Current Problems in Cancer 44 (2020) 100558

Contents lists available at ScienceDirect

Current Problems in Cancer

journal homepage: www.elsevier.com/locate/cpcancer

Depression, anxiety, and their associated factors among Chinese early breast cancer in women under 35 years of age: A cross sectional study

Bo Lan[a,†], Shiyu Jiang[a,†], Tao Li[b], Xiaoying Sun[c], Fei Ma[a,*]

[a] Department of Medical Oncology, National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China
[b] Department of psychological medicine, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China
[c] Department of Medical Oncology, Cancer Hospital of HuanXing ChaoYang District, Beijing, China

ABSTRACT

Background: It has been reported that younger breast cancer patients are at greater risk of having psychological problems than their older counterparts. This study is conducted to evaluate the psychological status of Chinese postoperative breast cancer patients aged 35 years or younger and understand the associated factors in this patient group.
Methods: This cross-sectional study prospectively enrolled 114 Chinese postoperative breast cancer patients aged 35 years or younger. They completed standard instruments evaluating depression (Patient Health Questionnaire [PHQ]-9) and anxiety (General Anxiety Disorder-7). Logistic regression was used to identify the associated factors.
Results: The mean scores were 5.21 and 4.19 for the PHQ-9 and General Anxiety Disorder-7, respectively. There were 76.3%, 20.2%, and 3.5% patients categorized into the none and/or mild (score 1-7), moderate (score 8-14), and moderate to severe depression (score 15-19) groups, respectively. For anxiety, there were 91.2%, 5.3% and, 3.5% of patients in the none and/or mild anxiety (score 0-9), moderate anxiety (score 10-14), and severe anxiety (score 15-21) groups, respectively. With univariate analysis, cohabitation status

☆ Conflict of interest: The authors declare no competing interests.
☆☆ Funding: This study was supported by the following grants: Beijing Hope Run Special Fund of Cancer Foundation of China (grant number: LC2018B12) and PUMC Youth Fund (grant number: 3332018066).

* Correspondence to: Fei Ma, Department of Medical Oncology, National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100021, China.
E-mail address: drmafei@126.com (F. Ma).
† Bo Lan and Shiyu Jiang contributed equally to this work.

https://doi.org/10.1016/j.currproblcancer.2020.100558

($P = 0.002$) and adjuvant endocrine therapy ($P = 0.048$) tended to be associated with the level of depression (PHQ-9 $\geq$ 8). In the multivariate analysis, living alone (odds ratio = 5.08, 95% confidence interval = 1.81-14.26, $P = 0.002$) and the administration of ovarian function suppression (odds ratio = 2.76, 95% confidence interval = 1.04-7.37, $P = 0.042$) were still independently correlated with a higher level of depression. No significant predictors were found for anxiety.

Conclusions: Our study evaluated the depression and anxiety of young Chinese breast cancer patients; addressing the psychosocial assessment of these patients should be integrated into cancer treatments and follow-ups, especially for those receiving ovarian function suppression and living alone.

ARTICLE INFO

Keywords: Breast cancer; Oncology; Young; Depression; Anxiety

Introduction

Breast cancer is the most commonly diagnosed cancer and the leading cause of cancer death among females, with an annual global incidence of more than 2.0 million cases.[1] Although women in China overall have a lower risk of breast cancer than do women in high-income countries, female breast cancer incidence rate significantly increased in China, from 31.90 per 100,000 in 2000 to 63.30 per 100 000 in 2014.[2] According to the National Central Cancer Registry of China, there will be about 268,600 newly diagnosed breast cancer cases in women in the year of 2015, accounting for 15% of all new cancers in women.[3] The treatment of breast cancer often includes surgery, endocrine therapy, chemotherapy, and radiotherapy. While extensive clinical trials have been conducted in breast cancer patients to tailor the treatment and improve prognosis, psychological issues have become another challenge with an excess absolute risk of 4.1 per 100,000 person-years of suicide after breast cancer.[4]

Among all solid malignancies, the psychological issues may be most severe in breast cancer patients. In a study on the 4-week prevalence of mental disorders in cancer patients from Western major tumor entities, the highest prevalence of any mental disorder was observed in patients with breast cancer.[5] As a particularly common affective disorder among cancer patients, depression occurs in breast cancer patients with a prevalence ranging from 12% to 25%.[6,7] In Chinese population, the prevalence of depression was higher among cancer patients than healthy individuals.[8] As for breast cancer patients, 21%-26% of women reported depressive symptoms in China.[9,10] Frequently co-occurring with depression, anxiety is also associated with increased adverse effects, somatic symptoms, and poorer physical functioning.[11,12] The detrimental effects of worse psychological status on cancer patient well-being have been researched, and it has been suggested that they are correlated with patient outcome in breast cancer,[13] although the results on this correlation were inconsistent.[14-17]

It has been reported that young patients with breast cancer have more aggressive disease, and some of them have a genetic predisposition. Previously, age-related differences in depressive symptomatology have been reported. Younger breast cancer patients have been documented to be at greater risk of having psychosocial problems than their older counterparts.[18-22] Thus, psychological status should be regularly assessed in this population. Recently, the importance of multidisciplinary care for young breast cancer patients has been addressed, with an emphasis on individual psychosocial status, genetic predisposition, fertility, and sexual health. Young women have unique medical and psychological features that need to be taken into consideration.[23]

Breast cancer is the leading cause of cancer death in women younger than 45 years in China.[3] Nevertheless, until now, there have been few studies conducted in young breast cancer patients, especially in patients under the age of 35. Noticeably, patients diagnosed with breast cancer are generally younger in China than in the United States, with median diagnosis ages of 48-50 years and 64 years in China and the United States, respectively.[24] With a higher proportion of

young breast cancer patients in China,[25] it is even more meaningful to focus the physical and psychological domains of this population. The aim of this study was to determine the prevalence of depression and anxiety, identify the associated factors among breast cancer patients ≤35 years old in China.

Material and methods

Study design

This cross-sectional and prospective study ran from October 2018 to May 2019 in the National Cancer Center in China. The inclusion criteria were as follows: women aged 35 years or younger, having been diagnosed with localized breast cancer, who underwent complete surgical resection. By the time of enrolment, those with any confirmed or suspicious metastasis or disease relapse were excluded. Moreover, participants with writing or reading disability assessed by the investigators through the interview were also excluded. When patients who met the inclusion criteria came to our institute for follow-up clinics, the investigators explained the aim of this study and invited patients to join. After informed consent was given, the questionnaire was delivered by the investigators in person and completed by the patients. Ethical approval was obtained from the Institutional Review Board of the National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital (reference number: 19-013/1798).

Questionnaire and data measures

The self-administered questionnaire developed and used in this study aimed to assess the depression and anxiety of breast cancer patients aged 35 years or younger, as well as the contributing factors. The final questionnaire was divided into 2 parts. The first section comprised mostly demographic and clinical information, whereas the second section evaluated depression and anxiety in this cohort. The final form of the questionnaire was approved by all investigators. It was written in Chinese, the native language of the participants.

The sociodemographic characteristics collected were as follows: residence, cohabitation status, educational level, and personal income. The clinical data collected were as follows: Tumor, Node, Metastasis (TNM) staging classification, type of surgery, time since surgery, adjuvant radiation therapy, adjuvant endocrine therapy, and adjuvant chemotherapy.

Depression and generalized anxiety were assessed with the Chinese translation of Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder (GAD)-7 Scale, respectively. The validity and reliability of these 2 Chinese version questionnaires have been previously proven.[26,27] The PHQ-9 is a 9-item screening instrument. Each of the 9 items received a score of 0-3 The following PHQ-9 cut-off scores have been recommended to determine levels of depression severity: 0-7 none and/or mild, 8-14 moderate, 15-19 moderate to severe, and 20-27 severe. Major depression was defined as a sum score of ≥8.[28,29] The GAD-7 Scale consists of 7 items; each item was scored from 0 to 3. Scores of 5, 10, and 15 were established as the cut-off points for mild, moderate, and severe anxiety, respectively. GAD was defined as a sum score of ≥10.[29]

Statistical analyses

Cronbach's α value was determined as an indicator to assess the internal consistency of the questionnaire. In this study, the Cronbach's α alpha value was 0.82 and 0.90 for the Chinese version of PHQ-9 and GAD-7 scale, respectively, which is generally regarded as acceptable. Logistic regression was used to analyze factors affecting the level of depression and anxiety. Hazard ratio and the 95% confidence interval (CI) were calculated. Statistical analysis was conducted in SPSS 22.0 (SPSS Inc, Chicago, IL). All tests were 2 tailed, and a *P*value<0.05 was considered statistically significant.

Table 1
Sociodemographic and clinical characteristics.

Variable	N	%
Residence		
Urban	100	87.7
Rural	14	12.3
Cohabitation status		
Living with others	92	80.7
Living alone	22	19.3
Educational level		
High school or below	19	16.7
Undergraduate and above	95	83.3
Income		
4000 yuan and below	21	18.4
4001-8000 yuan	48	42.1
8001- yuan	45	39.5
TNM Stage		
Stage I	53	46.5
Stage II	39	34.2
Stage III	22	19.3
Type of surgery		
Mastectomy	60	52.6
Lumpectomy	54	47.4
Hormone (estrogen and/or progesterone) receptor positive		
Yes	94	82.5%
No	20	17.5%
HER2 positive		
Yes	45	39.5%
No	69	60.5%
Family history of breast cancer		
Yes	10	8.8%
No	104	91.2%
Time since surgery		
≤1 year	54	47.4
>1 year	60	52.6
Adjuvant radiation therapy		
Yes	80	70.2
No	34	29.8
Ovarian function suppression		
Yes	61	53.5
No	53	46.5
Adjuvant chemotherapy		
Yes	103	90.4
No	11	9.6

HER2, human epidermal growth factor receptor 2.

Results

Sociodemographic and oncological characteristics

Among the 115 patients who were invited to participate, consent was obtained from 114 patients, with a response rate of 99.1% in our study. The sociodemographic and clinical characteristics of the 114 participants was presented in Table 1. The median age was 32.5 (range, 26.0-35.9) years old in this cohort. Among the participants, most (80.70%, 92/114) of the patients lived with others, while 19.3% (22/114) patients claimed to be living alone. A majority of patients (83.30%, 95/114) claimed to have an educational level of undergraduate and above. In terms of clinical factors, more than half of patients (52.6%, 60/114) had mastectomy and nearly half (46.5%, 53/114) of patients had a pathologic stage I. In addition, 82.5% (94/114) patients were categorized as hormone (estrogen and/ or progesterone) receptor positive; 39.5% (45/114) patients had

human epidermal growth factor receptor 2-positive disease (immunochemistry 3+, or immunochemistry 2+ confirmed by fluorescent in situ hybridization); 8.8% (10/114) patients claimed to have family history of breast cancer. There were 90.4% (103/114) and 70.2% (80/114) patients received adjuvant chemotherapy and radiotherapy, respectively. A total of 91 (79.8%) patients received adjuvant endocrine therapy, and among them, 30 patients received tamoxifen alone; 61 patients received ovarian function suppression (OFS) plus tamoxifen or aromatase inhibitors.

Psychological features

The mean sum score of the PHQ-9 in this cohort was 5.21. According to the algorithm for depression [none and/or mild (score 0-7), moderate (score 8-14), and moderate to severe (score 15-19)], 76.3% (87/114), 20.2% (23/114), and 3.5% (4/114) of patients were categorized in the none and/or mild, moderate, and moderate to severe depression groups, respectively. On the item level, 9 out of the 114 patients claimed to have suicidal ideation. Noticeably, self-blame (n = 46, 40.4%) and concentration problems (n = 43, 37.7%) were commonly observed. As with anxiety assessment, the mean score was 4.19 for the entire cohort. There were 91.2% (104/114), 5.3% (6/114), and 3.5% (4/114) of patients in the none and/or mild anxiety (score 0-9), moderate anxiety (score 10-14), and severe anxiety (score 15-21) groups, respectively.

Analysis of factors contributing to patients' mental status

With univariate analysis, cohabitation status ($P = 0.002$) and adjuvant endocrine therapy ($P = 0.048$) tended to be associated with the level of depression (PHQ-9 $\geq$ 8) (Table 2). In the multivariate analysis, living alone (odds ratio = 5.08, 95%CI = 1.81-14.26, $P = 0.002$) and the administration of OFS (odds ratio = 2.76, 95%CI = 1.04-7.37, $P = 0.042$) were still independently correlated with a higher level of depression (Table 3). No significant predictors were found for anxiety (GAD-7) (Table 2).

Discussion

We conducted this study to show the levels of depression and anxiety in Chinese breast cancer patients aged 35 years or younger after surgery. We also gained an in-depth understanding of the associated factors impacting depression level among Chinese young breast cancer patients from this study, which may lay the basis for screening high-risk patients for depressive disorders during routine treatment and follow-ups and offering psychological interventions to mitigate the negative emotional sequelae of breast cancer.

Due to chemotherapy and endocrine therapy, menopausal symptoms such as hot flashes can be troublesome in breast cancer survivors.[30,31] Unlike natural menopause, sudden and intense menopausal symptoms could be challenging to the young patients' coping abilities. Additionally, these patients are facing problems including fertility, pregnancy, and sexual dysfunction at this age period.[32,33] All the reasons mentioned above could explain the higher incidence of psychological disorders in this younger breast cancer population compared with that observed in their counterparts. Thus, we expected to observe a higher rate of depression. Nevertheless, the rates of moderate and moderate to severe depression in our study were 20.2% and 3.5%, respectively, and the mean sum score of the PHQ-9 was 5.21, which is comparable to previously reported data in patients without age selection.[9,10,34] This could be explained by the reported findings that the occurrence of a distant metastasis was indicated as a strong predictor of psychological distress, and all the enrolled women in our cohort were early-stage postoperative breast cancer patients.

Extensive research has sought to determine the factors affecting depression in cancer patients. Carlson et al found that younger age, lower income, and a longer duration of illness were

Table 2
Statistical predictors for depression (PHQ-9) and anxiety (GAD-7) in breast cancer patients aged 35 years or younger.

Variable		PHQ-9			GAD-7		
		OR	95%CI	*P* value	OR	95%CI	*P* value
Residence	Urban	–	–	–	–	–	–
	Rural	0.50	0.11-2.39	0.385	0.52	0.10-2.75	0.443
Cohabitation status	Living with a partner	–	–	–	–	–	–
	Living alone	4.75	1.76-12.84	0.002	1.92	0.45-8.10	0.376
Educational level	High school or below	–	–	–	–	–	–
	Undergraduate and above	1.20	0.36-3.97	0.768	1.88	0.22-15.81	0.560
Income	4000 yuan and below	–	–	–	–	–	–
	4001–8000 yuan	0.83	0.26-2.63	0.756	2.86	0.32-25.35	0.346
	8001- yuan	0.63	0.19-2.07	0.441	1.43	0.14-14.61	0.764
Clinical variable	Stage I	–	–	–	–	–	–
	Stage II	1.69	0.63-4.50	0.294	1.02	0.22-4.85	0.979
	Stage III	1.61	0.50-5.16	0.421	1.93	0.40-9.47	0.415
Type of surgery	Mastectomy	–	–	–	–	–	–
	Lumpectomy	1.04	0.44-2.47	0.926	1.12	0.31-4.11	0.862
Time to surgery	≤1 year	–	–	–	–	–	–
	>1 year	0.65	0.27-1.55	0.331	0.35	0.09-1.44	0.147
Adjuvant radiation therapy	No	–	–	–	–	–	–
	Yes	1.01	0.39-2.61	0.980	0.99	0.24-4.08	0.990
OFS application	No	–	–	–	–	–	–
	Yes	2.55	1.01-6.43	0.048	3.85	0.78-19.00	0.098
Adjuvant chemotherapy	No	–	–	–	–	–	–
	Yes	3.38	0.41-27.66	0.257	NA	NA	0.999
Hormone receptor	No	–	–	–	–	–	–
	Yes	0.92	0.30-2.81	0.879	NA	NA	0.998
HER2 status	No	–	–	–	–	–	–
	Yes	1.95	0.81-4.66	0.135	1.02	0.27-3.85	0.972
Family history of breast cancer	No	–	–	–	–	–	–
	Yes	2.35	0.61-9.03	0.214	3.00	0.54-16.57	0.208

CI, confidence interval; GAD-2, generalized anxiety disorder scale; OFS, ovarian function suppression; OR, odds ratio; PHQ-9, Patient Health Questionnaire.

Table 3
Multivariate analysis of depression in 114 breast cancer patients ≤35 years old.

Variable		OR	95% CI	*P* value
Cohabitation status	Living with a partner	–	–	–
	Living alone	5.08	1.81-14.26	0.002
Ovarian function suppression	No	–	–	–
	Yes	2.76	1.04-7.37	0.042

CI, confidence interval; OR, odds ratio.

independently associated with higher distress in 2776 cancer patients.[35] In the study conducted by Hong et al, the factors influencing depression of cancer patients in China were performance status, pain, age, and education level.[8] In breast cancer, factors such as being in a metastatic stage, a lack of social and family support, living in a difficult emotional and/or financial situation and being younger than 50 years old were independent factors associated with psychological distress, with the occurrence of a distant metastasis being the strongest predictor.[19] Similarly, Bidstrup et al suggested that younger age and living without a partner were predictors of the most severe distress. Moreover, they also indicated that shorter education and clinical treatment features, such as treatment with chemotherapy and not receiving radiotherapy, could add to psychological depression.[36] Among Chinese breast cancer patients, those within 1 year after surgery, lower income, being single, or recurrent breast cancer were more likely to have depression disorder.[9] Another study in China showed low income, marital status, comorbidity, and low quality of life scores were independent predictors for depression.[10] Besides, the impact of surgery pro-

cedure on the psychological state had also been evaluated in breast cancer patients younger than 45 years old, suggesting that breast conserving surgery was correlated with lower rates of psychological distress compared with mastectomy.[37]

In contrast to other studies on the psychological health of breast cancer patients, our study focused on very young breast cancer patients (≤35) with localized disease, which accounted for a significant proportion of patients in China. We found that family support (living alone or not) was an independent factor affecting depression levels. Moreover, we focused on the use of adjuvant endocrine therapy and found that adding OFS can add to psychological depression in this population.

Younger age (≤35 years) at diagnosis of breast cancer indicated a more aggressive disease. In the Suppression of Ovarian Function trial, after a median follow-up of 8 years, significantly higher rates of disease-free and overall survival were seen after adding OFS to endocrine treatment. The absolute benefits were even larger in the cohort of patients who were diagnosed with breast cancer before the age of 35 years.[38,39] On the basis of these findings, guidelines recommend adding OFS in this age group.[23,40] In the meantime, adverse events were reported more common after the addition of OFS, including hot flushes, sweating, and osteoporosis. Although the incidences of depression were similar across different groups in the Suppression of Ovarian Function trial, our study showed that addition of OFS could increase the risk of depression in the young patients group. Thus, we present these results addressing that OFS should be used with assessing the psychological status of the patients during follow-ups, especially for the younger ones. Screening for high-risk patients (such as those living alone and receiving OFS treatment) and transferring them to psycho-oncological clinics could lower the incidence and level of psychological disorders as well as raise patient quality of life.

Very few studies have assessed the psychological status and the associated factors in Chinese breast cancer patients aged 35 years old or younger. Nevertheless, it should be noted that there were some limitations to this study. First, the cross-sectional design limited cause-and-effect conclusions, and we cannot ignore the factor that social desirability bias potentially existed because the questionnaire was delivered and retrieved in person. Additionally, the results of our study are limited in their generalizability to any broader population because patients who declined to join our study were not surveyed and all the participants came from the same site. Considering that the present study was conducted in the National Cancer Center in China, the demographics of the participants might differ from those in community settings. Thus, a multicenter survey is needed to test the generalizability of our findings.

Conclusions

Our study offers insight into the occurrence of depression and anxiety in Chinese postoperative breast cancer patients aged 35 years or younger, addressing the significance of routine screening during follow-ups. Meanwhile, the associated factors were identified, indicating that awareness of the increased risk of depression in patients receiving OFS treatment or living alone remains crucial.

Acknowledgment

The authors express sincere gratitude to the patients who participated in the study.

CRediT authorship contribution statement

Bo Lan: Conceptualization, Methodology, Data curation, Writing - original draft. **Shiyu Jiang:** Methodology, Writing - original draft. **Tao Li:** Writing - review & editing. **Xiaoying Sun:** Writing - review & editing. **Fei Ma:** Conceptualization, Methodology, Data curation, Writing - original draft, Supervision.

References

1. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2018;68:394–424.
2. Sun KX, Zheng RS, Gu XY, et al. Incidence trend and change in the age distribution of female breast cancer in cancer registration areas of China from 2000 to 2014. *Zhonghua Yu Fang Yi Xue Za Zhi*. 2018;52:567–572.
3. Chen W, Zheng R, Baade PD, et al. Cancer statistics in China, 2015. *CA Cancer J Clin*. 2016;66:115–132.
4. Schairer C, Brown LM, Chen BE, et al. Suicide after breast cancer: An international population-based study of 723,810 women. *J Natl Cancer Inst*. 2006;98:1416–1419.
5. Mehnert A, Brahler E, Faller H, et al. Four-week prevalence of mental disorders in patients with cancer across major tumor entities. *J Clin Oncol*. 2014;32:3540–3546.
6. Deshields T, Tibbs T, Fan MY, Taylor M. Differences in patterns of depression after treatment for breast cancer. *Psychooncology*. 2006;15:398–406.
7. Burgess C, Cornelius V, Love S, et al. Depression and anxiety in women with early breast cancer: five year observational cohort study. *BMJ*. 2005;330:702.
8. Hong JS, Tian J. Prevalence of anxiety and depression and their risk factors in Chinese cancer patients. *Support Care Cancer*. 2014;22:453–459.
9. Qiu J, Yang M, Chen W, et al. Prevalence and correlates of major depressive disorder in breast cancer survivors in Shanghai. *China. Psychooncology*. 2012;21:1331–1337.
10. Chen X, Zheng Y, Zheng W, et al. Prevalence of depression and its related factors among Chinese women with breast cancer. *Acta Oncol*. 2009;48:1128–1136.
11. Teunissen SC, de Graeff A, Voest EE, de Haes JC. Are anxiety and depressed mood related to physical symptom burden? A study in hospitalized advanced cancer patients. *Palliat Med*. 2007;21:341–346.
12. Aass N, Fossa SD, Dahl AA, Moe TJ. Prevalence of anxiety and depression in cancer patients seen at the Norwegian Radium Hospital. *Eur J Cancer*. 1997;33:1597–1604.
13. Kessler RC. The costs of depression. *Psychiatr Clin North Am*. 2012;35:1–14.
14. Pinquart M, Duberstein PR. Depression and cancer mortality: A meta-analysis. *Psychol Med*. 2010;40:1797–1810.
15. Groenvold M, Petersen MA, Idler E, et al. Psychological distress and fatigue predicted recurrence and survival in primary breast cancer patients. *Breast Cancer Res Treat*. 2007;105:209–219.
16. Watson M, Haviland JS, Greer S, et al. Influence of psychological response on survival in breast cancer: A population-based cohort study. *Lancet*. 1999;354:1331–1336.
17. Watson M, Homewood J, Haviland J, Bliss JM. Influence of psychological response on breast cancer survival: 10-year follow-up of a population-based cohort. *Eur J Cancer*. 2005;41:1710–1714.
18. Howard-Anderson J, Ganz PA, Bower JE, Stanton AL. Quality of life, fertility concerns, and behavioral health outcomes in younger breast cancer survivors: A systematic review. *J Natl Cancer Inst*. 2012;104:386–405.
19. Berhili S, Kadiri S, Bouziane A, et al. Associated factors with psychological distress in Moroccan breast cancer patients: A cross-sectional study. *Breast*. 2017;31:26–33.
20. Gomez-Campelo P, Bragado-Alvarez C, Hernandez-Lloreda MJ. Psychological distress in women with breast and gynecological cancer treated with radical surgery. *Psychooncology*. 2014;23:459–466.
21. Lam WW, Bonanno GA, Mancini AD, et al. Trajectories of psychological distress among Chinese women diagnosed with breast cancer. *Psychooncology*. 2010;19:1044–1051.
22. Gold M, Dunn LB, Phoenix B, et al. Co-occurrence of anxiety and depressive symptoms following breast cancer surgery and its impact on quality of life. *Eur J Oncol Nurs*. 2016;20:97–105.
23. Paluch-Shimon S, Pagani O, Partridge AH, et al. ESO-ESMO 3rd international consensus guidelines for breast cancer in young women (BCY3). *Breast*. 2017;35:203–217.
24. Fan L, Strasser-Weippl K, Li JJ, et al. Breast cancer in China. *Lancet Oncol*. 2014;15:e279–e289.
25. Li J, Zhang BN, Fan JH, et al. A nation-wide multicenter 10-year (1999-2008) retrospective clinical epidemiological study of female breast cancer in China. *BMC Cancer*. 2011;11:364.
26. Zeng QZ, He YL, Liu H, et al. Reliability and validity of Chinese version of the Generalized Anxiety Disorder 7-item(GAD-7) scale in screening anxiety disorders in outpatients from traditional Chinese internal department. *Chin Mental Health J*. 2013;27:163–168.
27. Wang W, Bian Q, Zhao Y, et al. Reliability and validity of the Chinese version of the Patient Health Questionnaire (PHQ-9) in the general population. *Gen Hosp Psychiatry*. 2014;36:539–544.
28. Manea L, Gilbody S, McMillan D. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): A meta-analysis. *CMAJ*. 2012;184:E191–E196.
29. Andersen BL, DeRubeis RJ, Berman BS, et al. Screening, assessment, and care of anxiety and depressive symptoms in adults with cancer: An American Society of Clinical Oncology guideline adaptation. *J Clin Oncol*. 2014;32:1605–1619.
30. Ganz PA, Rowland JH, Meyerowitz BE, Desmond KA. Impact of different adjuvant therapy strategies on quality of life in breast cancer survivors. *Recent Results Cancer Res*. 1998;152:396–411.
31. Loprinzi CL, Kugler JW, Sloan JA, et al. Venlafaxine in management of hot flashes in survivors of breast cancer: A randomised controlled trial. *Lancet*. 2000;356:2059–2063.
32. Aapro M, Cull A. Depression in breast cancer patients: The need for treatment. *Ann Oncol*. 1999;10:627–636.
33. Speer JJ, Hillenberg B, Sugrue DP, et al. Study of sexual functioning determinants in breast cancer survivors. *Breast J*. 2005;11:440–447.
34. Massie MJ. Prevalence of depression in patients with cancer. *J Natl Cancer Inst Monogr*. 2004:57–71.
35. Carlson LE, Angen M, Cullum J, et al. High levels of untreated distress and fatigue in cancer patients. *Br J Cancer*. 2004;90:2297–2304.
36. Bidstrup PE, Christensen J, Mertz BG, et al. Trajectories of distress, anxiety, and depression among women with breast cancer: Looking beyond the mean. *Acta Oncol*. 2015;54:789–796.

37. Berhili S, Ouabdelmoumen A, Sbai A, et al. Radical mastectomy increases psychological distress in young breast cancer patients: Results of a cross-sectional study. *Clin Breast Cancer*. 2019;19:e160–e165.
38. Francis PA, Pagani O, Fleming GF, et al. Tailoring adjuvant endocrine therapy for premenopausal breast cancer. *N Engl J Med*. 2018;379:122–137.
39. Burstein HJ, Lacchetti C, Anderson H, et al. Adjuvant endocrine therapy for women with hormone receptor-positive breast cancer: American Society of Clinical Oncology clinical practice guideline update on ovarian suppression. *J Clin Oncol*. 2016;34:1689–1701.
40. Coates AS, Winer EP, Goldhirsch A, et al. Tailoring therapies—Improving the management of early breast cancer: St Gallen International Expert Consensus on the Primary Therapy of Early Breast Cancer 2015. *Ann Oncol*. 2015;26:1533–1546.