RESEARCH COMMUNICATION

Interaction of Social Support and Psychological Stress on Anxiety and Depressive Symptoms in Breast Cancer Patients

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Abstract

Purpose: The aim of the present study was to assess the association of psychological stress and social support with anxiety and depressive symptoms in Chinese newly diagnosed breast cancer patients. Methods: Four hundred and one patients with breast cancer were recruited. Their demographic characteristics, psychological stress and social support were determined with a structured questionnaire, and their anxiety and depressive symptoms were assessed with the Hospital Anxiety and Depression Scale. Results: Psychological stressors caused by breast cancer diagnosed originated from five major sources, as determined by factor analysis. These included "Worrying about health being harmed," "Fear of decline of physical function," "Fear of work being harmed," "Worry about daily life and social relationship being restricted," and "Fear of family being harmed." Hierarchical linear regression analysis indicated that, after adjusting for gender, age, marital status, educational level, and duration of illness, solid social support can alleviate such symptoms. Conclusions: The results of this study suggest that there are strong associations between patients' needs and psychological distress with newly diagnosed breast cancer. Social support might affect these associations in Chinese women with breast cancer.

Keywords: Breast cancer - social support - psychological stress - anxiety - depression

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Introduction

Breast cancer is one of the most common malignancies affecting women (26% of all cancers) (Jemal et al., 2008). Although the incidence of breast cancer in China is lower than in other countries, but the incidence of breast cancer in past two decades have increased by 80% in young women (Zhang et al., 2010). The diagnosis and treatment for breast cancer in women can cause significant psychological distress (Zabora et al., 2001; Massie et al., 2004), and bring about psychological disturbance including anxiety and depression (Pandey et al., 2006; Jacobsen et al., 2008). More than 30% of the women with early breast cancer had depression, anxiety, or both at diagnosis (Burgess et al., 2005). Numbers of studies reported that depressed patients tend to be less proactive in seeking more aggressive treatments, and have severe symptoms, poor response to systemic therapy, long recovery times and poor outcomes (Hirschfeld, 2001; Colleoni et al., 2000; Walker et al., 1999). In addition, management of depression and anxiety leads to reduction in disease progression, improvement in survival rates, reduction in healthcare costs and improvement in quality of life (Pinquart and Duberstein, 2010; Satin et al., 2009; Frick et al., 2007). The need for fast and accurate diagnosis and timely treatment is vital, but attention to psychosocial needs is equally important, forming an essential part of modern cancer care. An important aspect of psychosocial care is social support (Clarke et al., 2006; Friedman et al., 2006), which play a role in preventing psychological problems like anxiety and depression.

Social support is the perception that an individual is a member of a complex network in which one can give and receive affection, aid, and obligation. Previous studies have consistently proved that social support can improve health outcomes (Ogden, 2000; House et al., 1998; Broadhead et al., 1983). For example, social support can help women with breast cancer to adjust and cope, and can have positive impacts on the survivor's health (Bloom et al., 2004; Bloom et al., 2001; Goodwin et al., 2001; Kroenke et al., 2006); 2 a supportive environment can protect them against some of the adverse emotional consequences of heightened breast cancer risk perceptions (Kinsinger et al., 2009). However, patients with low social support scores were positively associated with worsening depressive symptoms (Simpson et al., 2002; Talley et al., 2008). Therefore, social support is an important factor which may affect the general well-being of individuals after diagnosed with breast cancer.

To our knowledge, most of the previous studies

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mainly focus on the depression in breast cancer patients after treatment or metastatic breast cancer patients. Little is known, however, about Chinese' social support experiences and needs. Also, little attention has been paid to the anxiety associated with psychological stress and social support, particularly in those newly diagnosed with breast cancer. Hence, the present study aimed to examine the major effects of psychological stress and social support on anxiety and depressive symptoms in Chinese breast cancer patients prior to treatment.

Materials and Methods

Subjects

We invited to participate in our study a consecutive series of 401 women, aged 18 to 60 years, with a diagnosis of early breast cancer at Sun Yat-sen University Cancer Center (Guangzhou, China) during March 2010 to June 2010. Exclusion criteria included previous breast or other cancer, age younger than 18 or over 60, and distant metastasis at diagnosis. Trained interviewers screened the eligibility of potential patients initially via a structured face-to-face interview to ensure whether they met the criteria. Written informed consents were obtained from all the participants prior to the enrollments, following a detailed explanation on study objectives and the specific requirements of the survey introduced by well-trained interviewers. This study was granted approval by the Ethical Committee of the Sun Yat-sen University.

Measurements

We conducted a face-to-face interview for each participant to obtain relevant information using a structured questionnaire consisting of four major sections: socio-demographic factors; psychological stress by the disease; social support; anxiety and depression symptoms. Our pilot study revealed that using a self-administered questionnaire had higher incomplete data than those obtained from an interview-based approach. The reason might be that many of the patients were poorly educated, and unable to understand the questionnaire correctly. Moreover, some patients with breast cancer had vision problems which might prevent them from reading and filling the questionnaire by themselves. Therefore, an interview-based approach was used to collect information from the participants, which could assure to get complete and exact data.

Socio-demographic and Medical Factors

Socio-demographic characteristics included in the questionnaire were age, educational level, marital status, occupation, and income. Patients were asked to report their experiences of basic disease, including benign breast disease, cerebrovascular, cardiovascular, and metabolic diseases.

Psychological Stress

Psychological stress was measured using the scales originally developed by Leung et al (Leung et al., 1999) with slightly modifications: omitting some sexual-related items based on Chinese culture reasons and combining similar items as appropriate. So, the modified questionnaire consisted of 30 items finally. Each item was scored on a 5-point Likert-type scale (from 1=never or rarely to 5=very often). The patients were asked to choose only one number from each of the item.

Social Support

Social support status was assessed using a well-validated social support rating scale designed by Xiao (Xiao, 1998). The scale is a 10-item measure consisting of three dimensions of social support: objective support (behavior that directly helps the person in need), subjective support (provision of empathy, caring, love and trust), and degree of social support utility (actually delivered and received support from the social network). A higher score stands for higher social support received by the patient (subject).

Anxiety and Depressive Symptoms

Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression (Zigmond and Snaith, 1983). 8 It consists of 14 items, 7 items for anxiety and 7 for depression. Sub-scale scores of anxiety and depression were calculated separately, and the score for each subscale ranges from 0-21. The higher the score is, the worse the status is presented with respect to a particular category. The Chinese version of HADS has been developed and validated by previous studies (Zheng et al., 2003).

Data Analysis

Factor analysis followed by orthogonal rotation (Varimax) was used to identify the sources of the stress, in detail in Ye et al (Ye et al., 2008). The Pearson correlation analysis was used to examine the univariate correlation between the scores of anxiety/depressive symptoms and each source of perceived stress, and social support.

The major and interactive effects of psychological stress and social support on the anxiety and depressive symptoms were separately assessed using hierarchical multiple regression procedure (Cohen and Cohen, 1983). In the first block, age, educational level, marital status, and occupation were first analyzed in the model by the forced method as covariates, with the anxiety or depressive symptoms as the dependent variable. In the second block, the main effects for psychological stress and social support were simultaneously taken into the model by the forced method to estimate the amount of variance. In the third block, the product term(s) of the source of psychological stress and the types of social support were taken into the model using a stepwise method (Bennett, 2000). The entry and exit criteria were set at $p=0.05$ and $p=0.10$, respectively. List-wise deletion was used in the multivariate analyses. All the P values were two-tailed, and a $P<0.05$ value was considered statistically significant, unless otherwise mentioned. All the analyses were performed with SPSS 11.0 for Windows.

In data analysis, the definitions of independent variables were as following: age, educational level (primary school or below=0, middle school=1, college or above=2), marital status (married =0, unmarried/

Table 1. Main Characteristics of 401 Patients with Breast Cancer

Variables	Number	%
Mean age (SD, years)	46.9 (10.1)	-
Marital status		
Married	375	93.5
Unmarried / divorced / widowed	26	6.5
Educational level		
Primary school or below	212	52.9
Middle school	99	24.7
College or above	90	22.4
Income		
< 1000 yuan / month *	196	48.9
≥ 1000 yuan/ month	205	51.1
Employment status		
White-collar worker (civil servants, managerial staff and professionals)	106	26.4
Blue-collar worker (commercial staff, service staff, production and transportation workers)	82	20.4
Farmer / others (agriculture, animal husbandry and non-occupation)	213	53.1
Basic disease		
Yes	96	23.9
No 305	76.1	

*1000 yuan is equivalent to £150

divorce/ bereft of one's spouse=1), and employment status (administrator or other white collar=0, blue collar worker=1, farmer/others=2).

Results

General Demographic Characteristics of Patients

A total of 401 women with breast cancer were recruited and all of them were assessed in this study. The mean age was 46.9 ± 10.1 years old, For the education level, 77.6% cases had education attainment below college, while only 26.4% cases were white collar workers. We noted that 23.9% cases had basic disease prior to breast cancer (seen Table 1).

Correlations Among Social Support, Psychological Stress, Anxiety and Depressive Symptoms

Correlations among social support, psychological stress, anxiety and depressive symptoms were shown in Table 2 and Table 3, respectively. Subjective social support correlated negatively with "Fear of work being harmed", "worry about daily life and social relationship being restricted", and "fear of family being harmed"; positively correlated with "worrying about health being harmed". Objective social support correlated negatively with "worrying about health being harmed".

Anxiety symptoms correlated significantly and positively with "worrying about health being harmed", "fear of decline of physical function", "fear of work being harmed", and "worry about daily life and social relationship being restricted"; negatively correlated with "objective social support" and "degree of social support utility". In addition, depressive symptoms were positively correlated with "Fear of decline of physical function", "fear of work being harmed", "worry about daily life and social relationship being restricted" and "fear of family being harmed"; negatively correlated with "worrying about health being harmed", "objective social support", "subjective social support" and "degree of social support utility".

Table 3. Relationship of Psychological Stress and Social Support with Anxiety and Depressive Symptoms in Breast Cancer Patients

Independent variables	Anxiety (r)	Depression (r)
Sources of psychological stress		
Worrying about health being harmed	0.224**	-0.110*
Fear of decline of physical function	0.129*	0.187*
Fear of work being harmed	0.207**	0.159**
Worry about daily life and social relationship being restricte	0.264**	0.357**
Fear of family being harmed	0.087	0.200**
Social support		
Objective social support	-0.196**	-0.141**
Subjective social support	-0.087	-0.315**
Degree of social support utility	-0.128*	-0.168**

***p<0.001; **p<0.01; *p<0.05.

Effect of Social Supports on Psychological Stress with Anxiety and Depressive Symptoms

The results of hierarchical regression analysis on psychological stress and social support with the anxiety symptoms were shown in Table 4. In the first block, the four demographic variables were accounted for only 1.0% of unique variance, there was no significant association between the anxiety symptoms and these demographics. In the second block, the major effect of the five identified factors of psychological stress and the three aspects of social support were accounted for 19.7% of unique variance, "worrying about health being harmed", "Fear of work being harmed", "Worry about daily life and social relationship being restricted", and "Degree of social support utility" were significantly associated with an increase in the anxiety symptoms, "Subjective social support" was significantly associated with an decrease in the anxiety symptoms. In the third block, among the fifteen interaction terms between the psychological stress and the social support, only the two interaction terms of "Worry about daily life and social relationship being

Table 2. Relationship Between Social Support and Psychological Stress in Breast Cancer Patients

Psychological stress	Subjective social support	Objective social support	Degree of social support utility
Worrying about health being harmed	0.119*	-0.205**	0.122*
Fear of decline of physical function	-0.022	-0.06	-0.048
Fear of work being harmed	-0.116*	-0.002	0.007
Worry about daily life and social relationship being restricted	-0.194**	-0.042	-0.06
Fear of family being harmed	-0.156**	0.038	0.193**

*p<0.05; **p<0.01

Table 4. Hierarchical Regression Analysis on Association of Psychological Stress and Social Support with Anxiety Symptoms in Breast Cancer Patients

Independent variables	β	R^2	Total R^2	F	P
Block 1 (demographics)		0.01	0.01	0.812	>.05
Age	-0.016				
Educational level	-0.195				
Marital status	-0.272				
Occupation	-0.222				
Block 2 (psychological stress and social support)		0.197	0.208	6.551	<.01
Worrying about health being harmed	0.657**				
Fear of decline of physical function	0.325				
Fear of work being harmed	0.753**				
Worry about daily life and social relationship being restricted	0.786**				
Fear of family being harmed	0.194				
Objective social support	0.085				
Subjective social support	-0.108*				
Degree of social support utility	0.329*				
Block 3 (Interaction terms)		0.232		6.426	<.01
Worry about daily life and social relationship being restricted × Degree of social support utility	0.385*				
Fear of family being harmed × Objective social support	0.081*				

*p < 0.05; **p < 0.01.

Table 5. Hierarchical Regression Analysis on Association of Psychological Stress and Social Support with Depressive Symptoms in Breast Patients

Independent variables	β	R^2	Total R^2	F	P
Block 1 (demographics)		0.056	0.056	4.562	<.001
Age	0.017				
Educational level	-0.398 *				
Marital status	-0.237				
Occupation	-1.206 *				
Block 2 (psychological stress and social support)		0.236	0.292	10.276	<.001
Worrying about health being harmed	-0.278				
Fear of decline of physical function	0.682***				
Fear of work being harmed	0.536**				
Worry about daily life and social relationship being restricted	1.043***				
Fear of family being harmed	0.508**				
Objective social support	-0.249*				
Subjective social support	-0.035				
Degree of social support utility	0.322				
Block 3 (Interaction terms)		0.063	0.355	8.972	<.001
Worrying about health being harmed × Degree of social support utility	-0.322*				
Worry about daily life and social relationship being restricted × Degree of social support utility	0.407*				
Fear of decline of physical function × Objective social support	-0.134**				
Worrying about health being harmed × Objective social support	-0.097*				
Fear of family being harmed × Objective social support	0.083*				

***P<0.001; **p<0.01; *p<0.05

restricted" with degree of social support utility and "Fear of family being harmed" with objective social support were significantly related to the increase in the anxiety symptoms, accounting for 2.4% of unique variance.

Similar results were obtained in the hierarchical regression analysis on psychological stress and social support with depressive symptoms (seen Table 5). In the first block, "Educational level" and "Occupation" were significantly related to the decrease in the depressive symptoms. In the second block, "Fear of decline of physical function", "Fear of work being harmed", "Worry about daily life and social relationship being restricted", and "Fear of family being harmed" were significantly correlated with the severity of depressive symptom, objective social support was significantly decreased the level of depressive symptoms. In the third block, in the fifteen interaction terms between the psychological stress and the social support, the interaction terms of "Worry about daily life and social relationship being restricted" with degree of social support utility and "Fear of family

being harmed" with objective social support significantly increased the level of depressive symptoms. However, "Fear of family being harmed" with degree of social support utility, "Fear of decline of physical function" with objective social support, and "Worrying about health being harmed" with objective social support significantly decreased the level of depressive symptoms. Overall, the first, second, and third blocks accounted for 5.6%, 23.6%, and 6.3% of the unique variance, respectively.

Discussion

The aim of the present study was to investigate the association between psychological stressors, social support and the anxiety and depressive symptoms in Chinese women shortly after diagnosed of breast cancer. As the findings of this study demonstrate, there were five factors associated with the psychological stress, including "Worrying about health being harmed", "Fear of decline of physical function", "Fear of work being harmed", "Worry about daily life and social relationship being restricted" and "Fear of family being harmed". Multivariate logistic regression found that "Worrying about health being harmed", "Fear of work being harmed", "Worry about daily life and social relationship being restricted" and "Degree of social support utility" were significantly contributed to the severity of anxiety symptoms, while the subjective social support significantly decreased severity of anxiety symptoms. With regard to depression, higher educational level and white-collar worker have less likely to bring depressive symptom. "Fear of decline of physical function", "Fear of work being harmed", "Worry about daily life and social relationship being restricted", and "Fear of family being harmed" were significantly contributed to the severity of depressive symptoms, while the objective social support significantly decreased severity of depressive symptoms. Moreover, the interaction terms of "Worry about daily life and social relationship being restricted" with degree of social support utility and "Fear of family being harmed" with objective social support were significantly related to the increase in the anxiety and depressive symptoms. However, the interaction terms of "Fear of family being harmed" with degree of social support utility, "Fear of decline of physical function" with objective social support, and "Fear of family being harmed" with objective social support significantly decreased the level of depressive symptoms. It is noteworthy that the variables included in the two models were accounted for only 23.2% of the total variance in the anxiety symptoms and 35.5% of the total variance in the depressive symptoms. These findings might imply that psychological distress among patients newly diagnosed breast cancer originate from many factors except for those considering health, family, work, physical function, and daily life and social relationship. Thus, health care workers as well as the patients' families, relatives, managers, and colleagues are encouraged to interact with patients more actively and positively to provide multidimensional supports in understanding better of the nature of the disease. These may result in improvement in both the psychological stress caused by the disease and the anxiety and depressive symptoms resulted from the psychological stress, which in turn improves medical management (Carlson et al., 2003; Zabora, 1998). Unfortunately, many people including health care workers are lack of comprehension or understanding, many states including China offer less support groups because of financial, institutional, cultural factors and so on, which result in women's decreased awareness and access to key information that can promote healthy adjustment to cancer (Kadan-Lottick et al., 2005; Ell et al., 2005).

Support for this theory is provided by Abbey et al (Abbey et al., 1985) who suggest that a specific support person better influences domain-specific emotions, whereas the entire social network influences more global emotions such as anxiety or depression. Social support is defined as the real or perceived resources provided by others that enable a person to feel cared for, valued, and part of a network of communication and mutual obligation (Stroebe, 2000). It has been recognized for many years that social support is an important factor which may affect the general well-being of individuals living with chronic and life-threatening health conditions like breast cancer (Cohen and Syme, 1985).

Based on stress theory, there are two hypotheses for social support affecting health outcomes (Ogden, 2000). The first one is the main-effect hypothesis that suggests social support itself is beneficial to health outcome and the absence of social support is stressful, which was supported by the several previous studies on the effects of social support on depression in breast cancer patients. Supportive psychotherapy has been shown to improve quality of life and psychological symptoms, protected against depression (Helgeson et al., 1996; Parker et al., 2003; Goodwin et al., 2001; Kissane et al., 2007). In randomized clinical trial, Cognitive-behavioral therapy has been shown to effectively reduce psychological symptoms (anxiety and depression) in patients with cancer (Moorey et al., 1998). Women who perceive a supportive social network are protected from the negative effects of stressful circumstances, such as depression and anxiety (Finch et al., 1999; Kinsingera et al., 2009). These findings provided consistent evidence that perceived social support is associated with lower levels of anxiety and depression. In this study, our finding showed that both objective and subjective social supports have different effect on anxiety and depression (see table 4, 5), which suggested that different types of social support give rise to differential impact to health outcomes (Adler and Page, 2008). Especially, subjective social support has the most associations with factors, which resulted in the psychological stress. Our results are previous studies that emotional support is most desired by patients, and generally considered the most beneficial among the different dimensions of support (Helgeson and Cohen, 1996; Kinsinger et al., 2009; Kroenke et al., 2006). Contrary to the hypothesis, a positive association between the degree of social utility and anxiety and depressive symptoms was observed in the present study. The reason for this might be due to the limitation of cross-sectional study design. When a patient felt anxiety, she might

actively seek social support and help from the social networks around her for alleviating depressive symptoms, and she would report a higher degree of social support utility than those patients without anxiety symptoms. Therefore, a longitudinal study design is needed to assess the association between social support and anxiety and depressive symptoms in breast cancer patients.

The second hypothesis for social support affecting health outcomes is the buffering effects, which suggest that social support can help individuals to cope with stress, therefore moderating the stress-illness link by buffering the individuals from the stressor and positively influencing the individual's appraisal of the potential or existing stressor. This hypothesis was proved by our results and the findings by several previous researches. In the present study there were significantly negative relationships between several selected interactive terms of the social support with the psychological stress and both the anxiety and the depression in Chinese breast cancer patients. These results support the buffering effect hypotheses about social support positively affecting health outcomes (Cohen and, Will, 1985; House et al., 1988). It can be expected that social support for breast cancer patients will always produce beneficial effect on patients' psychological state and be helpful in constructing positive and reasonable attitude towards the disease as a challenge.

When interpreting our results, it is important to note some limitations of our study. First, being a cross-sectional study, it is unlikely to determine the cause-effect relationships of the psychosocial factors with the anxiety and depressive symptoms. Further study with a longitudinal design may provide a solution to this issue. Second, sampling bias might not be avoided completely. The patients were sampled from Sun Yat-sen University Cancer Center, which is a top class hospital in this region. The patients of the hospitals usually have a relatively higher social economical status than those from other smaller hospitals or clinics. Such a sample might not well represent patients with breast cancer in the general population. Third, the psychological stress scale used in this study just included generic stressors related to chronic disease, and some cancer-specific stressors were not covered, which might have lost some of the information of psychological stress. Despite these limitations, the sample size of this study is relatively large; complete and exact data were collected by an interview-based approach; the whole Cronbach alphas of both psychological stress and coping style were over 0.90.

In summary, the results of the present study indicate that the physiological stressors caused by breast cancer diagnosis might directly increase the severity of anxiety and depressive symptoms and the effects of the psychosocial stressors on anxiety and depressive symptoms are alleviated by the objective and subjective social support received or perceived by breast cancer patients. These findings may have important clinical implications for breast cancer patients. First, it is necessary to make periodically assessment on the psychological stressors in breast cancer patients, which may be helpful for developing specific and focused nursing and psychiatric interventions to reduce stressors. Secondly, health care workers shall actively communicate with patients' families, relatives, and managers and colleagues, and educate them on the importance of giving patients more understanding, patience, sympathy and social support. In this way, effects of psychosocial stressors on anxiety and depressive symptoms will be moderated or eliminated when the patients, patients' family and friends, and health cares including doctors, nurses and social workers all work together to fight against the disease.

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