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Original Article

Prevalence of depression, trait anxiety, and social support during the diagnostic phases of breast cancer

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الملخص

أهداف البحث: تهدف هذه الدراسة إلى تحديد مدى انتشار الاكتئاب والقلق بين النساء المشتبه في إصابتهن بسرطان الثدي، والتحقيق في ارتباط هذه العوامل بتشخيص سرطان الثدي.

طرق البحث: أجريت دراسة مقطعية على ٧٤٥ امرأة ظهرت عليهن أعراض الثدي في عيادة الثدي الجامعية في ماليزيا. وصدرت تعليمات للمشاركات بالرد على استبانات التقرير الذاتي عن الاكتئاب والقلق من السمات والدعم الاجتماعي بينما كن ينتظرن تقييم اللجان شبه الأساسية المشتبه فيها. تم تتبع التشخيص النهائي لهؤلاء المرضى بعد شهر من سجلاتهم الطبية. وقد تم إجراء الإحصاءات الوصفية للخصائص الاجتماعية-الديمغرافية والسريرية لجميع المشاركات.

النتائج: وأظهر التحليل أن تم تشخيص سرطان الثدي لدى ١٠٩ (١٤.٦٪)، ومرض الثدي الحميد لدى ٥٥٠ (٧٣.٨٪)، والثدي السليم لدى ٨٦ (١١.٥٪) امرأة. وكان انتشار الاكتئاب ٥٣.٢٪ في حالات النساء مع سرطان الثدي، ٥٣.٦٪ في حالات مرض الثدي الحميد و٦٠.٥٪ في حالات الثدي السليم قبل التشخيص. وكان انتشار القلق ٣٣٪. وكانت متوسط درجات القلق في مجموعة سرطان الثدي ٤٢.٢±٩ و٤١.٨±٩.١ لمجموعة مرض الثدي الحميد. وكان مستوى الدعم الاجتماعي المتصور مماثلا في جميع الفئات الثلاث.

الاستنتاجات: لم نجد أي فرق كبير في الاكتئاب والقلق والدعم الاجتماعي بين النساء مع التشخيص الحديث لسرطان الثدي، ومرض الثدي الحميد وذوات الثدي السليم في النساء مع أعراض الثدي، في أثناء الخضوع للتقييم التشخيصي. من

الضروري إجراء دراسة طولية لإثبات العلاقة بين الإجهاد العقلي المزمن وسرطان الثدي.

الكلمات المفتاحية: سرطان الثدي؛ الاكتئاب؛ القلق؛ الدعم الاجتماعي؛ التشخيص المسبق

Abstract

Objective: This study aims to determine the prevalence of depression, trait anxiety, and social support among women suspected of breast cancer (BC) and to investigate the association of these factors with the diagnosis of BC.

Methods: A cross-sectional study was conducted on 745 women who presented with breast symptoms in a university breast clinic in Malaysia. Participants were instructed to respond to self-report questionnaires on depression, trait anxiety, and social support while they were waiting for assessment of their suspected BC. The final diagnoses of these patients were traced one month after examining their medical records. Descriptive statistics were performed to examine the socio-demographic and clinical characteristics of all participants. A multiple regression analysis was carried out to determine the association of the abovementioned factors with the diagnosis of BC.

Results: The analysis showed that BC was diagnosed in 109 (14.6%), benign breast disease (BBD) in 550 (73.8%), and healthy breast (HB) in 86 (11.5%) women. The prevalence of depression was 53.2% in women with BC, 53.6% in women with BBD, and 60.5% in women with HB prior to diagnosis. The prevalence of trait anxiety was

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33%. Mean scores for trait anxiety were 42.2 ± 9.0 and 41.8 ± 9.1 for the BC group and BBD group, respectively. The level of perceived social support was similar in all three groups.

Conclusion: We found no significant difference in depression, trait anxiety, and social support among women with newly diagnosed BC, BBD, and HB in women with breast symptoms while undergoing diagnostic evaluation. A longitudinal study is essential to establish the association between chronic mental stress and BC.

Keywords: Breast cancer; Depression; Pre-diagnosis; Social support; Trait anxiety

Introduction

Common presentations of breast disease in outpatient clinics are breast lumps, breast pain, swelling and inflammation, nipple discharge, breast distortion, and scaling nipple.[1–3] Identification of these signs or symptoms reported by women may indicate underlying breast cancer (BC) in those with abnormal mammograms,[3] with further histopathology diagnostic procedures possibly confirming the diagnosis. It is estimated that 1 in 20 women in Malaysia develop BC in their lifetime, making BC one of the most common cancers among women in the country.[4]

Undergoing a diagnostic evaluation of suspected cancer and waiting for the results can be very frightening and threatening. There are many well-established studies on depression and anxiety following the diagnosis of BC or among BC survivors.[5–8] In a systematic review, the prevalence of depression among BC survivors was reported to be between 13% and 56%.[9] Studies have found that this is due in part to the uncertainty of the situation and the knowledge that painless breast lumps are highly indicative of malignant BC, which can often trigger high levels of distress, anxiety, and depressive symptoms.[10,11] Additionally, high levels of psychological distress were identified in women undergoing breast diagnostic evaluations, where the distress manifested as anxiety.[12,13] This is further supported by research findings which indicate that the prevalence of anxiety is often high among patients awaiting diagnostic procedures.[14,15] This may be further exacerbated by an individual's trait anxiety, which has been found to largely impact the experience of psychological distress.[16]

Hilakivi-Clarke et al.[17] proposed that factors such as the number of stressful events and their significance to the individual, personality characteristics, and social support may play a more crucial role in the development of mammary growths than the stressor itself. This implies that an individual's ability to cope with the uncertainty and threat posed by the risk of BC diagnosis could be vital in identifying the potential preventive factors for BC. In the past, researchers have investigated the plausibility of the association among depression, personality types, and life events with the incidence of BC.[18–20] Previous research has even examined social support, which is associated with an individual's coping mechanism with stress.[21] However, findings from these studies have been conflicting, ranging from positive associations, negative associations, to even no associations.[19,22,23] Furthermore, there exists a gap in research studying the association between social support and the onset of BC, with limited recent studies examining this association and most studies measuring social support at post-diagnosis and not pre-diagnosis.

Therefore, this study aims to determine the prevalence and level of depression, trait anxiety, and the level of social support among women who presented with breast symptoms and were suspected of BC. Furthermore, we aim to investigate whether there exists any association between depression, trait anxiety, and social support at the time of evaluation with subsequent confirmed diagnosis of BC.

Materials and Methods

This cross-sectional study was conducted at a university breast clinic in Malaysia on women who presented with breast symptoms and came for the investigation of suspected BC. These women were either referred to the clinic by their primary care doctors or self-referred. The assessment was performed over a two-year period from March 2013 until December 2015. Ethical approval from the Medical Ethics Committee was obtained before the commencement of the study. The inclusion criteria were as follows: (1) female patients presenting with any breast symptom(s), (2) less than 60 years old, (3) and understanding Malay or English. The exclusion criterion was severely ill patients who were confused or delirious. Every consecutive patient was approached and given a consent form to sign. Patients who consented were given questionnaires to fill in private before their consultation with the surgical team. Diagnoses were made by the breast surgeon based on the clinical presentation, mammogram, and histopathology results. The final confirmed breast diagnosis was traced from the participants' medical notes after one month. Both the participants and investigators were blinded to the diagnosis at the time the questionnaires were completed.

Measures

The socio-demographic information and clinical symptoms gathered were age, ethnic group, marital status, employment status, breast symptoms (breast lump, swelling, pain, abscess, rash, and other complaints), and duration of the symptoms. Participants could report more than one breast symptom. Hormonal factors, lifestyle, and other variables such as the age of menarche, history of breast-feeding, history of using oral contraceptive pills, history of using hormonal replacement therapy, history of drinking alcohol, history of smoking, and family history of BC were also obtained.

The Center for Epidemiologic Studies−Depression Scale (CES-D) was used to screen for depression.[24] The psychometric properties of the CES-D have been studied for women with and without BC in a previous study. The CES-D was found to have good internal consistency, with alpha coefficients > 0.85 for both groups, as well as adequate test-retest reliability.[25] Additionally, the 20-item scale has been validated for the Malaysian population.[26] The total CES-D score ranges from 0 to 60, with higher scores indicating more depressive symptoms. A cut-off score of ≥16 was used to indicate a 'case' of depression.

The State-Trait Anxiety Inventory Form Y-2 (STAI) was used to measure long-standing anxiety experienced by our participants by measuring trait anxiety. Trait anxiety is an individual's predisposition to experiencing anxiety in life-threatening situations and consists of 20 items that are rated on a 4-point Likert scale ranging from 1, 'never at all', to 4, 'almost always'. The total STAI score ranges from 20 to 80. Typical scores for those diagnosed with anxiety fall within the range of 47−61.[27] The investigator rated the test as follows: grade I (20−29), seldom anxious; grade II (30−49), sometimes anxious; grade III (50−69), often anxious; and grade IV (70−80), always anxious.[28]

To assess the level of social support perceived by women in our study, we used the Multidimensional Scale of Perceived Social Support (MSPSS) questionnaire. The MSPSS is a 12-item self-administered scale that measures perceived social support systems from three sources: family, friends, and significant others. The items are rated on a 7-point Likert scale that ranges from 1 for 'very strongly disagree' to 7 for 'very strongly agree'.[29,30] This scale enables data to be analysed in four categories: total MSPSS score and total levels of perceived social support in its respective subscale categories; total family score; total friends score; and total significant others score. Both the English and Malay versions of the MSPSS have good internal consistency and reliability.[31] As such, both versions of the scale were employed in this study.

Sample size calculations

The sample size, *n*, was determined using the following formula:[32]

$$n = \frac{Z^2 P(1 - P)}{d^2},$$

where *Z* and *d* were determined to be 1.96 and 0.02, respectively, to achieve a 95% confidence level. *P*, the expected prevalence, was determined based on a previous study at the UMMC Breast Clinic from 2005 to 2006, where the prevalence of malignancy of all excision biopsies conducted was found to be 8.2%.[33] Calculations yielded a required sample size of 722.

Statistical analysis

Data collected from this study were entered and analysed using the Statistical Package for Social Science, SPSS version 22. Descriptive analyses were done for the socio-demographic and clinical characteristics of all participants and also the three groups; namely, participants with BC,

BBD, and HB. The means and standard deviations for the depressive symptoms, trait anxiety, and social support of the three groups were presented. For trait anxiety, the percentage of each grade (I, II, III, and IV) was calculated. Lastly, multiple regression analysis was done to determine the significant associated factors for newly diagnosed BC. Normality of data was tested using Kruskal Wallis, and all tests were two-tailed with 0.05 significance level.

Results

A total of 745 women who presented with breast symptoms were included in this study. They came as walk-ins or were referred cases for breast lumps, breast swelling, breast pain, or breast abscess for the assessment and investigation of suspected BC. The mean age of the participants was 35.30 ± 12.14 years. More than half of the participants were Malays (56.1%), followed by Chinese (18.9%), Indians (18.4%), and other races (6.6%). A total of 61.5% were ever married, 60% were employed, 19.2% were housewives, and 88% presented with a breast lump. The majority (89%) of the symptoms were from a unilateral breast. The socio-demographic profiles and clinical presentations of the patients are shown in Table 1.

Table 1: Socio-demographic profiles and clinical presentations of the participants (n = 745).

Variables	Mean + SD	N	%
Age (years)	35.3 ± 12.1		
Age of menarche (years)	12.9 ± 4.5		
Age of menopause (years)	49.4 ± 4.6		
Ethnic			
Malay		418	56.1
Chinese		141	18.9
Indian		137	18.4
Others		49	6.6
Marital status			
Married		414	55.6
Single		287	38.5
Divorcee/separated/widow		44	5.9
Employment			
Employed		443	59.5
Not employed		20	2.7
Housewife		143	19.2
Student		139	18.7
Breast lump			
Yes		655	87.9
No		90	12.1
Breast swelling			
Yes		132	17.7
No		613	82.3
Breast pain			
Yes		336	45.1
No		409	54.9
Breast abscess			
Yes		16	2.1
No		729	97.9
Breast rash			
Yes		28	3.8
No		717	96.2
Other symptoms			
Yes		89	11.9

Table 1 (*continued*)

Variables	Mean + SD	N	%
No		656	88.1
Site of breast symptom			
Right		343	46.0
Left		320	43.0
Both		81	10.9
Mean duration of symptoms (weeks)	39.3 ± 95.4		
History of breastfeeding			
Yes		226	30.3
No		519	69.7
History of using oral contraceptive pills			
Yes		97	14.8
No		557	85.2
History of using hormonal replacement Therapy			
Yes		15	2.3
No		639	97.7
History of drinking alcohol			
Yes		23	3.5
No		629	96.5
History of cigarette smoking			
Yes		20	3.1
No		634	96.9
Positive family history of BC			
Yes		50	6.7
No		695	93.3
CES-D total score	17.35 ± 9.3		
STAI total score	42.1 ± 9.1		
MSPSS total score	67.6 ± 10.6		

CES-D: Center for Epidemiologic Studies–Depression; RR: risk ratio; STAI: State-Trait Anxiety Inventory Form Y-2; MSPSS: Multidimensional Scale to Perceived Social Support.

Of all the women presenting with breast symptoms for investigation, 405 (54.4%) had depression. The assessment revealed that 243 (32.6%) of the women had trait anxiety. The total score for depression was significantly correlated with the total scores for trait anxiety (r = 0.54, p < 0.001), and social support was negatively correlated with depression (r = −0.28, p < 0.001) and trait anxiety (r = −0.36, p < 0.001).

A total of 109 (14.6%) women presenting with breast symptoms at the university breast clinic received a final diagnosis of BC, while benign breast disease (BBD) was diagnosed in 550 (73.8%) patients and healthy breast (HB) in 86 (11.5%) patients.

Table 2 shows the socio-demographic and clinical characteristics of the three groups. The mean age of participants in the BC group was 47.2 years, which was significantly older than the mean age of participants in the BBD (32.9 years) and HB (35.6 years) groups. Additionally, presenting with a breast lump or breast swelling was significantly associated with subsequent BC diagnosis. History of breastfeeding, history of using oral contraceptive pills, and positive history of BC in family members were also significantly associated with subsequent BC diagnosis.

We also found that 58 (53.2%) of the women diagnosed with BC had depression, while 295 (53.6%) of the BBD patients had depression. Table 3 shows the mean total scores for depression, trait anxiety, and social support among the three groups. The levels of depression were high for all three groups and were not significantly different from each other. Similarly, there were no significant differences in the mean total scores for trait anxiety and perceived social support in the BC, BBD, and HB groups. Those diagnosed with BC had a mean total score for trait anxiety of 42.2 ± 9.0 and 41.8 ± 9.1 for the BBD group. The level of perceived social support was also similar in all the three groups. Table 4 shows the severity of trait anxiety in the BC, BBD, and HB groups.

Further multivariate analysis (Table 5) showed that older age, history of being married, symptom(s) of breast swelling, and breast lump(s) were significantly associated with the

Table 2: The socio-demographic and clinical characteristics of the three groups: BC, BBD, and HB.

Variables	BC (n = 109)	BBD (n = 550)	HB (n = 86)	p-value
Age (mean, years)	47.2 ± 8.9	32.9 ± 11.4	35.6 ± 11.0	<0.001*
Age at menarche (mean, years)	12.9 ± 1.2	12.9 ± 5.3	12.8 ± 1.5	0.981
Age at menopause (mean, years)	49.7 ± 4.2	49.4 ± 4.9	48.0 ± 4.6	0.602
Being a Malay	56 (51.4%)	314 (57.1%)	48 (55.8%)	0.546
Being married	74 (67.9%)	280 (50.9%)	60 (69.8%)	<0.001*
Being employed	67 (61.5%)	326 (59.3%)	50 (58.1%)	0.881
Being a housewife	37 (33.9%)	84 (15.3%)	22 (25.6%)	<0.001*
Breast lump	102 (93.6%)	486 (88.4%)	67 (77.9%)	0.003*
Breast swelling	34 (31.2%)	86 (15.6%)	12 (14.0%)	<0.001*
Breast pain	53 (48.6%)	240 (43.6%)	43 (50.0%)	0.395
Breast abscess	0 (0.0%)	14 (2.5%)	2 (2.3%)	0.244
Breast rash	4 (3.7%)	21 (3.8%)	3 (3.5%)	0.988
Other symptoms	12 (11.0%)	63 (11.5%)	14 (16.3%)	0.416
Unilateral breast symptom	106 (97.2%)	479 (87.1%)	78 (91.8%)	0.006*
Duration of symptoms (mean, weeks)	28.0 ± 39.6	42.0 ± 95.0	35.6 ± 1138.1	0.356
History of breastfeeding	47 (43.1%)	148 (26.9%)	31 (36.0%)	0.002*
History of using OCP	23 (22.5%)	58 (12.2%)	16 (21.3%)	0.007*
History of using HRT	4 (3.9%)	8 (1.7%)	3 (3.9%)	0.231
History of drinking alcohol	4 (3.9%)	16 (3.4%)	3 (3.9%)	0.948
History of cigarette smoking	5 (4.9%)	13 (2.7%)	2 (2.6%)	0.499
Positive family history of BC	13 (11.9%)	30 (5.5%)	7 (8.1%)	0.041*

OCP: oral contraceptive pill; HRT: hormone replacement therapy; * statistically significant difference.

Table 3: Depressive symptoms, trait anxiety, and social support of the three groups: BC, BBD, and HB.

Variables	BC (n = 109)	BBD (n = 550)	HB (n = 86)	p-value
CES-D total score (mean ± SD)	17.3 ± 9.1	17.3 ± 9.5	17.6 ± 8.6	0.947
STAI total score (mean ± SD)	42.2 ± 9.4	41.8 ± 9.1	43.6 ± 8.6	0.259
MSPSS total score (mean ± SD)	68.0 ± 9.8	67.5 ± 10.8	67.4 ± 10.6	0.873
Family (mean ± SD)	23.6 ± 3.7	23.5 ± 4.2	23.2 ± 4.6	0.747
Friends (mean ± SD)	21.1 ± 4.5	21.0 ± 4.4	20.9 ± 4.4	0.943
Significant others (mean ± SD)	23.2 ± 4.2	23.0 ± 4.6	23.2 ± 4.5	0.862

CES-D: Center for Epidemiologic Studies−Depression; STAI: State-Trait Anxiety Inventory Form Y-2; MSPSS: Multidimensional Scale to Perceived Social Support.

Table 4: The severity of trait anxiety (Spielberger trait) in the BC, BBD, and HB groups.

Severity of the trait anxiety level	BC n = 109 (100%)	BBD n = 550 (100%)	HB n = 86 (100%)	p-value (Overall)
Gr I (seldom)	10 (9.2)	54 (9.8)	6 (7.0)	0.89
Gr II (sometimes)	76 (69.7)	378 (68.9)	57 (66.3)	
Gr III (often)	23 (21.1)	116 (21.1)	23 (26.7)	
Gr IV (always)	0	1 (0.2)	0	

Table 5: Multiple regression analyses of the factors predicting newly diagnosed BC.

Model	Standardised coefficients beta	t	Significance
(Constant)		9.303	0.000
Age	-.391	−9.365	0.000
Married	.157	3.663	0.000
Housewife	.006	.153	.879
Breast lump	.163	4.637	0.000
Breast swelling	.121	3.479	0.001
Unilateral site	-.028	-.818	.414
Breast feeding	.042	1.078	.281
Family history of BC	-.035	−1.008	.341
MSPSS	-.128	-.347	.729
Significant others' support	.075	.462	.644
Family support	-.017	-.115	.908
Friends' support	.059	.375	.707
CES-D	-.016	-.382	.702
STAI	.020	.460	.646

Dependent variable: Diagnosis
CES-D: Center for Epidemiologic Studies−Depression; STAI: State-Trait Anxiety Inventory Form Y-2; MSPSS: Multidimensional Scale to Perceived Social Support.

incidence of BC. The level of depression, anxiety, and perceived social support during the time of evaluation, however, were not associated with the incidence of BC.

Discussion

Slightly more than half of the women presenting with breast symptoms in this study experienced clinical depression irrespective of their final diagnosis. Our findings support those of several studies which reported the prevalence of depression before the diagnosis of BC.[11,28,34] For instance, Montazeri et al., in their study on Iranian BC patients, stated that the prevalence of depression at pre-diagnosis was 38%, irrespective of diagnoses, with no significant changes at follow-up post-diagnosis.[34] Regarding the association between depression and the incidence of BC, we found no significant association between depression and subsequent diagnosis. Similarly, the Kuopio Breast Cancer study in Finland that involved a smaller cohort of patients concluded that there was no association between depression and newly diagnosed BC during the diagnostic period.[28] This corroborates the findings from a meta-analysis by Sun et al.,[35] which found that epidemiological studies often do not indicate the presence of any association between depression and BC incidence as compared to experimental studies and clinical evidence, which inversely suggest positive associations.

Waiting for diagnostic procedures for suspected BC has been found to lead to a higher prevalence of anxiety.[15] One-quarter of the women in this study had trait anxiety, which has been found to predict a higher level of distress in BC patients.[12,13,16,36] However, there was no association between trait anxiety and BC incidence. This is consistent with a larger prospective cohort study.[37] Additionally, we found no difference in the prevalence of trait anxiety between the respective diagnoses.

In our study, we found social support to be significantly negatively correlated with depression and trait anxiety. As such, this finding potentially supports the literature suggesting that high levels of social support could protect against the risk of BC.[17] However, this still remains unconfirmed as there is likely a more complicated relationship between the two; social support is not directly related to BC risk but may be related to it via other factors.[17,21,38] For instance, it was reported that women's perceptions of social support availability could protect them against some adverse emotional consequences of heightened BC risk perceptions.[21] Social support, along with emotional responses and defence mechanisms, have additionally been found to influence the level of uncertainty while waiting for definitive diagnoses.[10] Given this, it might be beneficial to examine the moderation relationship among these variables and BC incidence.

The risk of BC is attributed to a combination of factors. In this study, we found that older age is associated with the incidence of cancer, which is in line with previous research where BC is mostly seen in women over 50 years of age.[39]

Our results also showed that a history of marriage, symptoms of breast swelling, and breast lumps are statistically associated with the incidence of BC. This finding warrants caution that all married women get regular breast examinations or screenings to detect early breast symptoms or cancer as early detection increases the likelihood of receiving suitable treatment before the advancement of the disease.

There are several limitations to the current study. For instance, participants were recruited from a single centre, and therefore, the results may not be generalised to all women with breast symptoms. Additionally, this study employs a cross-sectional design, and as such, we are unable to describe any causal links between the variables. Another limitation of the study is that we neglected to examine state anxiety, which may shed some light on the lack of significance in the relationships studied. Other risk factors of cancer that may be of concern were not included in the study, such as obesity, alcohol consumption, lifestyle, and diet patterns.

Conclusion

This study found that women who attended the clinic with breast symptoms, regardless of a final diagnosis of BC, BB, or HB, had a similar level of depression, trait anxiety, and social support during the diagnostic period. Additionally, we did not find depression, trait anxiety, and social support to be associated with BC. Nonetheless, a high proportion of depressed patients and patients with high trait anxiety were found among women with breast symptoms. This number is appalling, and earlier psychological intervention would be beneficial for these women.

Recommendations

Screening for anxiety and depression among women who presented with breast symptoms.

Monitoring the mental health status of women with breast symptoms.

It may be beneficial for future studies to investigate the association between depression, anxiety, and symptom manifestation in BC.

Source of funding

Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

Ethical approval was obtained from the Medical Ethics Committee, University of Malaya Medical Centre (MEC-UMMC), before the commencement of the study. Ethical Approval number: 1059.57, Ethical body: MEC, UMMC, Date: 17th April 2014.

Authors contributions

NZZ and NCG conceived and designed the study, AW and BA collected the data, NAMT contributed the participants for study, NZZ analysed the data and wrote the first draft of the manuscript, and LSY reviewed and edited the paper. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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