

RESEARCH ARTICLE

Psychopathological Profile of Women with Breast Cancer Based on the Symptom Checklist-90-R

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Abstract

Background: With effective early treatments, many breast cancer patients suffer from psychological distress due to adverse effects and lifelong physical disfigurement. Our study aimed to evaluate the psychopathological profile of breast cancer patients in comparison with healthy women and explored demographic correlates. **Method:** We consecutively enrolled breast cancer patients who came to the hospital for follow-up or rehabilitation care after primary treatment, and healthy female relatives or friends of inpatients in the Cancer Institute of Chinese Academy of Medical Sciences between August 30, 2010 and January 1, 2012. Psychopathological profile was assessed based on the Symptom Checklist-90-R (SCL-90-R) for patients and controls. We compared demographics such as age, ethnicity, education, marriage, and occupation, and incorporated these data plus cancer status for the association with the general SCL-90-R index and scores for 9 major symptom dimensions in multiple regression analysis. **Results:** We surveyed a total of 291 female breast cancer patients and 531 healthy women. The average age was 55.1 ± 6.40 years for breast cancer patients and 43.1 ± 12.8 for healthy controls ($P < 0.01$). The mean survival was 5.20 years for cancer patients (range, 0.60-9.90 years). There were statistically significant differences in education, marriage, and occupation between the two groups ($P < 0.01$). General index (1.45 ± 0.45 versus 1.32 ± 0.37) and 8 dimension scores (excluding anxiety) on SCL-90-R were significantly higher in patients ($P < 0.05$). Multiple regression analysis showed that the breast cancer status was positively correlated with general SCL-90-R index and 6 dimension scores (excluding the anxiety, phobic anxiety and paranoid ideation dimensions) ($P < 0.05$). Regression coefficients ranged from 0.10 (depression) to 0.19 (somatization). Higher interpersonal sensitivity was noticed in single women compared to married women. **Conclusions:** Chinese patients with breast cancer demonstrate greater psychopathology compared to healthy controls. The breast cancer status is an independent contributing factor to the general psychopathological profile. Breast cancer patients should be given particular counseling and care to alleviate their psychological distress.

Keywords: Breast cancer - psychopathology - symptom checklist-90-R - multiple regression - China

Asian Pac J Cancer Prev, 14 (11), 6579-6584

Introduction

Breast cancer is the most common malignancy in women in China (Ferlay et al., 2010). Its annual age-standardized incidence and mortality estimates were 21.6 and 5.70 per 100,000 women in 2008. Nationwide breast cancer screening is not available as a routine practice, and regional screening is only implemented in some rural populations with compromised uptake (Sadler et al., 2000; Tan et al., 2007). In such context, breast cancer becomes a major priority in cancer prevention and control.

The secular trend and geographic variation of breast cancer is daunting in China. The incident cases increased from 126,227 in 2002 to over 169,000 in 2008. In Shanghai alone, the incidence increased from 17.2 per 100,000 to

40.2 per 100,000 from 1975 to 2004, with an annual increase of 4.20% (Fan et al., 2009). The mortality has nearly doubled during the past 30 years according to the latest national survey on causes of deaths (National Office for Cancer Prevention and Control of the Chinese Ministry of Health, 2010). In contrast, the incidence and mortality of breast cancer decline slowly in developed countries, although they remain at a high level; they decreased at an annual rate of 0.70% and 1.90%, respectively, in the US between 2001 and 2010 (Howlander et al., 2013). Breast cancer also seems more aggressive in China than in developed countries, although tumor size and stage at diagnosis decreases year by year (Zheng et al., 2012). In addition, demographic and pathologic characteristics of breast cancer vary geographically within China as well.

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The mortality and incidence rates are substantially higher in urban compared to rural areas (35.6 versus 15.5 per 100,000; 6.90 versus 4.60 per 100,000 in 2008) (Chen et al., 2013). Women in less economically developed areas are more likely to be diagnosed at later cancer stages than those in other areas (Wang et al., 2012), which might be due to reluctance of seeking screening and workup in poorer areas. One of the most cited reasons of secular and geographic change in breast cancer in China might be social modernization and westernization such as socioeconomic improvements, longer life expectancy, dietary changes, decreased exercise, childbearing delay, and reproductive control (Porter, 2008). As expected, the rates of breast cancer will increase substantially as modernization continues in China.

While more cases are detected in clinical practice, progress has been made in improving outcomes of women with breast cancer through comprehensive effective treatments (Li et al., 2011). Breast cancer is diagnosed at different TMN stages that in turn assist in treatment decisions and outcome prediction (Singh et al., 2007). The prognosis of breast cancer depends on the timing of detection and location of occurrence. According to the US experience, women with localized breast cancer has a 5-year relative survival of 98.2%, as opposed to 84.4% for regional and 24.3% for distant disease (Howlander et al., 2013). As anticipated, overall survival may improve due to early detection through scale-up of routine screening and wider availability of comprehensive treatments in China. With survival increase due to major advances in treatments and early detection of breast cancer, patients' psychological functioning as well as quality of life looms large during and after treatment (Knobf, 2011). The diagnosis and treatment of breast cancer exert an important psychological effect on women (Gandubert et al., 2009). Approximately 30%-50% women with breast cancer experience psychological distress complicated by multiple antecedent and concomitant factors over time (Knobf, 2007; Knobf, 2011). The malignancy itself and prescribed treatments may cause functional restrictions or disabilities which result in an array of psychosocial problems (van't Spijker et al., 1997). Subsequent to definite diagnosis are despair of possible death, stress of informing family members, and fear associated with expectation of drastic life change, followed by adverse effects of treatments and quality of life compromise. Common responses after primary treatment include fear of recurrence, normative mood changes, an increased sense of vulnerability, uncertainty, feelings of loss (eg, fertility), concerns about disfigurement, self concept, and sexuality, emotional distress related to role adjustments and family response, and concerns about finances and employment (Knobf, 2007; Knobf, 2011). Up to one third of patients may suffer from psychological morbidity during the year following primary treatment, and adverse effects may persist in a significant proportion of women for several years (Fafouti et al., 2010). It underscores the significance of understanding psychopathologic profile in breast cancer patients during treatments and follow-up.

To date, a few studies have been conducted to understand psychological morbidity among breast

cancer patients in China (Chen et al., 2002; Zhang, 2002; Chu et al., 2006; Zhang et al., 2008). However, most of these studies had a very small sample size, and did not compare psychological conditions between breast cancer patients and healthy controls; rather they looked at psychopathologic changes among a single group at different time points or narrowly compared the patients with a comparison group established about 30 years ago (Jin et al., 1986). The objectives of the current case-control study were to evaluate general psychopathology among breast cancer survivors after primary treatment in comparison with concurrent healthy women, and tentatively explored demographic correlates with psychological morbidity.

Materials and Methods

Study design and population

The study was conducted based on convenient sampling in the Cancer Institute of Chinese Academy of Medical Sciences (CICAMS). We consecutively recruited breast cancer patients who came to the hospital for follow-up or rehabilitation after primary treatment. Controls were selected from healthy relatives or friends of inpatients in the same institution. Since breast cancer has a limited impact on patients with a long survival, we arbitrarily excluded patients with a survival over 10 years. In addition, patients with cognitive impairment were excluded from recruitment. For the control group, besides the absence of cognitive impairment, absence of major chronic diseases or treatments was required. The study was approved by the Institutional Review Board of the CICAMS. Informed consent was obtained from each research subject before enrollment.

Instrument and data collection

The survey was administered between August 30, 2010 and January 1, 2012. Research subjects were approached by our trained volunteers for a semi-structured interview. Those who consented to the survey were asked about their basic demographic information such as age, education, marital status, ethnicity, and occupation. The validated Chinese version of Symptom Checklist-90-R (SCL-90-R) (Wang, 1984) was given to assess the general psychopathology in them. They were requested to answer the questions according to actual conditions within the past week.

The SCL-90-R is a self-report 90-item psychometric instrument that objectively evaluates a broad range of symptoms of psychopathology. It measures nine symptom dimensions including somatization, interpersonal sensitivity, obsessive-compulsive symptoms, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychotism, as well as a class of additional items that assess other aspect of symptoms; it can provide an overview of a patient's psychological symptoms and their intensity at a given time point (Fafouti et al., 2010). With established reliability and validity, it is widely used in measuring psychological distress in clinical practice and research in Chinese (Tang et al., 1999; Feng et al., 2001; Bian et al., 2008).

Table 1. Demographic Characteristics of Research Subjects

	Breast Cancer Patients (n=291)	Controls (n=531)	P value
Age, years (mean±SD)	55.1±6.40	43.1±12.8	<0.01
Ethnic groups (n, %)			0.08
Han	272 (93.5)	477 (89.8)	
Minorities	19 (6.53)*	54 (10.2)**	
Education (n, %)			<0.01
< Senior middle school	66 (22.7)	110 (20.7)	
Senior middle school or equivalent	132 (45.4)	172 (32.4)	
>Senior middle school	93 (33.0)	249 (47.0)	
Marriage (n, %)			<0.01
Married	270 (92.8)	457 (86.1)	
Divorced or widowed	2 (0.69)	54 (10.2)	
Single	17 (5.84)	13 (2.45)	
Unknown	2 (0.69)	7 (1.32)	
Occupation (n, %)			<0.01
Workers or farmers	80 (27.5)	173 (32.6)	
Managerial or technical staff	29 (9.97)	99 (18.6)	
Commercial or service personnel	20 (6.87)	85 (16.0)	
Retired or unemployed	156 (53.6)	97 (18.3)	
Other	6 (2.06)	77 (14.5)	

*includes 10 Hui, 8 Man, and 1 Meng ethnic Chinese. **includes 1 Bai, 1 Tibetan, 2 Korean, 1 Dong, 13 Hui, 19 Man, 15 Meng, 1 Uyghur, and 1 Zhuang ethnic Chinese

Statistical analysis

Continuous variables were expressed as means ± standard deviation (SD), and categorical variables were computed by numbers and percentages. Demographic characteristics were compared between cases and controls by means of chi-square test and Student's t test.

SCL-90-R dimension scores were compared between breast cancer patients and controls using Student's t test. The association between breast cancer and SCL-90-R dimensions was modeled through multiple linear regression analyses. All models were adjusted for

Table 2. Scores on SCL-90 in Breast Cancer Patients and Controls

SCL-90	Breast Cancer Patients (n=291)	Controls (n=531)	P value
Somatization	1.55±0.53	1.32±0.43	<0.01
Obsessive-compulsive	1.68±0.59	1.47±0.53	<0.01
Interpersonal sensitivity	1.43±0.49	1.29±0.40	<0.01
Depression	1.49±0.54	1.38±0.50	<0.01
Anxiety	1.38±0.50	1.34±0.48	0.25
Hostility	1.38±0.45	1.30±0.42	0.01
Phobic anxiety	1.29±0.49	1.20±0.34	0.01
Paranoid ideation	1.30±0.49	1.23±0.37	0.04
Psychotism	1.28±0.43	1.20±0.34	<0.01
Number of positive factors	26.9±19.8	19.6±18.9	<0.01
Score of positive factors	2.40±0.47	2.36±0.43	0.24
General index	1.45±0.45	1.32±0.37	<0.01

age, ethnicity, education, marriage, and occupation. Standardized regression coefficients (β) and standard errors (SE) were presented based on the linear regression analyses. All P values were two-tailed and statistical significance was indicated by a value of $P<0.05$. SPSS 13.0 was used to analyze data (SPSS Inc., Chicago, USA).

Results

We successfully enrolled 291 female breast cancer patients and 531 healthy women from the CICAMS. The average age was 55.1±6.40 (mean ± SD) years for breast cancer patients and 43.1±12.8 for controls ($P<0.001$). The mean survival was 5.2 years for cancer patients (range, 0.60-9.90 years). Demographic characteristics of patients with breast cancer and controls are summarized in Table 1. Most cancer patients were ethnic Han Chinese (93.5%), received education equivalent to senior middle school or above (78.3%), were married (92.8%), and

Table 3A. Multiple Linear Regression Models: Standardized Regression Coefficients and Standard Errors for SCL-90 Dimensions

SCL-90 dimension	Somatization		Obsessive-compulsive		Interpersonal sensitivity		Depression		Anxiety	
	β	SE	β	SE	β	SE	β	SE	β	SE
Breast cancer	0.19*	0.04	0.15*	0.05	0.16*	0.04	0.10**	0.04	0.04	0.04
Age, years (mean±SD)	0.04	0.00	0.02	0.00	-0.06	0.00	-0.01	0.00	0.00	0.00
Ethnic groups (n, %)										
Han										
Minorities	-0.01	0.06	-0.01	0.07	0.00	0.05	0.01	0.06	0.01	0.06
Education (n, %)										
< Senior middle school										
Senior middle school or equivalent	0.06	0.05	0.03	0.05	0.04	0.04	0.02	0.05	0.05	0.05
>Senior middle school	0.08	0.05	0.02	0.06	0.05	0.05	0.07	0.05	0.06	0.05
Marriage (n, %)										
Married										
Divorced or widowed	-0.05	0.08	0.02	0.09	0.02	0.07	-0.01	0.08	0.00	0.08
Single	0.03	0.09	0.02	0.10	0.08	0.08	0.03	0.10	0.01	0.09
Unknown	-0.03	0.16	-0.02	0.19	-0.03	0.15	-0.02	0.17	-0.01	0.17
Occupation (n, %)										
Workers or farmers										
Managerial or technical staff	-0.05	0.06	-0.02	0.07	-0.03	0.05	-0.06	0.06	-0.04	0.06
Commercial or service personnel	0.01	0.06	0.05	0.07	0.00	0.06	-0.04	0.06	0.00	0.06
Retired or unemployed	0.00	0.05	0.05	0.05	0.02	0.04	-0.01	0.05	-0.01	0.05
Other	-0.02	0.06	-0.02	0.07	-0.02	0.06	-0.06	0.07	-0.03	0.06

* $P<0.01$, ** $P<0.05$

Table 3B. Multiple Linear Regression Models: Standardized Regression Coefficients and Standard Errors for SCL-90 Dimensions

SCL-90 dimension	Hostility		Phobic anxiety		Paranoid ideation		Psychotism		General index	
	β	SE	β	SE	β	SE	β	SE	β	SE
Breast cancer	0.11*	0.04	0.08	0.03	0.08	0.04	0.12*	0.03	0.14*	0.03
Age, years (mean \pm SD)	-0.06	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.00
Ethnic groups (n, %)										
Han										
Minorities	0.01	0.05	0.03	0.05	0.01	0.05	-0.01	0.05	0.00	0.05
Education (n, %)										
< Senior middle school										
Senior middle school or equivalent	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
>Senior middle school	0.02	0.05	0.01	0.04	0.03	0.04	0.04	0.04	0.05	0.04
Marriage (n, %)										
Married										
Divorced or widowed	0.01	0.07	0.02	0.07	0.01	0.07	0.03	0.06	0.00	0.07
Single	0.02	0.08	0.04	0.08	0.05	0.08	0.02	0.07	0.03	0.08
Unknown	-0.02	0.15	-0.03	0.14	-0.02	0.14	-0.04	0.13	-0.03	0.14
Occupation (n, %)										
Workers or farmers										
Managerial or technical staff	-0.01	0.05	-0.04	0.05	-0.03	0.05	-0.02	0.05	-0.04	0.05
Commercial or service personnel	0.05	0.06	-0.02	0.05	0.05	0.05	0.03	0.05	0.01	0.05
Retired or unemployed	0.06	0.04	0.00	0.04	0.05	0.04	-0.01	0.04	0.02	0.04
Other	-0.01	0.06	-0.02	0.05	0.00	0.05	0.01	0.05	-0.03	0.05

* $P < 0.01$

retired or unemployed (53.6%). There were statistical significant differences between cases and controls in terms of education between two groups ($P < 0.01$). Statistically significant difference with regard to marriage and occupation ($P < 0.01$ for both) was also noted between the cases and controls.

Mean scores on different dimensions of SCL-90-R are summarized in Table 2. General index (1.45 \pm 0.45 versus 1.32 \pm 0.37) and 8 dimension scores on SCL-90-R were significantly higher in patients ($P < 0.05$). However, no statistically significant difference was noted in the anxiety score between two groups ($P = 0.25$). Results of multiple linear regression analyses with all SCL-90-R scales as dependent variables are shown in Table 3A and 3B. The breast cancer status was the only variable that was significantly associated with the SCL-90-R general index ($P < 0.01$). It was also positively associated with somatization ($P < 0.01$), interpersonal sensitivity ($P < 0.01$), obsessive-compulsive symptom ($P < 0.01$), depression ($P < 0.02$), hostility ($P < 0.01$), and psychotism ($P < 0.01$). In addition, we found that single women had higher scores on interpersonal sensitivity compared to married women ($P = 0.02$). Regression coefficients ranged from 0.10 (depression) to 0.19 (somatization). However, all other demographic variables were not statistically associated with SCL-90-R dimension scores or general index.

Discussion

The shock of diagnosis, existential concerns, the burden of treatment, and changes in body and self-image present a substantial challenge to adaptation and coping for women with breast cancer (Kissane et al., 2004). Common psychosocial issues in women with breast cancer include fear of recurrence, body image

disruption, sexual dysfunction, treatment-related anxieties, intrusive thoughts about illness/persistent anxiety, marital/partner communication, feelings of vulnerability, and existential concerns regarding mortality (Ganz, 2008). Although there have been multiple investigations in the psychopathological profile of breast cancer patients in China, our study is the largest one that compared women with the disease and healthy controls for psychopathological problems based on the widely used SCL-90-R. A major finding in our study was that breast cancer patients showed statistically significant higher general index and individual dimension scores compared to healthy controls. In particular, breast cancer was positively correlated with SCL-90-R general index and most dimension scores. Our findings may contribute to the growing evidence of psychopathology in breast cancer with current or follow-up treatment. Attention thus should be given to patients' psychological wellbeing in addition to cancer control and symptom relief.

Breast cancer patients showed statistically significantly higher scores in almost all measures of psychopathology (excluding anxiety) as assessed by the SCL-90-R. This finding is consistent with previous studies in China (Zhang, 2002) and other countries (Ganz, 2008; Gandubert et al., 2009; Fafouti et al., 2010). Multiple regression analysis showed that the cancer status was the only variable associated with the SCL-90-R general index. After controlling for basic demographic factors, it was still positively associated with psychological problems such as somatization, interpersonal sensitivity, obsessive-compulsive symptom, depression, hostility, and psychotism. It is hypothesized that the disease condition may activate complex mechanisms giving rise to a wide psychopathology. The result is meaningful because it indicates that the disease makes a larger independent

contribution to these psychopathological measures than any of the other investigated variables. Most women adjust well to the diagnosis of breast cancer and manage to endure adverse effects with primary treatment, and psychological distress diminishes with improvement in physical symptoms (Ganz, 2008), even though physical symptoms like fatigue, menopausal symptoms, neuropathy, and insomnia persist when therapy ends. However, in others persistent emotional distress may progress to a wide spectrum of psychopathological responses such as reactive anxiety, depression, adjustment disorder, fears of recurrence, worry, and distress related to sexuality changes, self concept, and family and marital relationships (Knobf, 2011). In addition, social and emotional support from family and friends gradually decreases when they notice no more needs for treatment because the patient's hair begins to grow back, skin reactions from radiation therapy improve, and strength and physical vitality is seemingly regained. Current physician-advised follow-up visits often emphasize assessment of physical symptoms and cancer status, and ignore psychological symptom distress or communication related to psychosocial and sexual functioning. Our findings suggest that breast cancer patients should be followed up after diagnosis and even major treatments to identify psychological problems, and given appropriate psychosocial intervention to facilitate more positive treatment outcomes.

In our study, age, ethnicity, education, and occupation were not associated with psychopathological profile of breast cancer, while we found that single women had higher interpersonal sensitivity. Our finding was inconsistent with that in previous studies that conclude age and ethnicity are statistically significant correlates for psychological response to breast cancer (Ganz, 2008; Knobf, 2011). This might be due to the fact that most breast cancer patients were older women (overall 50 years) and ethnic Han Chinese in our study, so the impact of age and ethnicity could not be established by statistical analysis. In the earlier review, younger age, fewer personal resources, poorly controlled physical symptoms, poor communication, lack of support, past history of a mood disorder, greater personal life stress, avoidant coping styles, and lower optimism and hope are pivotal factors that affect the psychological symptoms and quality of life of a breast cancer patient (Knobf, 2011). We noted that single women with breast cancer scored higher on the interpersonal sensitivity symptom, which suggest that they may be more susceptible to problems relating to appropriately understanding others and responding accordingly. Husband is an important source of family support and his emotional involvement and understanding of the spouse's cancer experience is directly associated with psychological adjustment and outcomes (Wimberly et al., 2005; Manne et al., 2006).

Of note, the positive association between psychological profile and development and course of breast cancer has been well suspected based on anecdotal evidence and partly explains the variability of individual outcomes in context of similar disease conditions and treatments (van't Spijker et al., 1997). For example, breast cancer patients with depression may have a modestly but significantly

higher risk of mortality depending on stage of breast cancer and time of depression (Hjerl et al., 2003). The implementation of psychosocial intervention might be justified during clinical treatment of breast cancer patients.

Our study has certain limitations to address. Given the small sample size of the present study, it is unclear to what extent our findings are generalizable to the broader population of survivors of breast cancer. In addition, we expect that breast cancer patients from different times are treated with different modalities according to available guidelines, which might impact the outcomes of treatment and accompanied psychosocial responses, given that the span of survival is nearly ten years among patients in our study. Thirdly, no detailed psychiatric history was available for research subjects at recruitment, and the bias due to this lack of information is inevitable. Moreover, our study only tentatively identified the association between the breast cancer status and psychopathological profile based on the variance of scores between breast cancer patients and healthy controls. However, this deduction might be questionable since SCL-90-R is a general instrument not intended for diagnostic purposes in clinical practice and a higher score does not necessarily indicate absolute psychopathology since there is no established up to date threshold for determining abnormality in China. Last but not least, lack of treatment and staging information of cervical cancer might hinder us from making a solid conclusion.

In conclusion, Chinese patients with breast cancer demonstrate psychopathology compared to healthy controls. The breast cancer status is an independent contributing factor to the general psychopathological profile. Breast cancer patients should be given particular counseling and care to alleviate the psychological distress.

Acknowledgements

This study was supported by the Beijing Hope Marathon Fund (No. 2010YF47). We thank all the volunteers who helped us conduct the survey in CICAMS. We are also grateful to research subjects for their cooperation in the study. The abstract of our manuscript was accepted for oral presentation (ID: 602) in the 45th Asia Pacific Academic Consortium of Public Health Conference in Wuhan, China.

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