BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (http://bmjopen.bmj.com).

If you have any questions on BMJ Open's open peer review process please email
info.bmjopen@bmj.com

BMJ Open

Emotional, informational, and instrumental support needs in breast cancer patients after surgery: a cross-sectional study

SCHOLARONE™
Manuscripts

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

BMJ

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Emotional, informational, and instrumental support needs in breast cancer patients after surgery:

a cross-sectional study

Tingting Cai [1]·Qingmei Huang[1]·Changrong Yuan[1]

School of Nursing, Fudan University, Shanghai, China

Correspondence: Changrong Yuan, yuancr@fudan.edu.cn, PhD, RN, FAAN

Abstract

Objectives: To evaluate emotional, informational, and instrumental support needs in breast cancer patients after surgery and identified variables associated with these needs.

Design: Cross-sectional survey.

Methods: This study was conducted in three tertiary hospitals in China between January 2018 and July 2020. Using convenience sampling, eligible breast cancer patients completed the sociodemographic information questionnaire, the PROMIS social relationships short form, the PROMIS anxiety short form, and the PROMIS depression short form.

Results: A total of 461 breast cancer patients, with a mean age of 50.9 years, were recruited in this study. The T scores of the informational support were lower than the reference group, while those of emotional and informational support were at an average level. Marital status, childbearing history, lifestyle, employment status, anxiety, and depression level were related to the scores of emotional, informational, and instrumental support. Regression analysis revealed that the level of emotional support and instrumental support, marital status, employment status, anxiety, and depression outcomes were predictors for informational support.

Conclusions: Informational support should be specifically assessed and promoted in breast cancer

1

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

patients. Marital status, childbearing history, lifestyle, employment status, anxiety, and depression level should be evaluated when conducting interventions to promote emotional, informational, and instrumental support in this population.

Relevance to clinical practice: Early and regular screenings for high-risk patients will facilitate nurses to identify patients who are likely to benefit from targeted preventive interventions for emotional, informational, and instrumental support issues.

Trial registration numbers ClinicalTrials. gov registry (ChiCTR2000035439).

KEYWORDS

breast cancer, emotional support, informational support, instrumental support, social health

Strengths and limitations of this study

1. To our knowledge, this study is one of the few to examine self-reported emotional, informational, and instrumental support needs and the predictors in breast cancer patients after surgery, especially in the Chinese cancer population.

2. The results will facilitate nurses to identify patients who are likely to benefit from targeted preventive interventions for emotional, informational, and instrumental support issues.

3. The survey only included breast cancer patients in tertiary hospitals.

4. The focus was on breast cancer patients undergoing surgery, and the majority of them were middle-aged patients.

2

INTRODUCTION

Breast cancer is the most frequent cancer in women worldwide.[1] The diagnosis and treatment of breast cancer are traumatic and life-changing events, which could cause a long-lasting impact on patients' social interactions.[2] The social relationship issues were reportedly affected by the disease in this population.[3] The inability to maintain stable social relationships with family members, friends, and other significant individuals is challenging for the patients. Additionally, the patients may also experience unemployment, which could impact their perception of support in this difficult period.[4] Social relationships with significant persons can influence the health outcomes in this vulnerable population.[5] Therefore, it is critical to address the unique social relationship needs. However, such needs are often not met, and hence, necessitates urgent solutions in this population.[6] Social relationships, such as emotional, informational, and instrumental support, are beneficial to breast cancer patients to cope with their disease.[7] Briefly, emotional support indicates expressions of being loved, esteemed, valued, and cared for; instrumental support could be described as tangible aid and service; informational support indicates the support such as advice, suggestions, and information.[8] Although the benefits of stable social relationships have been well-established, emotional, informational, and instrumental support needs remain unaddressed for breast cancer patients in clinical settings.

Several qualitative studies have reported the social relationship needs of breast cancer patients; however, only a few quantitative studies have been conducted.[9] More information is needed to be easily disseminated for daily assessment use in clinical settings. Therefore, whether patients obtained their desired support and their unmet needs were identified for targeted intervention should be assessed.[10, 11] Although various types of social relationships are recognized, only a few efforts have

3

been made to explore the interactions. A dearth of studies in this area indicates a lack of evidence regarding the specific support that should to be given to satisfy patients' diverse needs. To deal with such dilemma, the measures for social relationships have been developed and validated in the Patient-reported outcomes measurement information system (PROMIS) domain framework (v2.0), which assess different types of social relationships across varied populations and is now available in the Chinese version. Therefore, studies using brief and accurate PROMIS measures to evaluate the social relationship needs of breast cancer patients are needed.

Objective

This study aimed to address this issue to examine the unmet social relationship needs in breast cancer patients after surgery and identify variables associated with these needs.

METHODS

Study design

A multicenter cross-sectional study design was utilized (Clinical Trial Registration Number: ChiCTR2000035439).

Participants and data collection

Using convenience sampling method, patients from the Breast Care Ward of three tertiary hospitals in mainland China (Shanghai, Zhejiang, and Shandong provinces) were enrolled between January 2018 and July 2020. The inclusion criteria were: breast cancer diagnosis; age >18-years-old; undergone surgery for breast cancer; able to speak and read Chinese. On the other hand, patients with psychiatric

4

illness and cognitive impairment that would impair effective communication were excluded from the

study. The ethics committee of the Institutional Review Boards of Fudan University and all study sites

approved the study (Ethics Approval Number: 1810192-22). The trained nurse researchers identified

eligible patients and contacted them to participate in the survey at the time of their hospital admission.

A brief overview of the study was provided, and confidentiality and anonymity principles were

explained to the participants by trained nurse researchers and signed informed consent was obtained.

The participants could choose to complete a paper questionnaire or electronic questionnaires. The

participants completed the questionnaire, including the sociodemographic information questionnaire,

the PROMIS social relationships short form, the PROMIS anxiety short form, and the PROMIS

depression short form.

Measurements

Sociodemographic information questionnaire: A sociodemographic information questionnaire

collected demographic and clinical data. In this study, age, marital status, childbearing history, religion,

educational background, menstrual status, living style, employment status, monthly family income, and

health insurance. The demographic information was self-reported by the patients, while the clinical

information was reviewed and obtained from their medical records by the researchers.

PROMIS social relationships short forms: We specifically selected the Chinese version of social

relationships measures under the PROMIS domain framework, which were translated by our research

group previously. Therefore, the 4-item PROMIS emotional support, the PROMIS informational

support, and the PROMIS instrumental support were used to assess social relationships in this study.

5

The responses to the questions were obtained using a 5-point Likert-type scale with response options

ranging from "never" to "always". The total scores of each short form were 4-20, with higher scores

corresponding to better social relationships.[12, 13] The total raw scores were converted and reported as T

scores according to the PROMIS guidelines (mean = 50, standard deviation (SD) = 10).[14] These

measures have been validated in breast cancer patients previously by our research group. Cronbach's

alpha values ranged from 0.90-0.95 for the measures in this study.

PROMIS anxiety short form Anxiety was assessed by the Chinese version of the 8-item PROMIS

anxiety short form. All items were rated on a 5-point Likert-type scale ranging from "never" to

"always" over a 7-day period.[12] Total scores ranged between 4 and 20, and higher scores represented

higher level of anxiety.[13] The raw scores were in the form of a standard T scores metric (mean = 50,

SD = 10) .[15] The psychometric properties of the measure have already been verified in Chinese breast

cancer patients.[12] Cronbach's alpha was 0.93 in the present study.

PROMIS depression short form Depression was assessed using the Chinese version of the 8-item

PROMIS depression short form. Participants were required to report their experience of depression

over a 7-day period using a 5-point Likert-type scale.[16] The total raw scores ranged from 8 to 40, and

the scoring procedure was similar to that described in the scoring manual above. Higher scores

represented a greater level of depression symptoms. The Chinese version of the measure has shown

satisfactory psychometric properties in previous studies on breast cancer patients.[12] The measure

showed satisfactory internal consistency in this study (Cronbach's α = 0.89).

6

Statistical analysis

IBM SPSS Statistics (version 22.0) was utilized to perform the statistical analyses. Descriptive statistics, such as percentage, number, means, and SD were utilized to describe the participants' sociodemographic information and distribution of items. The responses to the items were ranked and by comparing the mean value of the scores. Pearson correlations were utilized to compare the social relationship dimensions with respect to anxiety and depression. Subsequently, based on a purposeful selection of covariates, multivariable regression analyses were conducted to examine the relative contribution of the variables in explaining the overall level of patients' informational support, with an entry criterion of $p < .05$. For all analyses, the statistical significance level was $p < .05$.

RESULTS

Sample characteristics

The descriptive characteristics of the participants' sociodemographic and clinical data are shown in Table 1. The data of 16/477 eligible patients were discarded due to incorrect or incomplete responses. Finally, data from 461 breast cancer patients were finally included for analyses. The average age of the participants was 50.90 ± 10.34 (range = 10-77) years. Most participants were married (91.32%), had a child (95.23%), were premenopausal (53.58%), were without religion (84.16%), had secondary school education background (35.14%), lived with family (93.28%), were unemployed (45.82%), had a family income > ¥ 3000-9000 per month (51.19%), had employee health insurance (54.66%), and received chemotherapy recently (58.35%).

Table 1 Sample characteristics (N = 461)

Variables	N (%)

7

Age (Mean ± SD)	50.90 ± 10.34
18-40	70 (15.18)
41-60	305 (66.16)
61-90	86 (18.66)
Marital status	
Single	11 (2.39)
Married	421 (91.32)
Divorced	9 (1.95)
Widowed	20 (4.34)
Childbearing history	
Yes	439 (95.23)
No	22 (4.77)
Menstrual status	
Premenopausal	247 (53.58)
Postmenopausal	214 (46.42)
Religion	
Yes	73 (15.84)
No	388 (84.16)
Education background	
Primary school or below	139 (30.15)
Secondary school	162 (35.14)
High school	92 (19.96)
University or above	68 (14.75)
Lifestyle	
Living alone	26 (5.64)
Living with family	430 (93.28)
Living with others	5 (1.08)

8

Employment status

Employed	92 (19.96)
Medical leave	65 (10.10)
Unemployed	201 (43.60)
Retired	103 (22.34)

Monthly family income

≤ ¥ 3000	212 (45.99)
¥ 3000-¥ 9000	236 (51.19)
＞ ¥ 9000	13 (2.82)

Medical insurance

Free medical insurance	4 (0.87)
Employee health insurance	252 (54.66)
Rural health insurance	173 (37.53)
Without health insurance	32 (6.94)

Current medical treatment

Postoperative stage	192 (41.65)
Chemotherapy	269 (58.35)

Emotional, informational, and instrumental support level

As seen in Table 2, the ranks of the item scores showed that PROMIS instrumental support had the highest score (4.32 ± 0.79), while that of the PROMIS informational support was lowest (3.92 ± 1.01). These results indicated that the patients had better instrumental support and lower informational support. The T scores for the PROMIS emotional support, the PROMIS informational support, and the PROMIS instrumental support were 50.04 ± 10.03, 49.78 ± 9.26, and 51.42 ± 9.01, respectively. These results demonstrated that the informational support level was lower than average, while other

9

dimensions were at the average level.

Table 2 Scores of the PROMIS social relationships short forms

Dimension	Item	Score	Rank
PROMIS Emotional	I have someone who will listen to me when I need	4.21 ± 0.86	5
PROMIS Emotional	I have someone to confide in or talk to about	4.11 ± 0.90	7
PROMIS Emotional	I have someone who makes me feel appreciated	3.95 ± 1.05	9
PROMIS Emotional	I have someone to talk with when I have a bad day	4.11 ± 0.92	7
PROMIS Informational	I have someone to give me good advice about a	4.13 ± 0.88	6
PROMIS Informational	I have someone to turn to for suggestions about	4.13 ± 0.88	6
PROMIS Informational	I have someone to give me information if I need it	3.92 ± 1.01	10
PROMIS Informational	I get useful advice about important things in life	4.03 ± 0.93	8
PROMIS Instrumental	Do you have someone to help you if you are	4.29 ± 0.89	3
PROMIS Instrumental	Do you have someone to take you to the doctor if	4.38 ± 0.82	1
PROMIS Instrumental	Do you have someone to help with your daily	4.25 ± 0.88	4
PROMIS Instrumental	Do you have someone to run errands if you need it?	4.32 ± 0.79	2

Predictors of an emotional, informational, and instrumental support level

Demographic variables related to the PROMIS social relationships short form-based scores were

marriage status, childbearing history, lifestyle, and employment status (Table 3). In bivariate analysis,

Pearson correlation coefficients confirmed there were significant negative correlations between the

PROMIS social relationships short forms with anxiety (ranged from -0.298 to -0.384) and depression

scores (ranged from -0.428 to -0.509). The correlations were higher for depression than those of

anxiety.

Multiple linear regression analysis contributed to determine the predictors of an emotional,

informational, and instrumental support level. Since the PROMIS informational support short form

10

scores were lower than other subscales, the tool was adopted as the dependent variable. The independent variables employed in the analysis varied significantly in the previous study; these included scores of the PROMIS instrumental support short form, the PROMIS instrumental support short form, marital status, childbearing history, lifestyle, employment status, scores of the PROMIS anxiety short form and the PROMIS depression short form. As shown in Table 4, the variables of the PROMIS Emotional Support Short Form scores, the PROMIS instrumental support short form scores, marital status, employment status, the PROMIS anxiety short form scores, and the PROMIS depression short form scores serve as predictors of the PROMIS social relationships short forms scores ($R^2 = 0.62$, F = 262.55, p = .00).

Table 3 Significant demographic variables of the PROMIS social relationships short forms

Variables	Emotional Support	Informational Support	Instrumental Support
Age	0.26	0.52	0.20
Marital status	0.00*	0.00*	0.00*
Childbearing history	0.30	0.29	0.04*
Menstrual status	0.71	0.48	0.77
Religion	0.32	0.31	0.61
Education background	0.50	0.25	0.11
Lifestyle	0.00*	0.00*	0.00*
Employment status	0.02*	0.04*	0.04*
Monthly family income	0.14	0.15	0.12
Medical insurance	0.26	0.43	0.70
Current medical treatment	0.17	0.20	0.30

*Represents p-value < .05

11

Table 4 Significant variables of the PROMIS informational support short form scores using multiple linear regression

Variable	B	SB	β	T	*p*
Constant	3.26	2.55		10.81	0.00*
PROMIS Emotional Support Short Form scores	0.53	0.03	0.53	16.27	0.00*
PROMIS Instrumental Support Short Form scores	0.41	0.03	0.41	12.69	0.00*
Marital status	0.88	0.28	0.06	3.15	0.00*
Childbearing history	0.73	0.93	0.02	0.79	0.43
Lifestyle	-0.31	0.57	-0.01	0.54	0.59
Employment status	0.81	0.21	0.07	3.22	0.00*
PROMIS Anxiety Short Form scores	0.07	0.03	0.07	2.58	0.01*
PROMIS Depression Short Form scores	-0.11	0.03	-0.11	-3.64	0.00*

*Represents *p*-value < .05

DISCUSSION

Emotional, informational, and instrumental support level

To our knowledge, this study is one of the few to examine emotional, informational, and instrumental support needs and the predictors in breast cancer patients after surgery, especially in the Chinese cancer population. We found that the informational support level in this population was lower than that of the reference group, while emotional and instrumental support was at the average level.

The ranks of the social relationship dimensions in breast cancer patients were similar to those of the previous qualitative studies, which suggested that information needs were not routinely met in breast cancer patients. Also, the top unmet need for breast cancer patients was support from peers and health professionals.[17] The study stated that peer support, reminders for mammography and professional

12

breast self-examination knowledge were top unmet support needs for breast cancer patients, which could be classified into emotional support, instrumental support, and informational support, respectively. These results were not against our findings because the patients in this study reported not having sufficient emotional, instrumental, and informational support. Andic et al. also reported that the support needs for relieving anxiety were commonly fulfilled in this population, which also supported our results that the anxiety level was associated with patients' anxiety symptoms.[17] Similarly, Kwok and White[18] explored the experience of information needs and in Chinese-Australian breast cancer patients. The findings that the patients for culturally and linguistically tailored information on cancer-related side effects and signs of recurrence of the disease during rehabilitation. Therefore, informational support should be customized to the unique needs in patients with breast cancer, which has also been emphasized in this population in other studies. Halkett et al. investigated the information needs of breast cancer patients undergoing radiotherapy.[19] Thus, 14 healthcare professionals and 34 early-stage breast cancer patients were interviewed using semi-structured interview methods. The data revealed that patient's information needs were maximal during the first appointment of radiotherapy. Therefore, nurses should provide more information support in terms of radiotherapy treatment for breast cancer patients, especially during this period.

Furthermore, Arroyo et al. reported that the needs for emotional support were frequently unmet in breast cancer patients with emotional distress.[20] However, the study did not investigate the informational support and instrumental support level. Cardoso et al. investigated 1577 patients with advanced breast cancer to understand their needs of psychosocial, emotional, functional, and support.[21] The results demonstrated that approximately half of these patients felt isolated and worried, had lower income, and faced employment changes due to the cancer diagnosis. Half of them felt that

13

they were viewed negatively by society and found it difficult to find similar peers. Although most of

them were satisfied with the support from their family and friends, the support also decreased over

time, which increased the feelings of negativity. Thus, providing access to cancer-related information

to satisfy the unmet needs of such patients is an urgently needed. Informational support should be

addressed because it not only promotes patients' involvement but also reduces their feelings of

uncertainty in the rehabilitation process.

Some studies have provided new insights into the informational support needs of breast cancer

patients. Corter et al. had conducted semi-structured interviews with 13 young breast cancer patients

to explore their perceptions of online information support.[22] The results indicated that multifunction

online support was a valuable approach to obtain online support in this population. A similar study

was conducted by Kemp et al., wherein two qualitative interviews were summarized for patients

with advanced breast cancer. The results concluded that an online intervention was helpful for finding

informational support by healthcare professionals, family, and others in this population.[23] Therefore,

online support could be a potentially useful way to provide cancer-related informational support and

could be integrated with traditional intervention.

The current study only conducted a survey of the patients' perspective. A study compared the

perception of unmet informational needs between breast cancer patients receiving chemotherapy and

healthcare professionals in Japan.[24] The results showed that the physicians and nurses considered it

important to provide information regarding the side effects of medical treatment and options of

physical and psychological support. However, these needs were inadequate in the patients'

perspective. The patients preferred to have other information in addition to information of treatment

and, social and professional rehabilitation. A study explored the emotional and instrumental support

14

needs in breast cancer patients.[25] The data addressed that viewing friends as a source for information support contributed to posttraumatic growth in breast cancer patients. Therefore, additional studies are needed to address the patients' unique social relationships support needs.

Predictors of emotional, informational, and instrumental support level

Marital status, childbearing history, lifestyle, employment status, anxiety, and depression level were found to be predictors of emotional, informational, and instrumental support level of breast cancer patients. Multiple regression analysis further revealed that emotional support, instrumental support, marital status, employment status, anxiety, and depression scores contributed to the prediction of informational support. Similar results were found in a previous study reporting that emotional support expression was related to the living status of breast cancer patients.[26] In Chinese traditional culture, women are always expected to be good wives and devoted mothers.[27, 28] For patients in an intimate relationship, their disease and invasive treatment poses significant challenges for their family, profession, and social life domain. Therefore, they are forced to reconsider their responsibility and participation in significant life domains after the diagnosis.[29] They would be overwhelmed with the frequent medical treatment and hospital visits and suffer from the side effects and symptoms. Feeling unable to fulfill their roles, they are unlikely to participate in social roles and activities as usual, especially in the early-stage after the cancer diagnosis.[30] Altered employment status is another challenge in this population. Notably, work adjustments are protective factors for professional rehabilitation in breast cancer patients, which contribute to financial stability and facilitate social relationships.[31, 32] Thus, working patients could benefit from work adjustments in the long term, and thus, breast cancer patients are encouraged to proceed with their work.[33]

15

On the other hand, a study reported that young patients required more unmet information needs than other age groups.[34] However, no significant age difference was detected in our study. This inconsistency could be attributed to the sample in this study since patients < 40-years-old constituted 15.2% of the population, while the majority were middle-aged patients aged 40-60-years-old (66.2%). Therefore, additional studies need to be conducted to explore the social relationship status in young breast cancer patients in the future.

Findings from bivariate analyses indicated that emotional, informational, and instrumental support levels were associated with lower depression and anxiety levels reported in previous studies.[35, 36] The correlations were further supported in multivariate results, obtained by analysis of significant variables. Similar findings were found in a previous study reporting that the patients were likely to have anxiety and depression issues if their information needs about the treatment were not satisfied.[35] Reportedly, the unmet information needs were a predictor of anxiety for young patients, especially in the early survivorship.[37] Vodermaier et al. stresses that the level of depression and anxiety were conversely associated with the support needs in this population.[38] The study surveyed the breast cancer patients and their daughters and reported that the provision of emotional support from patients' daughters was related to their lower depressive level in the long run; this phenomenon, which was in consistent with our results that suggest a negative correlation between emotional support and depression in this population.

CONCLUSIONS

Unmet emotional, informational, and instrumental support required in breast cancer patients after surgery highlight the importance of developing tailed interventions. Especially, informational support

16

should be stressed in this population, which was lower than the average range. In the case of predictors, marriage status, childbearing history, lifestyle, employment status, anxiety, and depression level were related to the level of emotional, informational, and instrumental support, and should be evaluated while conducting related interventions for breast cancer patients.

RELEVANCE FOR CLINICAL PRACTICE

This study provided valuable insight into the unmet emotional, informational, and instrumental support required by breast cancer patients after surgery. Early and regular screenings could equip the nurses to identify identify individuals who might benefit from targeted preventive interventions for emotional, informational, and instrumental support issues.

Contributors

CY, TC and QH designed the study. TC and QH are the principal investigators; TC wrote the manuscript; QH is in charge of statistical analysis and all authors reviewed and contributed to the manuscript. All authors have read, approved the paper and meet the criteria for authorship.

Competing interests None declared

17

REFERENCES

1. Villarreal-Garza C, López-Martínez EA, Martínez-Cannon BA, *et al*. Medical and information needs among young women with breast cancer in Mexico. *European Journal of Cancer Care*, 2019;28(4):e13040.

2. Finck C, Barradas S, Zenger M, *et al*. Quality of life in breast cancer patients: Associations with optimism and social support. *International Journal of Clinical and Health Psychology*, 2018;18(1):27-34.

3. Collins K, McClimens A, Mekonnen S, *et al*. Breast cancer information and support needs for women with intellectual disabilities: a scoping study. *Psycho-Oncology*, 2014;23(8):892-7.

4. Fong AJ, Scarapicchia TMF, McDonough MH, *et al*. Changes in social support predict emotional well-being in breast cancer survivors. *Psycho-Oncology*, 2016;26(5):664-71.

5. Recio-Saucedo A, Gerty S, Foster C, *et al*. Information requirements of young women with breast cancer treated with mastectomy or breast conserving surgery: A systematic review. *Breast*, 2016;25:1-13.

6. Hinzey A, Gaudier-Diaz MM, Lustberg MB, *et al*. Breast cancer and social environment: getting by with a little help from our friends. *Breast Cancer Research*, 2016;18(1):54.

7. Waxler-Morrison, N, Hislop TG, Mears B, *et al*. Effects of social relationships on survival for women with breast cancer: A prospective study. *Social Science & Medicine*, 1991;33(2):177-83.

8. Hahn EA, Cella D, Bode RK, *et al*. Measuring Social Well-being in People with Chronic Illness. *Social Indicators Research*, 2010;96:381-401.

9. Aranda S, Schofield P, Weih L, *et al*. Meeting the support and information needs of women with advanced breast cancer: a randomized controlled trial. *British Journal of Cancer*, 2006;95(6):667-73.

18

10. Gellaitry G, Peters K, Bloomfield D, *et al*. Narrowing the gap: the effects of an expressive writing intervention on perceptions of actual and ideal emotional support in women who have completed treatment for early-stage breast cancer. *Psycho-Oncology*, 2010;19(1):77-84.

11. Ray CD, Veluscek AM. Nonsupport Versus Varying Levels of Person-Centered Emotional Support: A Study of Women with Breast Cancer. *Journal of Cancer Education*, 2016;33(3):649-52.

12. Cai TT, Huang QM, Wu FL, *et al*. Latent class analysis of social function of breast cancer patients receiving chemotherapy based on Patient-reported outcomes. *Journal of Nurses Training*, 2020;45(5):S3-11.

13. Beleckas CM, Prather H, Guattery J, *et al*. Anxiety in the orthopedic patient: using PROMIS to assess mental health. *Quality of Life Research*, 2018;27(9):2275-82.

14. Cella D, Yount S, Rothrock N, *et al*. The Patient-Reported Outcomes Measurement Information System (PROMIS): Progress of an NIH Roadmap cooperative group during its first two years. *Medical Care*, 2007;45(5):S3-11.

15. Victorson D, Schalet BD, Kundu S, *et al*. Establishing a common metric for self-reported anxiety in patients with prostate cancer: Linking the Memorial Anxiety Scale for Prostate Cancer with PROMIS Anxiety. *Cancer*, 2019;125(18):3249-58.

16. Recklitis CJ, Blackmon JE, Chang G. Screening young adult cancer survivors with the PROMIS Depression Short Form (PROMIS-D-SF): Comparison with a structured clinical diagnostic interview. *Cancer*, 2020;126(7):1568-75.

17. Andic S, Karayurt O. Determination of information and support needs of first-degree relatives of women with breast cancer. *Asian Pacific journal of cancer prevention*, 2012;13(9):4491-9.

18. Kwok C, White K. Perceived information needs and social support of Chinese-Australian breast

19

cancer survivors. *Supportive Care in Cancer*, 2014;22(10):2651-9.

19. Halkett GKB, Kristjanson LJ, Lobb E, *et al*. Meeting breast cancer patients' information needs during radiotherapy: what can we do to improve the information and support that is currently provided? *European Journal of Cancer Care*, 2009;19(4):538-47.

20. Arroyo OM, Vaíllo YA, López PM, *et al*. Emotional distress and unmet supportive care needs in survivors of breast cancer beyond the end of primary treatment. *Supportive Care in Cancer*, 2019;27(3):1049-57.

21. Cardoso F, Harbeck N, Mertz S, *et al*. Evolving psychosocial, emotional, functional, and support needs of women with advanced breast cancer: Results from the Count Us, Know Us, Join Us and Here & Now surveys. *The Breast*, 2016;28:5-12.

22. Corter AL, Speller B, Sequeira S, *et al*. What Young Women with Breast Cancer Get Versus What They Want in Online Information and Social Media Supports. *Journal of Adolescent and Young Adult Oncology*, 2019;8(3):320-8.

23. Kemp E, Koczwara B, Butow P, *et al*. Online information and support needs of women with advanced breast cancer: a qualitative analysis. *Supportive Care in Cancer*, 2018;26(10):3489-96.

24. Sakai H, Umeda M, Okuyama H, *et al*. Differences in perception of breast cancer treatment between patients, physicians, and nurses and unmet information needs in Japan. *Supportive Care in Cancer*, 2020;28:2331-8.

25. Hasson-Ohayon I, Tuval-Mashiach R, Goldzweig G, *et al*. The need for friendships and information: Dimensions of social support and posttraumatic growth among women with breast cancer. *Palliative and Supportive Care*, 2015;14(04):387-92.

26. Yoo W, Namkoong K, Choi M, *et al*. Giving and receiving emotional support online:

20

Communication competence as a moderator of psychosocial benefits for women with breast cancer. *Computers in Human Behavior*, 2014;30:13-22.

27. Chen S, Sun N, Ge W, *et al*. The development process of self-acceptance among Chinese women with breast cancer. *Japan Journal of Nursing Science*, 2020;17(2):1-8.

28. Fu MR, Xu B, Liu Y, *et al*. 'Making the best of it': Chinese women's experiences of adjusting to breast cancer diagnosis and treatment. *Journal of Advanced Nursing*, 2008;63(2):155-65.

29. Oh GH, Yeom CW, Shim EJ, *et al*. The effect of perceived social support on chemotherapy-related symptoms in patients with breast cancer: A prospective observational study. *Journal of Psychosomatic Research*, 2019;130:109911.

30. Schmidt JE, Andrykowski MA. The role of social and dispositional variables associated with emotional processing in adjustment to breast cancer: an internet-based study. *Health Psychol*, 2004;23:259-66.

31. Tamminga SJ, de Boer AG, Verbeek JH, *et al*. Breast cancer survivors' views of factors that influence the return-to-work process-a qualitative study. *Scandinavian Journal of Work, Environment & Health*, 2012;38(2):144-54.

32. Paalman CH, van Leeuwen FE, Aaronson NK, *et al*. Employment and social benefits up to 10 years after breast cancer diagnosis: a population-based study. *British Journal of Cancer*, 2016;114(1):81-7.

33. Vayr F, Montastruc M, Savall F, *et al*. Work adjustments and employment among breast cancer survivors: a French prospective study. *Supportive Care in Cancer*, 2020;28:185-92.

34. Miyashita M, Ohno S, Kataoka A, *et al*. Unmet Information Needs and Quality of Life in Young Breast Cancer Survivors in Japan. *Cancer Nursing*, 2015;38(6):E1-11.

21

35. Cappiello M, Cunningham RS, Knobf MT, *et al*. Breast cancer survivors: information and support after treatment. *Clin Nurs Res*, 2007;16(4):278-93.

36. Barr K, Hill DBC, Farrelly AD, *et al*. Unmet information needs predict anxiety in early survivorship in young women with breast cancer. *Journal of Cancer Survivorship*. 2020, 14(6):826-33.

37. Leng J, Lee T, Sarpel U, *et al*. Identifying the informational and psychological needs of Chinese immigrant cancer patients: a focus group study. *Support Care Cancer*, 2012;20(12):321-9.

38. Vodermaier A, Stanton AL. Familial breast cancer: less emotional distress in adult daughters if they provide emotional support to their affected mother. *Familial Cancer*, 2012;11(4):645-52.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1-2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	4-5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5-7
Bias	9	Describe any efforts to address potential sources of bias	-
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	-
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	4
		(*e*) Describe any sensitivity analyses	-
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7-8
		(b) Give reasons for non-participation at each stage	7-8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	7
Outcome data	15*	Report numbers of outcome events or summary measures	7-9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	-

			(*b*) Report category boundaries when continuous variables were categorized	8
			(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses		17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	-
Discussion				
Key results		18	Summarise key results with reference to study objectives	13
Limitations		19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	2
Interpretation		20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	13-16
Generalisability		21	Discuss the generalisability (external validity) of the study results	16
Other information				
Funding		22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Emotional, informational, and instrumental support needs in breast cancer patients who have undergone surgery: a cross-sectional study

SCHOLARONE™
Manuscripts

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Emotional, informational, and instrumental support needs in breast cancer patients who have

undergone surgery: a cross-sectional study

Tingting Cai[1], Qingmei Huang[1], Changrong Yuan[1*]

[1]School of Nursing, Fudan University, Shanghai, China

*Corresponding author: Changrong Yuan, PhD, RN, FAAN, yuancr@fudan.edu.cn

Address: School of Nursing, Fudan University, 305 Fenglin Rd, Shanghai 200032

Abstract

Objectives: This study evaluated emotional, informational, and instrumental support needs in breast cancer patients who had undergone surgery, then identified the variables associated with those needs.

Design: This was a cross-sectional survey study.

Setting: Questionnaires were distributed in tertiary hospitals in China between January 2018 and July 2020.

Participants: We recruited 477 eligible breast cancer patients via convenience sampling. Due to exclusions for response errors, the final analyzed sample included 461 participants (mean age of 50.9 years). Each completed a questionnaire consisting of a sociodemographic information component and three short forms from the Patient-Reported Outcomes Measurement Information System (PROMIS) (social relationships short form, anxiety short form, and depression short form). Subsequent analyses included the chi-squared test, Pearson correlation, and multivariate regression.

Results: The T scores for informational support were lower than those for the reference group (general population), while those for emotional and informational support were average. Marital status, childbearing history, lifestyle, employment status, anxiety, and depression levels were related to the scores for emotional, informational, and instrumental support in this population. The regression analysis revealed that emotional support levels, instrumental support levels, marital status, employment status, anxiety, and depression outcomes were predictors for informational support levels.

Conclusions: Informational support should be specifically assessed and promoted among breast cancer patients in general, while marital status, childbearing history, lifestyle, employment status, anxiety, and depression levels should be evaluated when conducting interventions to promote emotional, informational, and instrumental support for those who have undergone surgery. Early and regular

screenings for high-risk patients will help nurses identify those who are likely to benefit from targeted

preventive interventions aimed at emotional, informational, and instrumental support issues.

Trial registration number: ClinicalTrials.gov registry (ChiCTR2000035439)

KEYWORDS

breast cancer, emotional support, informational support, instrumental support, social health

Strengths and limitations of this study

- To our knowledge, this was among the few studies to use PROMIS measures to assess
  self-reported emotional, informational, and instrumental support needs and their predictors
  among breast cancer patients who have undergone surgery, especially within the Chinese
  cancer population.

- Our results will help nurses identify patients who are likely to benefit from targeted preventive
  interventions aimed at emotional, informational, and instrumental support issues.

- We only included breast cancer patients receiving treatment at tertiary hospitals.

- Our focus was on breast cancer patients who had undergone surgery, but the sample solely
  consisted of female patients, most of whom were middle-aged.

INTRODUCTION

Breast cancer is the most frequently occurring type of cancer in women throughout the world.[1] The impacts are also substantial, as the both the diagnosis and treatment procedures are often traumatic and life-changing. In this context, patients may experience difficulty when attempting to maintain their social networks,[2][3] including the inability to hold stable social relationships with family members, friends, colleagues, and other significant individuals. Many patients may also experience unemployment, which can further impact their perception of reduced support while undergoing hardship difficult period.[4][5]

High-level social relationships are known to help breast cancer patients cope with their disease.[6][7] However, reports have shown that many of these patients tend to underutilize their support networks, and may even receive less support after treatments such as surgery, especially in the first following year.[8] Thus, breast cancer patients who have undergone surgery constitute a vulnerable population with distinct social relationships needs that are associated with psychological well-being.[4] Compared with recently diagnosed breast cancer patients, those who have undergone surgical treatments tend to experience unique emotional challenges, such as the need to negotiate a changed, unfamiliar body and increased mood disturbances, with many feeling disconnected from their social networks.[4] This is an area of high concern, as patients with insufficient social networks tend to report poor psychological well-being at higher rates, including increased depression and anxiety.[9-11] However, the literature currently shows a lack of research on both the nature of social relationships needs following surgical treatment and the association between social relationships and psychological well-being among breast cancer patients.

Nevertheless, some qualitative studies have generally reported on the social relationships needs of

breast cancer patients. For example, Arroyo et al. reported that emotional support needs were frequently unmet in breast cancer patients with emotional distress.[12] Cardoso et al. investigated 1,577 patients with advanced breast cancer to better understand their psychosocial, emotional, functional, and support needs,[13] with results showing that approximately half felt isolated and worried, had lower incomes, and faced employment changes due to their cancer diagnoses. Further, about half felt they were viewed negatively by society, and found it difficult to find similar peers. Although most were satisfied with the support they received from family and friends, this decreased over time, which then increased their feelings of negativity. Halkett et al. investigated the informational needs of breast cancer patients undergoing radiotherapy.[14] More specifically, 14 healthcare professionals and 34 early-stage patients with breast cancer were interviewed via the semi-structured methods, with results showing that informational support needs were maximal for patients during their initial radiotherapy appointments. In sum, the literature shows that it is important to assess social relationships needs during routine breast cancer care, with various studies showing that needs may vary based on demographic characteristics. While various types of social relationships have been recognized, only a handful of researchers have explored specific interactions.[3 7] This highlights the need to conduct valid assessments of social relationships needs and interactions, thus ensuring quick and accurate determinations for patients with breast cancer. Such findings will also aid in the selection of appropriate clinical interventions.

As social relationships are subjective experiences, the abovementioned assessments should be conducted from the patient's perspective. In this context, patient-reported outcomes (PROs) are important for revealing many health-related quality-of-life (QoL) aspects, including symptoms, limitations, well-being, and care/treatment preferences. In fact, PRO measurements are considered the

best way to obtain subjective information about patient's experience. In this regard, the

Patient-Reported Outcomes Measurement Information System (PROMIS) project was aimed at

advancing PRO measurements in various settings through a range of short form instruments, with the

social relationships component including concepts of social support and isolation under the PROMIS

social health framework. [6] Specifically, the PROMIS social relationships short forms are brief and

accurate measures for assessing different types of social relationships among patients with chronic

disease.[15] For use in this study, these forms were translated into Chinese versions by our research

group.[16] Due to the lack of PRO usage to investigate social relationships needs in breast cancer

patients who have undergone surgery, we believed these measures were optimal research tools for

addressing this gap in the literature. As such, this study evaluated emotional, informational, and

instrumental support needs in breast cancer patients who had undergone surgery, thus identifying

important variables associated with those needs. We used three PROMIS measures, including the

social relationships short form, anxiety short form, and depression short form.

METHODS

Study design

This study employed a multicenter cross-sectional design (Clinical Trial Registration Number:

ChiCTR2000035439).

Participants and data collection

We used convenience sampling to recruit patients from breast care wards at two tertiary hospitals in

mainland China (Shanghai provinces), with eligible participants being enrolled between January 2018

and July 2020. The inclusion criteria were set as follows: breast cancer diagnosis, aged > 18 years,

undergone surgery within the past three months, and able to speak and read Mandarin Chinese. On the

other hand, patients with psychiatric illness and/or cognitive impairments that would impede effective

communication were excluded. This resulted in 477 initial participants, with 16 excluded due to

response errors; as such, the final analyzed sample consisted of 461 patients. The ethics committee of

the Institutional Review Board at Fudan University and all survey sites approved of this study (Ethics

Approval Number: 1810192-22). Trained nurse researchers identified and informed eligible patients

about the opportunity to participate in this study at the time of hospital admission. A brief study

overview was then provided. Candidates were also ensured that confidentiality and anonymity would

stringently be maintained. Those who were willing to participate signed informed consent forms prior

to study engagement. All participants completed paper questionnaires, which included the

sociodemographic information component and three PROMIS short forms, including the social

relationships short form, anxiety short form, and depression short form.

Measurements

Sociodemographic and clinical information

The sociodemographic questionnaire component asked participants for information on age, marital

status, childbearing history, religion, educational background, menstrual status, living style,

employment status, monthly family income, and health insurance. On the other hand, we directly

obtained clinical information about medical treatments directly from their respective medical records.

PROMIS social relationships short forms

The Chinese versions of the PROMIS social relationships short forms were previously translated by

our research group.[16] More specifically, the 4-item PROMIS emotional support, informational support,

and instrumental support forms were used to assess social relationships, as they have been validated for

use among patients with chronic disease, including cancer.[7] Responses to each item were given

according to a 5-point Likert-type scale ranging from "never" to "always." Total scores for each short

form thus ranged from 4-20, with higher scores corresponding to better social relationships.[6][17] Total

raw scores were then converted and reported as T scores (mean = 50, standard deviation (SD) = 10).[18]

Cronbach's alpha values ranged from 0.90-0.95 for the measures used in this study.

PROMIS anxiety short form

Anxiety was assessed using the Chinese version of the 8-item PROMIS anxiety short form. All items

were rated on a 5-point Likert-type scale ranging from "never" to "always" over a seven-day period.[16]

Total scores could thus range from 4-20, with higher scores indicating higher levels of anxiety.[18] Raw

scores were then presented via a standard T scores metric (mean = 50, SD = 10).[19] The psychometric

properties of this measure were previously verified among Chinese breast cancer patients.[16] In this

study, a Cronbach's alpha of 0.93 was returned.

PROMIS depression short form

Depression was assessed using the Chinese version of the 8-item PROMIS depression short form.

Participants were required to report their experiences with depression over a seven-day period

according to a 5-point Likert-type scale.[20] Total raw scores could range from 8-40, with a similar

scoring procedure to that described in the scoring manual mentioned above. Higher scores represented

greater levels of depressive symptom. The Chinese version of the measure was previously shown to be satisfactory for assessing psychometric properties among breast cancer patients.[16] In this study, a Cronbach's alpha of 0.89 was returned.

Statistical analysis

All statistical analyses were conducted using IBM SPSS 23 for Windows. Descriptive statistics, such as percentages, numbers, means, and SDs were used to describe demographic and treatment characteristics as well as the item distributions. Item responses were ranked and compared based on mean score values. Sociodemographic and clinical variables that were related to the PROMIS social relationships short forms scores were identified via chi-squared test. The correlations between scores from the social relationship dimensions and those from the anxiety and depression measures were calculated via the Pearson correlation. Based on a purposeful selection of covariates, multivariable regression analyses were then conducted to examine the relative contribution of each variable in explaining the overall level of informational support among patients, with an entry criterion of $p < .05$. For all analyses, statistical significance was determined at $p < .05$.

Patient and public involvement

No patients or members of the public were involved in the design or planning of this study.

RESULTS

Sample characteristics

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1 shows descriptive characteristics derived from the sociodemographic and clinical data obtained

from participants. As mentioned earlier, 16 of the 477 originally eligible patients were excluded from

analysis due to incorrect or incomplete responses. Ultimately, we therefore analyzed data from 461

breast cancer patients. The average participant age was 50.90 ± 10.34 years (range = 10-77). Most were

married (91.32%), had one or more child (95.23%), were premenopausal (53.58%), were non-religious

(84.16%), had attained secondary school education (35.14%), lived with family (93.28%), were

unemployed (45.82%), had family incomes between ¥ 3000 and 9000 per month (51.19%), had

employee health insurance (54.66%), and had recently received chemotherapy (58.35%). All

participants were female.

Table 1. Sample characteristics (N = 461)

Variables	N (%)
Age (Mean ± SD)	50.90 ± 10.34
18-40	70 (15.18)
41-60	305 (66.16)
61-90	86 (18.66)
Marital status	
Single	11 (2.39)
Married	421 (91.32)
Divorced	9 (1.95)
Widowed	20 (4.34)
Childbearing history	
Yes	439 (95.23)
No	22 (4.77)

Menstrual status

   Premenopausal 247 (53.58)

   Postmenopausal 214 (46.42)

Religion

   Yes 73 (15.84)

   No 388 (84.16)

Education background

   Primary school or below 139 (30.15)

   Secondary school 162 (35.14)

   High school 92 (19.96)

   University or above 68 (14.75)

Lifestyle

   Living alone 26 (5.64)

   Living with family 430 (93.28)

   Living with others 5 (1.08)

Employment status

   Employed 92 (19.96)

   Medical leave 65 (10.10)

   Unemployed 201 (43.60)

   Retired 103 (22.34)

Monthly family income

   ≤ ¥ 3000 212 (45.99)

   ¥ 3000 to ¥ 9000 236 (51.19)

   > ¥ 9000 13 (2.82)

Medical insurance

   Free medical insurance 4 (0.87)

   Employee health insurance 252 (54.66)

Rural health insurance	173 (37.53)
Without health insurance	32 (6.94)
Medical treatments over the past 7 days	
Postoperative stage	192 (41.65)
Chemotherapy	269 (58.35)

Emotional, informational, and instrumental support levels

As shown in Table 2, the item score rankings show that the highest scores were returned for PROMIS

instrumental support (4.32 ± 0.79), while the lowest were returned for PROMIS informational support

(3.92 ± 1.01). In other words, participants reported more instrumental support and less informational

support. The T scores for PROMIS emotional support, PROMIS informational support, and PROMIS

instrumental support were 50.04 ± 10.03, 49.78 ± 9.26, and 51.42 ± 9.01, respectively. These results

show that informational support levels were below average, while other dimensions were simply

average.

Table 2. Scores from the three PROMIS social relationships short forms

Dimension	Item	Score[*]	Rank
PROMIS Emotional Support	I have someone who will listen to me when I need to talk	4.21 ± 0.86	5
PROMIS Emotional Support	I have someone to confide in or talk to about myself or my problems	4.11 ± 0.90	7
PROMIS Emotional Support	I have someone who makes me feel appreciated	3.95 ± 1.05	9

PROMIS Emotional Support	I have someone to talk with when I have a bad day	4.11 ± 0.92	7
PROMIS Informational Support	I have someone to give me good advice about a crisis if I need it	4.13 ± 0.88	6
PROMIS Informational Support	I have someone to turn to for suggestions about how to deal with a problem	4.13 ± 0.88	6
PROMIS Informational Support	I have someone to give me information if I need it	3.92 ± 1.01	10
PROMIS Informational Support	I get useful advice about important things in life	4.03 ± 0.93	8
PROMIS Instrumental Support	Do you have someone to help you if you are confined to bed?	4.29 ± 0.89	3
PROMIS Instrumental Support	Do you have someone to take you to the doctor if you need it?	4.38 ± 0.82	1
PROMIS Instrumental Support	Do you have someone to help with your daily chores if you are sick?	4.25 ± 0.88	4
PROMIS Instrumental Support	Do you have someone to run errands if you need it?	4.32 ± 0.79	2

* Data are presented in means ± SDs

Predictors for emotional, informational, and instrumental support levels

Demographic variables related to scores derived from the PROMIS social relationships short forms

included marital status ($p = .00$), childbearing history ($p < .05$ for the instrumental support domain), lifestyle ($p = .00$), and employment status ($p < .05$) (Table 3). For the bivariate analysis, Pearson correlation coefficients confirmed significant negative correlations between the PROMIS social relationships short forms and both the anxiety (ranged from -0.298 to -0.384) and depression (ranged from -0.428 to -0.509) scores. Here, the correlations were higher for depression than for anxiety.

A multiple linear regression analysis helped determine predictors for the emotional, informational, and instrumental support levels. Since the PROMIS informational support short form scores were lower than those for other subscales, the tool was adopted as the dependent variable. The independent variables varied significantly; these included scores from the PROMIS instrumental support short form, the PROMIS instrumental support short form, marital status, childbearing history, lifestyle, employment status, scores from the PROMIS anxiety short form, and scores from the PROMIS depression short form. As shown in Table 4, the PROMIS emotional support short form scores, PROMIS instrumental support short form scores, marital status, employment status, PROMIS anxiety short form scores, and PROMIS depression short form scores were all predictor variables for the PROMIS informational support short form scores ($R^2 = 0.62$, F = 262.55, $p = .00$).

Table 3. Significant demographic variables: PROMIS social relationships short forms

Variables	Emotional Support	Informational Support	Instrumental Support
Age	0.26	0.52	0.20
Marital status	0.00*	0.00*	0.00*
Childbearing history	0.30	0.29	0.04*
Menstrual status	0.71	0.48	0.77
Religion	0.32	0.31	0.61

Education background	0.50	0.25	0.11
Lifestyle	0.00[*]	0.00[*]	0.00[*]
Employment status	0.02[*]	0.04[*]	0.04[*]
Monthly family income	0.14	0.15	0.12
Medical insurance	0.26	0.43	0.70
Current medical treatment	0.17	0.20	0.30

The analysis was performed via chi-squared test; [*]p-values < .05

Table 4. Significant variables from the PROMIS informational support short form scores via multiple linear regression

Variable	B	SB	β	T	p
Constant	3.26	2.55		10.81	.00[*]
PROMIS Emotional Support Short Form scores	0.53	0.03	0.53	16.27	.00[*]
PROMIS Instrumental Support Short Form scores	0.41	0.03	0.41	12.69	.00[*]
Marital status	0.88	0.28	0.06	3.15	.00[*]
Childbearing history	0.73	0.93	0.02	0.79	.43
Lifestyle	-0.31	0.57	-0.01	0.54	.59
Employment status	0.81	0.21	0.07	3.22	.00[*]
PROMIS Anxiety Short Form scores	0.07	0.03	0.07	2.58	.01[*]
PROMIS Depression Short Form scores	-0.11	0.03	-0.11	-3.64	.00[*]

[*]p-values < .05

DISCUSSION

Emotional, informational, and instrumental support levels

To our knowledge, this was one of the few studies that have used PROMIS measures to assess

self-reported emotional, informational, and instrumental support needs and their predictors in breast cancer patients who have undergone surgery, especially in the Chinese cancer population. We thus found that informational support levels were lower in the study population when compared to the reference group of the general population, while emotional and instrumental support were about average.

Among our study sample, the social relationships dimension outcomes were similar to those reported in previous research, which suggests that informational needs are not routinely met among breast cancer patients.[21 22] Of further note, the top unmet need for these patients is support from peers and health professionals,[21] specifically including peer support, mammography reminders, and professional breast self-examination knowledge, which can be classified as emotional support, instrumental support, and informational support, respectively. These results are not contrary to our findings, as our participants reported insufficient levels of emotional, instrumental, and informational support. Similarly, Kwok and White explored information needs among Chinese-Australian breast cancer patients, finding they were in need of culturally and linguistically tailored information about cancer-related side effects and signs of disease recurrence during rehabilitation.[22] This shows that informational support should be customized to fit the unique needs of different breast cancer patients. Some studies have provided new insights into the informational support needs of breast cancer patients. For example, Corter et al. investigated how young breast cancer patients perceived online information support, thereby suggesting that multifunction online support was a valuable provision.[23] Kemp et al. similarly demonstrated that an online intervention was a helpful way for health professionals, family members, and others to provide informational support.[24] As such, online support might be a good way to provide cancer-related informational support, and can even be integrated with

traditional interventions.

Predictors of emotional, informational, and instrumental support levels

We found that marital status, childbearing history, lifestyle, employment status, anxiety, and depression levels were all predictors of emotional, informational, and instrumental support levels in the study sample. A multiple regression analysis further revealed that emotional support, instrumental support, marital status, employment status, anxiety, and depression scores contributed to the prediction of informational support. These findings were similar to the results of a previous study showing that emotional support expression was related to living status of breast cancer patients.[25] In Chinese traditional culture, women are expected to dedicate themselves to being good wives and devoted mothers.[26 27] For patients with intimate relationships, both the nature of the breast cancer disease and its invasive treatment requirements pose significant challenges in areas pertaining to the family, profession, and social life domain. In the context of a positive diagnosis, they are often forced to reconsider their responsibilities and levels of participation in significant life domains. For example, frequent medical treatments and hospital visits can become overwhelming, especially due to the many side effects and symptoms. Patients may thus feel that they are unable to fulfill their roles, and are unlikely to participate in social roles and activities as usual.[28 29] Altered employment status is another challenge in this population. In this regard, patients who are treated for breast cancer may face job discrimination, which can impact their perceptions of preexisting social relationships.[30] Notably, work adjustments are protective factors for professional rehabilitation among breast cancer patients, thus contributing to financial stability and stable social relationships.[30 31] As employed patients may therefore benefit from work adjustments in the long term, they are encouraged to continue working if

possible.[32]

While one previous study reported that young patients had more unmet information needs than other age groups,[33] this study found no significant age-related differences. This inconsistency may be attributed to the sample characteristics, as patients < 40 years of age only comprised 15.2% of our study population, with the majority being middle-aged (40-60 years; 66.2%). This highlights the need for additional research aimed at exploring social relationship status among young breast cancer patients.

Using the focus group interview method, Paladino et al. identified racial differences of social relationships needs in black and white women with breast cancer who had undergone adjuvant endocrine therapy.[34] All participants noted the importance of informational and emotional support, as provided by friends and family members. On the other hand, white participants reported that support from other patients with breast cancer was crucial, while black women did not regard other patients as members of their social networks at all. Despite these differences, their findings highlighted the general importance of assessing social relationships needs in patients with breast cancer. Our study only included breast cancer patients in China, in which case we are unable to comment on any racial differences. Future studies should continue to compare race-based differences among breast cancer patients.

Our bivariate and multivariate analyses showed that emotional, informational, and instrumental support levels were associated with lower depression and anxiety levels, which is consistent with previous studies.[35 36] For example, Cappiello et al. reported that patients were more likely to experience issues with anxiety and depression if their informational needs about treatment remained unsatisfied.[35] Reportedly, unmet informational needs also predict anxiety in young patients, especially during early

survivorship.[36] Indeed, Fong et al. reported that decreased social support quality was associated with increased depression, stress, and negative effects in patients with breast cancer over time.[4]

Limitations

This study also had some limitations. First, our survey only included breast cancer patients at tertiary hospitals, in which case the results may not be representative of the conditions in other clinical settings. Second, our sample solely consisted of female breast cancer patients, most of whom were middle-aged. In this case, patients of different ages and genders may have differed emotional, informational, and instrumental support needs. Future studies should therefore replicate our procedures in other clinical contexts.

CONCLUSIONS

Informational support should be specifically assessed and promoted in breast cancer patients who have undergone surgery. In this study, marital status, childbearing history, lifestyle, employment status, anxiety, and depression levels were related to emotional, informational, and instrumental support levels, and should thus be evaluated when conducting related interventions for breast cancer patients.

RELEVANCE FOR CLINICAL PRACTICE

This study provided valuable insight into the nature of the emotional, informational, and instrumental support requirements of breast cancer patients who have undergone surgery, especially in regard to what areas may typically be unmet. The early screening of high-risk individuals should help nurses identify those who may benefit from targeted preventive interventions aimed at emotional,

informational, and instrumental support issues.

Acknowledgements

We thank all study participants for their support. We also thank all participating hospitals for allowing

us to survey their staff.

Contributors

CY, TC, and QH designed the study. TC and QH were the principal investigators. TC wrote the

manuscript. QH was in charge of the statistical analysis. All authors reviewed and contributed to the

manuscript. Finally, all authors read the paper, approved of the final manuscript, and met the criteria

for authorship.

Competing interests

The authors declare no competing interests.

Patient consent for publication

Not required.

Ethics approval

Ethical approval was obtained from the Institutional Review Board of Fudan University and all study

sites (number: 1810192-22).

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

The data used to support the claims made in this study are available from the corresponding author

upon request.

REFERENCES

1. Villarreal-Garza C, López-Martínez EA, Martínez-Cannon BA, *et al*. Medical and information needs

among young women with breast cancer in Mexico. *Eur J Cancer Care* 2019;28(4):e13040.

2. Finck C, Barradas S, Zenger M, *et al*. Quality of life in breast cancer patients: Associations with

optimism and social support. *Int J Clin Health Psychol* 2018;18(1):27-34.

3. Collins K, McClimens A, Mekonnen S, *et al*. Breast cancer information and support needs for

women with intellectual disabilities: a scoping study. *Psycho-Oncology* 2014;23(8):892-7.

4. Fong AJ, Scarapicchia TMF, McDonough MH, *et al*. Changes in social support predict emotional

well-being in breast cancer survivors. *Psycho-Oncology* 2016;26(5):664-71.

5. Recio-Saucedo A, Gerty S, Foster C, *et al*. Information requirements of young women with breast

cancer treated with mastectomy or breast conserving surgery: A systematic review. *Breast* 2016;25:1-13.

6. Hahn EA, DeVellis RF, Rita K, *et al*. Measuring social health in the patient-reported outcomes measurement information system (PROMIS): item bank development and testing. *Qua Life Res* 2010;19:1035-44.

7. Hahn EA, Cella D, Bode RK, *et al*. Measuring Social Well-being in People with Chronic Illness. *Soc Indic Res* 2010;96:381-401.

8. Arora NK, Finney Rutten LJ, Gustafson DH, *et al*. Perceived helpfulness and impact of social support provided by family, friends, and health care providers to women newly diagnosed with breast cancer. *Psychooncology* 2007;16(5):474-86.

9. Fong AJ, Scarapicchia TM, McDonough MH, *et al*. Changes in social support predict emotional well-being in breast cancer survivors. *Psycho-oncology* 2017;26(5):664-71.

10. Beasley JM, Newcomb PA, Trentham-Dietz A, *et al*. Social networks and survival after breast cancer diagnosis. *J Cancer Surviv* 2010;4(4):372-80.

11. Kroenke CH, Michael YL, Poole EM, *et al*. Postdiagnosis social networks and breast cancer mortality in the After Breast Cancer Pooling Project. *Cancer* 2016;123(7):1228-37.

12. Arroyo OM, Vaíllo YA, López PM, *et al*. Emotional distress and unmet supportive care needs in survivors of breast cancer beyond the end of primary treatment. *Support Care Cancer* 2019;27(3):1049-57.

13. Cardoso F, Harbeck N, Mertz S, *et al*. Evolving psychosocial, emotional, functional, and support needs of women with advanced breast cancer: Results from the Count Us, Know Us, Join Us and Here & Now surveys. *Breast* 2016;28:5-12.

14. Halkett GKB, Kristjanson LJ, Lobb E, *et al*. Meeting breast cancer patients' information needs during radiotherapy: what can we do to improve the information and support that is currently provided? *Eur J Cancer Care* 2009;19(4):538-47.

15. Hahn EA, DeWalt DA, Bode RK, *et al*. New English and Spanish social health measures will facilitate evaluating health determinants. *Health Psychol* 2014;33:490-9.

16. Cai TT, Huang QM, Wu FL, *et al*. Latent class analysis of social function of breast cancer patients receiving chemotherapy based on Patient-reported outcomes. *J Nurses Training* 2020;45(5):S3-11.

17. Beleckas CM, Prather H, Guattery J, *et al*. Anxiety in the orthopedic patient: using PROMIS to assess mental health. *Qual Life Res* 2018;27(9):2275-82.

18. Cella D, Yount S, Rothrock N, *et al*. The Patient-Reported Outcomes Measurement Information System (PROMIS): Progress of an NIH Roadmap cooperative group during its first two years. *Med Care* 2007;45(5):S3-11.

19. Victorson D, Schalet BD, Kundu S, *et al*. Establishing a common metric for self-reported anxiety in patients with prostate cancer: Linking the Memorial Anxiety Scale for Prostate Cancer with PROMIS Anxiety. *Cancer* 2019;125(18):3249-58.

20. Recklitis CJ, Blackmon JE, Chang G. Screening young adult cancer survivors with the PROMIS Depression Short Form (PROMIS-D-SF): Comparison with a structured clinical diagnostic interview. *Cancer* 2020;126(7):1568-75.

21. Andic S, Karayurt O. Determination of information and support needs of first-degree relatives of women with breast cancer. *Asian Pac J Cancer P* 2012;13(9):4491-9.

22. Kwok C, White K. Perceived information needs and social support of Chinese-Australian breast cancer survivors. *Support Care Cancer* 2014;22(10):2651-9.

23. Corter AL, Speller B, Sequeira S, *et al*. What Young Women with Breast Cancer Get Versus What They Want in Online Information and Social Media Supports. *J Adolesc Young Adul* 2019;8(3):320-8.

24. Kemp E, Koczwara B, Butow P, *et al*. Online information and support needs of women with advanced breast cancer: a qualitative analysis. *Support Care Cancer* 2018;26(10):3489-96.

25. Yoo W, Namkoong K, Choi M, *et al*. Giving and receiving emotional support online: Communication competence as a moderator of psychosocial benefits for women with breast cancer. *Computers Human Behav* 2014;30:13-22.

26. Chen S, Sun N, Ge W, *et al*. The development process of self-acceptance among Chinese women with breast cancer. *Jpn J Nurs Sci* 2020;17(2):1-8.

27. Fu MR, Xu B, Liu Y, *et al*. 'Making the best of it': Chinese women's experiences of adjusting to breast cancer diagnosis and treatment. *J Adv Nurs* 2008;63(2):155-65.

28. Oh GH, Yeom CW, Shim EJ, *et al*. The effect of perceived social support on chemotherapy-related symptoms in patients with breast cancer: A prospective observational study. *J Psychosom Res* 2019;130:109911.

29. Schmidt JE, Andrykowski MA. The role of social and dispositional variables associated with emotional processing in adjustment to breast cancer: an internet-based study. *Health Psychol* 2004;23:259-66.

30. Tamminga SJ, de Boer AG, Verbeek JH, *et al*. Breast cancer survivors' views of factors that influence the return-to-work process-a qualitative study. *Scand J Work Env Hea* 2012;38(2):144-54.

31. Paalman CH, van Leeuwen FE, Aaronson NK, *et al*. Employment and social benefits up to 10 years after breast cancer diagnosis: a population-based study. *Brit J Cancer* 2016;114(1):81-7.

32. Vayr F, Montastruc M, Savall F, *et al*. Work adjustments and employment among breast cancer survivors: a French prospective study. *Support Care Cancer* 2020;28:185-92.

33. Miyashita M, Ohno S, Kataoka A, *et al*. Unmet Information Needs and Quality of Life in Young Breast Cancer Survivors in Japan. *Cancer Nurs* 2015;38(6):E1-11.

34. Paladino A, Anderson JN, Graff C, et al. A qualitative exploration of race-based differences in social support needs of diverse women with breast cancer on adjuvant therapy. *Psycho-Oncology* 2019, 28(3): 570-76.

35. Cappiello M, Cunningham RS, Knobf MT, *et al*. Breast cancer survivors: information and support after treatment. *Clin Nurs Res* 2007;16(4):278-93.

36. Barr K, Hill DBC, Farrelly AD, *et al*. Unmet information needs predict anxiety in early survivorship in young women with breast cancer. *J Cancer Surviv* 2020, 14(6):826-33.

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6-7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6-7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-9
Bias	9	Describe any efforts to address potential sources of bias	-
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	9
		(*b*) Describe any methods used to examine subgroups and interactions	-
		(*c*) Explain how missing data were addressed	9
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	9
		(*e*) Describe any sensitivity analyses	-
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7-8
		(b) Give reasons for non-participation at each stage	10
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10
		(b) Indicate number of participants with missing data for each variable of interest	10
Outcome data	15*	Report numbers of outcome events or summary measures	12-17
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear	-

		which confounders were adjusted for and why they were included	
		(*b*) Report category boundaries when continuous variables were categorized	9
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	-

Discussion

Key results	18	Summarise key results with reference to study objectives	10-15
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	16-19
Generalisability	21	Discuss the generalisability (external validity) of the study results	19

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.