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Knowledge of symptoms, time to presentation and barriers to medical help-seeking among Omani women diagnosed with breast cancer - A cross-sectional study

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Knowledge of symptoms, time to presentation and barriers to medical help-seeking among Omani women diagnosed with breast cancer - A cross-sectional study

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ABSTRACT

Objectives To identify knowledge of breast cancer (BC) symptoms, time taken to consult a doctor and factors contributing to delays in medical help-seeking.

Design A cross-sectional study of Omani women diagnosed with BC.

Setting The two main teaching hospitals in Oman, Royal Hospital and Sultan Qaboos University Hospital.

Participants All adult Omani women recently diagnosed with BC.

Tools The Breast Cancer Awareness Measure and International Cancer Benchmarking Partnership questionnaire were used to collect data.

Results A total of 300 women with BC participated (response rate: 91.0%). Mean age at diagnosis was 43.0 ± 12.50 years and the majority (60.5%) were diagnosed at stages II, III or IV. Although most women (74.4%) recognised breast/armpit lumps to be a symptom of BC, less than half identified other symptoms, including breast/armpit pain (44.0%), changes in the position of the nipple (36.2%), redness (31.7%), fatigability (26.3%), weight loss (23.4%) and loss of appetite (20.8%). While most (91.6%) were aware that BC could be cured if detected early, only 66.4% sought medical help within a month of developing symptoms. Initial responses to symptoms included informing husbands (40.2%) or family members (36.5%). Barriers to seeking medical help included feeling scared (68.9%) and worried about what the doctor might find (62.8%). Highly educated women were more likely to recognise the following as BC symptoms: changes in nipple position (odds ratio (OR): 0.16, 95% confidence interval (CI): 0.03–0.81), breast pain (OR: 0.10, 95% CI 0.01–0.86) and unexplained weight loss (OR: 0.18, 95% CI: 0.04–0.88) (all $p < 0.05$).

Conclusions Although many Omani women with BC were aware of the importance of early diagnosis, most demonstrated inadequate knowledge of symptoms, did not prioritise seeking medical help and reported emotional barriers to help-seeking. More educational measures are needed to improve symptom recognition and address help-seeking barriers to minimise delays in diagnosis.

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Strengths and limitations of this study

- This is the first study conducted in Oman to explore time taken to seek medical help and barriers to seeking medical help among women diagnosed with breast cancer (BC).
- Although women were aware of the importance of early BC detection and that delays in seeking medical help could lead to complications, most presented at relatively advanced stages, with the cause for delay usually being due to the patients themselves.
- The initial response upon first noticing possible BC symptoms was to inform husbands and family members rather than seeking medical help.
- The possibility of recall and response bias could not be ruled out due to the use of self-reported questionnaire measures for data collection.
- While the Arabic version of the final questionnaire was assessed for reliability, the validity of this measure was not determined.

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BACKGROUND

Worldwide, breast cancer (BC) accounts for 10% of all cancers diagnosed annually and approximately 15% of all cancer deaths among women.[1] Despite efforts to improve the early detection of BC, nearly one-third of women worldwide have either regional or distant metastasis at the time of diagnosis.[2] In the Gulf Cooperation Council (GCC) region, BC is the most commonly diagnosed cancer among women, accounting for 13–35% of all cancers; moreover, approximately half of BC patients are under 50 years of age at the time of diagnosis, with a median age of 49–52 years compared to 63 years in Western countries.[3] In addition, approximately 58.0% of women in GCC countries present with advanced stages of BC at diagnosis (45% with regional metastasis and 12.8% with distant metastasis).[4]

Nonetheless, there is a high chance of a cure if BC is detected early and adequately treated; for example, women who begin treatment within 3–5 months of developing symptoms have significantly worse survival rates compared to those who seek medical help in <3 months.[5, 6] Delays in cancer diagnosis are defined as the time interval between the first symptom and the start of treatment.[7] The most common causes of delay are usually because patients do not correctly identify cancer symptoms or act on them to seek medical help.[8, 9] Low awareness of BC symptoms, lack of access to care, unavailability or non-participation in BC screening, fatalism, negative perceptions of BC and cultural beliefs are all factors which contribute to delays in seeking medical help on the part of patients.[2, 8, 10-12]

In Oman, BC is the most commonly diagnosed cancer and accounts for 12.79% of all cancers and 21.2% of cancers affecting women.[13] Recently, the incidence of BC has almost doubled from 13.6 cases per 100,000 women in 1996 to 26.9 in 2015.[13] Like other GCC countries, the majority of women diagnosed with BC in Oman are younger (median age: 49 years) and present at advanced stages (i.e. stages III and IV), with a low five-year survival rate (63%).[14] Several factors contribute to delays in cancer diagnosis in Oman, including the lack of a national screening programme, social stigma, the influence of family, spouses and friends in treatment decision-making and the prevalence of traditional medicine and medical tourism.[8, 15-17] Identifying specific factors which contribute to delays in BC diagnosis are crucial to help improve patient outcomes. The aim of this study was therefore to identify knowledge of BC symptoms, time taken to seek medical help and barriers to medical help-seeking among Omani women diagnosed with BC.

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Methods

Study setting

This cross-sectional study was carried out between November 2018 and April 2019 at the National Oncology Centre of the Royal Hospital (RH) and the Oncology Unit of the Sultan Qaboos University Hospital (SQUH), both of which are located in Muscat, the capital city of Oman. These hospitals represent the two primary oncology centres in Oman and provide comprehensive treatment (including surgery, chemotherapy and radiotherapy) and palliative care to patients diagnosed with all types of cancer, including BC.[18] Patients diagnosed at other regional hospitals of Oman are referred to either RH or SQUH for treatment.

Sample size estimation and recruitment

According to previous data from the National Cancer Registry from 1999 to 2015, the number of BC patients in 2018 and 2019 was estimated to be 271 based on a linear prediction model.[13] Thus, all Omani women diagnosed with BC during the year prior to data collection were targeted for inclusion in the current study, as having been diagnosed more than a year previously could have resulted in recall bias.

A total of 330 adult Omani women aged ≥18 years and diagnosed with BC within the preceding year at RH or SQUH were identified from the electronic hospital systems and invited to participate in the study. Patients were informed that participation in the study was optional and would not affect the medical care they received. Only women who agreed to participate and who attended the outpatient oncology clinics or day care units or those who were admitted to the wards during the study period were included. Women who were in obvious distress, pain or admitted because of complications such as febrile neutropenia were excluded. All participants signed a consent form prior to taking part in the study.

Tool used to measure BC symptom knowledge and barriers to seeking medical help

The Breast Module of the Cancer Awareness Measure (Breast-CAM) was developed in the UK and is a valid and reliable instrument for measuring BC awareness in women.[19, 20] It has moderate to good test-retest reliability for most items, with a good discriminatory index of BC knowledge and can be administered either face-to-face or via telephone interviews.[19, 20] The Breast-CAM includes three different sections which independently measure and assess knowledge of BC symptoms, anticipated delays before contacting the doctor and barriers to seeking medical help (including both emotional, practical and service-related barriers).[19]

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Tool used to measure time taken to seek medical help

In Europe, the International Cancer Benchmarking Partnership (ICBP) developed a module to measure the overall time interval between the first possible symptom of cancer and the start of treatment.[7] This overall interval is then divided into subintervals depending on the factor responsible for the delay, including delays related to the patient themselves, the diagnostic process and the treatment or management process. The ICBP questionnaire has been used in several international studies to investigate root causes of delays in cancer diagnoses.[21, 22]

For the purposes of the current study, the Breast-CAM and ICBP tools were combined into one questionnaire in order to assess knowledge of BC symptoms, time taken to consult a doctor, and barriers to seeking medical help among Omani women. Sociodemographic variables in the modules were modified to be relevant to Omani society and the national healthcare system. Both the Breast-CAM and ICBP tools were translated from English to Arabic and then back-translated into English. The combined questionnaire was completed by two researchers during face-to-face interviews conducted with the participants. In order to ensure the clarity and reliability of the questionnaire, a pilot study was conducted of the first 30 women enrolled in the study. Based on a standardised item analysis, Cronbach's alpha (α) values of the Arabic versions of the Breast-CAM tool and ICBP questionnaire were 0.88 and 0.85, respectively.

Statistical analysis

Data were analysed using SPSS software, version 22 (IBM Corp., Armonk, New York). Descriptive data were presented as numbers and percentages. A Chi-squared (χ^2) test was used to determine associations between sociodemographic characteristics and the responses of the participants. A binary logistic regression model was used to adjust for the effect of certain factors, with the findings presented as odds ratios (ORs) and 95% confidence intervals (CIs). A p value of <0.05 was considered significant.

Results

Characteristics of the participants

A total of 300 women with BC participated in the study out of 333 eligible subjects, resulting in a response rate of 91.0%. The mean age was 47.0 ± 12.2 years (median: 45.0 years, range: 24–84 years). The majority were below the age of 50 years (66.1%) and married (76.2%). Over one-third were residents of Muscat (34.3%) and had no formal education (35.2%). Overall, 81

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patients (27.1%) reported having a family history of BC, of which the majority (76.3%) were first- or second-degree relatives. The mean age at BC diagnosis was 43.0 ± 12.50 years. Most women (60.5%) were diagnosed with BC at stages II, III or IV. The women were receiving various treatments modalities at the time of the interviews, including chemotherapy, radiotherapy and hormonal therapy (table 1).

Knowledge of BC symptoms and barriers to seeking medical help

The majority of women were aware that BC could be cured if detected sufficiently early (91.6%) and that delays in seeking medical treatment could adversely affect their health (91.6%). Moreover, the majority were aware that missing or delaying an appointment to visit the doctor could cause delays in treatment (90.2%) and that delays in diagnosis could lead to complications (89.0%). On the other hand, less than half of the women (43.8%) had been aware of BC prior to their diagnosis. Under one-third of the cohort thought that a BC diagnosis could lead to social stigma (24.2%) and that society had an effect in delaying BC treatment (30.2%) (figure 1).

The majority of women (74.7%) were aware that lumps in the breast or armpit could be symptoms of BC. However, less than half were aware that pain in the breast or armpit (44.0%), changes in the position of the nipple (36.2%), redness of the skin of the breast (31.7%), fatigability (26.3%), unexplained weight loss (23.4%) and loss of appetite (20.8%) were possible BC symptoms (figure 2). The most commonly reported barriers to seeking medical help were fear (68.9%), followed by anxiety over what the doctor might find (62.8%), having too many other things to worry about (43.6%), embarrassment (26.0%), being too busy to make time to go to the doctor (19.5%), difficulties arranging transport (13.7%), difficulties explaining their symptoms to the doctor (12.4%) and worry over wasting the doctor's time (8.1%) (figure 3).

Associations between sociodemographic characteristics and responses

The binary logistic regression analysis indicated that women who had no formal education were less likely than those who were highly educated (i.e. college and above) to recognise that the following were potential symptoms of BC: changes in the position of the nipple (OR 0.16 (95% CI 0.03–0.81) p <0.05), pain in the breast or armpit (OR 0.10 (95% CI 0.01–0.86) p <0.05) and unexplained weight loss (OR 0.18 (95% CI 0.04–0.88) p <0.05). On the other hand, women educated to the high school level were more likely than college-educated women to

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recognise that a lump in the breast or armpit (OR 7.28 (95% CI 1.06–50.19) p <0.05) and fatigability (OR 3.82 (95% CI 1.08–13.58) p <0.05) could be BC symptoms.

Employed women were more likely than unemployed women to recognise that fatigability could be a symptom of BC (OR 4.18 (95% CI 1.34–13.05) p <0.05). In addition, women in the lowest income category were more likely than those in the highest category to recognise that pain in the breast or armpit (OR 4.14 (95% CI 1.14–15.12) p <0.05) and redness (OR 3.58 (95% CI 1.11–11.52) p <0.05) could be BC symptoms (table 2).

Time taken to seek medical help

At the time of the interviews, most women (71.0%) had been diagnosed with BC less than six months previously. Upon first noticing possible BC symptoms, the initial response of most women were to inform their husband (40.2%), followed by informing other family members (36.5%) and seeing a doctor at a government hospital (8.4%), local health centre (LHC) (8.1%) or private facility (2.4%); however, several women reported traveling abroad (2.0%) or using traditional or herbal remedies (0.7%). Less than half of the cohort consulted a doctor within two weeks of developing possible BC symptoms (46.6%) and more than half of them (65.0%) were able to get an appointment to see a doctor within two weeks

However, the majority were diagnosed with BC immediately after their first visit to an LHC (67.7%) or after their first or second visit to government hospitals (51.2%). Moreover, most women were able to see specialists at government hospitals within two weeks of referral (71.3%) and received confirmation of the diagnosis within two weeks of their first appointment (65.7%). Finally, more than half (58.5%) were able to receive their first treatment within two weeks of their diagnosis (table 3).

Discussion

To our knowledge, this is the first study conducted in Oman to explore knowledge of BC symptoms, time taken to seek medical help and barriers to seeking medical help among women with BC. The mean age of the women diagnosed with BC in this study was 43 years; this is much lower than the average age reported in developed countries (mean age: 63 years) and slightly below that reported in other Arab countries (mean age: 49–52 years).[3] A previous study conducted in Oman shared similar findings in which the mean age of women diagnosed with BC was 47 years, with one-third being under 40 years.[14] The younger age of

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presentation of women with BC in Oman might be attributable to various factors, including genetic background, the adoption of more 'Westernised' lifestyles (including reduced levels of physical activity and higher rates of obesity), a decrease in breastfeeding and the presence of potential carcinogens in the local environment.[23]

Although the vast majority of women in this study were aware of the importance of early BC detection and that delays in seeking medical help could lead to complications, most nevertheless presented at relatively advanced stages (i.e. stages II, III or IV). Previous studies have reported similar findings.[14, 24] Although a large proportion of women in this study were able to recognise that lumps in the breast or armpit were a possible symptom of BC, the majority were not aware of other symptoms such as fatigability, unexplained weight loss or loss of appetite. Indeed, less than half of the women reported having been aware of or knowledgeable regarding BC prior to their own diagnosis. Researchers have recommended incorporating information regarding cancer risk factors and symptoms into the school curriculum so as to increase cancer knowledge in adulthood.[25]

Poor awareness of BC symptoms is a predominant reason for delayed presentation to a doctor, particularly if symptoms are atypical in nature.[9] Most women with BC more commonly recognise obvious symptoms, such as lumps, compared to more ambiguous symptoms, such as tiredness, unexplained weight loss and reduced appetite; in fact, delays in presentation are more likely to occur in BC cases in which the symptoms do not include a breast lump.[6, 11] Furthermore, knowledge of BC symptoms is a prerequisite for prompt help-seeking behaviours, particularly if the symptom is perceived to be serious.[26] Uneducated women in our study were less likely to recognise certain BC symptoms, such as changes in the position of the nipple, breast or armpit pain and unexplained weight loss. Similar findings have also been noted among Omani women with ovarian cancer, with more educated women being more likely to recognise specific symptoms compared to those who were less educated.[27]

More than half of women in our study who sought medical help at LHCs or government hospitals were diagnosed with BC after their first or second visit, indicating that the cause for any delays in diagnosis was likely due to the patients themselves. Other researchers have highlighted that not seeking early medical help is a predictor of delayed diagnosis.[8, 28] Furthermore, the majority of women who were seen at LHCs in the present study were subsequently seen by specialists within two weeks of referral, with the BC diagnosis confirmed

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within another two weeks. Once again, this indicates that factors related to the local health system do not seem to play a major role in delaying BC diagnoses in Oman. Referral policies covering specific aspects of patient care are well established to oversee the transfer of patients from one healthcare setting to another for management.[29] Nonetheless, cancer patients in Oman, much like those in neighbouring GCC countries, often choose to seek medical help abroad (i.e. in countries like Thailand or India); this trend often causes delays in diagnosis, with many patients returning home with additional complications.[15]

For the majority of women in the current study, their initial response upon first noticing possible BC symptoms was to inform their husbands and family members. Becoming aware of possible symptoms of a life-threatening disease is often associated with feelings of emotional distress, anxiety and depression; hence, sharing this information with close family members might offer some emotional relief and support.[30, 31] Indeed, most women in our study prioritised sharing their symptoms with husbands or family members over consulting a doctor. This finding might be related to prevailing sociocultural attitudes which are based on a strong sense of moral responsibility and familial obligation, particularly when it comes to illness.[17] Furthermore, Omani women diagnosed with BC often rely on their families for emotional, physical and financial support, which also plays a role in treatment decision-making.[16, 17] However, the involvement of family members in medical decisions and treatment options can sometimes delay diagnoses, particularly if these individuals encourage patients to seek medical treatment abroad or pursue alternative or traditional remedies.[8, 32]

Although more than half of the women in our study sought medical help within one month of developing BC symptoms, most nevertheless presented at an advanced stage by the time they were diagnosed. Various psychosocial and cultural beliefs have been attributed to the delayed presentation of BC cases.[15, 28, 30] A previous study from Oman showed that women with BC experienced severe psychosocial distress, including fear of death, social isolation, anxiety regarding the side-effects of treatment and fear that the cancer might spread or interfere with their daily lives.[15] Women who express explicit fears about the consequences of diagnosis and treatment are more reluctant to seek medical help, resulting in a higher chance of delays in diagnosis.[11] Similarly, many women in our study reported emotional barriers that might contribute to delays in consulting a doctor, such being scared, embarrassed or worried about what the doctor might find. Symptom appraisal and perception of their severity is a predictor of decisions to seek medical help.[28]

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This study has certain limitations. First, it was difficult to objectively assess delays in BC presentation, diagnosis and treatment due to variations in how people perceive and define time intervals.[33] Furthermore, many patients in Oman often choose to access healthcare in non-integrated settings; for instance, by attending a mixture of government facilities, private facilities and facilities abroad. Thus, it was difficult in some cases to track the time taken throughout the diagnostic pathway using the three usual component intervals of delay (i.e. patient, primary care and secondary care delays). Apart from self-reported information from the patients, there were no other methods available to measure delays in the absence of electronic or written tracking data.

Second, while we recruited all Omani women diagnosed with BC within the previous year to satisfy the sample size requirements, the possibility of recall bias cannot be ruled out. Third, although the Arabic version of the combined questionnaire (which incorporated both the Breast-CAM and ICBP tools) was tested for reliability and demonstrated a satisfactory Cronbach's alpha (α) coefficient, we could not guarantee its validity, which was beyond the scope of this research. Finally, we used the Breast-CAM section to measure knowledge of BC symptoms and barriers to seeking medical help among patients who had already been diagnosed with BC; as such, we could not rule out potential bias in that the participants might have more knowledge of BC symptoms compared to other Omani women.

Conclusion

Omani women with BC demonstrated low levels of knowledge of BC symptoms and experienced several emotional barriers to seeking medical help; moreover, the majority were diagnosed at advanced stages. Despite national efforts to increase BC awareness, further educational initiatives are needed. Healthcare professionals should visit schools to raise awareness of BC symptoms and promote early help-seeking behaviours among female students in different regions of Oman. Employing both social and traditional media campaigns in LHCs and hospitals might also help to increase BC knowledge. Finally, healthcare professionals should make more efforts to build a trusting and cooperative relationship with female patients in order to help address emotional barriers to medical help-seeking, thereby encouraging them to disclose potential symptoms and thus reducing delays in diagnosis.

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Contributors

MA, KA, HA, ZM, JA and YA conceived of the study and contributed to its design and implementation. JA and YA collected data. SMP performed the statistical analysis. MA drafted the manuscript. All authors read and approved the final version of the manuscript.

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Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting or dissemination of this research.

Patient consent for publication

Not applicable as no details regarding individual patients have been reported in the manuscript.

Ethical approval

The study received ethical approval from the Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University (MREC #1809) as well

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as the Scientific Research Committee of the Royal Hospital (SRC #87/2018). Informed consent was obtained from all participants prior to their inclusion in the study.

Data availability statement

The datasets used and/or analysed during this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Table 1: Sociodemographic and clinical characteristics as stated by the participants

Variables	n (300)	%
Age (years) (n = 298)		
≤ 40	109	36.6
41–50	88	29.5
> 50	101	33.9
Marital status (n = 298)		
Single	21	7.0
Married	227	76.2
Divorced	11	3.7
Widowed	39	13.1
Origin (n = 297)		
Muscat	102	34.3
Ad Dhahirah	33	11.1
Al Batinah	60	20.2
Ad Dakhiliyah	40	13.5
Al Wusta	1	0.3
Ash Sharqiyah	41	13.8
Dhofar	5	1.7
Musandam	2	0.7
Al Buraimi	13	4.4
Educational level (n = 298)		
No formal education	105	35.2
Primary and elementary	37	12.4
High school	93	31.2
College and above	63	21.1
Employment status (n = 293)		
Employed	97	33.1
Unemployed/Housewife	196	66.9
Monthly family income in OMR (n = 281)		
≤ 500	110	39.1
501–1,000	99	35.2
> 1,000	72	25.6
Family history of BC (n = 299)		
Yes	81	27.1
No	218	72.9
If yes, degree of relationship (n = 80)		
First-degree	29	36.3
Second-degree	32	40.0
Third-degree	19	23.8
Stage of BC at diagnosis (n = 299)		
Stage I	62	20.7
Stage II	81	27.1
Stage III	55	18.4
Stage IV	45	15.1
I don't know	56	18.7
Treatment modality at time of interview (n = 261)		
Radiotherapy	135	51.7
Hormonal therapy	94	36.0
Targeted biological therapy	37	14.2
Chemotherapy	202	77.4
Surgery	154	59.0
I don't remember	33	12.6

BC: breast cancer; OMR: Omani riyal.

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Figure 1: General knowledge of breast cancer and delays in diagnosis

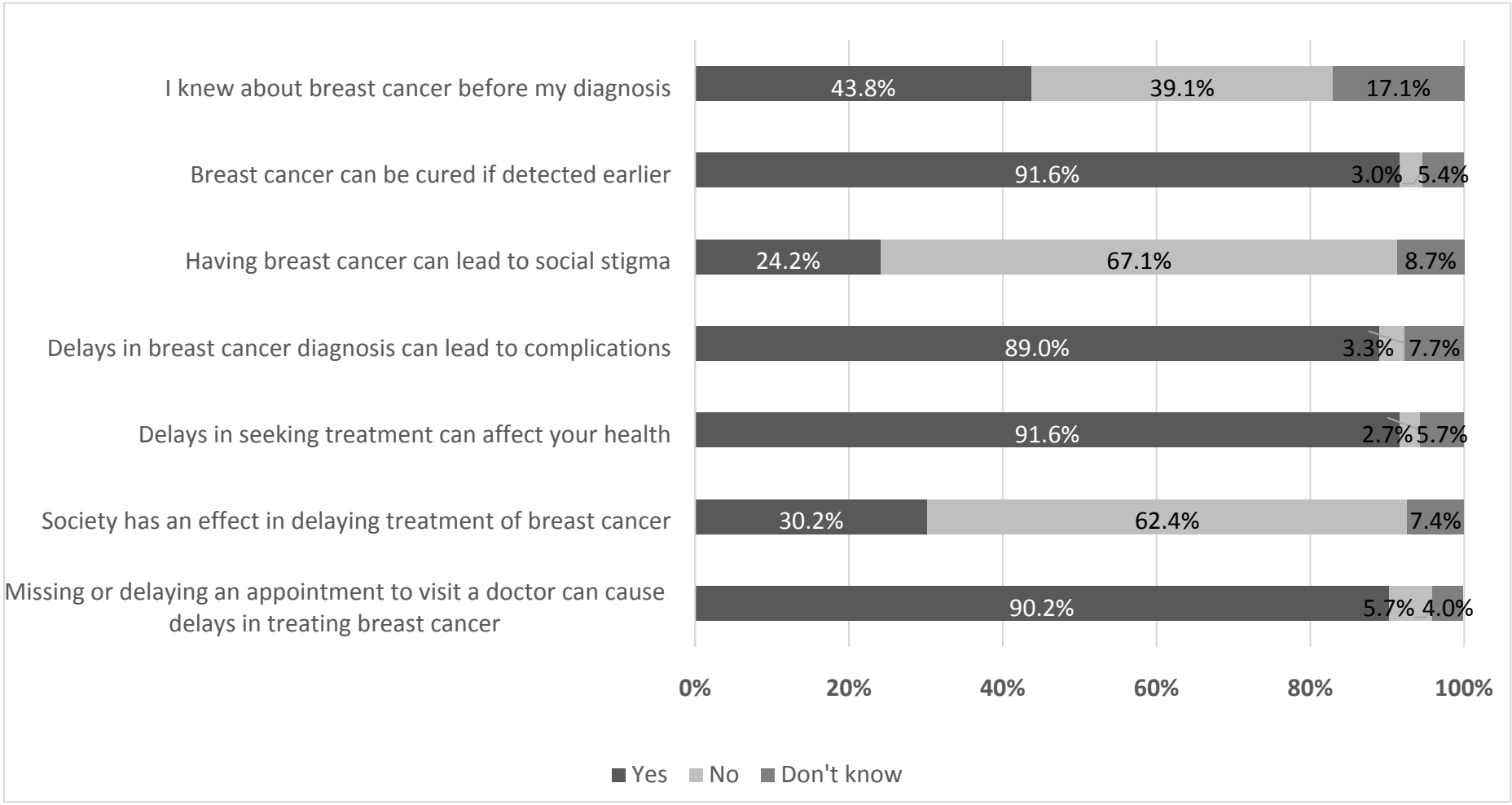

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Figure 2: Knowledge of specific signs and symptoms of breast cancer

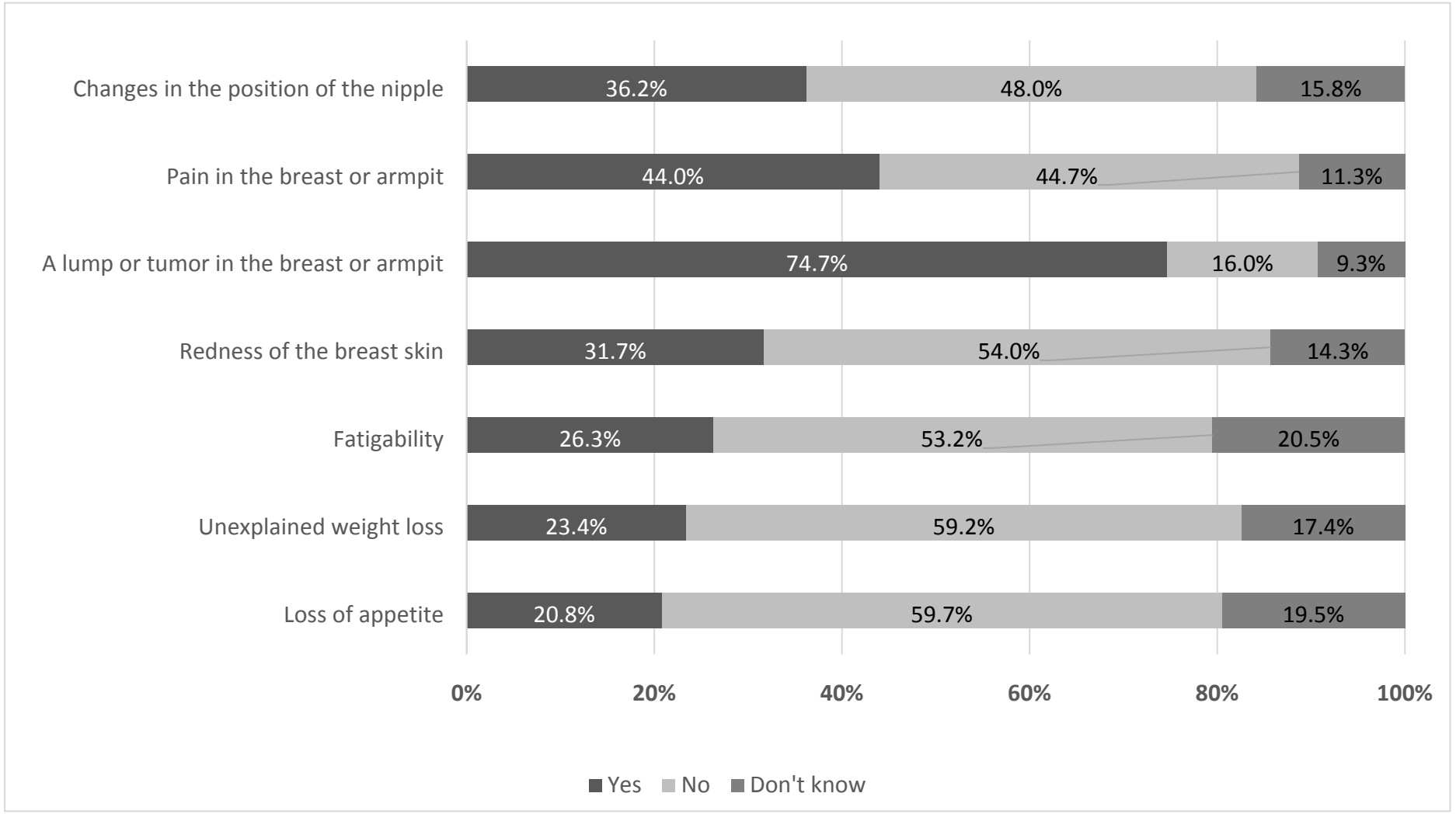

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Figure 3: Barriers to medical help-seeking

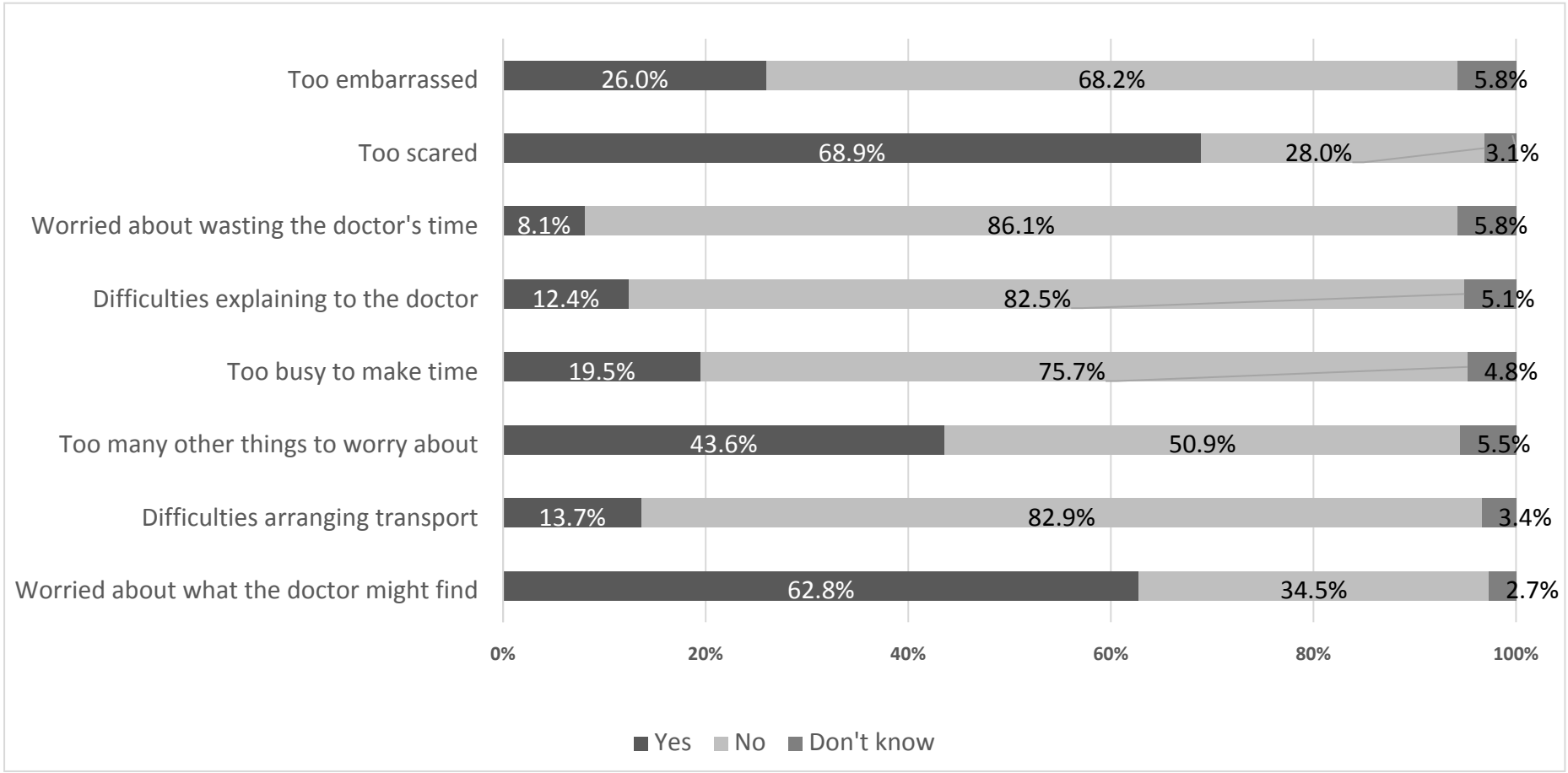

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Table 2: Association between sociodemographic characteristics and knowledge of breast cancer symptoms

Characteristics	Knowledge of BC symptoms, OR (95% CI)						
	Changes in the position of the nipple	**Pain in the breast or armpit**	**Lump/tumour in the breast or armpit**	**Redness of the breast skin**	**Fatigability**	**Unexplained weight loss**	**Loss of appetite**
Age (years)							
≤ 40	0.71 (0.24–2.07)	1.41 (0.42–0.47)	1.12 (0.31–4.0)	0.95 (0.30–2.97)	0.69 (0.26–1.82)	1.04 (0.37–2.93)	0.62 (0.23–1.69)
41–50	0.99 (0.35–2.82)	2.11 (0.61–7.34)	1.27 (0.37–4.40)	0.74 (0.27–2.05)	0.82 (0.32–2.08)	1.11 (0.40–3.06)	0.81 (0.31–2.14)
> 50	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Marital status							
Single	0.68 (0.10–4.45)	0.23 (0.03–1.75)	0.39 (0.05–2.88)	2.53 (0.26–24.41)	0.37 (0.09–1.58)	0.52 (0.10–2.60)	0.82 (0.17–3.90)
Married	0.605 (0.22–1.69)	0.53 (0.16–1.78)	0.82 (0.24–2.82)	1.65 (0.66–4.13)	0.97 (0.39–2.39)	0.89 (0.33–2.35)	1.22 (0.50–2.99)
Divorced/Widowed	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Educational level							
No formal education	0.16 (0.03–0.81)*	0.10 (0.01–0.86)*	0.93 (0.14–6.36)	2.97 (0.05–1.62)	1.13 (0.27–4.80)	0.29 (0.06–1.42)	0.37 (0.09–1.56)
Primary and elementary	0.49 (0.08–2.87)	0.10 (0.01–0.84)*	0.73 (0.11–4.96)	0.27 (0.05–1.47)	1.18 (0.27–5.08)	0.18 (0.04–0.88)*	0.29 (0.07–1.19)
High school	0.97 (0.24–3.85)	0.60 (0.09–4.10)	7.28 (1.06–50.19)*	1.19 (0.28–5.18)	3.82 (1.08–13.58)*	0.72 (0.19–2.68)	1.41 (0.44–4.53)
College and above	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Employment status							
Employed	0.83 (0.28–2.50)	1.60(0.37–6.83)	1.78 (0.38–8.12)	2.53 (0.74–8.59)	4.18 (1.34–13.05)*	1.18 (0.41–3.43)	1.45 (0.54–3.95)
Unemployed/Housewife	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Monthly family income in OMR							
≤ 500	1.22 (0.37–4.04)	4.14 (1.14–15.12)*	1.54 (0.35–6.80)	3.58 (1.11–11.52)*	1.49 (0.51–4.35)	1.89 (0.60–5.92)	2.66 (0.92–7.72)
501–1,000	0.98 (0.32–2.97)	1.98 (0.58-6.76)	0.58 (0.16–2.09)	3.33 (1.07–10.43)*	1.15 (0.43–3.06)	0.83 (0.30–2.29)	1.06 (0.42–2.65)
> 1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Family history of BC							
Yes	0.50 (0.20–1.23)	0.48 (0.17–1.41)	0.42 (0.13–1.33)	0.54 (0.22–1.32)	0.39 (0.17–0.91)	0.52 (0.22–1.24)	0.73 (0.34–1.56)
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Family history of any cancer							
Yes	0.74 (0.31–1.75)	0.73 (0.26–2.0)	0.93 (0.33–2.58)	1.04 (0.45–2.38)	1.61 (0.80–3.26)	1.10 (0.50–2.43)	1.22 (0.59–2.51)
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0

BC: breast cancer; OR: odds ratio; CI: confidence interval; OMR: Omani riyal.
*Significant at the p <0.05 level.

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Table 3: Time taken for medical consultation, referral, and treatment of breast cancer as stated by the participants

Variables	n (300)	%
Overall length of time since diagnosis (months) (n = 297)		
< 3	46	15.5
3–6	165	55.6
6–12	86	29.0
Initial response upon first noticing possible BC symptoms (n = 296)		
Informing husband	119	40.2
Informing family members	108	36.5
Informing friends	5	1.7
Seeing a doctor in a local health center	24	8.1
Seeing a doctor in a government hospital	25	8.4
Seeing a doctor in a private sector facility	7	2.4
Traveling abroad	6	2.0
Using traditional/herbal medicine	2	0.7
Approximate duration of symptom(s) before contacting a doctor (n = 298)		
< 1 week	93	31.2
1–2 weeks	46	15.4
3–4 weeks	59	19.8
5–7 weeks	24	8.1
2–5 months	38	12.8
6–12 months	18	6.0
> 12 months	20	6.7
Length of time between contacting a doctor and getting an appointment (n = 294)		
Same/next day	52	17.7
< 1 week	78	26.5
1–2 weeks	61	20.7
3–4 weeks	54	18.4
1–2 months	35	11.9
> 3 months	14	4.8
Number of medical visits before being diagnosed		
At local health centres (n = 155)		
1	105	67.7
2	27	17.4
3	23	14.8
At government hospitals (n = 209)		
1	63	30.1
2	44	21.1
3	47	22.5
≥ 4	55	26.3
Length of time between being referred to hospital and getting an appointment with a specialist (n = 296)		
< 1 week	117	39.5
1–2 weeks	94	31.8
3–4 weeks	58	19.6
5–7 weeks	12	4.1
2–5 months	8	2.7
6–12 months	3	1.0
> 12 months	4	1.4
Approximate length of time between first medical appointment and diagnosis (n = 297)		
Same/next day	31	10.4
< 1 week	72	24.2
1-2 weeks	92	31.0
3–4 weeks	53	17.8

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1–2 months	30	10.1
3–6 months	10	3.4
> 6 months	9	3.0
Length of time between diagnosis and first receiving treatment (n = 294)		
< 1 week	88	29.9
1–2 weeks	84	28.6
3–4 weeks	58	19.7
1–2 months	46	15.6
> 3 months	18	6.1

BC: breast cancer.

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Knowledge of symptoms, time to presentation and barriers to medical help-seeking among Omani women diagnosed with breast cancer - A cross-sectional study

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ABSTRACT

Objectives To identify knowledge of breast cancer (BC) symptoms, time taken to consult a doctor and factors contributing to delays in medical help-seeking.

Design A cross-sectional study of Omani women diagnosed with BC.

Setting The two main teaching hospitals in Oman, Royal Hospital and Sultan Qaboos University Hospital.

Participants Adult Omani women recently diagnosed with BC.

Tools The Breast Cancer Awareness Measure and International Cancer Benchmarking Partnership questionnaire were used to collect data.

Results A total of 300 women with BC participated (response rate: 91.0%). The mean age at diagnosis was 43.0 ± 12.50 years and 33.5% were diagnosed at stages III or IV. Although most women (74.4%) recognised breast/armpit lumps to be a symptom of BC, less than half identified other symptoms, including breast/armpit pain (44.0%), changes in the position of the nipple (36.2%), redness (31.7%), fatigue (26.3%), weight loss (23.4%) and loss of appetite (20.8%). While most (91.6%) were aware that BC could be cured if detected early, only 66.4% sought medical help within a month of developing symptoms. Initial responses to symptoms included informing husbands (40.2%) or family members (36.5%). Barriers to seeking medical help included feeling scared (68.9%) and worried about what the doctor might find (62.8%). Highly educated women were more likely to recognise the following as BC symptoms: changes in nipple position (odds ratio (OR): 0.16, 95% confidence interval (CI): 0.03–0.81), breast pain (OR: 0.10, 95% CI 0.01–0.86) and unexplained weight loss (OR: 0.18, 95% CI: 0.04–0.88) (all $p < 0.05$).

Conclusions Although many Omani women with BC were aware of the importance of early diagnosis, most demonstrated inadequate knowledge of symptoms, did not prioritise seeking medical help and reported emotional barriers to help-seeking. More educational measures are needed to improve symptom recognition and address help-seeking barriers to minimise delays in diagnosis.

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Strengths and limitations of this study

- This is the first study conducted in Oman to explore time taken to seek medical help and barriers to seeking medical help among women diagnosed with breast cancer (BC).
- Although women were aware of the importance of early BC detection and that delays in seeking medical help could lead to complications, most presented at relatively advanced stages, with the cause for delay usually being due to the patients themselves.
- The initial response upon first noticing possible BC symptoms was to inform husbands and family members rather than seeking medical help.
- The possibility of recall and response bias could not be ruled out due to the use of self-reported questionnaire measures for data collection.
- While the Arabic version of the final questionnaire was assessed for reliability, the validity of this measure was not determined.

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BACKGROUND

Worldwide, breast cancer (BC) accounts for 10% of all cancers diagnosed annually and approximately 15% of all cancer deaths among women.[1] Despite efforts to improve the early detection of BC, nearly one-third of women worldwide have either regional or distant metastasis at the time of diagnosis.[2] In the Gulf Cooperation Council (GCC) region, BC is the most commonly diagnosed cancer among women, accounting for 13–35% of all cancers; moreover, approximately half of BC patients are under 50 years of age at the time of diagnosis, with a median age of 49–52 years compared to 63 years in Western countries.[3] In addition, approximately 58.0% of women in GCC countries present with advanced stages of BC at diagnosis (45% with regional metastasis and 12.8% with distant metastasis).[4]

Nonetheless, there is a high chance of a cure if BC is detected early and adequately treated; for example, women who begin treatment within 3–5 months of developing symptoms have significantly worse survival rates compared to those who seek medical help in <3 months.[5, 6] Delays in cancer diagnosis are defined as the time interval between the first symptom and the start of treatment.[7] The most common causes of delay are usually because patients do not correctly identify cancer symptoms or act on them to seek medical help.[8, 9] Low awareness of BC symptoms, lack of access to care, unavailability or non-participation in BC screening, fatalism, negative perceptions of BC and cultural beliefs are all factors which contribute to delays in seeking medical help on the part of patients.[2, 8, 10-12]

In Oman, BC is the most commonly diagnosed cancer and accounts for 12.79% of all cancers and 21.2% of cancers affecting women.[13] Recently, the incidence of BC has almost doubled from 13.6 cases per 100,000 women in 1996 to 26.9 in 2015.[13] Like other GCC countries, the majority of women diagnosed with BC in Oman are younger (median age: 49 years) and present at advanced stages (i.e. stages III and IV), with a low five-year survival rate (63%).[14] Several factors contribute to delays in cancer diagnosis in Oman, including the lack of a national screening programme, social stigma, the influence of family, spouses and friends in treatment decision-making and the prevalence of traditional medicine and medical tourism.[8, 15-17] Identifying specific factors which contribute to delays in BC diagnosis are crucial to help improve patient outcomes. The aim of this study was therefore to identify knowledge of BC symptoms, time taken to seek medical help and barriers to medical help-seeking among Omani women diagnosed with BC.

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Methods

Study setting

This cross-sectional study was carried out between November 2018 and April 2019 at the National Oncology Centre of the Royal Hospital (RH) and the Oncology Unit of the Sultan Qaboos University Hospital (SQUH), both of which are located in Muscat, the capital city of Oman. These hospitals represent the two primary oncology centres in Oman and provide comprehensive treatment (including surgery, chemotherapy and radiotherapy) and palliative care to patients diagnosed with all types of cancer, including BC.[18] The majority of patients diagnosed with BC at other regional hospitals of Oman are referred to either RH or SQUH for treatment.

Sample size estimation and recruitment

According to previous data from the National Cancer Registry from 1999 to 2015, the number of BC patients in 2018 and 2019 was estimated to be 271 based on a linear prediction model.[13] Thus, Omani women diagnosed with BC at the RH or SQUH during the year prior to data collection were targeted for inclusion in the current study, as having been diagnosed more than a year previously could have resulted in recall bias.

A total of 330 adult Omani women aged ≥18 years and diagnosed with BC within the preceding year at RH or SQUH were identified from the electronic hospital systems and invited to participate in the study. The names of the patients and the date of their next visit to outpatient oncology clinics and day care units or admission to wards was identified. Two different researchers over a period of six months were involved in the data collection process in order to increase the number of participants in the study. Also, women who did not respond were contacted again and the date of their next appointment recorded.

Patients were informed that participation in the study was optional and would not affect the medical care they received. Only women who agreed to participate were included in the study. Women who were in obvious distress or pain and those who were admitted because of complications such as febrile neutropenia were excluded. All participants signed a consent form prior to taking part in the study.

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Tool used to measure BC symptom knowledge and barriers to seeking medical help

The Breast Module of the Cancer Awareness Measure (Breast-CAM) was developed by Cancer Research UK, King's College London and University College London and is a valid and reliable instrument for measuring BC awareness in women.[19, 20] It has moderate to good test-retest reliability for most items, with a good discriminatory index of BC knowledge and can be administered either face-to-face or via telephone interviews.[19, 20] The Breast-CAM were intended to be delivered to women in the community and includes different sections which independently measure and assess the following: knowledge of BC symptoms (i.e. changes in the nipple, pain or lumps in the breast or armpit, redness, fatigue, unexplained weight loss and loss of appetite) and barriers to seeking medical help, including emotional (i.e. being too embarrassed, scared or worried about what the doctor might find), practical (i.e. being too busy to make time, having too many other things to worry about and anticipating difficulties explaining concerns to the doctor) and service-related barriers (i.e. difficulties arranging transport or being worried about wasting the doctor's time).[19]

Tool used to measure time taken to seek medical help

The International Cancer Benchmarking Partnership (ICBP) was developed by the Department of Health in the UK to study international variations in cancer survival; the module seeks to measure the overall time interval between the first possible symptom of cancer and the start of treatment.[7] This overall interval is then divided into subintervals depending on the factor responsible for the delay, including delays related to the patient's attitudes and help-seeking behaviours (i.e. their initial response upon first noticing symptoms and the duration of symptoms before contacting the doctor), the diagnostic process (i.e. time elapsed to secure an appointment to see the doctor, number of medical visits before receiving a diagnosis and time elapsed between being referred to hospital and getting an appointment with a specialist) and the treatment or management process (i.e. time elapsed between first medical appointment and diagnosis and between diagnosis and first receiving treatment).[7] The ICBP questionnaire has been used in several international studies to investigate root causes of delays in cancer diagnoses.[21, 22]

For the purposes of the current study, the Breast-CAM and ICBP tools were combined into one questionnaire in order to assess knowledge of BC symptoms, time taken to consult a doctor and barriers to seeking medical help among Omani women. Sociodemographic variables in the modules were modified to be relevant to Omani society and the national healthcare system.

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Both the Breast-CAM and ICBP tools were translated from English to Arabic and then back-translated into English.

The combined questionnaire was completed by two researchers during face-to-face interviews conducted with the participants. In order to ensure the clarity and reliability of the questionnaire, a pilot study was conducted of the first 30 women enrolled in the study. Based on a standardised item analysis, Cronbach's alpha (α) values of the Arabic versions of the Breast-CAM tool and ICBP questionnaire were 0.88 and 0.85, respectively.

Statistical analysis

Data were analysed using SPSS software, version 22 (IBM Corp., Armonk, New York). Descriptive data were presented as numbers and percentages. A Chi-squared (χ^2) test was used to determine associations between sociodemographic characteristics and the responses of the participants. A binary logistic regression model was used to adjust for the effect of certain factors, with the findings presented as odds ratios (ORs) and 95% confidence intervals (CIs). A p value of <0.05 was considered significant.

Results

Characteristics of the participants

A total of 300 women with BC participated in the study out of 333 eligible subjects, resulting in a response rate of 91.0%. The mean age was 47.0 ± 12.2 years (median: 45.0 years, range: 24–84 years). The majority were below the age of 50 years (66.1%) and married (76.2%). Over one-third were residents of Muscat (34.3%) and had no formal education (35.2%). Overall, 81 patients (27.1%) reported having a family history of BC, of which the majority (76.3%) were first- or second-degree relatives. The mean age at BC diagnosis was 43.0 ± 12.50 years.

At the time of the interviews, the length of the time since diagnosis was less than three months in 15.5% of women. Moreover, 33.5% of women had been diagnosed at late stages (i.e. stages III and IV). The women were receiving various treatments modalities at the time of the interviews, including chemotherapy, radiotherapy and hormonal therapy (table 1).

Knowledge of BC symptoms and barriers to seeking medical help

The majority of women were aware that BC could be cured if detected sufficiently early (91.6%) and that delays in seeking medical treatment could adversely affect their health

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(91.6%). Moreover, the majority were aware that missing or delaying an appointment to visit the doctor could cause delays in treatment (90.2%) and that delays in diagnosis could lead to complications (89.0%). On the other hand, less than half of the women (43.8%) had been aware of BC prior to their diagnosis. Under one-third of the cohort thought that a BC diagnosis could lead to social stigma (24.2%) and that society had an effect in delaying BC treatment (30.2%) (figure 1).

The majority of women (74.7%) were aware that lumps in the breast or armpit could be symptoms of BC. However, less than half were aware that pain in the breast or armpit (44.0%), changes in the position of the nipple (36.2%), redness of the skin of the breast (31.7%), fatigue (26.3%), unexplained weight loss (23.4%) and loss of appetite (20.8%) were possible BC symptoms (figure 2). The most commonly reported barriers to seeking medical help were fear (68.9%), followed by anxiety over what the doctor might find (62.8%), having too many other things to worry about (43.6%), embarrassment (26.0%), being too busy to make time to go to the doctor (19.5%), difficulties arranging transport (13.7%), difficulties explaining their symptoms to the doctor (12.4%) and worry over wasting the doctor's time (8.1%) (figure 3).

Associations between sociodemographic characteristics and responses

The binary logistic regression analysis indicated that women who had no formal education were less likely than those who were highly educated (i.e. college and above) to recognise that the following were potential symptoms of BC: changes in the position of the nipple (OR 0.16 (95% CI 0.03–0.81) p <0.05), pain in the breast or armpit (OR 0.10 (95% CI 0.01–0.86) p <0.05) and unexplained weight loss (OR 0.18 (95% CI 0.04–0.88) p <0.05). On the other hand, women educated to the high school level were more likely than college-educated women to recognise that a lump in the breast or armpit (OR 7.28 (95% CI 1.06–50.19) p <0.05) and fatigue (OR 3.82 (95% CI 1.08–13.58) p <0.05) could be BC symptoms.

Employed women were more likely than unemployed women to recognise that fatigue could be a symptom of BC (OR 4.18 (95% CI 1.34–13.05) p <0.05). In addition, women in the lowest income category were more likely than those in the highest category to recognise that pain in the breast or armpit (OR 4.14 (95% CI 1.14–15.12) p <0.05) and redness (OR 3.58 (95% CI 1.11–11.52) p <0.05) could be BC symptoms (table 2).

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Time taken to seek medical help

The initial response of most women upon first noticing possible BC symptoms was to inform their husband (40.2%), followed by informing other family members (36.5%) and seeing a doctor at a government hospital (8.4%), local health centre (LHC) (8.1%) or private facility (2.4%); however, several women reported traveling abroad (2.0%), informing friends (1.7%) or using traditional or herbal remedies (0.7%).

Of all respondents, less than half (31.2%) decided to see a doctor within the first week of developing possible BC symptoms and 17.7% were able to get an appointment to see a doctor on the same day or the next day following their decision to seek medical help.

The majority of women were diagnosed with BC after their first visit to an LHC (67.7%) or to government hospitals (30.1%). Moreover, many women were able to see specialists at government hospitals within less than one week of referral (39.5%) and received confirmation of the diagnosis on the same day or the next day following their first appointment (10.4%). Finally, many women (29.9%) were able to receive their first treatment within the first week of their diagnosis (table 3).

Discussion

To our knowledge, this is the first study conducted in Oman to explore knowledge of BC symptoms, time taken to seek medical help and barriers to seeking medical help among women with BC. The mean age of the women diagnosed with BC in this study was 43 years; this is much lower than the average age reported in developed countries (mean age: 63 years) and slightly below that reported in other Arab countries (mean age: 49–52 years).[3] A previous study conducted in Oman shared similar findings in which the mean age of women diagnosed with BC was 47 years, with one-third being under 40 years.[14] The younger age of presentation of women with BC in Oman might be attributable to various factors, including genetic background, the adoption of more 'Westernised' lifestyles (including reduced levels of physical activity and higher rates of obesity), a decrease in breastfeeding and the presence of potential carcinogens in the local environment.[23]

Although the vast majority of women in this study were aware of the importance of early BC detection and that delays in seeking medical help could lead to complications, many nevertheless presented at relatively advanced stages (i.e. stages III or IV). Previous studies

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have reported similar findings.[14, 24] Although a large proportion of women in this study were able to recognise that lumps in the breast or armpit were a possible symptom of BC, the majority were not aware of other symptoms such as fatigue, unexplained weight loss or loss of appetite. Indeed, less than half of the women reported having been aware of or knowledgeable regarding BC prior to their own diagnosis. Researchers have recommended incorporating information regarding cancer risk factors and symptoms into the school curriculum so as to increase cancer knowledge in adulthood.[25]

Poor awareness of BC symptoms is a predominant reason for delayed presentation to a doctor, particularly if symptoms are atypical in nature.[9] Most women with BC more commonly recognise obvious symptoms, such as lumps, compared to more ambiguous symptoms, such as tiredness, unexplained weight loss and reduced appetite; in fact, delays in presentation are more likely to occur in BC cases in which the symptoms do not include a breast lump.[6, 11] Furthermore, knowledge of BC symptoms is a prerequisite for prompt help-seeking behaviours, particularly if the symptom is perceived to be serious.[26] Uneducated women in our study were less likely to recognise certain BC symptoms, such as changes in the position of the nipple, breast or armpit pain and unexplained weight loss. Similar findings have also been noted among Omani women with ovarian cancer, with more educated women being more likely to recognise specific symptoms compared to those who were less educated.[27]

More than half of women in our study who sought medical help at LHCs or government hospitals were diagnosed with BC after their first or second visit, indicating that the cause for any delays in diagnosis was likely due to the patients themselves. Other researchers have highlighted that not seeking early medical help is a predictor of delayed diagnosis.[8, 28] Furthermore, the majority of women who were seen at LHCs in the present study were subsequently seen by specialists within two weeks of referral, with the BC diagnosis confirmed within another two weeks. Once again, this indicates that factors related to the local health system do not seem to play a major role in delaying BC diagnoses in Oman. Referral policies covering specific aspects of patient care are well established to oversee the transfer of patients from one healthcare setting to another for management.[29] Nonetheless, cancer patients in Oman, much like those in neighbouring GCC countries, often choose to seek medical help abroad (i.e. in countries like Thailand or India); this trend often causes delays in diagnosis, with many patients returning home with additional complications.[15]

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For the majority of women in the current study, their initial response upon first noticing possible BC symptoms was to inform their husbands and family members. Becoming aware of possible symptoms of a life-threatening disease is often associated with feelings of emotional distress, anxiety and depression; hence, sharing this information with close family members might offer some emotional relief and support.[30, 31] Indeed, most women in our study prioritised sharing their symptoms with husbands or family members over consulting a doctor. This finding might be related to prevailing sociocultural attitudes which are based on a strong sense of moral responsibility and familial obligation, particularly when it comes to illness.[17] Furthermore, Omani women diagnosed with BC often rely on their families for emotional, physical and financial support, which also plays a role in treatment decision-making.[16, 17] However, the involvement of family members in medical decisions and treatment options can sometimes delay diagnoses, particularly if these individuals encourage patients to seek medical treatment abroad or pursue alternative or traditional remedies.[8, 32]

Although more than half of the women in our study sought medical help within one month of developing BC symptoms, many nevertheless presented at an advanced stage by the time they were diagnosed. Various psychosocial and cultural beliefs have been attributed to the delayed presentation of BC cases.[15, 28, 30] A previous study from Oman showed that women with BC experienced severe psychosocial distress, including fear of death, social isolation, anxiety regarding the side-effects of treatment and fear that the cancer might spread or interfere with their daily lives.[15] Women who express explicit fears about the consequences of diagnosis and treatment are more reluctant to seek medical help, resulting in a higher chance of delays in diagnosis.[11]

Similarly, many women in our study reported emotional barriers that might contribute to delays in consulting a doctor, such being scared, embarrassed or worried about what the doctor might find. Symptom appraisal and perception of their severity is a predictor of decisions to seek medical help.[28] Indeed, it is difficult to assess delays in BC presentation, diagnosis and treatment objectively due to variations in how people perceive symptoms and define time intervals.[33] Although there is growing interest in measuring cancer diagnostic time intervals and examining their effect on outcomes, the pathway from symptoms to diagnosis is complex.[34] The Model of Pathways to Treatment framework identified that the process of general healthcare-seeking is influenced by a mixture of physical, social and psychological factors. In this model, key time points along the diagnostic pathway include the detection of

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bodily changes, the development of perceived reasons to consult with a doctor, the decision and action of consulting the doctor and, finally, the diagnosis and start of the treatment.[34]

The decision to consult a doctor and seek medical help often relies on a patient's subjective definition of the 'main' symptoms of cancer, which in itself is often influenced by their pre-existing knowledge and perceptions of symptom severity.[35] The presence of chronic diseases or psychological symptoms may also further influence interpretation of these symptoms.[34] Furthermore, international variations in the investigation and referral of cancer patients to secondary care for suspected cancer symptoms can play a critical role in diagnostic delays and cancer outcomes; for instance, countries in which healthcare professionals demonstrate a greater readiness to refer or investigate patients with possible cancer symptoms have demonstrated high rates of cancer survival.[36]

This study has certain limitations. First, many patients in Oman often choose to access healthcare in non-integrated settings; for instance, by attending a mixture of government facilities, private facilities and facilities abroad. Thus, it was difficult in some cases to track the time taken throughout the diagnostic pathway using the three usual component intervals of delay (i.e. patient, primary care and secondary care delays). Apart from self-reported information from the patients, there were no other methods available to measure delays in the absence of electronic or written tracking data.

Second, while we recruited Omani women diagnosed with BC within the previous year to satisfy the sample size requirements, the possibility of recall bias cannot be ruled out. Third, although the Arabic version of the combined questionnaire (which incorporated both the Breast-CAM and ICBP tools) was tested for reliability and demonstrated a satisfactory Cronbach's alpha (α) coefficient, we could not guarantee its validity, which was beyond the scope of this research. Finally, we used the Breast-CAM section to measure knowledge of BC symptoms and barriers to seeking medical help among patients who had already been diagnosed with BC; as this tool was originally designed to be delivered to a community sample, we could not rule out potential bias in that the participants might have more knowledge of BC symptoms compared to other Omani women.

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Conclusion

Omani women with BC demonstrated low levels of knowledge of BC symptoms and experienced several emotional barriers to seeking medical help; moreover, the majority were diagnosed at advanced stages. Despite national efforts to increase BC awareness, further educational initiatives are needed. Healthcare professionals should visit schools to raise awareness of BC symptoms and promote early help-seeking behaviours among female students in different regions of Oman. Employing both social and traditional media campaigns in LHCs and hospitals might also help to increase BC knowledge. Finally, healthcare professionals should make more efforts to build a trusting and cooperative relationship with female patients in order to help address emotional barriers to medical help-seeking, thereby encouraging them to disclose potential symptoms and thus reducing delays in diagnosis.

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Contributors

MA, KA, HA, ZM, JA and YA conceived of the study and contributed to its design and implementation. JA and YA collected data. SMP performed the statistical analysis. MA drafted the manuscript. All authors read and approved the final version of the manuscript.

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Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting or dissemination of this research.

Patient consent for publication

Not applicable as no details regarding individual patients have been reported in the manuscript.

Ethical approval

The study received ethical approval from the Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University (MREC #1809) as well as the Scientific Research Committee of the Royal Hospital (SRC #87/2018). Informed consent was obtained from all participants prior to their inclusion in the study.

Data availability statement

The datasets used and/or analysed during this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Table 1: Sociodemographic and clinical characteristics as stated by the participants

Variables	n (300)	%
Age (years) (n = 298)		
≤ 40	109	36.6
41–50	88	29.5
> 50	101	33.9
Marital status (n = 298)		
Single	21	7.0
Married	227	76.2
Divorced	11	3.7
Widowed	39	13.1
Origin (n = 297)		
Muscat	102	34.3
Ad Dhahirah	33	11.1
Al Batinah	60	20.2
Ad Dakhiliyah	40	13.5
Al Wusta	1	0.3
Ash Sharqiyah	41	13.8
Dhofar	5	1.7
Musandam	2	0.7
Al Buraimi	13	4.4
Educational level (n = 298)		
No formal education	105	35.2
Primary and elementary	37	12.4
High school	93	31.2
College and above	63	21.1
Employment status (n = 293)		
Employed	97	33.1
Unemployed/Housewife	196	66.9
Monthly family income in OMR (n = 281)		
≤ 500	110	39.1
501–1,000	99	35.2
> 1,000	72	25.6
Family history of BC (n = 299)		
Yes	81	27.1
No	218	72.9
If yes, degree of relationship (n = 80)		
First-degree	29	36.3
Second-degree	32	40.0
Third-degree	19	23.8
Overall length of time since diagnosis (months) (n = 297)		
< 3	46	15.5
3–6	165	55.6
6–12	86	29.0
Stage of BC at diagnosis (n = 299)		
Stage I	62	20.7
Stage II	81	27.1
Stage III	55	18.4
Stage IV	45	15.1
I don't know	56	18.7
Treatment modality at time of interview (n = 261)		
Radiotherapy	135	51.7
Hormonal therapy	94	36.0
Targeted biological therapy	37	14.2
Chemotherapy	202	77.4
Surgery	154	59.0

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I don’t remember	33	12.6

BC: breast cancer; OMR: Omani riyal.

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Figure 1: General knowledge of breast cancer and delays in diagnosis

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Figure 2: Knowledge of specific signs and symptoms of breast cancer

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Figure 3: Barriers to medical help-seeking

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Table 2: Association between sociodemographic characteristics and knowledge of breast cancer symptoms

Characteristics	Knowledge of BC symptoms, OR (95% CI)						
	Changes in the position of the nipple	**Pain in the breast or armpit**	**Lump/tumour in the breast or armpit**	**Redness of the breast skin**	Fatigue	**Unexplained weight loss**	**Loss of appetite**
Age (years)							
≤ 40	0.71 (0.24–2.07)	1.41 (0.42–0.47)	1.12 (0.31–4.0)	0.95 (0.30–2.97)	0.69 (0.26–1.82)	1.04 (0.37–2.93)	0.62 (0.23–1.69)
41–50	0.99 (0.35–2.82)	2.11 (0.61–7.34)	1.27 (0.37–4.40)	0.74 (0.27–2.05)	0.82 (0.32–2.08)	1.11 (0.40–3.06)	0.81 (0.31–2.14)
> 50	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Marital status							
Single	0.68 (0.10–4.45)	0.23 (0.03–1.75)	0.39 (0.05–2.88)	2.53 (0.26–24.41)	0.37 (0.09–1.58)	0.52 (0.10–2.60)	0.82 (0.17–3.90)
Married	0.605 (0.22–1.69)	0.53 (0.16–1.78)	0.82 (0.24–2.82)	1.65 (0.66–4.13)	0.97 (0.39–2.39)	0.89 (0.33–2.35)	1.22 (0.50–2.99)
Divorced/Widowed	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Educational level							
No formal education	0.16 (0.03–0.81)*	0.10 (0.01–0.86)*	0.93 (0.14–6.36)	2.97 (0.05–1.62)	1.13 (0.27–4.80)	0.29 (0.06–1.42)	0.37 (0.09–1.56)
Primary and elementary	0.49 (0.08–2.87)	0.10 (0.01–0.84)*	0.73 (0.11–4.96)	0.27 (0.05–1.47)	1.18 (0.27–5.08)	0.18 (0.04–0.88)*	0.29 (0.07–1.19)
High school	0.97 (0.24–3.85)	0.60 (0.09–4.10)	7.28 (1.06–50.19)*	1.19 (0.28–5.18)	3.82 (1.08–13.58)*	0.72 (0.19–2.68)	1.41 (0.44–4.53)
College and above	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Employment status							
Employed	0.83 (0.28–2.50)	1.60(0.37–6.83)	1.78 (0.38–8.12)	2.53 (0.74–8.59)	4.18 (1.34–13.05)*	1.18 (0.41–3.43)	1.45 (0.54–3.95)
Unemployed/Housewife	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Monthly family income in OMR							
≤ 500	1.22 (0.37–4.04)	4.14 (1.14–15.12)*	1.54 (0.35–6.80)	3.58 (1.11–11.52)*	1.49 (0.51–4.35)	1.89 (0.60–5.92)	2.66 (0.92–7.72)
501–1,000	0.98 (0.32–2.97)	1.98 (0.58-6.76)	0.58 (0.16–2.09)	3.33 (1.07–10.43)*	1.15 (0.43–3.06)	0.83 (0.30–2.29)	1.06 (0.42–2.65)
> 1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Family history of BC							
Yes	0.50 (0.20–1.23)	0.48 (0.17–1.41)	0.42 (0.13–1.33)	0.54 (0.22–1.32)	0.39 (0.17–0.91)	0.52 (0.22–1.24)	0.73 (0.34–1.56)
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Family history of any cancer							
Yes	0.74 (0.31–1.75)	0.73 (0.26–2.0)	0.93 (0.33–2.58)	1.04 (0.45–2.38)	1.61 (0.80–3.26)	1.10 (0.50–2.43)	1.22 (0.59–2.51)
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0

BC: breast cancer; OR: odds ratio; CI: confidence interval; OMR: Omani riyal.
*Significant at the p <0.05 level.

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Table 3: Time taken for medical consultation, referral, and treatment of breast cancer as stated by the participants

Variables	n (300)	%
Initial response upon first noticing possible BC symptoms (n = 296)		
Informing husband	119	40.2
Informing family members	108	36.5
Seeing a doctor in a government hospital	25	8.4
Seeing a doctor in a local health centre	24	8.1
Seeing a doctor in a private sector facility	7	2.4
Traveling abroad	6	2.0
Informing friends	5	1.7
Using traditional/herbal medicine	2	0.7
Approximate duration of symptom(s) before contacting a doctor (n = 298)		
< 1 week	93	31.2
1–2 weeks	46	15.4
3–4 weeks	59	19.8
5–7 weeks	24	8.1
2–5 months	38	12.8
6–12 months	18	6.0
> 12 months	20	6.7
Length of time between contacting a doctor and getting an appointment (n = 294)		
Same/next day	52	17.7
< 1 week	78	26.5
1–2 weeks	61	20.7
3–4 weeks	54	18.4
1–2 months	35	11.9
> 3 months	14	4.8
Number of medical visits before being diagnosed		
At local health centres (n = 155)		
1	105	67.7
2	27	17.4
3	23	14.8
At government hospitals (n = 209)		
1	63	30.1
2	44	21.1
3	47	22.5
≥ 4	55	26.3
Length of time between being referred to hospital and getting an appointment with a specialist (n = 296)		
< 1 week	117	39.5
1–2 weeks	94	31.8
3–4 weeks	58	19.6
5–7 weeks	12	4.1
2–5 months	8	2.7
6–12 months	3	1.0
> 12 months	4	1.4
Approximate length of time between first medical appointment and diagnosis (n = 297)		
Same/next day	31	10.4
< 1 week	72	24.2
1–2 weeks	92	31.0
3–4 weeks	53	17.8
1–2 months	30	10.1
3–6 months	10	3.4
> 6 months	9	3.0
Length of time between diagnosis and first receiving treatment (n = 294)		

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< 1 week	88	29.9
1–2 weeks	84	28.6
3–4 weeks	58	19.7
1–2 months	46	15.6
> 3 months	18	6.1

BC: breast cancer.

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Figure 1: General knowledge of breast cancer and delays in diagnosis

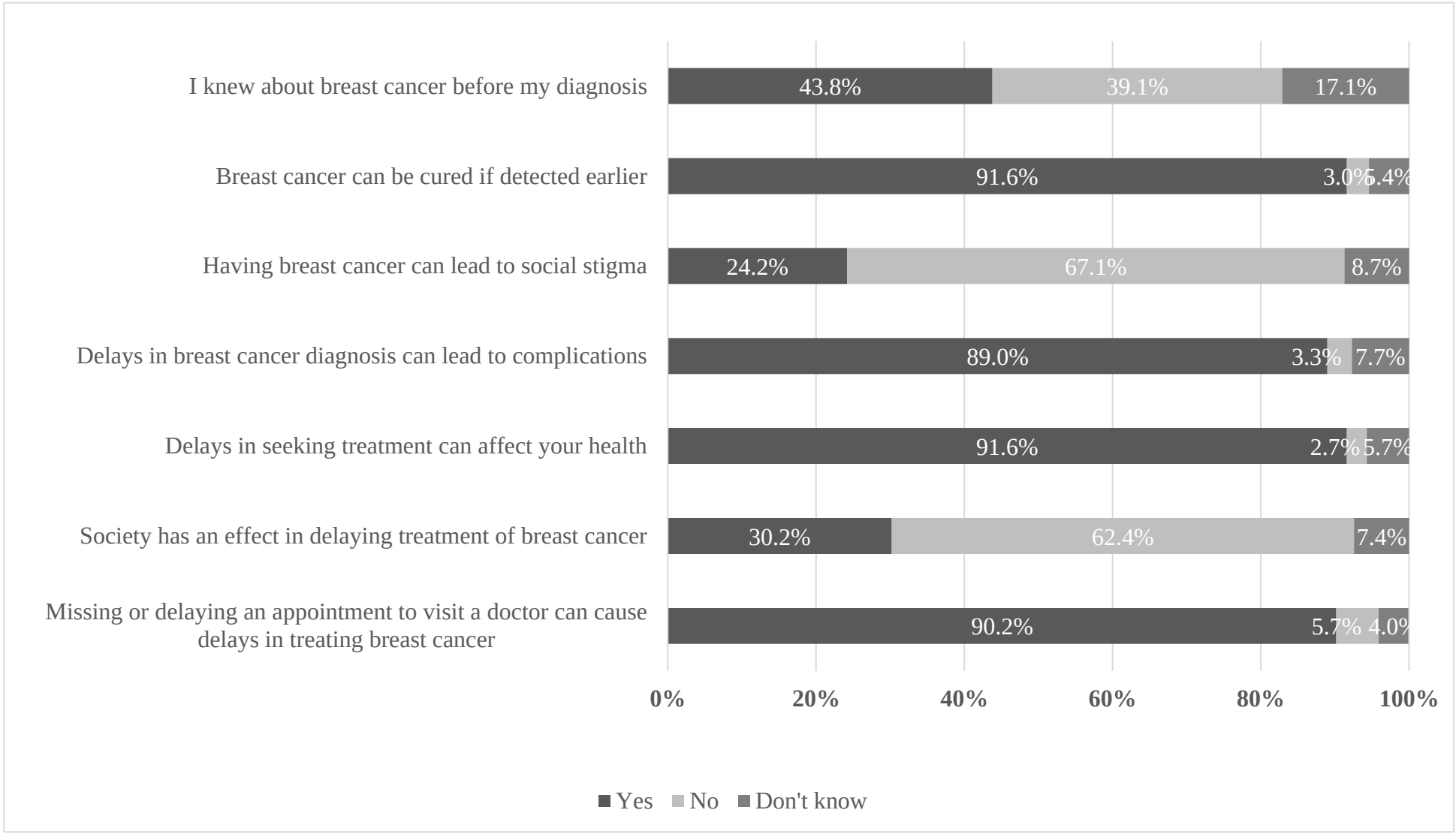


Figure 2: Knowledge of specific signs and symptoms of breast cancer

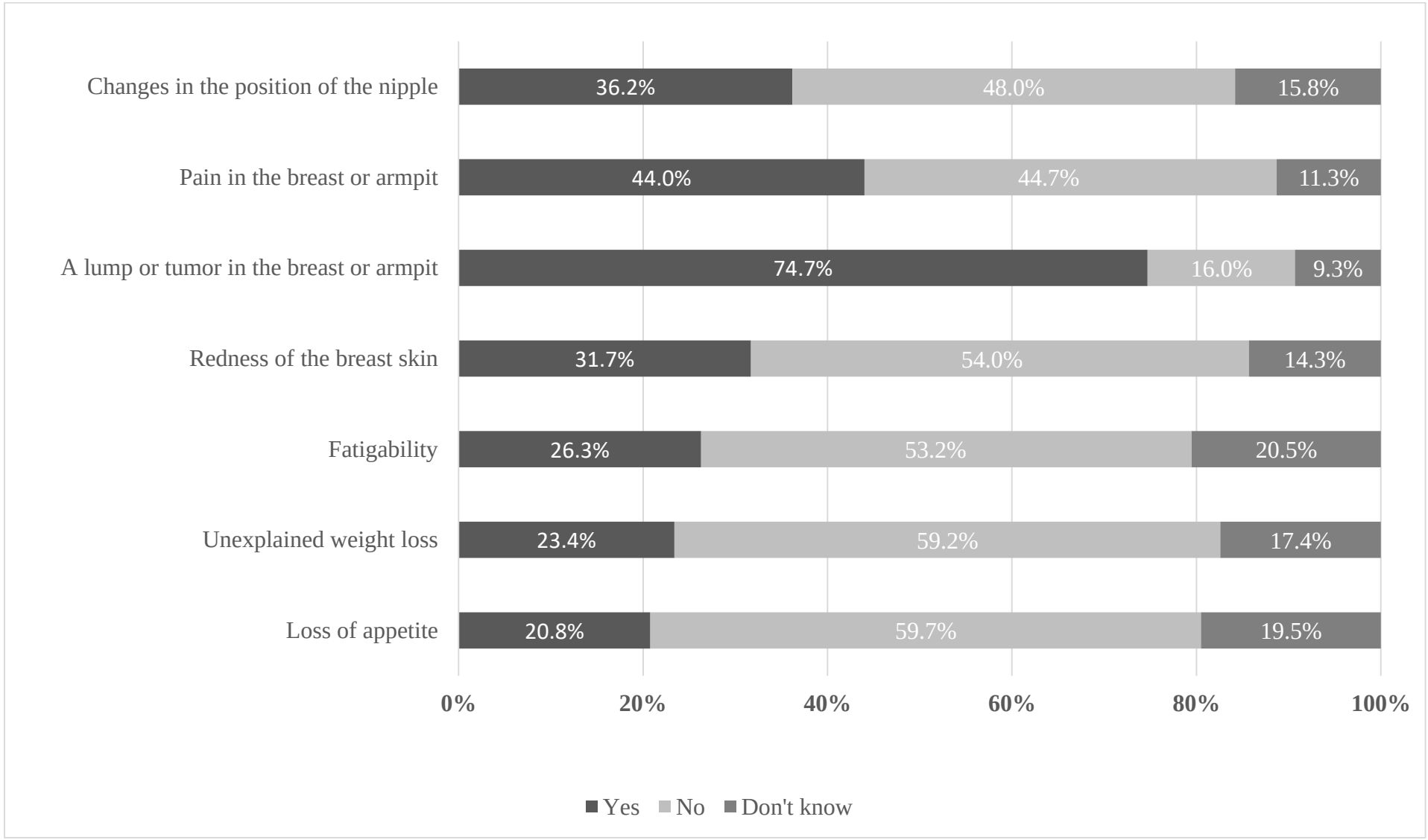
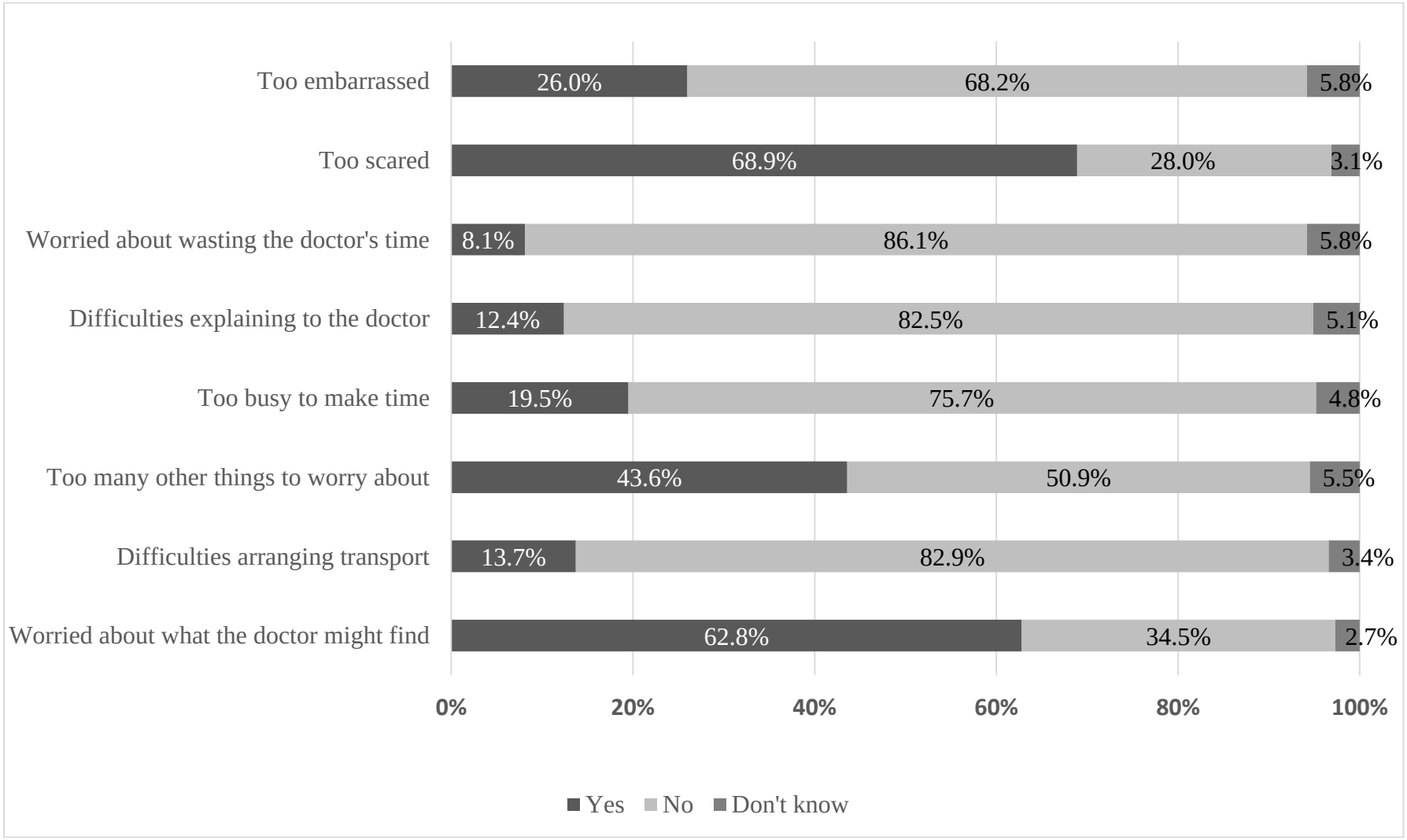


Figure 3: Barriers to medical help-seeking



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Knowledge of symptoms, time to presentation and barriers to medical help-seeking among Omani women diagnosed with breast cancer - A cross-sectional study

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Keywords: Breast Cancer; Knowledge; Help-Seeking Behavior; Delayed Diagnosis; Time-to-Treatment; Oman

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ABSTRACT

Objectives To identify knowledge of breast cancer (BC) symptoms, time taken to consult a doctor and factors contributing to delays in medical help-seeking.

Design A cross-sectional study of Omani women diagnosed with BC.

Setting The two main teaching hospitals in Oman, Royal Hospital and Sultan Qaboos University Hospital.

Participants Adult Omani women recently diagnosed with BC.

Tools The Breast Cancer Awareness Measure and International Cancer Benchmarking Partnership questionnaire were used to collect data.

Results A total of 300 women with BC participated (response rate: 91.0%). The mean age at diagnosis was 43.0 ± 12.50 years and 33.5% were diagnosed at stages III or IV. Although most women (74.4%) recognised breast/armpit lumps to be a symptom of BC, less than half identified other symptoms, including breast/armpit pain (44.0%), changes in the position of the nipple (36.2%), redness (31.7%), fatigue (26.3%), weight loss (23.4%) and loss of appetite (20.8%). While most (91.6%) were aware that BC could be cured if detected early, only 66.4% sought medical help within a month of developing symptoms. Initial responses to symptoms included informing husbands (40.2%) or family members (36.5%). Barriers to seeking medical help included feeling scared (68.9%) and worried about what the doctor might find (62.8%). Highly educated women were more likely to recognise the following as BC symptoms: changes in nipple position (odds ratio (OR): 0.16, 95% confidence interval (CI): 0.03–0.81), breast pain (OR: 0.10, 95% CI 0.01–0.86) and unexplained weight loss (OR: 0.18, 95% CI: 0.04–0.88) (all $p < 0.05$).

Conclusions Although many Omani women with BC were aware of the importance of early diagnosis, most demonstrated inadequate knowledge of symptoms, did not prioritise seeking medical help and reported emotional barriers to help-seeking. More educational measures are needed to improve symptom recognition and address help-seeking barriers to minimise delays in diagnosis.

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Strengths and limitations of this study

- This is the first study conducted in Oman to explore time taken to seek medical help and barriers to seeking medical help among women diagnosed with breast cancer (BC).
- Although women were aware of the importance of early BC detection and that delays in seeking medical help could lead to complications, most presented at relatively advanced stages, with the cause for delay usually being due to the patients themselves.
- The initial response upon first noticing possible BC symptoms was to inform husbands and family members rather than seeking medical help.
- The possibility of recall and response bias could not be ruled out due to the use of self-reported questionnaire measures for data collection.
- While the Arabic version of the final questionnaire was assessed for reliability, the validity of this measure was not determined.

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BACKGROUND

Worldwide, breast cancer (BC) accounts for 10% of all cancers diagnosed annually and approximately 15% of all cancer deaths among women.[1] Despite efforts to improve the early detection of BC, nearly one-third of women worldwide have either regional or distant metastasis at the time of diagnosis.[2] In the Gulf Cooperation Council (GCC) region, BC is the most commonly diagnosed cancer among women, accounting for 13–35% of all cancers; moreover, approximately half of BC patients are under 50 years of age at the time of diagnosis, with a median age of 49–52 years compared to 63 years in Western countries.[3] In addition, approximately 58.0% of women in GCC countries present with advanced stages of BC at diagnosis (45% with regional metastasis and 12.8% with distant metastasis).[4]

Nonetheless, there is a high chance of a cure if BC is detected early and adequately treated; for example, women who begin treatment within 3–5 months of developing symptoms have significantly worse survival rates compared to those who seek medical help in <3 months.[5, 6] Delays in cancer diagnosis can occur at any time between the first symptom being noticed and the start of treatment.[7] The most common causes of delay are usually because patients do not correctly identify cancer symptoms or act on them to seek medical help.[8, 9] Low awareness of BC symptoms, lack of access to care, unavailability or non-participation in BC screening, fatalism, negative perceptions of BC and cultural beliefs are all factors which contribute to delays in seeking medical help on the part of patients.[2, 8, 10-12].

The Pathways to Treatment model is a framework which defines the various temporal stages which occur between the onset of recognisable symptoms to the start of treatment and is often used to contextualise the various processes involved in symptom appraisal and help-seeking behaviours.[13] The model is based on the notion that the process of general healthcare-seeking is complex and influenced by a mixture of physical, social and psychological factors. Key time points along the diagnostic pathway include the detection of initial bodily changes (symptoms), the perception of such changes as abnormal (symptom appraisal), the development of perceived reasons to consult with a doctor, the decision and action of consulting the doctor and, finally, the diagnosis and start of the treatment.[13]

In Oman, BC is the most commonly diagnosed cancer and accounts for 12.79% of all cancers and 21.2% of cancers affecting women.[14] Recently, the incidence of BC has almost doubled from 13.6 cases per 100,000 women in 1996 to 26.9 in 2015.[14] Like other GCC

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countries, the majority of women diagnosed with BC in Oman are younger (median age: 49 years) and present at advanced stages (i.e. stages III and IV), with a low five-year survival rate (63%).[15] Several factors contribute to delays in cancer diagnosis in Oman, including the lack of a national screening programme, social stigma, the influence of family, spouses and friends in treatment decision-making and the prevalence of traditional medicine and medical tourism.[8, 16-18] Identifying specific factors which contribute to delays in BC diagnosis are crucial to help improve patient outcomes. The aim of this study was therefore to identify knowledge of BC symptoms, time taken to seek medical help and barriers to medical help-seeking among Omani women diagnosed with BC.

Methods

Study setting

This cross-sectional study was carried out between November 2018 and April 2019 at the National Oncology Centre of the Royal Hospital (RH) and the Oncology Unit of the Sultan Qaboos University Hospital (SQUH), both of which are located in Muscat, the capital city of Oman. These hospitals represent the two primary oncology centres in Oman and provide comprehensive treatment (including surgery, chemotherapy and radiotherapy) and palliative care to patients diagnosed with all types of cancer, including BC.[19] The majority of patients diagnosed with BC at other regional hospitals of Oman are referred to either RH or SQUH for treatment.

Sample size estimation and recruitment

According to previous data from the National Cancer Registry from 1999 to 2015, the number of BC patients in 2018 and 2019 was estimated to be 271 based on a linear prediction model.[14] Thus, Omani women diagnosed with BC at the RH or SQUH during the year prior to data collection were targeted for inclusion in the current study, as having been diagnosed more than a year previously could have resulted in recall bias.

A total of 330 adult Omani women aged ≥18 years and diagnosed with BC within the preceding year at RH or SQUH were identified from the electronic hospital systems and invited to participate in the study. The names of the patients and the date of their next visit to outpatient oncology clinics and day care units or admission to wards was identified. Two different researchers over a period of six months were involved in the data collection process in order to

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increase the number of participants in the study. Also, women who did not respond were contacted again and the date of their next appointment recorded.

Patients were informed that participation in the study was optional and would not affect the medical care they received. Only women who agreed to participate were included in the study. Women who were in obvious distress or pain and those who were admitted because of complications such as febrile neutropenia were excluded. All participants signed a consent form prior to taking part in the study.

Tool used to measure BC symptom knowledge and barriers to seeking medical help

The Breast Module of the Cancer Awareness Measure (Breast-CAM) was developed by Cancer Research, King's College London and University College London in the United Kingdom (UK) and is a valid and reliable instrument for measuring BC awareness in women.[20, 21] It has moderate to good test-retest reliability for most items, with a good discriminatory index of BC knowledge and can be administered either face-to-face or via telephone interviews.[20, 21] The Breast-CAM were intended to be delivered to women in the community and includes different sections which independently measure and assess the following: knowledge of BC symptoms (i.e. changes in the nipple, pain or lumps in the breast or armpit, redness, fatigue, unexplained weight loss and loss of appetite) and barriers to seeking medical help, including emotional (i.e. being too embarrassed, scared or worried about what the doctor might find), practical (i.e. being too busy to make time, having too many other things to worry about and anticipating difficulties explaining concerns to the doctor) and service-related barriers (i.e. difficulties arranging transport or being worried about wasting the doctor's time).[20]

Tool used to measure time taken to seek medical help

The International Cancer Benchmarking Partnership (ICBP) was initiated by the Department of Health in the UK and was subsequently used as part of a collaborative research project to study international variations in cancer survival between jurisdictions in six countries, including Australia, Canada, Denmark, Norway, Sweden and the UK.[7] The module seeks to measure the overall time interval between the first possible symptom of cancer and the start of treatment.[7] This overall interval is then divided into subintervals depending on the factor responsible for the delay, including delays related to the patient's attitudes and help-seeking behaviours (i.e. their initial response upon first noticing symptoms and the duration of symptoms before contacting the doctor), the diagnostic process (i.e. time elapsed to secure an

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appointment to see the doctor, number of medical visits before receiving a diagnosis and time elapsed between being referred to hospital and getting an appointment with a specialist) and the treatment or management process (i.e. time elapsed between first medical appointment and diagnosis and between diagnosis and first receiving treatment).[7] The ICBP questionnaire has been used in several international studies to investigate root causes of delays in cancer diagnoses.[22, 23]

For the purposes of the current study, the Breast-CAM and ICBP tools were combined into one questionnaire in order to assess knowledge of BC symptoms, time taken to consult a doctor and barriers to seeking medical help among Omani women. Sociodemographic variables in the modules were modified to be relevant to Omani society and the national healthcare system. Both the Breast-CAM and ICBP tools were translated from English to Arabic and then back-translated into English.

The combined questionnaire was completed by two researchers during face-to-face interviews conducted with the participants. In order to ensure the clarity and reliability of the questionnaire, a pilot study was conducted of the first 30 women enrolled in the study. Based on a standardised item analysis, Cronbach's alpha (α) values of the Arabic versions of the Breast-CAM tool and ICBP questionnaire were 0.88 and 0.85, respectively.

Statistical analysis

Data were analysed using SPSS software, version 22 (IBM Corp., Armonk, New York). Descriptive data were presented as numbers and percentages. A Chi-squared (χ^2) test was used to determine associations between sociodemographic characteristics and the responses of the participants. A binary logistic regression model was used to adjust for the effect of certain factors, with the findings presented as odds ratios (ORs) and 95% confidence intervals (CIs). A p value of <0.05 was considered significant.

Results

Characteristics of the participants

A total of 300 women with BC participated in the study out of 333 eligible subjects, resulting in a response rate of 91.0%. The mean age was 47.0 ± 12.2 years (median: 45.0 years, range: 24–84 years). The majority were below the age of 50 years (66.1%) and married (76.2%). Over one-third were residents of Muscat (34.3%) and had no formal education (35.2%). Overall, 81

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patients (27.1%) reported having a family history of BC, of which the majority (76.3%) were first- or second-degree relatives. The mean age at BC diagnosis was 43.0 ± 12.50 years.

At the time of the interviews, the length of the time since diagnosis was less than three months in 15.5% of women. Moreover, 33.5% of women had been diagnosed at late stages (i.e. stages III and IV). The women were receiving various treatments modalities at the time of the interviews, including chemotherapy, radiotherapy and hormonal therapy (table 1).

Knowledge of BC symptoms and barriers to seeking medical help

The majority of women were aware that BC could be cured if detected sufficiently early (91.6%) and that delays in seeking medical treatment could adversely affect their health (91.6%). Moreover, the majority were aware that missing or delaying an appointment to visit the doctor could cause delays in treatment (90.2%) and that delays in diagnosis could lead to complications (89.0%). On the other hand, less than half of the women (43.8%) had been aware of BC prior to their diagnosis. Under one-third of the cohort thought that a BC diagnosis could lead to social stigma (24.2%) and that society had an effect in delaying BC treatment (30.2%) (figure 1).

The majority of women (74.7%) were aware that lumps in the breast or armpit could be symptoms of BC. However, less than half were aware that pain in the breast or armpit (44.0%), changes in the position of the nipple (36.2%), redness of the skin of the breast (31.7%), fatigue (26.3%), unexplained weight loss (23.4%) and loss of appetite (20.8%) were possible BC symptoms (figure 2). The most commonly reported barriers to seeking medical help were fear (68.9%), followed by anxiety over what the doctor might find (62.8%), having too many other things to worry about (43.6%), embarrassment (26.0%), being too busy to make time to go to the doctor (19.5%), difficulties arranging transport (13.7%), difficulties explaining their symptoms to the doctor (12.4%) and worry over wasting the doctor's time (8.1%) (figure 3).

Associations between sociodemographic characteristics and responses

The binary logistic regression analysis indicated that women who had no formal education were less likely than those who were highly educated (i.e. college and above) to recognise that the following were potential symptoms of BC: changes in the position of the nipple (OR 0.16 (95% CI 0.03–0.81) p <0.05), pain in the breast or armpit (OR 0.10 (95% CI 0.01–0.86) p <0.05) and unexplained weight loss (OR 0.18 (95% CI 0.04–0.88) p <0.05). On the other hand,

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women educated to the high school level were more likely than college-educated women to recognise that a lump in the breast or armpit (OR 7.28 (95% CI 1.06–50.19) p <0.05) and fatigue (OR 3.82 (95% CI 1.08–13.58) p <0.05) could be BC symptoms.

Employed women were more likely than unemployed women to recognise that fatigue could be a symptom of BC (OR 4.18 (95% CI 1.34–13.05) p <0.05). In addition, women in the lowest income category were more likely than those in the highest category to recognise that pain in the breast or armpit (OR 4.14 (95% CI 1.14–15.12) p <0.05) and redness (OR 3.58 (95% CI 1.11–11.52) p <0.05) could be BC symptoms (table 2).

Time taken to seek medical help

The initial response of most women upon first noticing possible BC symptoms was to inform their husband (40.2%), followed by informing other family members (36.5%) and seeing a doctor at a government hospital (8.4%), local health centre (LHC) (8.1%) or private facility (2.4%); however, few women reported traveling abroad (2.0%), informing friends (1.7%) or using traditional or herbal remedies (0.7%). Of all respondents, less than half (31.2%) decided to see a doctor within the first week of developing possible BC symptoms and 17.7% were able to get an appointment to see a doctor on the same day or the next day following their decision to seek medical help.

The majority of women were diagnosed with BC after their first visit to an LHC (67.7%) or to government hospitals (30.1%). Moreover, many women were able to see specialists at government hospitals within less than one week of referral (39.5%) and received confirmation of the diagnosis on the same day or the next day following their first appointment (10.4%). Finally, many women (29.9%) were able to receive their first treatment within the first week of their diagnosis (table 3).

Based on an in-depth regression analysis, no significant associations were observed between sociodemographic variables and awareness of BC symptoms or help-seeking behaviours (i.e. time taken for medical consultation, referral and treatment).

Discussion

To our knowledge, this is the first study conducted in Oman to explore knowledge of BC symptoms, time taken to seek medical help and barriers to seeking medical help among women

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with BC. The mean age of the women diagnosed with BC in this study was 43 years; this is much lower than the average age reported in developed countries (mean age: 63 years) and slightly below that reported in other Arab countries (mean age: 49–52 years).[3] A previous study conducted in Oman shared similar findings in which the mean age of women diagnosed with BC was 47 years, with one-third being under 40 years.[15] The younger age of presentation of women with BC in Oman might be attributable to various factors, including genetic background, the adoption of more 'Westernised' lifestyles (including reduced levels of physical activity and higher rates of obesity), a decrease in breastfeeding and the presence of potential carcinogens in the local environment.[24]

Although the vast majority of women in this study were aware of the importance of early BC detection and that delays in seeking medical help could lead to complications, many nevertheless presented at relatively advanced stages (i.e. stages III or IV). Previous studies have reported similar findings.[15, 25] Although a large proportion of women in this study were able to recognise that lumps in the breast or armpit were a possible symptom of BC, the majority were not aware of other symptoms such as fatigue, unexplained weight loss or loss of appetite. Indeed, less than half of the women reported having been aware of or knowledgeable regarding BC prior to their own diagnosis. Researchers have recommended incorporating information regarding cancer risk factors and symptoms into the school curriculum so as to increase cancer knowledge in adulthood.[26]

Poor awareness of BC symptoms is a predominant reason for delayed presentation to a doctor, particularly if symptoms are atypical in nature.[9] Most women with BC more commonly recognise obvious symptoms, such as lumps, compared to more ambiguous symptoms, such as tiredness, unexplained weight loss and reduced appetite; in fact, delays in presentation are more likely to occur in BC cases in which the symptoms do not include a breast lump.[6, 11] Furthermore, knowledge of BC symptoms is a prerequisite for prompt help-seeking behaviours, particularly if the symptom is perceived to be serious.[27] Uneducated women in our study were less likely to recognise certain BC symptoms, such as changes in the position of the nipple, breast or armpit pain and unexplained weight loss. Similar findings have also been noted among Omani women with ovarian cancer, with more educated women being more likely to recognise specific symptoms compared to those who were less educated.[28] Although more educated women in the current study were generally more likely to recognise BC symptoms compared to less educated women, the opposite was true for certain items.

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Specifically, women educated to the high school level were more likely than those with college degrees to understand that lumps in the breast or armpit or fatigue could be BC symptoms. Similarly, women in the low income group were more likely to understand that pain and redness could be associated with BC compared to those with high incomes. This contradicts results reported by a previous study.[28] Reasons for these surprising findings are not clear and merit further investigation.

More than half of women in our study who sought medical help at LHCs or government hospitals were diagnosed with BC after their first or second visit, indicating that the cause for any delays in diagnosis was likely due to the patients themselves. Other researchers have highlighted that not seeking early medical help is a predictor of delayed diagnosis.[8, 29] Furthermore, the majority of women who were seen at LHCs in the present study were subsequently seen by specialists within two weeks of referral, with the BC diagnosis confirmed within another two weeks. Once again, this indicates that factors related to the local health system do not seem to play a major role in delaying BC diagnoses in Oman. Referral policies covering specific aspects of patient care are well established to oversee the transfer of patients from one healthcare setting to another for management.[30] Nonetheless, cancer patients in Oman, much like those in neighbouring GCC countries, often choose to seek medical help abroad (i.e. in countries like Thailand or India); this trend can cause delays in diagnosis, with many patients returning home with additional complications.[16]

For the majority of women in the current study, their initial response upon first noticing possible BC symptoms was to inform their husbands and family members. Becoming aware of possible symptoms of a life-threatening disease is often associated with feelings of emotional distress, anxiety and depression; hence, sharing this information with close family members might offer some emotional relief and support.[31, 32] Indeed, most women in our study prioritised sharing their symptoms with husbands or family members over consulting a doctor. This finding might be related to prevailing sociocultural attitudes which are based on a strong sense of moral responsibility and familial obligation, particularly when it comes to illness.[18] Furthermore, Omani women diagnosed with BC often rely on their families for emotional, physical and financial support, which also plays a role in treatment decision-making.[17, 18] However, the involvement of family members in medical decisions and treatment options can sometimes delay diagnoses, particularly if these individuals encourage patients to seek medical treatment abroad or pursue alternative or traditional remedies.[8, 33]

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Although more than half of the women in our study sought medical help within one month of developing BC symptoms, many nevertheless presented at an advanced stage by the time they were diagnosed. Various psychosocial and cultural beliefs have been attributed to the delayed presentation of BC cases.[16, 29, 31] A previous study from Oman showed that women with BC experienced severe psychosocial distress, including fear of death, social isolation, anxiety regarding the side-effects of treatment and fear that the cancer might spread or interfere with their daily lives.[16] Women who express explicit fears about the consequences of diagnosis and treatment are more reluctant to seek medical help, resulting in a higher chance of delays in diagnosis.[11]

Similarly, many women in our study reported emotional barriers that might contribute to delays in consulting a doctor, such as being scared, embarrassed or worried about what the doctor might find. Symptom appraisal and perception of their severity is a predictor of decisions to seek medical help.[29] Indeed, it is difficult to assess delays in BC presentation, diagnosis and treatment objectively due to variations in how people perceive symptoms and define time intervals.[34] Although there is growing interest in measuring cancer diagnostic time intervals and examining their effect on outcomes, the pathway from symptoms to diagnosis is a complex process as outlined in the Pathways to Treatment framework.[13]

The decision to consult a doctor and seek medical help often relies on a patient's subjective definition of the 'main' symptoms of cancer, which in itself is often influenced by their pre-existing knowledge and perceptions of symptom severity.[35] The presence of chronic diseases or psychological symptoms may also further influence interpretation of these symptoms.[13] Furthermore, international variations in the investigation and referral of cancer patients to secondary care for suspected cancer symptoms can play a critical role in diagnostic delays and cancer outcomes; for instance, countries in which healthcare professionals demonstrate a greater readiness to refer or investigate patients with possible cancer symptoms have demonstrated high rates of cancer survival.[36]

This study has certain limitations. First, many patients in Oman often choose to access healthcare in non-integrated settings; for instance, by attending a mixture of government facilities, private facilities and facilities abroad. Thus, it was difficult in some cases to track the time taken throughout the diagnostic pathway using the three usual component intervals of delay (i.e. patient, primary care and secondary care delays). Apart from self-reported

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information from the patients, there were no other methods available to measure delays in the absence of electronic or written tracking data.

Second, while we recruited Omani women diagnosed with BC within the previous year to satisfy the sample size requirements, the possibility of recall bias cannot be ruled out. Third, although the Arabic version of the combined questionnaire (which incorporated both the Breast-CAM and ICBP tools) was tested for reliability and demonstrated a satisfactory Cronbach's alpha (α) coefficient, we could not guarantee its validity, which was beyond the scope of this research. Fourth, we provided women with a predetermined list of BC symptoms in the Breast-CAM module instead of asking them to demonstrate their own knowledge of such symptoms; this may have obscured our understanding of how knowledge influenced help-seeking behaviours. Finally, we used the Breast-CAM section to measure knowledge of BC symptoms and barriers to seeking medical help among patients who had already been diagnosed with BC; as this tool was originally designed to be delivered to a community sample, we could not rule out potential bias in that the participants might have more knowledge of BC symptoms compared to other Omani women.

Conclusion

Omani women with BC demonstrated low levels of knowledge of BC symptoms and experienced several emotional barriers to seeking medical help; moreover, many were diagnosed at advanced stages. Despite national efforts to increase BC awareness, further educational initiatives are needed. Healthcare professionals should visit schools to raise awareness of BC symptoms and promote early help-seeking behaviours among female students in different regions of Oman. Employing both social and traditional media campaigns in LHCs and hospitals might also help to increase BC knowledge. Finally, healthcare professionals should make more efforts to build a trusting and cooperative relationship with female patients in order to help address emotional barriers to medical help-seeking, thereby encouraging them to disclose potential symptoms and thus reducing delays in diagnosis.

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Contributors

MA, KA, HA, ZM, JA and YA conceived of the study and contributed to its design and implementation. JA and YA collected data. SMP performed the statistical analysis. MA drafted the manuscript. All authors read and approved the final version of the manuscript.

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Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting or dissemination of this research.

Patient consent for publication

Not applicable as no details regarding individual patients have been reported in the manuscript.

Ethical approval

The study received ethical approval from the Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University (MREC #1809) as well as the Scientific Research Committee of the Royal Hospital (SRC #87/2018). Informed consent was obtained from all participants prior to their inclusion in the study.

Data availability statement

The datasets used and/or analysed during this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Table 1: Sociodemographic and clinical characteristics as stated by the participants

Variables	n (300)	%
Age (years) (n = 298)		
≤ 40	109	36.6
41–50	88	29.5
> 50	101	33.9
Marital status (n = 298)		
Single	21	7.0
Married	227	76.2
Divorced	11	3.7
Widowed	39	13.1
Origin (n = 297)		
Muscat	102	34.3
Ad Dhahirah	33	11.1
Al Batinah	60	20.2
Ad Dakhiliyah	40	13.5
Al Wusta	1	0.3
Ash Sharqiyah	41	13.8
Dhofar	5	1.7
Musandam	2	0.7
Al Buraimi	13	4.4
Educational level (n = 298)		
No formal education	105	35.2
Primary and elementary	37	12.4
High school	93	31.2
College and above	63	21.1
Employment status (n = 293)		
Employed	97	33.1
Unemployed/Housewife	196	66.9
Monthly family income in OMR (n = 281)		
≤ 500	110	39.1
501–1,000	99	35.2
> 1,000	72	25.6
Family history of BC (n = 299)		
Yes	81	27.1
No	218	72.9
If yes, degree of relationship (n = 80)		
First-degree	29	36.3
Second-degree	32	40.0
Third-degree	19	23.8
Overall length of time since diagnosis (months) (n = 297)		
< 3	46	15.5
3–6	165	55.6
6–12	86	29.0
Stage of BC at diagnosis (n = 299)		
Stage I	62	20.7
Stage II	81	27.1
Stage III	55	18.4
Stage IV	45	15.1
I don't know	56	18.7
Treatment modality at time of interview (n = 261)		
Radiotherapy	135	51.7
Hormonal therapy	94	36.0
Targeted biological therapy	37	14.2
Chemotherapy	202	77.4
Surgery	154	59.0

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I don’t remember	33	12.6

BC: breast cancer; OMR: Omani riyal.

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Figure 1: General knowledge of breast cancer and delays in diagnosis

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Figure 2: Knowledge of specific signs and symptoms of breast cancer

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Figure 3: Barriers to medical help-seeking

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Table 2: Association between sociodemographic characteristics and knowledge of breast cancer symptoms

Characteristics	Knowledge of BC symptoms, OR (95% CI)						
	Changes in the position of the nipple	**Pain in the breast or armpit**	**Lump/tumour in the breast or armpit**	**Redness of the breast skin**	Fatigue	**Unexplained weight loss**	**Loss of appetite**
Age (years)							
≤ 40	0.71 (0.24–2.07)	1.41 (0.42–0.47)	1.12 (0.31–4.0)	0.95 (0.30–2.97)	0.69 (0.26–1.82)	1.04 (0.37–2.93)	0.62 (0.23–1.69)
41–50	0.99 (0.35–2.82)	2.11 (0.61–7.34)	1.27 (0.37–4.40)	0.74 (0.27–2.05)	0.82 (0.32–2.08)	1.11 (0.40–3.06)	0.81 (0.31–2.14)
> 50	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Marital status							
Single	0.68 (0.10–4.45)	0.23 (0.03–1.75)	0.39 (0.05–2.88)	2.53 (0.26–24.41)	0.37 (0.09–1.58)	0.52 (0.10–2.60)	0.82 (0.17–3.90)
Married	0.605 (0.22–1.69)	0.53 (0.16–1.78)	0.82 (0.24–2.82)	1.65 (0.66–4.13)	0.97 (0.39–2.39)	0.89 (0.33–2.35)	1.22 (0.50–2.99)
Divorced/Widowed	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Educational level							
No formal education	0.16 (0.03–0.81)*	0.10 (0.01–0.86)*	0.93 (0.14–6.36)	2.97 (0.05–1.62)	1.13 (0.27–4.80)	0.29 (0.06–1.42)	0.37 (0.09–1.56)
Primary and elementary	0.49 (0.08–2.87)	0.10 (0.01–0.84)*	0.73 (0.11–4.96)	0.27 (0.05–1.47)	1.18 (0.27–5.08)	0.18 (0.04–0.88)*	0.29 (0.07–1.19)
High school	0.97 (0.24–3.85)	0.60 (0.09–4.10)	7.28 (1.06–50.19)*	1.19 (0.28–5.18)	3.82 (1.08–13.58)*	0.72 (0.19–2.68)	1.41 (0.44–4.53)
College and above	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Employment status							
Employed	0.83 (0.28–2.50)	1.60(0.37–6.83)	1.78 (0.38–8.12)	2.53 (0.74–8.59)	4.18 (1.34–13.05)*	1.18 (0.41–3.43)	1.45 (0.54–3.95)
Unemployed/Housewife	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Monthly family income in OMR							
≤ 500	1.22 (0.37–4.04)	4.14 (1.14–15.12)*	1.54 (0.35–6.80)	3.58 (1.11–11.52)*	1.49 (0.51–4.35)	1.89 (0.60–5.92)	2.66 (0.92–7.72)
501–1,000	0.98 (0.32–2.97)	1.98 (0.58-6.76)	0.58 (0.16–2.09)	3.33 (1.07–10.43)*	1.15 (0.43–3.06)	0.83 (0.30–2.29)	1.06 (0.42–2.65)
> 1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Family history of BC							
Yes	0.50 (0.20–1.23)	0.48 (0.17–1.41)	0.42 (0.13–1.33)	0.54 (0.22–1.32)	0.39 (0.17–0.91)	0.52 (0.22–1.24)	0.73 (0.34–1.56)
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Family history of any cancer							
Yes	0.74 (0.31–1.75)	0.73 (0.26–2.0)	0.93 (0.33–2.58)	1.04 (0.45–2.38)	1.61 (0.80–3.26)	1.10 (0.50–2.43)	1.22 (0.59–2.51)
No	1.0	1.0	1.0	1.0	1.0	1.0	1.0

BC: breast cancer; OR: odds ratio; CI: confidence interval; OMR: Omani riyal.
*Significant at the p <0.05 level.

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Table 3: Time taken for medical consultation, referral, and treatment of breast cancer as stated by the participants

Variables	n (300)	%
Initial response upon first noticing possible BC symptoms (n = 296)		
Informing husband	119	40.2
Informing family members	108	36.5
Seeing a doctor in a government hospital	25	8.4
Seeing a doctor in a local health centre	24	8.1
Seeing a doctor in a private sector facility	7	2.4
Traveling abroad	6	2.0
Informing friends	5	1.7
Using traditional/herbal medicine	2	0.7
Approximate duration of symptom(s) before contacting a doctor (n = 298)		
< 1 week	93	31.2
1–2 weeks	46	15.4
3–4 weeks	59	19.8
5–7 weeks	24	8.1
2–5 months	38	12.8
6–12 months	18	6.0
> 12 months	20	6.7
Length of time between contacting a doctor and getting an appointment (n = 294)		
Same/next day	52	17.7
< 1 week	78	26.5
1–2 weeks	61	20.7
3–4 weeks	54	18.4
1–2 months	35	11.9
> 3 months	14	4.8
Number of medical visits before being diagnosed		
At local health centres (n = 155)		
1	105	67.7
2	27	17.4
3	23	14.8
At government hospitals (n = 209)		
1	63	30.1
2	44	21.1
3	47	22.5
≥ 4	55	26.3
Length of time between being referred to hospital and getting an appointment with a specialist (n = 296)		
< 1 week	117	39.5
1–2 weeks	94	31.8
3–4 weeks	58	19.6
5–7 weeks	12	4.1
2–5 months	8	2.7
6–12 months	3	1.0
> 12 months	4	1.4
Approximate length of time between first medical appointment and diagnosis (n = 297)		
Same/next day	31	10.4
< 1 week	72	24.2
1–2 weeks	92	31.0
3–4 weeks	53	17.8
1–2 months	30	10.1
3–6 months	10	3.4
> 6 months	9	3.0
Length of time between diagnosis and first receiving treatment (n = 294)		

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< 1 week	88	29.9
1–2 weeks	84	28.6
3–4 weeks	58	19.7
1–2 months	46	15.6
> 3 months	18	6.1

BC: breast cancer.

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Figure 1: General knowledge of breast cancer and delays in diagnosis

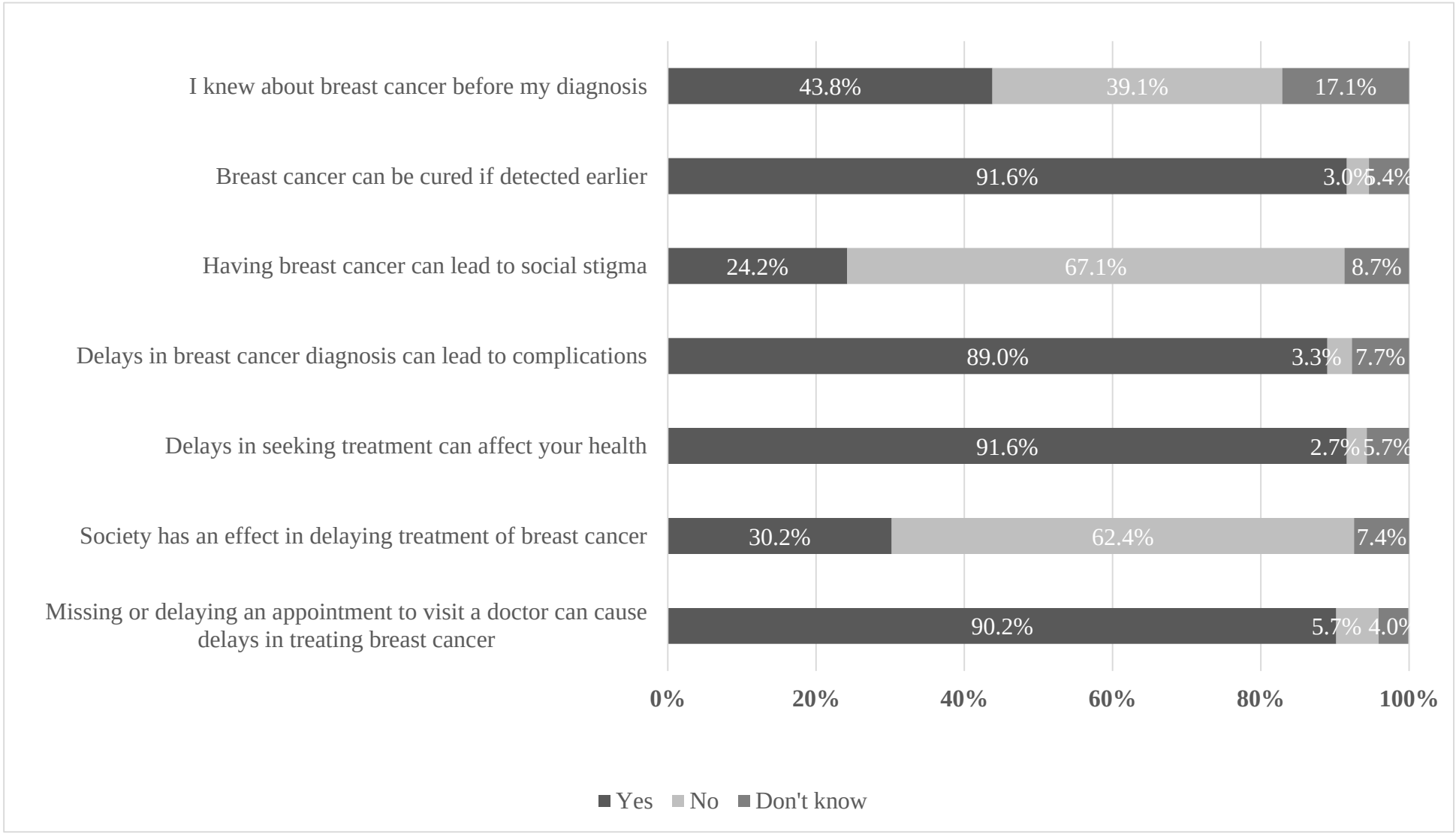


Figure 2: Knowledge of specific signs and symptoms of breast cancer

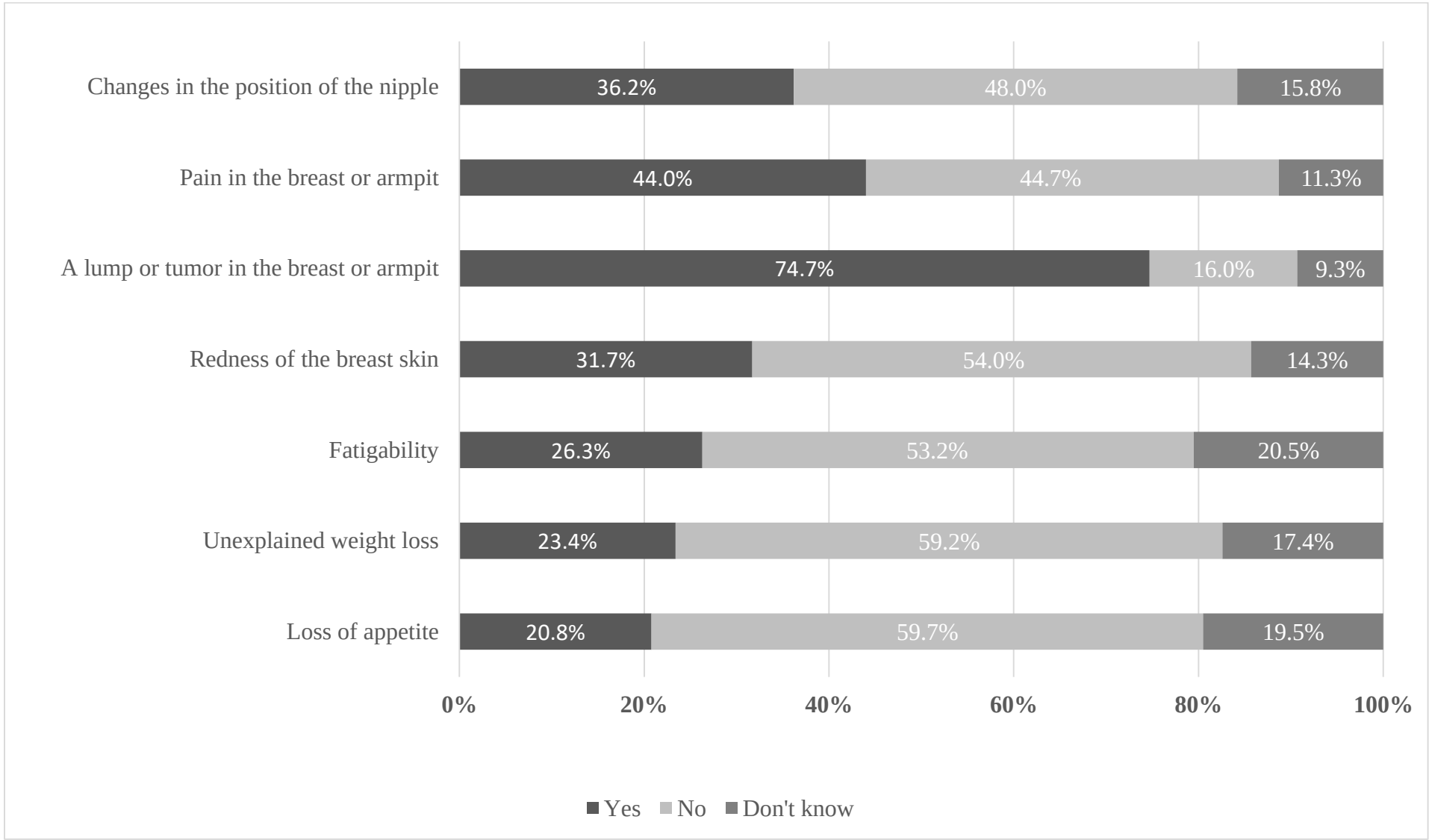
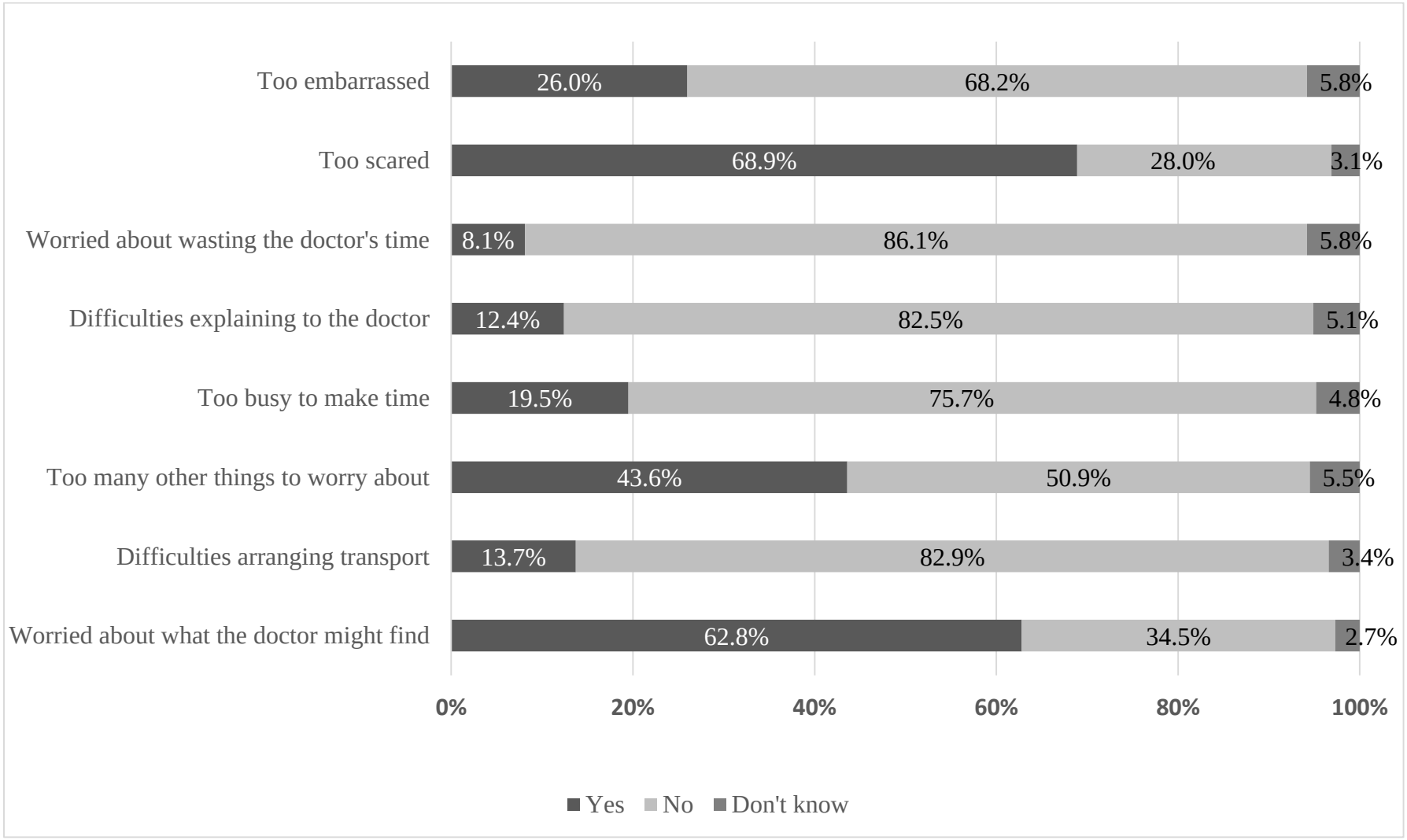


Figure 3: Barriers to medical help-seeking



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

	Item No	Recommendation	Page and line number
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 1, lines 4 to 5
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 2, lines 1 to 27
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 4, line 1 to page 5, line 23
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 5, lines 10 to 12
Methods			
Study design	4	Present key elements of study design early in the paper	Page 5, line 16
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 5, lines 15 to 23
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Page 5, line 28 to page 6, line 10
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	N/A
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	Page 6, line 12 to page 7, line 23
Bias	9	Describe any efforts to address potential sources of bias	Page 7, line 19 to 23.
Study size	10	Explain how the study size was arrived at	Page 5, line 25 to 30.
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 7, line 12 to 17.
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Page 7, lines 25 to 31.
		(*b*) Describe any methods used to examine subgroups and interactions	N/A
		(*c*) Explain how missing data were addressed	N/A
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
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	Page 8, lines 3 to 4
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A

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Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Page 7, line 32 to page 8, line 6
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	Page 8, line 5 to page 10, line 3
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	Page 9, line 1 to line 15
		(*b*) Report category boundaries when continuous variables were categorized	- Page 8, line 15 to 33. - Page 9, line 17 to Page 10, line 3.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	Page 10, llines 7 to 9
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	Page 13, line 14 to page 14, line 2
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 10, line 6 to page 13, line 12
Generalisability	21	Discuss the generalisability (external validity) of the study results	N/A
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	Page 15, lines 6 to 8

*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.

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