



Original research

Factors influencing psychological wellbeing of early breast cancer patients



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ABSTRACT

Aim: This paper aims to identify factors that influence the psychological wellbeing of patients newly diagnosed with localized breast cancer.

Background: Psychological wellbeing plays a significant part in the personal experience of patients during their cancer journey. However, despite progress in treatments and outcomes in breast cancer, psychosocial services and emotional support of cancer patients have been given less attention.

Materials and methods: Data were collected through a retrospective review of 274 charts of women diagnosed with breast cancer between 2012 and 2017 that received care in a single cancer center. Disease specific parameters, social and demographic variables, and Edmonton Symptom Assessment System (ESAS) scores were extracted from the patient charts.

Results: Self-reported scores of psychological-related symptoms were low (suggesting no or minimal psychological distress) at baseline and remained low in the majority of patients with breast cancer. Pain, depression, anxiety and wellbeing scores of 0–2 were observed in 78.5%, 81.4%, 63.5% and 70.1% of patients, respectively. Higher scores of anxiety at baseline were observed in patients with physical restrictions on the Eastern Cooperative Oncology Group performance status (ECOG PS) (14.9%), current smoking (20.5%) and history of mental illness (19.1%). Increasing scores for pain were observed in older patients during treatment as compared to baseline. Mastectomy was associated with increased scores for wellbeing (worsening wellbeing) as compared to lumpectomy. Of the patients with a history of mental illness (17.3%), 19.1% had more often increased scores for anxiety.

Conclusions: The findings highlight patients that may benefit from additional social and psychological supports at diagnosis and while undergoing treatment.

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1. Background

Despite advances in treatment options and outcomes for patients with breast cancer, psychosocial services and supports have lagged behind.¹ Treatment-related side effects range from side effects that impact quality of life and those that affect family members and friends of patients.¹ Three side effects due to

chemotherapy that cause distress and trauma are hair loss, nausea and fatigue.² Moreover, women who undergo mastectomy report more anxiety and depression in comparison to women who have breast conserving surgery.³ Depression is shown to be more prevalent among older and single patients while anxiety is higher in patients residing in rural regions. In another study, women undergoing treatment for anxiety and depression, as well as those with a medical history of anxiety and depression are more likely to have higher symptom severity scores in these domains.⁴

The Edmonton Symptom Assessment System (ESAS) scale^{5,6} is a validated symptom assessment tool used to identify and monitor nine symptoms that are commonly experienced by patients with cancer: pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, wellbeing and shortness of breath. When completing

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the tool, patients are asked to rate each symptom using a Likert scale from 0 to 10 where 0 indicates the absence of symptoms and 10 indicates the highest severity. The ESAS tool and the Functional Assessment of Cancer Therapy- Breast (FACT-B) self-administered questionnaires are commonly used to perform psychological assessments in patients with breast cancer. These tools have been used to examine quality of life and symptom burden in patients with breast cancer that have either undergone mastectomy or lumpectomy.⁷ The type of breast cancer surgery was also the focus of another study that used the Hospital Anxiety and Depression Scale (HADS) and Beck Depression Inventory (BDI).³ Several studies have used the ESAS tool to compare cohorts of patients receiving breast cancer treatment to derive information on their symptomatology as well as on the effect of treatments on quality of life. For example, in patients with bony metastases receiving bisphosphonates, ESAS scores for wellbeing were higher compared to patients not receiving these drugs.⁸

Studies in diverse settings have highlighted family history of cancer, lower education, as well as low income and financial constraints as some of the key predictors of a low quality of life score in patients with breast cancer.^{9,10} In the young African American population of breast cancer survivors, personal relationships, anxiety/depression and cognitive dysfunctions were identified as factors associated with psychological wellbeing.¹⁰ Hence, psychological wellbeing has been shown to vary depending on factors such as type of breast cancer, specific treatments, demographic variables and medical history. Since increased prevalence of anxiety and depression has been seen at diagnosis of breast cancer, the integration of psychosocial care into routine cancer care cannot be disregarded.¹

In summation, psychological factors are important for the wellbeing of patients with breast cancer and long-term outcomes of breast cancer.

2. Aim

This study examines factors that influence psychological wellbeing of patients newly diagnosed with localized breast cancer. We analyzed these variables in order to inform both the prioritization of resources and targeted interventions to patient cohorts with the greatest need. Supporting the psychological wellbeing of patients with breast cancer, in addition to their quality of life might improve cancer outcomes by optimization of adherence to therapies. For the purpose of this study, psychological wellbeing was operationalized as an aggregate of the individual pain, depression, anxiety and wellbeing scores on the ESAS scale. The proportion of patients with different psychological states as depicted by ESAS scores were measured. In addition, disease, demographic and social variables that influence psychological wellbeing in patients with breast cancer were determined. Finally, comparisons of psychological components on the ESAS before and during treatment were performed to identify patient groups with worsening self-reported psychological measures.

3. Methods

Data were collected through a retrospective review of 274 charts of women diagnosed with breast cancer between 2012 and 2017. Data were collected using patients' electronic medical records and paper charts. The following variables were captured: age and year of diagnosis, surgical date, TNM (tumor, nodes and metastases) classification, pathological stage (determined by TNM), grade of tumor, histology, type of surgery (lumpectomy or mastectomy), axillary node dissection or sentinel node biopsy, and treatment types (radiation, chemotherapy, adjuvant versus neoadjuvant, and hormone

therapy). Other demographics of interest, social and medical history that were recorded and analyzed were marital status, living arrangement (alone versus with family or in an assisted living facility), religious practices, tobacco use, alcohol use, and history of mental illness. Patients with missing baseline ESAS scores were excluded.

At initial evaluation, patients with breast cancer were invited to complete a questionnaire which collected information about sociodemographic characteristics and past medical and social history. Patients were asked to complete the ESAS tool at baseline and at each follow-up visit. Among the nine items that constitute the ESAS symptomatic evaluations, each rated on a 0–10 Likert Scale, the four relating directly or indirectly to psychological wellbeing (aggregate pain, depression, anxiety and wellbeing symptom scores), were extracted and recorded in a database specifically created for the purpose of this study. For each patient, scores from a baseline ESAS (ESAS1) and the first available ESAS from 2 to 12 months later (ESAS2) were assessed. The primary endpoint was identifying associations of individual and aggregate psychological wellbeing scores (aggregate pain, depression, anxiety and wellbeing symptom scores) with baseline characteristics of patients and their disease. The individual and aggregate wellbeing scores at baseline and during treatment were compared and correlations were also derived.

Statistical analysis was performed using an online statistical software program. The analysis used a combination of descriptive and categorical statistics to identify significant differences between treatment groups.

The sample size of 274 patients in the cohort allowed for the identification of statistically significant and clinically meaningful differences at a confidence interval of 90%. Chi-square tests were used to identify any significant differences between treatment groups. The paired t-test was conducted to compare pre-treatment and on-treatment ESAS scores of the various groups. The Pearson's R correlation test was used in correlation evaluations to determine the association between the continuous variables. The significance level was set at $p < 0.05$.

4. Results

Table 1 shows the patient age, disease/treatment characteristics and the respective aggregate baseline ESAS (ESAS1) scores (0–6 versus 7–10). Of the 274 patients in the series, 52.6% were 65 years old or younger and 15% were younger than age 50 (Table 1). 55% had Stage I disease, 36.6% had Stage II disease and 8.4% had locally advanced, Stage III breast cancer. The majority of patients (65.9%) had a lumpectomy and 61.5% had grade 1 or grade 2 cancers. 86% of the patients received hormonal therapy (HTx), 66.8% received adjuvant radiotherapy (RTx) and 40.1% received adjuvant chemotherapy.

Table 2 presents the social and functional status as well as habits of patients and the respective ESAS1 scores. About 70% of patients were married or in common-law relationships while 30% were single, divorced or widowed. 73.2% self-identified as non-religious, 14.7% were current smokers and 60% reported current regular alcohol use of any amount. The ECOG PS (Eastern Co-operative Oncology Group Performance Status) of 62.6% of patients was 0 (asymptomatic) and 17.3% of patients had a history of mental illness.

Table 3 shows the number of patients with self-reported ESAS1 and during follow-up (ESAS2) scores for pain, depression, anxiety and wellbeing. Most patients in the cohort self-reported no or minimal pain, depression and anxiety and a strong sense of global wellbeing in the respective symptom (ESAS scores of 0–3) both at baseline, and during treatment and follow-up (Table 3). Mean ESAS1 scores in the series were 1.33 (SEM=0.12) for pain, 1.33

Table 1
Associations of patients and disease/ treatment characteristics with baseline ESAS (ESAS1) scores (0–6 versus 7–10). Lymph node data were recorded in 127 pts of the cohort. Six patients had in situ carcinomas and for 6 pts no staging data were available. SNB: Sentinel Node Biopsy, AND: Axillary Node Dissection, RTx: Radiotherapy, HTx: Hormonal therapy.

	All (%)	ESAS pain (%)			ESAS depression (%)			ESAS anxiety (%)			ESAS well-being (%)		
		Low (0–6)	High (7–10)	p	Low (0–6)	High (7–10)	p	Low (0–6)	High (7–10)	p	Feel well (0–6)	Less well (7–10)	p
Age ≤65	144 (52.6)	139 (96.5)	5 (3.5)	0.12	137 (95.1)	7 (4.9)	0.68	128 (88.9)	16 (11.1)	0.22	136 (94.4)	8 (5.6)	0.95
Age >65	130 (47.4)	120 (92.3)	10 (7.7)		125 (96.2)	5 (3.8)		121 (93.1)	9 (6.9)		123 (94.6)	7 (5.4)	
Age ≤50	41 (15.0)	40 (97.6)	1 (2.4)	0.35	39 (95.1)	2 (4.9)	0.86	36 (87.8)	5 (2.2)	0.45	38 (92.7)	3 (7.3)	0.57
Age >50	233 (85.0)	219 (94.0)	14 (6.0)		223 (95.7)	10 (4.3)		213 (91.4)	20 (8.6)		221 (94.8)	12 (5.2)	
Lumpectomy	178 (65.9)	170 (95.5)	8 (4.5)	0.47	171 (96.1)	7 (3.9)	0.87	162 (91.0)	16 (9.0)	0.70	169 (94.9)	9 (5.1)	0.89
Mastectomy	92 (34.1)	86 (93.5)	6 (6.5)		88 (95.6)	4 (4.4)		85 (92.4)	7 (7.6)		87 (94.6)	5 (5.4)	
SNB	74 (58.3)	71 (95.9)	3 (4.1)	0.67	71 (95.9)	3 (4.1)	0.49	71 (95.9)	3 (4.1)	0.67	71 (95.9)	3 (4.1)	0.93
AND	53 (41.7)	50 (94.3)	3 (5.7)		52 (98.1)	1 (1.9)		50 (94.3)	3 (5.7)		51 (96.2)	2 (3.8)	
Stage I	144 (55.0)	139 (96.5)	5 (3.5)	0.15	140 (97.2)	4 (2.8)	0.26	133 (92.4)	11 (7.6)	0.31	138 (95.8)	6 (4.2)	0.46
Stage II	96 (36.6)	87 (90.6)	9 (9.4)		89 (92.7)	7 (7.3)		84 (87.5)	12 (12.5)		89 (92.7)	7 (7.3)	
Stage III	22 (8.4)	21 (95.5)	1 (4.5)		21 (95.5)	1 (4.5)		22 (100)	0		20 (90.9)	2 (9.1)	
Grade I/II	161 (61.5)	154 (95.7)	7 (4.3)	0.36	155 (96.3)	6 (3.7)	0.63	145 (90.1)	16 (9.9)	0.40	155 (96.3)	6 (3.7)	0.14
Grade III	101 (38.5)	94 (93.1)	7 (6.9)		96 (95.0)	5 (5.0)		94 (93.1)	7 (6.9)		93 (92.1)	8 (7.9)	
No RTx	91 (33.2)	83 (91.2)	8 (8.8)	0.08	88 (96.7)	3 (3.3)	0.53	84 (92.3)	7 (7.7)	0.56	85 (93.4)	6 (6.6)	0.56
RTx	183 (66.8)	176 (96.2)	7 (3.8)		174 (95.1)	9 (4.9)		165 (90.2)	18 (9.8)		174 (95.1)	9 (4.9)	
No Chemotherapy	164 (59.9)	153 (93.3)	11 (6.7)	0.27	158 (96.3)	6 (3.7)	0.47	150 (91.5)	14 (8.5)	0.68	157 (95.7)	7 (4.3)	0.28
Chemotherapy	110 (40.1)	106 (96.4)	4 (3.6)		104 (94.5)	6 (5.5)		99 (90.0)	11 (10.0)		102 (92.7)	8 (7.3)	
No Hormonal Therapy	38 (14.0)	38 (100)	0	0.34	38 (100)	0	0.48	36 (94.7)	2 (5.3)	0.36	36 (94.7)	2 (5.3)	0.94
Hormonal Therapy	234 (86.0)	219 (93.6)	15 (6.4)		222 (94.9)	12 (5.1)		211 (90.2)	23 (9.8)		221 (94.4)	13 (5.6)	

Table 2
Social factors, habits and performance status and baseline ESAS (ESAS1) scores (0–6 versus 7–10) of the patients in the cohort. ETOH: Alcohol use, ECOG: Eastern Co-operative Oncology Group Performance Status, Mental History: History of mental illness.

	All (%)	ESAS pain (%)			ESAS depression (%)			ESAS anxiety (%)			ESAS well-being (%)		
		Low (0–6)	High (7–10)	p	Low (0–6)	High (7–10)	p	Low (0–6)	High (7–10)	p	Feel well (0–6)	Less well (7–10)	p
Married/ Common Low	180 (69.2)	174 (96.7)	6 (3.3)	0.02	175 (97.2)	5 (2.8)	0.08	165 (91.7)	15 (8.3)	0.66	169 (93.9)	11 (6.1)	0.72
Single/ Divorced/Widow	80 (30.8)	72 (90.0)	8 (10.0)		74 (92.5)	6 (7.5)		72 (90.0)	8 (10.0)		76 (95.0)	4 (5.0)	
Religious	63 (26.8)	60 (95.2)	3 (4.8)	0.88	61 (96.8)	2 (3.2)	0.61	58 (92.1)	5 (7.9)	0.74	61 (96.8)	2 (3.2)	0.50
Not Religious	172 (73.2)	163 (94.8)	9 (5.2)		164 (95.3)	8 (4.7)		156 (90.7)	16 (9.3)		163 (94.8)	9 (5.2)	
Current Smoker	39 (14.7)	36 (92.3)	3 (7.7)	0.55	35 (89.7)	4 (10.3)	0.06	31 (79.5)	8 (20.5)	0.01	36 (92.3)	3 (7.7)	0.55
Not Current Smoker	226 (85.3)	214 (94.7)	12 (5.3)		218 (96.5)	8 (3.5)		209 (92.5)	17 (7.5)		214 (94.7)	12 (5.3)	
ETOH	153 (60.0)	147 (96.1)	6 (3.9)	0.29	146 (95.4)	7 (4.6)	0.90	138 (90.2)	15 (9.8)	1.0	146 (95.4)	7 (4.6)	0.27
No ETOH	102 (40.0)	95 (93.1)	7 (6.9)		97 (95.1)	5 (4.9)		92 (90.2)	10 (9.8)		94 (92.2)	8 (7.8)	
ECOG 0	124 (62.6)	119 (96.0)	5 (4.0)	0.65	120 (96.8)	4 (3.2)	0.45	117 (94.4)	7 (5.6)	0.02	121 (97.6)	3 (2.4)	0.13
ECOG >0	74 (37.4)	70 (94.6)	4 (5.4)		70 (94.6)	4 (5.4)		63 (85.1)	11 (14.9)		69 (93.2)	5 (6.8)	
Mental History	47 (17.3)	43 (91.5)	4 (8.5)	0.32	43 (91.5)	4 (8.5)	0.13	38 (80.9)	9 (19.1)	0.009	42 (89.4)	5 (10.6)	0.06
No Mental History	224 (82.7)	213 (95.1)	11 (4.9)		216 (96.4)	8 (3.6)		208 (92.9)	16 (7.1)		215 (96.0)	9 (4.0)	

Bold values signifies the values are statistically significant.

(SEM = 0.12) for depression, 2.18 (SEM = 0.15) for anxiety and 1.83 (SEM = 0.13) for wellbeing.

ESAS1 scores for pain, depression, anxiety and wellbeing categorized as low (ESAS scores of 0–6) or high (ESAS scores of 7–10) were not associated with any tumor or treatment characteristic ($p > 0.05$) (Table 1). Among social factors, marital status was associated with low baseline self-reported pain ($p = 0.02$) (Table 2). Three times more patients (10%), who were single, divorced or widowed, reported pain (ESAS scores of 7–10) as compared to 3.3% of patients that were married or in common-law relationships. In addition, significantly more patients that were current smokers, symptomatic from cancer (ECOG PS 1–2) and that had a history of mental illness, compared to other characteristics, self-reported high ESAS1 (ESAS scores of 7–10) for anxiety (Table 2). Current smoking status and presence of symptoms (ECOG PS 1–2) were also significantly associated with high ESAS1 scores in any (one or more) of the four symptoms ($p = 0.04$) (Table 4). History of mental illness was associated with high ESAS scores during treatment (ESAS2) in any (one or more) of the four symptoms ($p < 0.01$) (Table 5).

Age (>65 years) and cancer of lower grade (grade I or II) were more commonly associated with an increase of three or more points between the two ESAS scores for pain. Similarly, mastectomy was more commonly associated with an increase between the ESAS scores for wellbeing. This denoted a worsening of self-reported wellbeing in patients that had undergone a mastectomy compared to patients that had undergone a lumpectomy. Patients with a previous history of mental illness were at higher risk to self-report increased anxiety ($p < 0.01$).

Overall, mean ESAS scores during follow-up (ESAS2) were very similar to ESAS1 scores (Table 3). Mean ESAS2 scores were 1.48 (SEM = 0.14) for pain, 1.23 (SEM = 0.13) for depression, 1.62 (SEM = 0.13) for anxiety and 1.87 (SEM = 0.13) for wellbeing. Comparisons of the mean ESAS scores at baseline and during treatment showed a statistically significant decrease from 2.18 to 1.62 (paired $t = 3.64$, $p < 0.01$) in anxiety while the means of the three other symptoms were not significantly different. The two ESAS scores of each patient were weakly correlated (Pearson's $R = 0.307$) for pain and weak to moderately correlated (both with a Pearson's $R = 0.39$) for the anxiety and wellbeing symptoms. The two ESAS scores were moderately correlated (Pearson's $R = 0.51$) for depression. The cumulative scores of the four symptoms also showed a moderate correlation between the two time points (Pearson's $R = 0.50$).

5. Discussion

While advances in therapeutic options for patients undergoing breast cancer treatment continue to evolve, psychological support remains an area that requires continuous attention.¹¹ Breast cancer diagnosis and its subsequent treatment can be both physically and emotionally distressing.¹² In order to better focus resources for these supports, identification of patients undergoing breast cancer treatment with greater needs is of importance and would help target the most vulnerable patients. Studies have attempted to address the question of identifying cancer patients that are psychologically more vulnerable at an early point during their cancer journey, and these findings contribute to this area of research.

We found low self-reported ESAS scores in all ESAS symptoms examined in the majority of patients with early breast cancer, suggesting low psychological distress. During treatment, ESAS scores tended to remain stable, except for anxiety scores that decreased, suggesting that as time passed from diagnosis and as treatment plans were executed, patient anxiety was reduced. The existing evidence shows that psychological status may be a factor contributing not only to the wellbeing of patients with breast cancer but also a prognostic factor for breast cancer outcomes. Psychosocial factors

play a role in patient adherence to treatments which may affect disease outcomes.¹³ This aligns with the findings of Hui et al.¹⁴ who reported depression together with stage and hormonal status as predictors of Overall Survival (OS).

Only 3.3 % of patients that were married or common-law reported high baseline pain (ESAS scores of 7–10), indicating that marital status can be a protective factor from breast cancer symptom burden. Similarly, Martinez et al.¹⁵ and, Zhai et al.¹⁶ found better prognosis and survival outcomes in women that were married at the time of diagnosis as compared to their non-married (i.e., divorced, separated or widowed) counterparts. Greater financial resources and psychosocial support are some underlying factors associated with higher overall survival in married patients at the time of breast cancer diagnosis.¹⁶

Patients who had undergone mastectomy had more often increasing scores in wellbeing, indicating worsening wellbeing, compared with patients that had undergone lumpectomy. The findings were in concordance with other studies which reported significantly higher scores in several domains including pain, anxiety and depression as compared to those patients who had undergone lumpectomy.^{3,7}

Higher ECOG PS, current smoking and history of mental illness were associated with higher scores in anxiety at the beginning of adjuvant cancer treatment. Patients with a history of mental illness had more often increasing scores in anxiety during treatment compared to baseline self-reported anxiety. Other studies^{17,18} show increased prevalence of clinically relevant anxiety and depression symptoms in patients that experience restricted daily activities due to acute breast cancer treatment side effects. Additionally, patients that have comorbid conditions at diagnosis of their breast cancer are confronted with challenges in adhering to treatment regimens, which can lead to onset of anxiety disorders.¹⁹

Fatigue is a commonly reported side effect of anti-cancer treatments.¹ The etiology of fatigue consists of a psychological component which contributes to depression and impaired activities of daily living (measured through ECOG PS) among others.¹ Though our study did not examine fatigue as a marker for psychological wellbeing among patients with breast cancer, the higher scores for ECOG PS in our study can be associated with fatigue or fatigue-related side effects of breast cancer treatment.

Results from this study showed that women's age (>65) was also associated with an increase between the two ESAS scores for pain. Various age-related factors may increase the stress levels of older women making it difficult for them to cope with diagnosis and treatment for breast cancer.² The evidence of psychosocial interventions and their impact on the wellbeing of older patients with breast cancer has been weak. Durá-Ferrandis et al.²⁰ state that the presence of tangible social support during diagnosis and treatment has the potential to reduce physical and cognitive deterioration in older breast cancer survivors. In contrast, Villani et al. report that psychological interventions designed to reduce anxiety seem to have decreased effectiveness in patients with breast cancer over the age of 60. Given the increase in ESAS scores for pain in older women with breast cancer, increased surveillance of these cohorts for adverse symptom burden during breast cancer treatment is recommended.

The strengths of the study include the homogeneity of the population of newly diagnosed early breast cancer, the comparatively large size and the contemporary treatments used.

Since the study design was retrospective and it relied entirely on a questionnaire to assess psychological wellbeing, the relationships observed among variables cannot explain causation. Thus, some observed associations, such as the basal line ESAS scores and stage may be fortuitous. Moreover, some data were missing, especially in the scores during follow-up. This may have introduced information bias as patients with worsening status may have been

Table 3
Number of patients with each baseline (ESAS1) and during follow-up (ESAS2), scores (ESAS1 n = 274, ESAS2 n = 266).

ESAS value	Pain1	Pain2	Depression1	Depression2	Anxiety1	Anxiety2	Well being1	Well being2
0	146	150	176	165	100	129	112	103
1	40	32	24	29	34	32	38	44
2	29	24	23	17	40	33	42	39
3	19	16	11	15	31	22	25	21
4	13	9	7	11	24	17	11	16
5	8	8	17	15	10	14	22	27
6	4	12	4	5	10	10	9	6
7	9	6	4	3	8	5	10	4
8	4	5	5	5	15	3	5	5
9	1	3	1	1	0	0	0	0
10	1	1	2	0	2	1	0	1

Table 4
Comparison of the group of patients with any of the four baseline ESAS (ESAS1) scales above 6 (any >6) with the group having all four ESAS1 scales of interest below 7 (all < 7).

	ESAS total (%)			p		ESAS total (%)			p
	All <7	Any >6				All <7	Any >6		
Age ≤65	144 (52.6)	118 (81.9)	26 (18.1)	0.44	Married/ Common Low	180 (69.2)	154 (85.6)	26 (14.4)	0.26
Age >65	130 (47.4)	111 (85.4)	19 (14.6)		Single/ Divorced/Widow	80 (30.8)	64 (80.0)	16 (20.0)	
Age ≤50	41 (15.0)	34 (82.9)	7 (17.1)	0.90	Religious	63 (26.8)	52 (82.5)	11 (17.5)	0.74
Age >50	233 (85.0)	195 (83.7)	38 (16.3)		Not Religious	172 (73.2)	145 (84.3)	27 (15.7)	
Lumpectomy	178 (65.9)	151 (84.8)	27 (15.2)	0.63	Current Smoker	39 (14.7)	28 (71.8)	11 (28.2)	0.04
Mastectomy	92 (34.1)	76 (82.6)	16 (17.4)		Not Current Smoker	226 (85.3)	192 (85.0)	34 (15.0)	
Stage I	144 (55.0)	127 (88.2)	17 (11.8)	0.016	ETOH	153 (60.0)	130 (85.0)	23 (15.0)	0.33
Stage II	96 (36.6)	72 (75.0)	24 (25.0)		No ETOH	102 (40.0)	82 (80.4)	20 (19.4)	
Stage III	22 (8.4)	20 (90.9)	2 (9.1)						
Grade I/II	161 (61.4)	135 (83.8)	26 (16.2)	0.88	ECOG 0	124 (62.6)	112 (90.3)	12 (9.7)	0.005
Grade III	101 (38.6)	84 (83.2)	17 (16.8)		ECOG >0	74 (37.4)	56 (75.7)	18 (24.3)	
No Radiation Therapy	91 (33.2)	75 (82.4)	16 (17.6)	0.71	Mental History	47 (17.3)	35 (74.5)	12 (25.5)	0.057
Radiation Therapy	183 (66.8)	154 (84.2)	29 (15.8)		No Mental History	224 (82.7)	192 (85.7)	32 (14.3)	
No Chemotherapy	164 (59.9)	139 (84.8)	25 (15.2)	0.51					
Chemotherapy	110 (40.1)	90 (81.8)	20 (18.2)						
No Hormonal Therapy	38 (14.0)	34 (89.5)	4 (10.5)	0.28					
Hormonal Therapy	234 (86.0)	193 (82.5)	41 (17.5)						

Bold values signifies the values are statistically significant.

Table 5
Comparison of the group of patients with any of the four ESAS scales during follow-up (ESAS2) above 6 (any >6) with the group having all four ESAS2 scales of interest below 7 (all < 7).

	ESAS total (%)			p		ESAS total (%)			p
	All <7	Any >6				All <7	Any >6		
Age ≤65	142 (53.4)	125 (88.0)	17 (12.0)	0.70	Married/ Common Low	178 (70.1)	160 (89.9)	18 (10.1)	0.47
Age >65	124 (46.6)	111 (89.5)	13 (10.5)		Single/ Divorced/Widow	76 (29.9)	66 (86.8)	10 (13.2)	
Age ≤50	41 (15.4)	37 (90.2)	4 (9.8)	0.73	Religious	61 (26.5)	53 (86.9)	8 (13.1)	0.51
Age >50	225 (84.6)	199 (88.4)	26 (11.6)		Not Religious	169 (73.5)	152 (89.9)	17 (10.1)	
Lumpectomy	174 (65.9)	156 (89.7)	18 (10.3)	0.64	Current Smoker	37 (14.3)	31 (83.8)	6 (16.2)	0.30
Mastectomy	90 (34.1)	79 (87.8)	11 (12.2)		Not Current Smoker	221 (85.7)	198 (89.6)	23 (10.4)	
Stage I	141 (55.3)	128 (90.8)	13 (9.2)	0.30	ETOH	150 (60.5)	135 (90.0)	15 (10.0)	0.30
Stage II	92 (36.1)	79 (85.9)	13 (14.1)		No ETOH	98 (39.5)	84 (85.7)	14 (14.3)	
Stage III	22 (8.6)	21 (95.5)	1 (4.5)						
Grade I/II	158 (61.7)	138 (87.3)	20 (12.7)	0.39	ECOG 0	121 (62.4)	108 (89.3)	13 (10.7)	0.16
Grade III	98 (38.3)	89 (90.8)	9 (9.2)		ECOG >0	73 (37.6)	60 (82.2)	13 (17.8)	
No Radiation Therapy	87 (32.7)	79 (90.8)	8 (9.8)	0.45	Mental History	45 (17.0)	34 (75.6)	11 (24.4)	0.002
Radiation Therapy	179 (67.3)	157 (87.7)	22 (12.3)		No Mental History	219 (83.0)	200 (91.3)	19 (8.7)	
No Chemotherapy	157 (59.0)	138 (87.9)	19 (12.1)	0.61					
Chemotherapy	109 (41.0)	98 (89.9)	11 (10.1)						
No Hormonal Therapy	37 (14.0)	36 (97.3)	1 (2.7)	0.08					
Hormonal Therapy	227 (86.0)	199 (87.7)	28 (12.3)						

Bold values signifies the values are statistically significant.

more prone to not complete the questionnaire. Selection bias could stem from the fact that patients with missing ESAS1 scores in the record were not eligible for inclusion in the study. Confounding bias might have occurred because the type of questionnaire employed does not inform underlying causes of the symptoms which may be broad and may include both cancer-related and unrelated factors.

6. Conclusion

The findings of this study may identify the needs of different cohorts of patients with breast cancer and pinpoint specific subsets of patients who would benefit from additional support when undergoing breast cancer treatment. These include breast cancer patients with a history of mental illness, current smok-

ers and patients with decreased ECOG performance status. These findings may be used to inform the design and implementation of focused interventional support programs addressing individual psychosocial needs. Future prospective qualitative research involving patients directly may inform specific areas of need as well as the design and implementation of local and global support programs.

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Conflicts of interest

None declared.

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References

- Fallowfield L, Jenkins V. Psychosocial/survivorship issues in breast cancer: are we doing better? *J Natl Cancer Inst*. 2015;107(1):335. doi: 10.1093/jnci/dju335.
- Villani D, Cognetta C, Repetto C, et al. Promoting emotional well-being in older breast Cancer patients: Results from an eHealth intervention. *Front Psychol*. 2018;9:2279. <http://dx.doi.org/10.3389/fpsyg.2018.02279>.
- Kaminska M, Kubiawski T, Ciszewski T, et al. Evaluation of symptoms of anxiety and depression in women with breast cancer after breast amputation or conservation treated with adjuvant chemotherapy. *Ann Agric Environ Med*. 2015;22(1):185–189. <http://dx.doi.org/10.5604/12321966.1141392>.
- Stafford L, Komiti A, Bousman C, et al. Predictors of depression and anxiety symptom trajectories in the 24 months following diagnosis of breast or gynaecologic cancer. *Breast*. 2016;26:100–105. <http://dx.doi.org/10.1016/j.breast.2016.01.008>.
- Bruera E, Kuehn N, Miller MJ, Selmser P, Macmillan K. The Edmonton Symptom Assessment System (ESAS): A simple method for the assessment of palliative care patients. *J Palliat Care*. 1991;7(2):6–9.
- Hui D, Bruera E. The Edmonton Symptom Assessment System 25 years later: Past, present, and future developments. *J Pain Symptom Manage*. 2017;53(3):630–643. doi: 10.1016/j.jpainsymman.2016.10.370.
- Chow R, Pulenzas N, Zhang L, et al. Quality of life and symptom burden in patients with breast cancer treated with mastectomy and lumpectomy. *Support Care Cancer*. 2016;24(5):2191–2199. <http://dx.doi.org/10.1007/s00520-015-3027-8>.
- Ecclestone C, Chow R, Pulenzas N, et al. Quality of life and symptom burden in patients with metastatic breast cancer. *Support Care Cancer*. 2016;24(9):4035–4043. <http://dx.doi.org/10.1007/s00520-016-3217-z>.
- Abu-Helalah M, Al-Hanaqta M, Alshraideh H, Abdulbaqi N, Hijazeen J. Quality of life and psychological wellbeing of breast cancer survivors in Jordan. *Asian Pac J Cancer Prev*. 2014;15(14):5927–5936. <http://dx.doi.org/10.7314/apjcp.2014.15.14.5927>.
- Nolan TS, Frank J, Gisiger-Camata S, Meneses K. An integrative review of psychosocial concerns among young african american breast cancer survivors. *Cancer Nurs*. 2018;41(2):139–155. <http://dx.doi.org/10.1097/NCC.0000000000000477>.
- Andersen BL, DeRubeis RJ, Berman BS, et al. Screening, assessment, and care of anxiety and depressive symptoms in adults with cancer: an American Society of Clinical Oncology guideline adaptation. *J Clin Oncol*. 2014;32(15):1605–1619. <http://dx.doi.org/10.1200/JCO.2013.52.4611>.
- Maraste R, Brandt L, Olsson H, Ryde-Brandt R. Anxiety and depression in breast cancer patients at start of adjuvant radiotherapy. *Acta Oncol (Madr)*. 1992;31(6):641–643. <http://dx.doi.org/10.3109/02841869209083846>.
- Lin C, Clark R, Tu P, Bosworth HB, Zullig LL. Breast cancer oral anti-cancer medication adherence: A systematic review of psychosocial motivators and barriers. *Breast Cancer Res Treat*. 2017;165(2):247–260. <http://dx.doi.org/10.1007/s10549-017-4317-2>.
- Hui L, Huang T, Lian J, et al. Potential prognostic value of clinical characteristics, hormone status and major depressive disorder in breast cancer. *Future Oncol*. 2017;13(17):1493–1503. <http://dx.doi.org/10.2217/fon-2017-0515>.
- Martinez ME, Unkurt JT, Tao L, et al. Prognostic significance of marital status in breast cancer survival: A population-based study. *PLoS One*. 2017;12(5). doi: 10.1371/journal.pone.0175515.e0175515.
- Zhai Z, Zhang F, Zheng Y, et al. Effects of marital status on breast cancer survival by age, race, and hormone receptor status: A population-based Study. *Cancer Med*. 2019;8(10):4906–4917. <http://dx.doi.org/10.1002/cam4.2352>.
- Burgess C, Cornelius V, Love S, Graham J, Richards M, Ramirez A. Depression and anxiety in women with early breast cancer: Five year observational cohort study. *BMJ*. 2005;330(7493):702. <http://dx.doi.org/10.1136/bmj.38343.670868.D3>.
- Kang JI, Sung NY, Park SJ, Lee CG, Lee BO. The epidemiology of psychiatric disorders among women with breast cancer in South Korea: Analysis of national registry data. *Psycho-Oncol*. 2014;23(1):35–39. <http://dx.doi.org/10.1002/pon.3369>.
- Sartorius N, Holt RIG., & Maj M. (eds) (2015). Comorbidity of Mental and Physical Disorders. *Key Issues Ment Health*, Basel, Karger, 2015, 179, 88–98. doi: 10.1159/000365541.
- Durá-Ferrandis E, Mandelblatt JS, Clapp J, et al. Personality, coping, and social support as predictors of long-term quality-of-life trajectories in older breast cancer survivors: CALGB protocol 369901 (Alliance). *Psycho-Oncol*. 2017;26(11):1914–1921. <http://dx.doi.org/10.1002/pon.4404>.