenu compte des autres variables. Les résultats soulignent l'importance du soutien social dans l'anxiété par rapport à la santé et font ressortir le besoin de tenir compte des facteurs sociaux lorsqu'on évalue et traite l'anxiété par rapport à la santé dans cette population.

Mots-clés : anxiété face à la santé, soutien social, cancer du sein, anxiété.

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