

# BMJ Open Prevalence of psychological distress and associated factors among Omani women diagnosed with breast cancer: a single-centre, cross-sectional study

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## ABSTRACT

**Objectives** To determine the prevalence of psychological distress (ie, anxiety and depressive symptoms) among Omani women diagnosed with breast cancer (BC) and to investigate associations with socio-demographic factors.

**Design** A cross-sectional, self-administered survey was conducted between September 2021 and June 2022.

**Setting** Sultan Qaboos Comprehensive Cancer Care and Research Centre (Muscat, Oman).

**Participants** Adult Omani women diagnosed with BC during the study period.

**Outcome measures** Data regarding anxiety and depressive symptoms were collected using an Arabic version of the Hospital Anxiety and Depression Scale (HADS). Socio-demographic and clinical information was obtained from the participants and their hospital medical records.

**Results** 190 Omani women diagnosed with BC were invited to participate in the study, of whom 171 participated (response rate: 90.0%). The mean age was 50.3±10.9 years. 52.3% of participants had been diagnosed with BC at stages III or IV and 28.9% had metastasis. 29 women (17.0%) exhibited depressive symptoms (HADS-D score: ≥8), while 37 (21.6%) exhibited anxiety symptoms (HADS-A score: ≥8). Women with anxiety symptoms were almost 15-times more likely to have depressive symptoms than those without anxiety symptoms (OR: 14.87, p<0.001). Younger women were less likely to exhibit depressive symptoms than older women (≤39 vs ≥60 years, p=0.050; 40–59 vs ≥60 years, p=0.005). Women at the school/diploma education level were less likely to have depressive symptoms than those at college/university level (OR: 0.19, p=0.017).

**Conclusions** More than half of the women surveyed had been diagnosed at an advanced stage, with up to 21.6% presenting with symptoms of anxiety and depression. Healthcare professionals in Oman should consider additional screening for anxiety and depressive symptoms in this group and encourage patients with BC to disclose emotional information during consultations, particularly for those aged ≥60 years.

## INTRODUCTION

Breast cancer (BC) is the most frequently diagnosed type of cancer among women

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Symptoms of depression and anxiety were assessed using a previously validated, translated version of a widely used screening tool found to have high internal consistency, sensitivity and specificity in other Arab patient populations.
- ⇒ A power analysis was conducted to determine the sample size.
- ⇒ Results could be subject to errors related to recall, response and/or personal bias due to the cross-sectional study design and the self-administered nature of the data collection tool.
- ⇒ Although the study was conducted in a large, specialised cancer care centre treating patients referred from all over the country, the generalisability of the results is limited due to the single-centre setting.

worldwide, with an estimated 2.3 million new patients diagnosed globally each year, representing 10% of all cancer diagnoses and approximately 15% of all cancer-related deaths among women.<sup>1</sup> Despite global efforts to improve early detection and diagnosis, nearly one-third of all women with BC have either regional or distant metastasis at the time of diagnosis, most of whom reside in low- and middle-income countries (LMICs).<sup>2</sup> Despite the relatively low incidence rate in comparison to more developed countries, the mortality rate from BC in LMICs remains high.<sup>3</sup> Moreover, the median age of women diagnosed with BC in LMICs is 49–52 years, as compared with women in more developed countries for whom the median age is 63 years.<sup>3,4</sup>

Psychological distress in patients with BC is an important concern for healthcare practitioners as it reduces quality of life, negatively impacts compliance with medical treatment and carries an elevated risk of mortality.<sup>5</sup> Thus, emotional distress has been recognised as the sixth vital sign in cancer care alongside blood

pressure, pulse, temperature, respiratory rate and pain.<sup>6</sup> The US National Cancer Centre Network defines psychological distress as 'a multifactorial unpleasant emotional experience of a psychological (cognitive, behavioural, emotional), social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms and its treatment'.<sup>7</sup> In particular, individuals with BC have been found to be at greater risk of developing psychological distress, including symptoms of depression or anxiety, which lowers their quality of life and increases mortality.<sup>8,9</sup>

The overall prevalence of psychological distress among individuals with BC is reported to be between 8% and 24%.<sup>10</sup> In particular, the risk of depression increases in women with newly-diagnosed BC, although this can depend on the stage of BC at the time of diagnosis and the modality of treatment.<sup>11</sup> It has been found that individuals with BC are more likely to experience symptoms of depression and anxiety at the time of diagnosis and during treatment, but that such symptoms improve over the time.<sup>12</sup> Furthermore, several socio-demographic variables have been found to increase the risk of depression and anxiety symptoms among people with BC, with younger, less educated, low-income and divorced/widowed women more likely to suffer from these conditions compared with their respective counterparts.<sup>12,13</sup>

In Oman, BC remains the most commonly diagnosed cancer, accounting for 12.8% of all cancers and 21.2% of cancers affecting Omani women. Between 1996 and 2015, the incidence of BC in Oman almost doubled from 13.6 to 26.9 patients per 100 000 women.<sup>14</sup> Omani women are usually diagnosed with BC at a relatively young age (median age: 49 years) and more advanced stage (ie, stages III or IV), with a low 5-year survival rate (63%).<sup>15</sup> Many Omani women diagnosed with BC experience a concerning degree of psychological distress which can manifest in various ways, including as symptoms of anxiety, depression, fatigue, sexual concerns, social isolation, difficulty concentrating and self-blame.<sup>16,17</sup> However, to our knowledge, no previous study has yet been conducted to determine the prevalence of psychological distress, as measured by symptoms of anxiety and depression, among Omani women diagnosed with BC. Our aim was therefore to identify the prevalence of anxiety and depressive symptoms among a sample of Omani women diagnosed with BC and to determine associations with socio-demographic factors.

## METHODS

### Study design, setting and patient recruitment

A cross-sectional, self-administered survey was conducted between September 2021 and June 2022 at the Sultan Qaboos Comprehensive Cancer Care and Research Centre (SQCCCRC), a new, governmental, comprehensive cancer centre located in Muscat, the capital city of Oman. The centre integrates patient care with research, teaching and learning and provides evidenced-based,

patient-centred care.<sup>18</sup> The SQCCCRC receives referred patients diagnosed with cancer from all hospitals located throughout the country and provides comprehensive treatment (ie, surgery, radiotherapy, chemotherapy, hormonal therapy) and palliative and psychological care to patients diagnosed with all types of cancer, including BC.

All adult Omani women aged  $\geq 18$  years diagnosed with BC during the study period were identified from the electronic medical record system. The names of potential participants and the dates of their next appointment, visit or admission to the centre's day care units, outpatient clinics or wards were identified. Women who met the inclusion criteria were invited to participate in the study. Only women who agreed to participate and those who did not have current psychological or psychiatric illness or not currently taking any psychotropic medications were included in the study. Women who were admitted due to cancer chemotherapy complications or considered to have an oncological emergency, such as febrile neutropenia (defined as an axillary or oral temperature of  $\geq 38.5^{\circ}\text{C}$  or a sustained temperature of  $\geq 38^{\circ}\text{C}$  for 1 hour and an absolute neutrophil count (ANC) of  $< 500$  cells/ $\text{mm}^3$  or an expected ANC decrease to  $< 500$  cells/ $\text{mm}^3$  in the next 48 hours), or those in obvious pain were excluded from the study.<sup>19</sup>

### Sample size calculation

The sample size required for the present study was calculated for a single proportion of a finite population of 2000 patients with BC and at an absolute precision of 10% using nMaster sample size software, V.2.0 (Christian Medical College, Vellore, India). We considered the prevalence of anxiety and depression symptoms among women with BC to be approximately 25% based on an earlier systematic review.<sup>20</sup> For a confidence level of 95%, the minimum number of patients required for this study was calculated to be 170.

### Tools of measurement

The Hospital Anxiety and Depression Scale (HADS) is a widely used, 14-item scale to determine the prevalence of self-reported symptoms of anxiety (using the HADS-A subscale) and depression (using the HADS-D subscale) in non-psychiatric patients. The questionnaire comprises seven questions to detect symptoms of anxiety and seven questions to detect symptoms of depression. Although items relating to symptoms of anxiety and depression are interspersed throughout the HADS questionnaire, it is important that these dimensions are scored separately.<sup>21</sup> Previous research confirms that the tool demonstrates satisfactory psychometric properties in assessing symptom severity and caseness for symptoms of anxiety and depression in the general population, as well as among patients attending primary care settings, cognitively-intact nursing home residents and patients with cancer.<sup>21–23</sup> Correlations between the two subscales have been found to vary from 0.40 to 0.74 (mean: 0.56),

while the Cronbach's alpha reliability of the HADS-A and HADS-D subscales varies from 0.68 to 0.93 (mean: 0.83) and from 0.67 to 0.90 (mean: 0.82), respectively.<sup>23</sup> Scores range from 0 to 21 for each subscale, and the scale distinguishes between mild symptoms (scores of  $\geq 8$ ) and severe symptoms (scores of  $\geq 11$ ) for both depressive and anxiety symptoms.<sup>23</sup>

As such, a cut-off score of  $\geq 8$  was deemed optimal to ensure high sensitivity and specificity of 80%, given that previous studies have identified that the HADS-A and HADS-D subscales have a predictive validity of approximately 70% for the identification of symptoms of both anxiety and depression, including among individuals with BC.<sup>22–24</sup> Risk scores above these specific HADS cut-offs have proven useful in identifying symptoms of anxiety and depression among individuals with cancer in clinical practice at various stages in the disease trajectory.<sup>22</sup> For the purposes of the present study, a previously validated Arabic-language version of the HADS tool was used. Reported Cronbach's alpha values for the translated HADS-A and HADS-D subscales are 0.83 (95% CI: 0.79 to 0.88) and 0.77 (95% CI: 0.7 to 0.83), respectively.<sup>25</sup> The sensitivity and specificity of the Arabic-language version of the HADS tool has been reported to be 79% and 87%, respectively.<sup>26</sup>

Women who agreed to participate in our study were given the translated HADS to complete. For illiterate women, the questionnaire was introduced and completed by a research assistant during face-to-face interviews. Socio-demographic information was obtained directly from the participants. Additional clinical information was collected from the centre's electronic medical record system, including time since BC diagnosis, age at diagnosis, stage at diagnosis, modality of BC treatment (ie, hormonal therapy, radiation therapy, immunotherapy, surgery, chemotherapy) and the presence of any coexisting morbidities.

### Statistical analysis

The data analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, V.23.0 (IBM Corp., Armonk, New York, USA). The level of significance was set at 5%. Descriptive statistics were used to describe the basic socio-demographic characteristics and clinical outcomes of the participants, including percentages, means and medians. HADS-D and HADS-A scores were used to assess the prevalence of self-reported depressive and anxiety symptoms, respectively, for each participant; those with scores of  $\geq 8$  in the respective subscales were considered to have depressive or anxiety symptoms, respectively. A univariate analysis was conducted to compare socio-demographic factors among patients with and without depressive or anxiety symptoms using  $\chi^2$  and/or Fisher's exact tests. Multivariate logistic regression was applied, and ORs were used to determine risk factors associated with depressive symptoms after adjusting for socio-demographic factors.

### Ethical considerations

Potential participants were informed that participation in the study was optional and would not affect the medical care they received from SQCCRC.

### Patient and public involvement

None.

## RESULTS

### Basic characteristics of the study sample

Table 1 shows the patients' socio-demographic characteristics and clinical outcomes. Of the 190 women with BC invited to take part in the study, a total of 171 agreed to participate (response rate: 90.0%). The average age was 50.3 years (SD:  $\pm 10.9$  years), ranging from 24.0 to 85.0 years. The majority were married (n=128, 74.9%) and unemployed (n=130, 76.0%). Almost one-quarter (n=38, 22.2%) were illiterate, while 31.0% (n=53) had a college/university-level education. The majority had children (n=146, 85.4%) and received some degree of financial support from either the Ministry of Social Affairs and/or their family members (n=160, 93.6%). Most women (n=80, 52.3%) had been diagnosed with BC at stages III or IV and 28.9% (n=44) had metastasis. In terms of clinical outcomes, 29 patients (17.0%) exhibited depressive symptoms (HADS-D score:  $\geq 8$ ), while 37 patients (21.6%) had anxiety symptoms (HADS-A score:  $\geq 8$ ).

### Factors associated with depressive symptoms

Table 2 shows the socio-demographic and clinical factors associated with depressive symptoms among the sample. In the univariate analysis, no significant associations were found between depressive symptoms and marital status (single vs widowed/divorced, p=0.989; married vs widowed/divorced, p=0.989), education level (illiterate vs college/university education level, p=0.537; school/diploma vs college/university education level, p=0.084), employment status (p=0.824), having children (p=0.577) or financial support (p=0.693). However, patients who were younger were significantly less likely to exhibit depressive symptoms compared with older patients ( $\leq 39$  vs  $\geq 60$  years, p=0.005; 40–59 vs  $\geq 60$  years, p=0.005). In terms of clinical characteristics, no significant associations were found between depressive symptoms and stage of cancer at diagnosis (stage I vs IV, p=0.782; stage II vs IV, p=0.597; stage III vs IV, p=0.597) or the presence of metastasis (p=0.503); however, there was a significant association between depressive symptoms and anxiety status (p<0.001).

In the multivariate analysis, all socio-demographic and clinical factors were included to adjust for each other, except for stage of cancer at diagnosis and presence of metastasis due to >10% missing data. According to a Hosmer-Lemeshow goodness-of-fit test, the model was a good fit ( $\chi^2=7.527$ , p=0.376), with a predictive power of 81.3% (sensitivity: 72.4%, specificity: 83.1%). The logistic regression model showed that those aged 40–59 years were



**Table 1** Socio-demographic characteristics and clinical outcomes (N=171)

Characteristic/outcome	n (%)
Age (years)	
≤39	21 (12.3)
40–59	119 (69.6)
≥60	31 (18.1)
Mean±SD	50.3±10.9
Median (range)	50.0 (24.0–85.0)
Education level	
Illiterate	38 (22.2)
School/diploma	80 (46.8)
College/university	53 (31.0)
Marital status	
Single	15 (8.8)
Married	128 (74.9)
Widowed/divorced	28 (16.3)
Employment	
Employed	32 (18.7)
Unemployed	130 (76.0)
Retired	9 (5.3)
Have children	
No	25 (14.6)
Yes	146 (85.4)
Financial support	
Yes	160 (93.6)
No	11 (6.4)
Stage at diagnosis*	
I	34 (22.2)
II	39 (25.5)
III	39 (25.5)
IV	41 (26.8)
Metastatic cancer†	
Yes	44 (28.9)
No	108 (71.1)
Depressive symptoms	
Yes (HADS-D score: ≥8)	29 (17.0)
No	142 (83.0)
Anxiety symptoms	
Yes (HADS-A score: ≥8)	37 (21.6)
No	134 (78.4)

\*18 missing.  
†19 missing.  
HADS-A, Hospital Anxiety and Depression Scale, anxiety subscale; HADS-D, Hospital Anxiety and Depression Scale, depression subscale.

0.25-times less likely to have depressive symptoms than patients aged ≥60 years (OR: 0.25, p=0.042). In terms of education level, women at the school/diploma level were 0.19-times less likely to have depressive symptoms than

those at the college/university level (OR: 0.19, p=0.017). Finally, those with anxiety symptoms were 14.8-times more likely to have depressive symptoms compared with those without anxiety (OR: 14.87, p<0.001).

## DISCUSSION

To our knowledge, this is the first study conducted in Oman to identify the prevalence of anxiety and depressive symptoms and related socio-demographic factors among Omani women diagnosed with BC. Concerningly, over half of the participants in this study had been diagnosed with BC at later stages (ie, stages III or IV). A previous study conducted in Oman similarly found that 33.5% of Omani women diagnosed with BC presented with more advanced disease.<sup>15</sup> Moreover, many of the women from this study reported experiencing psychological distress after becoming aware of possible BC signs or symptoms which hindered them from seeking early medical help.<sup>15</sup> Prior research has indicated that Omani women with BC may experience several emotional barriers which hinder early medical help-seeking behaviour, such as fear of a BC diagnosis, being worried about what the doctor might find, fear of cancer-related mortality and concerns related to the hospital setting and the thought of undergoing medical procedures.<sup>15 27</sup> Suqri *et al* reported that delays in cancer diagnosis and presentation often occur among Omani individuals during the help-seeking interval between the appraisal of symptoms and consulting a doctor.<sup>28</sup>

Using HADS cut-off scores of ≥8, 17.0% of Omani women with BC in the present study were considered to have depressive symptoms, while 21.6% had anxiety symptoms. A study conducted among Malaysian women diagnosed with BC observed similar prevalence rates of these conditions (19.1% and 24.1%, respectively).<sup>29</sup> In previous research, Omani women diagnosed with BC reported devastating psychological distress immediately after their diagnosis, including fear of death, concern over treatment side effects and worries related to how the disease could affect their offspring, and their work or family commitments, as well as concern over the possibility of social stigma or adverse reactions from family members and members of the community.<sup>17</sup>

In the current study, women with anxiety symptoms were almost 15-times more likely to have depressive symptoms compared with those without anxiety symptoms; as such, women diagnosed with BC could benefit from routine screening to rule out pre-existing psychological morbidity.<sup>30</sup> The prevalence of depressive symptoms was also more frequent among women who had been diagnosed with BC at more advanced stages; this is likely as a result of awareness of their poorer prognosis compared with patients who are diagnosed at an earlier stage.<sup>31</sup> A study conducted in Greece similarly found that women diagnosed with stage IV BC were 1.9-times more likely to experience depressive symptoms compared with patients diagnosed with stages I or II BC.<sup>32</sup> Furthermore, more

**Table 2** Associations between depressive symptoms and socio-demographic characteristics and clinical outcomes (N=171)

Characteristic	Depressive symptoms		Univariate analysis	Multivariate analysis†
	Yes (HADS-D score: ≥8) (n=29)	No (n=142)	OR (p value)	OR (p value)
Age (years)				
≤39	2 (6.9)	19 (13.4)	0.19 (0.050*)‡	0.29 (0.258)
40–59	16 (55.2)	103 (72.5)	0.28 (0.005*)	0.25 (0.042*)
≥60§	11 (37.9)	20 (14.1)		
Education level				
Illiterate	10 (34.5)	28 (19.7)	1.36 (0.537)	0.40 (0.256)
School/diploma	8 (27.6)	72 (50.7)	0.93 (0.084)	0.19 (0.017*)
College/university§	11 (37.9)	42 (29.6)		
Marital status				
Single	1 (3.4)	14 (9.9)	0.33 (0.403)‡	0.67 (0.792)
Married	23 (79.3)	105 (73.9)	1.01 (0.989)	1.54 (0.530)
Widowed/divorced§	5 (17.3)	23 (16.2)		
Employment status				
Employed	5 (17.2)	27 (19.0)	0.89 (0.824)	0.65 (0.586)
Unemployed/retired§	24 (82.8)	115 (81.0)		
Have children				
No	3 (10.3)	22 (15.5)	0.63 (0.577)‡	0.77 (0.796)
Yes§	26 (89.7)	120 (84.5)		
Financial support				
Yes	28 (96.6)	132 (93.0)	2.12 (0.693)‡	1.13 (0.920)
No§	1 (3.4)	10 (7.0)		
Stage at diagnosis¶				
I	5 (22.7)	29 (22.1)	0.84 (0.782)	
II	5 (22.7)	34 (26.0)	0.71 (0.597)	
III	5 (22.7)	34 (26.0)	0.71 (0.597)	
IV§	7 (31.8)	34 (26.0)		
Metastatic cancer**				
Yes	8 (34.8)	36 (27.9)	1.38 (0.503)	
No§	15 (65.2)	93 (72.1)		
Anxiety symptoms				
Yes (HADS-A≥8)	19 (65.5)	18 (12.7)	13.09 (<0.001*)	14.87 (<0.001*)
No§	10 (34.5)	124 (87.3)		

\*Significant at p<0.05.

†Logistic (enter) regression, Hosmer and Lemeshow test:  $\chi^2=7.527$ , p=0.376; sensitivity: 72.4%, specificity: 83.1%, overall: 81.3%; Nagelkerke R<sup>2</sup>=0.390.

‡Fisher's exact test.

§Reference point.

¶18 missing.

\*\*19 missing.

††X<sup>2</sup> test.

HADS-A, Hospital Anxiety and Depression Scale, anxiety subscale; HADS-D, Hospital Anxiety and Depression Scale, depression subscale.

advanced BC might require more aggressive treatment which often involves unpleasant side effects, such as hair loss, disfigurement, decreased libido and nausea, all of which could affect the patient's body image and therefore increase their risk of emotional distress.<sup>33 34</sup>

We also observed that older patients were significantly more likely to exhibit depressive symptoms compared with younger patients. This contradicts findings from a study conducted in Syria which showed that younger women with BC suffered more frequently from anxiety



and depressive symptoms compared with older women.<sup>35</sup> Indeed, younger women in Oman are reportedly more likely to exhibit anxiety symptoms because of their fear of adverse effects affecting their perceived attractiveness and femininity as a result of the side effects of cancer treatment.<sup>36</sup> However, older people with BC in Germany were found to be 1.2-times more likely to experience both depressive and anxiety symptoms compared with younger patients.<sup>37</sup> In general, older individuals with BC may be more likely to report depressive symptoms compared with younger individuals because of lack of energy, increased sleep disturbances, decreased interest in activity and the coexistence of other conditions, such as cardiovascular disease, stroke, diabetes and hearing or visual impairments, all of which are more frequent in older age.<sup>31 35</sup>

More highly educated women in our study were more likely to report depressive symptoms compared with those who had not attended college or university. This finding could be attributed to the fact that more highly educated individuals are more likely to be aware of adverse cancer outcomes and treatment side effects.<sup>38</sup> A recent study conducted in Sweden similarly observed that higher education levels were associated with a greater frequency of anxiety symptoms in individuals with cancer.<sup>39</sup> On the other hand, other studies conducted elsewhere have indicated that less educated women are up to four times more likely to experience anxiety symptoms compared with those with a higher-level degree.<sup>32 39</sup> Researchers have suggested that one possible reason for this could be because more educated women have better access to information regarding cancer prognosis and treatment compared with less educated women, a factor which might offer some reassurance.<sup>32</sup> Further research is recommended to determine how education level might impact various forms of psychological distress experienced by individuals with BC.

This study has certain limitations. First, as a cross-sectional study based on a sample of participants with specific characteristics and self-reported measures, the results could be subject to errors related to recall, response and/or personal bias. Second, although most of the data were collected using self-administered questionnaires, the survey was completed on the behalf of illiterate women by the research assistants during face-to-face interviews; therefore, we cannot rule out the possibility of subjective bias on the part of the interviewers for these data points. Finally, the study was conducted among women with BC attending a single centre in Oman, potentially affecting the generalisability of the results. However, patients attending SQCCRC are often referred from other regions of Oman which could minimise this limitation.

## CONCLUSION

In conclusion, this study identified the prevalence of anxiety and depressive symptoms among Omani women diagnosed with BC to be 17.0% and 21.6%, respectively,

with more than half of the participants presenting with advanced stages of BC. Considering the high prevalence of psychological distress noted in this study, healthcare providers in Oman should improve their capacities for caring for such patients by implementing additional screening for symptoms of anxiety and depression and providing interventions to maintain the psychological well-being of individuals with BC. Moreover, additional health education initiatives to improve symptom recognition and early medical help-seeking behaviours are required to minimise delays in BC diagnosis among women in Oman. Healthcare providers should encourage women diagnosed with BC—particularly older women, those with additional comorbidities and those diagnosed at a more advanced stage—to disclose emotional information during consultations. This would allow for the early detection of anxiety and depressive symptoms and ensure that such patients are referred for appropriate psychological and psychiatric support.

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**Data availability statement** Data are available upon reasonable request. The data sets that support the findings of this study are available from the corresponding author upon reasonable request.

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