

# Patient delay and associated factors among Chinese women with breast cancer

## A cross-sectional study

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### Abstract

To examine the current situation of patient delay and to identify factors associated with patient delay among women with breast cancer in China.

A total of 283 women, aged 23 to 83 years old and with histologically confirmed breast cancer, were investigated in this cross-sectional study. The women were recruited from seven selected hospitals in Sichuan Province, China. Face-to-face interviews using a structured questionnaire were performed.

Among the 283 participants, the range of patient delay was 0.2 to 900 days with a median patient delay of 50 days. A total of 35.8% of patients waited  $\geq 90$  days to access medical treatment after symptom onset. Binary logistic regression analysis showed that the main predictors of patient delay were knowledge of breast cancer symptoms (OR = 0.716, 95%CI: 0.637–0.804,  $P = .000$ ), external health locus of control (OR = 1.173, 95%CI: 1.087–1.266,  $P = .000$ ), breast self-examination/physical examination (OR = 0.065, 95%CI: 0.007–0.590,  $P = .015$ ), perceived health competence (OR = 0.873, 95%CI: 0.808–0.944,  $P = .000$ ), family support (OR = 0.911, 95%CI: 0.847–0.981,  $P = .013$ ), pain stimulation (OR = 0.191, 95%CI: 0.046–0.792,  $P = .023$ ) and age (OR = 1.028, 95%CI: 1.000–1.058,  $P = .049$ ).

These factors explained 41.0% of the variance.

Information on the current situation and predictors of patient delay in Chinese women with breast cancer might provide meaning insights into the early diagnosis of breast cancer. The results of this study may help health professionals develop specific clinical practice strategies to reduce patient delay of initial treatment as a way to improve outcomes for women with breast cancer.

**Abbreviations:** 95%CI = 95% confidence interval, BCSK = breast cancer symptom knowledge, BSE = breast self-examination, CBE = clinical breast examination, HRHS = Health-Related Hardiness Scale, OR = odds ratio, PSS-Fa = Perceived Social Support from Family Scale, RHHI = Revised Health Hardiness Inventory.

**Keywords:** breast cancer, cancer, oncology, patient delay

## 1. Introduction

According to the GLOBOCAN 2012 statistics, breast cancer has the highest incidence among all cancers and is the leading cause of cancer death for women worldwide.<sup>[1]</sup> China accounts for 12.2%

of all newly diagnosed breast cancers worldwide, and breast cancer remains the most common cancer among Chinese women.<sup>[2]</sup> The most recent incidence and mortality rates showed an upward trend, as indicated by the National Central Cancer Registry of China (NCCR) database.<sup>[3]</sup> Early diagnosis of breast cancer is the most crucial factor for reducing mortality. However, additional delays between the discovery of symptoms and seeking medical care are likely to postpone an early diagnosis.

There is strong evidence that long delays are associated with lower survival.<sup>[4–6]</sup> Richards conducted a meta-analysis and found that the 5-year survival rate of patients with delays of 3 to 6 months was lower than that of patients with delays of <3 months.<sup>[5]</sup> In developing countries, patient delay is a major contributor to reduced survival.<sup>[7]</sup> Based on these results, several cancer prevention and treatment organizations regard reducing delayed patient presentation as equal in importance to breast self-examination (BSE) and screening for controlling breast cancer globally.<sup>[8]</sup>

Delayed presentation can be categorized into patient delay and provider delay.<sup>[4,9]</sup> Patient delay refers to a prolonged interval from the onset of symptoms to the initial presentation for a clinical appointment.<sup>[10,11]</sup> Typically, a patient delay  $\geq 90$  days after the onset of possible symptoms of the disease is considered to be the criterion.<sup>[12,13]</sup>

A large number of studies have focused on patient delay. However, little attention has been given to Chinese women with breast cancer. To our knowledge, the importance of early

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detection and timely seeking of medical treatment are not fully recognized in Chinese women, especially older women.<sup>[14,15]</sup>

The aims of this study were to identify the current situation of patient delay and the predictive factors that affect Chinese women with breast cancer. The present study, conducted in seven hospitals in China, cannot only improve our understanding of the current extent of and factors associated with patient delay, but can be of great help for developing specific clinical practice strategies to reduce patient delay as a way to improve outcomes for women with breast cancer in China.

## 2. Methods

### 2.1. Participants and procedures

A cross-sectional descriptive research design was used, and a total of 312 Chinese women with a histologically confirmed diagnosis of breast cancer were recruited by a convenience sampling strategy from January 2017 to June 2017. The participants were consecutively enrolled from seven hospitals (six tertiary grade A general hospitals and one tertiary grade A specialized cancer hospital) from five regions of central Chengdu in Sichuan Province, which is located in Southwest China: West China Hospital; Sichuan Academy of Medical Sciences & Sichuan Provincial People's Hospital; General Hospital of Chengdu Military Region; Chengdu First People's Hospital; Chengdu Second People's Hospital; The Third People's Hospital of Chengdu, and Sichuan Cancer Hospital & Institute. The inclusion criteria were as follows: patients who

1. had pathologically diagnosed breast cancer;
2. had normal linguistic and comprehension abilities;
3. were older than 18 years of age; and
4. agreed to participate in the study.

The study exclusion criteria were as follows:

1. a history of mental illness,
2. cognitive disorders,
3. other comorbid cancers,
4. relapsed breast cancer and
5. a history of drug addiction.

### 2.2. Measures

Data were obtained via face-to-face interviews. All participants were asked to complete the structured questionnaires independently after giving their consent. A total of five instruments were used to collect the participants' socio-demographic and clinical-related data and to measure the three dependent variables. The questionnaires include a socio-demographic characteristics form, a clinical-related characteristics form, the Breast Cancer Symptom Knowledge (BCSK) scale, the Revised Health Hardiness Inventory (RHHI-24) and the Perceived Social Support from Family scale (PSS-Fa).

**2.2.1. Socio-demographic and clinical-related characteristics.** A socio-demographic characteristics questionnaire based on a literature review was self-designed to collect the participants' socio-demographic information, including age, ethnicity, religion, marital status, place of residence, education level, household income, and medical payment method. In addition, we designed a clinical-related characteristics questionnaire

reflecting medical-treatment-seeking behavior, including pathological classification, clinical stage, symptom type, method of symptom discovery, when the symptoms were first discovered, and when the patient sought medical treatment for the first time.

**2.2.2. Breast cancer symptom knowledge.** The 15-item BCSK scale<sup>[16]</sup> was used to assess the patients' knowledge regarding breast cancer symptoms and presentation, including the danger signs of breast cancer endorsed by the American Cancer Society. The range of total scores is from 0 to 15. The scale shows excellent reliability and validity among English-speaking and Spanish-speaking populations in America.<sup>[17]</sup> In the present study, the Cronbach's  $\alpha$  of the scale was 0.87, and the content validity index was 0.84.

**2.2.3. Health hardiness.** Patients' health hardiness was assessed by the RHHI-24.<sup>[18]</sup> The RHHI-24 was developed based on the Health-Related Hardiness scale (HRHS).<sup>[19]</sup> The RHHI-24 comprises 24 items and four dimensions: health values, internal health locus of control, external health locus of control, and perceived health competence. Responses to this self-report scale are given using a 5-point Likert scale from 1 = "completely disagree" to 5 = "completely agree." The Cronbach's  $\alpha$  of each subscale ranges from 0.66 to 0.79.<sup>[18]</sup> The Cronbach's  $\alpha$  of the Chinese version ranges from 0.77 to 0.83.<sup>[20]</sup> In the present study, the Cronbach's  $\alpha$  of the four dimensions ranged from 0.67 to 0.87.

**2.2.4. Family support.** Participants' family support was assessed by the PSS-Fa, developed by Procidano and Heller. The reliability coefficient of the PSS-Fa was 0.90, showing good construct validity in three validation studies.<sup>[21]</sup> The Chinese version of the scale comprises 15 items with a "yes" or "no" response format that measure support from family members. The total scale scores range from 0 to 15, with higher scores indicating higher levels of family support. The reliability coefficient of the scale, as tested with the Kuder-Richardson 21 (KR-21) formula, was 0.95.<sup>[22]</sup> In the present study, the Cronbach's  $\alpha$  of the scale was 0.83.

### 2.3. Ethics considerations

Ethics approval to conduct the study was obtained from the West China Hospital Sichuan University Biomedical Ethics Committee (approval number: 201712).

### 2.4. Statistical analysis

All data analyses were performed using SPSS, version 22.0 (Chicago, IL). Descriptive statistics were calculated for the socio-demographic and clinical-related characteristics data and the magnitude of patient delay. Categorical variables between the groups were compared using the non-parametric Mann-Whitney *U* or Kruskal-Wallis *H* tests. Correlations were calculated using the Spearman rank correlation analysis. Multivariate analyses were performed using binary logistic regression to identify the predictor variables for patient delay. For all analyses, a *P* value < .05 (two-tailed) was considered statistically significant.

## 3. Results

A total of 312 questionnaires were distributed, and 283 were returned. Twenty-nine questionnaires were excluded because the participants did not remember the exact time of the onset of their

breast disease symptoms. The return rate of valid questionnaires was 90.71%.

### 3.1. The characteristics of the study population

Table 1 shows the socio-demographic and clinical characteristics of the study population (n=283). The mean age of all patients was 47 years (range: 23–83 years). All the participants were Han Chinese, and 266 (94%) patients had no religious beliefs. The majority of the patients, 223 (78.8%), came from an urban setting. A total of 258 (91.2%) patients were married. A total of 92 (32.5%) of the surveyed patients paid their own medical fees. Additionally, 94.3% of the patients had invasive breast cancer, and 25.8% of patients had stage II breast cancer. Table 2 shows the symptom type and method of symptom discovery of the participants. The first symptom noticed by 242 (61.6%) of the patients was a breast lump. Pain in the breast was reported by 64 participants (16.3%). The main method of symptom discovery was “accidental,” accounting for 82.7%.

### 3.2. Patient delay in seeking medical treatment

The frequency distribution of patient delay is shown in Table 3. The median patient delay in our setting was 50 days (range: 0.2–900 days). The interquartiles for patient delay were 170 days. For 45.9% (130/283) of the patients, a consultation was sought within 29 days after the patients noticed symptoms related to breast cancer. The remaining 35.8% (101/283) of patients delayed treatment by more than 90 days, while 11.8% (33/283) of patients sought medical treatment after more than 366 days.

### 3.3. Factors influencing patient delay

According to the normality test results, patient delay showed a non-normal distribution (Kolmogorov–Smirnov  $Z$  test,  $P < .05$ ). Therefore, patient delay levels in different categories were compared using the non-parametric Mann–Whitney  $U$  or Kruskal–Wallis  $H$  test. Patient delay was significant in the following subgroups: age ( $Z = -2.200$ ,  $P = .028$ ), place of residence ( $Z = -2.485$ ,  $P = .013$ ), and method of symptom discovery ( $\chi^2 = 23.667$ ,  $P = .013$ ). The results of the Spearman rank correlation showed that education level ( $r = -0.214$ ,  $P < .003$ ), monthly income per capita ( $r = -0.148$ ,  $P < .010$ ), knowledge of breast cancer symptoms ( $r = -0.447$ ,  $P < .000$ ), family support ( $r = -0.140$ ,  $P = .019$ ), health values ( $r = -0.287$ ,  $P < .000$ ), internal health locus of control ( $r = -0.180$ ,  $P < .002$ ), external health locus of control ( $r = 0.408$ ,  $P < .000$ ), and perceived health competence ( $r = -0.333$ ,  $P < .000$ ) were correlated with patient delay.

Multivariate analyses using patient delay as a dependent variable after transformation to a binary variable (“<90 days” = 0 and “≥90 days” = 1) were performed. Combining the significant variables from the univariate analysis and the results of the literature review, the following variables were used as independent variables: age, place of residence, education level, monthly income per capita, medical payment method, method of symptom discovery, knowledge of breast cancer symptoms, family support, health values, internal health locus of control, external health locus of control, and perceived health competence. The defined values of all the independent variables and the dependent variable are shown in Table 4. The partial maximum likelihood estimation forward method (forward: LR) was used to establish

**Table 1**

**The characteristics of the study population (n=283).**

Characteristics	Type	Number	Composition ratio
Clinical site	1	86	30.4
	2	81	28.6
	3	41	14.5
	4	23	8.1
	5	15	5.3
	6	21	7.4
	7	16	5.7
Age, years	~30	8	2.8
	31–40	56	19.8
	41–50	97	34.3
	51–60	73	25.8
	61–70	33	11.7
	71~	16	5.7
Ethnicity	Han Chinese	283	100.0
Religion	No	266	94.0
	Yes (Buddhism, Christianity, Taoism)	17	6.1
Education level	Below primary school	53	18.7
	Junior/middle school	89	31.4
	Senior high/vocational school	78	27.6
	University and above	63	22.3
Place of residence	Rural	60	21.2
	Urban	223	78.8
Marital status	Unmarried	8	2.8
	Married	258	91.2
	Divorced/widowed	17	6.0
Monthly income per capita (RMB)	~2500	207	73.2
	2501–5000	57	20.1
	5001~	19	6.7
Medical payment method	Self-payment	92	32.5
	Medical insurance	191	67.5
Pathological classification	Non-invasive breast cancer	1	0.4
	Early invasive breast cancer	14	4.9
	Invasive breast cancer	279	94.3
	Other rare breast cancer	1	0.4
Clinical stages	0	1	0.4
	I	46	16.2
	Ila	73	25.8
	Ilb	62	21.9
	IIla	41	14.5
	IIlb	50	17.7
IV	10	3.5	

RMB = renminbi.

the binary logistic regression model and verify the affected factors of patient delay.

Binary logistic regression analysis revealed that the main predictors of patient delay were knowledge of breast cancer symptoms, external health locus of control, BSE/clinical breast examination (CBE), perceived health competence, family support, pain stimulation, and age (Table 5). These variables explained 41% of the variance in patient delay among breast

**Table 2****Symptom type and method of symptom discovery of the participants (n=283).**

Symptom type and method of symptom discovery	Frequency	%
Symptom type		
Breast lump	242	61.6
Pain	64	16.3
Nipple discharge	22	5.6
Local thickening/hardening	15	3.8
Breast skin dimpling/redness and swelling	15	3.8
Armpit lump	12	3.0
Nipple scaling/ulcers/itching	8	2.0
Change in breast shape	7	1.8
Chest lump	5	1.3
No symptom (no examination)	3	0.8
Method of symptom discovery		
Accidental discovery	234	82.7
BSE/CBE	26	9.2
Pain stimulation	23	8.1

BSE/CBE=breast self-examination/clinical breast examination.

cancer patients. Knowledge of breast cancer symptoms (standardized  $\beta = -0.752$ , OR=0.716, 95%CI:0.637–0.804,  $P = .000$ ), BSE/CBE (standardized  $\beta = -0.436$ , OR=0.065, 95%CI:0.007–0.590,  $P = .015$ ), perceived health competence (standardized  $\beta = -0.343$ , OR=0.873, 95%CI:0.808–0.944,  $P = .000$ ), family support (standardized  $\beta = -0.260$ , OR=0.911, 95%CI:0.847–0.981,  $P = .013$ ), and pain stimulation (standardized  $\beta = -0.252$ , OR=0.191, 95%CI:0.046–0.792,  $P = .023$ ) were protective factors of patient delay in breast cancer patients. However, age (standardized  $\beta = 0.178$ , OR=1.028, 95%CI:1.000–1.058,  $P = .049$ ) and external health locus of control (standardized  $\beta = 0.458$ , OR=1.173, 95%CI:1.087–1.266,  $P = .000$ ) were risk factors of patient delay in breast cancer patients (Table 5).

#### 4. Discussion

The results show that the median patient delay for the recruited sample was 50 days, and the rate of patient delay (length of delay  $\geq 90$  days) was 35.8%. Compared with the results in studies from other developing countries, the rate of delay in the present study is moderate. In Uganda, 89% of patients had a delay of  $\geq 3$  months after the first discovery of symptoms or anomalies, and the reported median delay was 13 months.<sup>[23]</sup> Among Nigerian breast cancer patients, 81.6% delayed seeking professional help for more than 3 months.<sup>[24]</sup> Compared with studies from developed countries, our study showed a slightly more severe patient delay. A survey conducted in the United States by George reported that 26.4% of African American patients and 17.5% of

**Table 3****Frequency distribution of patient delay (n=283, unit: days).**

Duration of patient delay (days)	Frequency	%
~29	130	45.9
30~59	27	9.5
60~89	25	8.8
90~179	34	12.0
180~365	34	12.0
366~	33	11.8

**Table 4****Assignment values of the variables included in the logistic regression analyses.**

Variable name	Assignment value method
Patient delay	"<90 days" = 0; "≥90 days" = 1
Age (years)	Original value
Place of residence	Rural = 0; urban = 1
Education level	Below primary school = 1; junior/middle school = 2 Senior high/vocational school = 3; University and above = 4
Medical payment method	Self-payment = 1; medical insurance = 2
Monthly income per capita (RMB)	"~2500" = 1; "2501~5000" = 2; "5001~" = 3
Method of symptom discovery	Pain stimulation = (1,0) BSE/CBE = (0,1) Accidental discovery = (0,0)
Knowledge of breast cancer symptoms	Original value
Family support	Original value
Health values	Original value
Internal health locus of control	Original value
External health locus of control	Original value
Perceived health competence	Original value

BSE/CBE=breast self-examination/clinical breast examination, RMB=renminbi.

white patients with early-stage breast cancer delayed treatment by  $\geq 3$  months.<sup>[25]</sup> Forbes reported that 8.4% of breast cancer patients in England delayed seeking medication for more than 3 months.<sup>[26]</sup>

We found that knowledge of breast cancer symptoms is the most predictive of all the factors that affect patient delay (OR=0.716, 95%CI:0.637–0.804). Similar results were reported in other studies from different nations, namely, that a lack of specific BCSK is an important factor influencing delayed presentation for treatment.<sup>[25–29]</sup> Better BCSK might help individuals identify cancer symptoms and reduce possible patient delay. Smith reported that incorrect identification of symptoms may be the main cause of patient delay.<sup>[30]</sup> In China, women need to improve their awareness and behavior of early detection of breast cancer.<sup>[31]</sup> Sichuan Province is located in Southwest China, and residents have a relatively low socioeconomic level, inadequate BCSK, and lack of awareness regarding the early discovery of breast cancer symptoms.

Consistent with other studies, our study identified that age is an important factor related to patient delay. In the regression analysis, older age is the only socio-demographic factor that is associated with patient delay (OR=1.028, 95%CI:1.000–1.058). This result is consistent with those of studies from several other countries.<sup>[11,32]</sup> A systematic review showed strong evidence that older age is associated with longer delays in seeking medical treatment.<sup>[11]</sup> Burgess reported that older women are more likely to delay presentation with breast cancer.<sup>[33]</sup> In the present study, some participants believed that seeking medical treatment would only cause trouble for others. In China, many older women live with their children and often tend to the needs of other family members rather than their own.<sup>[34]</sup> Therefore, they do not seek medical treatment immediately after discovering symptoms and choose to wait and/or overlook their symptoms. The present study observed that some older patients who delayed presenting for medical treatment tended to neglect breast cancer symptoms, usually believing that they were natural changes after the onset of menopause. The elderly women attributed these



**Table 5****The result of the multiple logistic regression analysis for patient delay (n=283).**

Variable	B	S.E.	P	Standardized $\beta$	OR	95% CI
Knowledge of breast cancer symptoms	-0.335	0.059	.000**	-0.752	0.716	[0.637, 0.804]
External health locus of control	0.160	0.039	.000**	0.458	1.173	[1.087, 1.266]
BSE/CBE	-2.730	1.123	.015*	-0.436	0.065	[0.007, 0.590]
Perceived health competence	-0.136	0.040	.000**	-0.343	0.873	[0.808, 0.944]
Family support	-0.093	0.037	.013*	-0.260	0.911	[0.847, 0.981]
Pain stimulation	-1.657	0.726	.023*	-0.252	0.191	[0.046, 0.792]
Age	0.028	0.014	.049*	0.178	1.028	[1.000, 1.058]
Constant	2.924	1.951	.134			

BSE/CBE = breast self-examination/clinical breast examination.

\*  $P < .05$ .\*\*  $P < .01$ .  $R^2 = 0.41$ .

symptoms to aging instead of viewing them as an early warning sign.

External health locus of control refers to attributing health to external events such as chance and fate. In our study, patients with an external health locus of control are more likely to delay seeking medical help (OR = 1.173, 95% CI: 1.087–1.266), whereas perceived health competence reduces patient delay (OR = 0.873, 95% CI: 0.808–0.944). These results are consistent with the study by Tromp et al regarding head and neck cancer patients.<sup>[35]</sup> In addition, our results showed that health value and internal health locus of control do not affect delays in seeking medical treatment, which is consistent with the findings of other studies.<sup>[35,36]</sup> The reason for these results might be that when facing a life-threatening disease, such as cancer, individual differences in health value are very small, as people generally attach great importance to health.<sup>[36,37]</sup>

The results of the multivariate analysis in this study revealed that patients with less family support reported a long patient delay (OR = 0.911, 95% CI: 0.847–0.981). One study showed that most patients sought medical treatment after persuasion and encouragement from their families.<sup>[38]</sup> When individuals disclose their symptoms to someone close to them, they might receive encouragement as well as assistance to seek medical treatment and are thus less likely to delay. A previous study suggested that female patients who have a high level of support are less likely to have a long patient delay.<sup>[39]</sup> In the present study, family support is associated with the length of patient delay. High levels of family support can help patients to confide in others, encouraging them to disclose their symptoms and providing encouragement as well as assistance to seek medical treatment.

In this study, 6.0% (17/283) of the participants discovered their symptoms through BSE, and only 3.2% (9/283) of the participants discovered their symptoms through CBE. Compared with participants who discovered their symptoms by accident, those who discovered their symptoms through BSE/CBE were less likely to delay seeking medical treatment (OR = 0.065, 95% CI: 0.007–0.590). BSE and/or CBE can both be effectively used to identify and improve early detection to increase the chances of disease treatment at an early stage.<sup>[40–42]</sup> Although the association of breast cancer screening with reduced breast cancer mortality has not been adequately demonstrated,<sup>[43–45]</sup> early detection of breast cancer has been included in international cancer control programs as the cornerstone of efforts to control breast cancer and support breast health services in low- and middle-income resource settings.<sup>[46,47]</sup>

According to the multivariate analysis, pain stimulation promotes early seeking of medical treatment (OR = 0.191, 95% CI: 0.046–0.792), which is consistent with the results of Nosarti's study.<sup>[12]</sup> Lumley reviewed the psychological literature from the last decade and found that strong pain is related to emotional stress.<sup>[48]</sup> Forbes noted that pain could increase an individual's emotional stress and thus motivate him/her to seek early medical treatment or increase his/her sensitivity to symptoms.<sup>[49]</sup> Therefore, pain stimulation might prompt individuals to take a positive action to reduce delay.

Some limitations of this study should be noted. First, the selection criteria excluded patients with cognitive disorders, including mild cognitive impairment, which can introduce selection bias. Future studies of the Chinese breast cancer population with mild cognitive impairment should be considered. Second, the representativeness of the sample may be undermined by the convenience sampling method used in the present study. Third, cancer may persist over several years and can become a chronic disease, and the risk of possible recall bias in self-reported questionnaires cannot be excluded in studies of patient delay. Fourth, the distance between the place of residence and the consulting hospital may be associated with the patient delay. Unfortunately, we did not collect these data, which warrants further measurements in future investigations.

## 5. Conclusions

The results in this study show that patient delays are relatively common, with 35.8% of patients in Sichuan Province, China, having at least a 90-day delay in seeking medical treatment. The findings support that appropriate interventions are needed to reduce the length of patient delay among breast cancer patients, such as increasing knowledge about breast cancer symptoms to improve women's health competence in the identification of symptoms; guiding women in BSE and encouraging women, especially elderly ones, to participate in physical examinations; and providing health information to women. Additionally, family support is critical in encouraging women to seek medical help in a timely manner and in helping them to access care after they discover breast abnormalities.

The findings in the present study suggest that future efforts should focus on providing health education regarding the early detection of breast cancer to increase individuals' health consciousness and knowledge of symptoms and facilitate earlier medical presentation. Such efforts should include the development of clinical interventions to improve women's health

competence and to reduce the delay in medical treatment, particularly by providing guidance for high-risk groups in China.

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## Author contributions

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