Social hobbies can increase self-esteem and quality of life in female breast cancer patients with type A personality trait: KRATOS study

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Abstract

Self-esteem is a way of coping with stress for cancer patients and this improves their quality of life. It was aimed to determine the relationship between type A personality traits and self-esteem and quality of life in women with breast cancer and to determine the effective factors. 154 women with breast cancer and 78 healthy women were included. Bortner's Rating scale, Rosenberg's Self-Esteem scale, and EORTC QOL-C30 scale were used. The relationship between the presence of hobbies, self-esteem, quality of life, and personality type was examined. Mann–Whitney U, Kruskal–Wallis, Fisher's Exact, and Spearman Rank correlation tests were performed. Independent factors affecting personality type, self-esteem, and quality of life were determined by multivariate logistic (binary) regression analysis. The $p < 0.05$ value was significant in the SPSS v19 program. There was no age difference between the patients (54 ± 11 years) and the control group (42 ± 8 years) ($p = 0.108$). The rate of type A personality was 69% in patients and 58% in controls ($p = 0.093$). Similarly, the rate of high self-esteem was 93% in patients and 96% in controls ($p = 0.098$). Besides personality type and self-esteem, there was no relationship between personality type and quality of life in cancer patients ($p = 0.960$ and $p = 0.946$, respectively). A relationship was established between self-esteem and quality of life ($p = 0.018$) in patients. In patients with type A personality, hobbies providing socially active communication were common ($p = 0.039$), and had more than two hobbies ($p = 0.015$). Type A personality trait was independently effective on self-esteem ($p = 0.046$). Hobby orientation and the number of hobbies had independent effects on self-esteem ($p = 0.032$, $p = 0.041$), quality of life (respectively, $p = 0.004$, $p = 0.007$), and personality type (respectively, $p = 0.014$, $p = 0.027$). Hobbies that provide active social communication may have important effects on changes in personality traits, self-esteem, and quality of life in patients with breast cancer.

Keywords Breast cancer · Personality type · Self-esteem · Quality of life · Hobby

Introduction

It is thought that psychological problems such as anxiety, depression, and cognitive dysfunctions seen in cancer patients may adversely affect patients in terms of society, profession, family, and economy [1]. Young breast cancer patients constitute the patient group in which psychological problems are most common among cancer patients [1]. As a result of the removal of all or part of the breast, which is perceived as a symbol of femininity, significant psychosocial problems may occur [1]. Women with breast cancer may experience problems such as impaired body image, fertility, deterioration of family integrity, sexuality, and future anxiety [1, 2]. Many factors can affect the incidence and degree of these psychosocial problems. Family and professional support, education level, social situation, economic situation and coping methods can be counted among the most frequently emphasized. In addition, it has been stated that behavioral changes may develop in patients over time after the diagnosis of cancer. [2, 3]. Although personality traits, self-esteem, and body esteem in men and women are thought to be closely related to each other, and the exact nature of how personality traits relate to the other two structures is still

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unknown [4]. Both personality type [5] and self-esteem [6] are thought to have positive effects on health-related quality of life.

Beyond these relationships between personality type, self-esteem, and quality of life, it is thought that personality type may contribute to cancer development and cancer progression as associated with stress, but there is no clear consensus on this issue [5, 6].

This study was conducted to determine the effect of personality type on self-esteem and quality of life in women with a breast cancer diagnosis and to determine the related factors. It is the first study in English literature that investigated the relationship between personality type and self-esteem in women diagnosed with breast cancer.

Patients and methods

This cross-sectional study was conducted in the form of face-to-face interviews with female patients with breast cancer who were followed up in the Medical Oncology outpatient clinic of our hospital between 08 May 2021 and 31 December 2021. The medical file information of the patients was also recorded. After getting approval from Muğla Sıtkı Koçman University Scientific Research Ethics Committee (May 8, 2021/97), the study was started. The control group consisted of healthy women of similar age who had not been diagnosed with any systemic disease, psychological disease, or cancer before.

Women between the ages of 18 and 99 who were histologically diagnosed with breast cancer, receiving active anti-cancer therapy or not, with or without metastases were included in the study, while patients with brain metastases who received palliative brain radiotherapy were excluded from the study. While the common inclusion criteria for the study group and control group were to be able to understand and write Turkish and to give consent to the study, those with previously diagnosed and treated cognitive dysfunction, severe hearing problems, and a history of psychiatric illness were excluded from the study in both groups. The control group was selected from the relatives of the patients and the medical staff, and after their consent was obtained, the relevant forms and scales were filled in the form of face-to-face interviews. The patients were accepted to the study according to the order they were seen in the outpatient clinic, and the relevant forms and scales were applied to those who gave consent.

The sample of the study was calculated as follows: since the total number of patients followed and treated in the Department of Medical Oncology for the last 5 years was 650, the sample for the study group was calculated as 154 patients according to the 80% working power analysis with

95% reliability and 0.05 margin of error. For the healthy control group, this figure was 78.

Forms and scales used in the study

Study Form includes questions in which demographic and clinical characteristics were determined. It was applied to both patients in the study group and controls. The age, occupation, marital status, economic status, educational status, and hobby presence status of the patients in the study group and healthy volunteers in the control group were the demographic variables of the study. Diagnosis dates of the patients in the study group (Age at diagnosis), stage (TNM stage 1-4), metastasis status (Metastatic disease or non-metastatic disease), breast surgery status (Operative/non-operative), type of breast surgery (Non-operative/breast-conserving surgery/total mastectomy), reconstructive surgery status (yes/none), active anti-cancer treatment status (No treatment/adjuvant endocrine therapy/non-endocrine treatment oral or parenteral anti-cancer therapy) were determined.

Bortner's Grading Scale, which is suitable for type A and B personality classification, was used for personality type determination [7]. Although this scale does not have Turkish validation, it has been used in the Turkish population with the short form name [8, 9] and has been found sufficient, and was last evaluated as usable in a study conducted by Yıldız and Ersoy in 2013 [10]. This form was applied to both the study group and the control group.

The Rosenberg's Self-esteem Scale [11, 12] was applied to both the study group and the control group to determine self-esteem status. The Turkish validation of this form was used by Çuhadaroğlu [13] in the Turkish population and the Turkish reliability and validity study was last carried out by Tukuş in 2010 within the scope of his specialization thesis [14].

EORTC QLQ C30 form was used to determine the quality of life of patients in the study group [15]. There is a Turkish validation study of this form. The validation study in cancer patients was published by Beşer and Öz [16] in 2003.

Statistical analysis

The distribution of the variables was analyzed by the Kolmogorov–Smirnov test and histograms were drawn. The age distribution of the participants in the study group and control group was normal. Therefore, the age-related values of the participants were given as standard deviations of $\pm$ average. However, since the distribution of all other qualitative and quantitative variables was not determined normally, the values of the data were expressed as median and minimum–maximum. For non-parametric variables, it was done with Mann–Whitney U and Kruskal–Wallis. The Fisher test was performed for qualitative variables. Spearman Rank

correlation coefficient was used to determine the relationship between study variables and quality of life and self-status according to personality type. With the model created as a result of correlation and univariate analysis, multivariate logistic [bineary] regression analysis was performed to determine the independent factors determining personality type, self-identity, and quality of life from the study variables. Statistical analysis was performed using the SPSS v19 program and a p value of < 0.05 was considered statistically significant.

Results

This study included 154 female patients with breast cancer (Group 1, study group) and 78 healthy women (Group 2, control group) with similar age characteristics. The average age of all participants was 50 ± 13 (years). The Kolmogorov–Smirnov test and histogram were normal, and the distribution of age variables for all participants in the study was normal. Patients (54 ± 11 years) and healthy controls (42 ± 8 years) had similar ages ($p = 0.108$). The mean age of patients when diagnosed with breast cancer was 51 ± 11 (years).

Comparison of demographic characteristics of participants in both groups and clinical features of patients is presented in Table 1. As can be seen in Table 1, there was a difference between the variables since random sampling was preferred in the selection of healthy women under pandemic conditions in order to avoid bias in other variables except age. This made it difficult to determine the effect of some demographic characteristics on personality type in women with breast cancer and healthy women. Compared with the control group, it was found that in contrast to women with a diagnosis of breast cancer, healthy participants had more tendency to spend more individual time ($p = 0.011$) and only took up one hobby ($p = 0.041$). However, there was no significant difference between the two groups regarding hobby existence ($p = 0.299$). 69% of women with breast cancer and 58% of healthy women had type A personality traits. There was no significant difference between patients and controls in terms of personality type ($p = 0.093$). Similarly, 93% of the women with breast cancer and 96% of the controls had high self-esteem, but there was no difference between the two groups ($p = 0.624$). When low and moderate self-esteem were evaluated together, it was found that low-moderate self-esteem was significantly higher in patients than in controls ($p = 0.039$) (Table 1).

The clinical characteristics of the women with breast cancer included in the study are shown in Table 2. The fact that metastatic patients were relatively less was in order not to increase the risk of COVID-19 infection by filling out questionnaires for these patients under pandemic conditions.

Demographic and clinical characteristics of patients with breast cancer according to their personality type and self-esteem are given in Table 3. Patients with cancer who were older than 60 years at the time of diagnosis had a higher rate of self-esteem ($p = 0.041$). There was no difference in the degree of self-esteem according to personality types in patients with breast cancer ($p = 0.280$). However, self-esteem scores were higher in patients with type A personality structure ($p = 0.033$). Patients with type A personality traits preferred hobbies that enabled more socially active communication ($p = 0.039$) and had more hobbies ($p = 0.015$). On the other hand, women with breast cancer with low and moderate self-esteem did not prefer any hobby ($p = 0.034$) (Table 3).

In the analysis of the EORTC QOL-C30 quality of life scale of the patients, the mean score they received from the general health score sub-dimension was 67.64 ± 23.99. The mean of total scores from the functional scale sub-dimension was 59.22 ± 28.08 and the mean score of the symptom scale was 38.07 ± 24.23.

Table 4 shows the scores and analyses of the EORTC QOL-C30 quality of life scale subscales in the analysis performed according to breast surgery type, organ loss status, anti-cancer treatments, metastatic disease status, the presence of hobby, personality type, and self-esteem status. Only those who received active anti-cancer treatment had more intense nausea and vomiting ($p = 0.030$). The symptom scale score was higher in metastatic patients than in those without metastases ($p = 0.043$) and there was more intense weakness ($p = 0.031$) and loss of appetite ($p = 0.005$). In patients without a hobby, the mean value of the physical functions sub-dimension was lower ($p = 0.011$), and the symptom score was higher ($p = 0.003$); weakness ($p = 0.048$), pain (0.017), and shortness of breath (0.049) symptoms were more intense and they experienced more financial difficulties ($p = 0.001$). It was determined that patients with low-moderate self-esteem scores had lower scores in all sub-dimensions of the EORTC QOL-30 quality of life scale, whereas the symptom score was significantly higher. However, no significant difference was found regarding personality type (Table 4).

Analysis of the correlation of study variables with personality type, degree of self-esteem, and quality of life sub-dimensions is shown in Table 5. There was no correlation between personality type and self-esteem. Moreover, no correlation was found with other variables and quality of life sub-dimensions. No correlation was found between self-esteem and study variables. However, all other sub-dimensions of quality of life except the symptom scale were positively correlated with high self-esteem, while a negative correlation was found with the symptom score. In addition to these, it was found that there was a negative relationship between role function and metastatic disease status, negative between social function and systemic treatment status,

Table 1 Comparison of patients with breast cancer and control group in terms of demographic characteristics, personality type, and self-esteem status

Features	Group 1 (n = 154)	Group 2 (n = 78)	p value*
Age (year); n (%)			
< 60 year	105 (68)	56 (72)	0.104
≥ 60 year	49 (32)	22 (28)	
Educational status; n (%)			
Low education level	115 (75)	43 (55)	**0.003**
High level of education	39 (25)	35 (45)	
Occupational status; n (%)			
Housewife/retired	127 (83)	7 (9)	**0.000**
Active working	27 (17)	71 (91)	
Classification by occupation type; n (%)			
Has contact with foreign people	39 (25)	78 (100)	**0.000**
No contact with foreign people	113 (75)	0	
Marital status; n (%)			
Single	11 (7)	12 (15)	**0.004**
Divorced/deceased	39 (25)	7 (9)	
Married	104 (68)	59 (76)	
Marital status classification; n (%)			
No spouse/partner	50 (33)	19 (25)	0.243
Has a spouse/partner	104 (67)	59 (75)	
Classification for economic situation; n (%)			
Very low–low level	139 (90)	67 (86)	0.320
Mid–high level	15 (10)	11 (14)	
Hobby status; n (%)			
Absent	58 (38)	24 (31)	0.299
Present	96 (62)	54 (69)	
Hobby preferences; n (%)			
Crafts/painting	35 (23)	10 (13)	**0.018**
Travel/trip	29 (19)	26 (33)	
Reading/writing books	29 (19)	41 (53)	
Tracking/active sport	16 (10)	8 (10)	
Musical instrument	12 (8)	12 (15)	
Gardening	12 (8)	8 (10)	
Meditation/Yoga	2 (1)	18 (23)	
Dance	2 (1)	8 (10)	
Gastronomy	1 (1)	0 (0)	
Photography	0 (0)	14 (18)	
No hobby	58 (38)	24 (31)	
Hobby orientations; n (%)			
Absent	58 (38)	42 (54)	**0.011**
Individual time spending	38 (24)	12 (15)	
Social active communication	58 (38)	24 (31)	
Number of hobbies; n (%)			
Absent	58 (38)	24 (31)	**0.041**
Just a hobby	64 (42)	41 (53)	
At least two different hobbies	32 (20)	13 (16)	
Personality type; n (%)			
A type	106 (69)	45 (58)	0.093
B type	48 (31)	33 (42)	
Self-esteem degree; n (%)			
Low	1 (1)	0	**0.039**
Moderate	9 (6)	3 (4)	
High	144 (93)	75 (96)	
Total self-esteem score (median. minimum- maximum)	22 (4–40)	27 (14–40)	0.098

Table 2 Clinical characteristics of patients with breast cancer

Features	(n = 154)
Age at diagnosis; *n* (%)	
< 60 year	117 (76)
≥ 60 year	37 (24)
Total time spent with cancer diagnosis; *n* (%)	
In the first 1 year	24 (16)
2 to 5 years	69 (45)
6 to 10 years	36 (23)
> 11 years	25 (16)
Disease according to metastasis status; *n* (%)	
Non-metastatic disease	129 (84)
Metastatic disease	25 (16)
Breast surgery status; *n* (%)	
No breast surgery	10 (7)
Breast-conserving surgery	73 (47)
Radical mastectomy	71 (46)
Organ loss status; *n* (%)	
Present	65 (42)
Absent	89 (58)
Reconstructive surgery status; *n* (%)	
Present	10 (6)
Absent	144 (94)
Systemic anti-cancer treatment status; *n* (%)	
No anti-cancer treatment	32 (21)
Endocrine adjuvant therapy	66 (43)
Systemic anti-cancer therapy*	56 (46)

*It is an anti-cancer therapy that includes parenterally and orally administered chemotherapeutics and targeted drugs

positive between metastatic disease and symptom score, positive between hobby presence and physical function, and negative relationship between hobby presence and symptom score (Table 5).

The findings regarding the correlation of each symptom in the symptom scale with personality type, self-esteem, and study variables are shown in Table 6. Moreover, considering the high quality of life and low quality of life groups, there was no significant relationship between personality type and quality of life status ($r_{Spearman} = -0.005$, $p = 0.946$), while there was a mild but positive relationship between self-esteem and quality of life status ($r_{Spearman} = 0.190$, $p = 0.018$).

Variables that were considered significant for factors affecting self-esteem, quality of life and personality type in the univariate analysis were used as a model in the multivariate analysis. The odds ratios and also *confidence interval* for the regression analysis are shown in Table 7. As a result of multivariate logistic regression analysis, it was determined that the independent factors affecting high self-esteem were type A personality trait ($p = 0.046$), hobby orientation (social hobbies) ($p = 0.032$), and number of hobbies (acquiring many hobbies) ($p = 0.041$). A model was also created to determine independent factors affecting high quality of life and personality type. In these analyzes, it was determined that hobby orientation (social hobbies) and number of hobbies (acquiring many hobbies) were factors that had independent effects on quality of life ($p = 0.004$ and $p = 0.007$, respectively) and personality type ($p = 0.014$ and $p = 0.027$, respectively). It was determined that high symptom score ($p = 0.000$) had an independent effect on quality of life, while advanced age ($p = 0.015$) was found to be an independent factor affecting personality type (Table 7).

Discussion

This study showed that women with breast cancer with type A personality trait have more hobbies and more socially active hobbies than healthy women. Moreover, it was determined that those with type A personality traits had higher self-esteem scores. We found results showing that high self-esteem and hobbies lead to a better quality of life. The study is the first that we know of trying to determine the relationship between type A personality type and self-esteem in cancer patients.

The relationship between personality type and diseases has been a subject of curiosity for many years. The definition of personality and the more detailed definition of personality types over time have led to different results in studies on this subject.

Different personality subtype definitions and the scales used to determine them have evolved into different shapes over time. First of all, the Big Five Personality theory [17], developed by D.W. Fiske in 1949, was later expanded by other researchers such as Norman [18], Smith [19], Goldberg [20], and McCrae and Costa [21] and became an important subject of research. Another personality classification theory was developed by Eysenck in 1967 [22] and called the Super Three Factor theory. Subsequent research has progressed by focusing on common or different points between these two theories. Both the Big 5 factor theory and the super 3-factor hypothesis have emphasized the idea that people's personality types should be classified in more detail and that individuals may show some behavioral characteristics other than basic personality traits in the face of momentary situations.

Table 3 Comparison of demographic and clinical characteristics of breast cancer patients according to personality type and self-esteem level

Features	Personality type			Sel-esteem degree			
	A Type	B Type	p value*	Low Degree	Moderate Degree	High Degree	p value*
(n)	106	48		1	9	144	
Age (year); n (%)							
<60 year	67 (72)	38 (79)	0.062	1 (100)	0	38 (26)	0.268
≥60 year	39 (28)	10 (21)		0	9 (100)	106 (74)	
Age at diagnosis; n (%)							
<60 year	77 (73)	40 (83)	0.221	1 (100)	9 (100)	34 (24)	**0.041**
≥60 year	29 (27)	8 (17)		0	0	110 (76)	
Educational status; n (%)							
Primary school graduate/literate	47 (44)	24 (50)	0.834	1 (100)	3 (33)	67 (47)	0.092
Secondary school graduate	8 (8)	2 (4)		0	0	10 (7)	
High school graduate	24 (23)	10 (21)		0	6 (67)	28 (19)	
College/university graduate	27 (25)	12 (25)		0	0	39 (27)	
Classification by education level; n (%)							
Low education level	79 (75)	36 (75)	0.950	1 (100)	9 (100) 0	105 (73)	0.163
High level of education	27 (25)	12 (25)		0		39 (27)	
Occupational status; n (%)							
Housewife/retired	87 (82)	40 (83)	0.849	1 (100)	6 (67)	120 (83)	0.398
Active working	19 (18)	8 (17)		0	3 (33)	24 (17)	
Communication status at the work; n (%)							
Has contact with foreign people	27 (26)	12 (25)	0.950	0	3 (33)	36 (25)	0.722
No contact with foreign people	79 (74)	36 (75)		1 (100)	6 (77)	108 (75)	
Marital status; n (%)							
Single	8 (8)	3 (6)	0.839	0	3 (33)	8 (6)	**0.021**
Divorced/deceased	28 (26)	11 (23)		1 (100)	3 (33)	100 (69)	
Married	70 (66)	34 (71)		0	3 (33)	36 (25)	
Marital status classification; n (%)							
No spouse/partner	35 (33)	16 (33)	0.969	0	6 (67)	45 (31)	0.071
Has a spouse/partner	71 (67)	32 (67)		1 (100)	3 (33)	99 (69)	
Classification for economic situation; n (%)							
Very low—low level	94 (89)	45 (94)	0.394	1 (100)	8 (89)	130 (90)	0.938
Mid–high level	12 (11)	3 (6)		0	1 (11)	14 (10)	
Hobby status; n (%)							
Absent	32 (30)	26 (54)	**0.041**	1 (100)	9 (100)	48 (40)	**0.022**
Present	74 (70)	22 (46)		0	0	96 (60)	
Hobby orientations; n (%)							
Absent	70 (66)	26 (54)	**0.039**	1 (100)	9 (100)	48 (33)	**0.034**
Individual time spending	7 (7)	19 (40)		0 (0)	0 (0)	58 (40)	
Social active communication	29 (27)	3 (6)		0 (0)	0 (0)	38 (27)	
Hobby preferences; n (%)							
Crafts/painting	6 (6)	29 (60)	**0.047**	0	0	35 (24)	**0.048**
Travel/trip	26 (24)	3 (6)		0	0	29 (20)	
Reading/writing books	9 (8)	20 (42)		0	0	29 (20)	
Tracking/active sport	11 (10)	5 (10)		0	0	16 (11)	
Musical instrument	4 (4)	8 (17)		0	0	12 (8)	
Gardening	4 (4)	8 (17)		0	0	12 (8)	
Meditation/Yoga	0 (0)	2 (4)		0	0	2 (1)	
Dance	2 (2)	0 (0)		0	0	2 (1)	

Table 3 (continued)

Features	Personality type			Sel-esteem degree			
	A Type	B Type	p value*	Low Degree	Moderate Degree	High Degree	p value*
Gastronomy	0 (0)	1 (2)		0	0	1 (1)	
Photography	0 (0)	0 (0)		0	0	0	
No hobby	70 (66)	26 (54)		1 (100)	9 (100)	48 (33)	
Number of hobbies; n (%)							
Absent	32 (30)	26 (54)	**0.015**	1 (100)	9 (100)	48 (33)	0.274
Just a hobby	44 (41)	20 (42)		0 (0)	0 (0)	64 (45)	
At least two different hobbies	30 (29)	2 (4)		0 (0)	0 (0)	32 (22)	
Total time spent with cancer diagnosis; n (%)							
In the first 1 year	30 (28)	14 (29)	0.741	0	0	44 (31)	0.450
2 to 5 years	55 (52)	21 (44)		1 (100)	6 (67)	69 (48)	
6 to 10 years	18 (17)	11 (23)		0	3 (33)	26 (18)	
> 11 years	3 (3)	2 (4)		0	0	5 (3)	
Stage (TNM); n (%)							
Stage 1	20 (19)	4 (8)	0.250	0	2 (22)	22 (15)	0.623
Stage 2	44 (42)	27 (56)		0	5 (56)	66 (46)	
Stage 3	26 (25)	10 (21)		1 (100)	1 (11)	34 (24)	
Stage 4	16 (14)	7 (15)		0	1 (11)	22 (15)	
Disease according to metastasis status; n (%)							
Non-metastatic disease	89 (84)	40 (83)	0.922	1 (100)	8 (89)	120 (83)	0.824
Metastatic disease	17 (16)	8 (17)		0	1 (11)	24 (17)	
Breast surgery status; n (%)							
No breast surgery	6 (6)	4 (8)	0.737	0	0	10 (7)	0.748
Breast-conserving surgery	52 (49)	21 (44)		0	5 (56)	68 (47)	
Radical mastectomy	48 (45)	23 (48)		1 (100)	4 (44)	66 (46)	
Organ loss status; n (%)							
Present	51 (48)	24 (50)	0.828	1 (100)	5 (56)	69 (48)	0.533
Absent	55 (51)	24 (50)		0	4 (44)	75 (52)	
Reconstructive surgery status; n (%)							
Present	5 (5)	5 (10)	0.287	0	0	10 (7)	0.690
Absent	101 (95)	43 (90)		1 (100)	9 (100)	134 (93)	
Systemic anti-cancer treatment status; n (%)							
No anti-cancer treatment	18 (17)	14 (29)	0.219	0	1 (11)	31 (22)	0.458
Endocrine adjuvant therapy	47 (44)	19 (40)		1 (100)	6 (67)	59 (41)	
Systemic anti-cancer therapy**	41 (39)	15 (31)		0	2 (22)	54 (37)	
Self-esteem degree; n (%)							
Low	0	1 (2)	0.280	–	–	–	–
Moderate	7 (7)	2 (4)					
High	99 (93)	45 (94)					
Total self-esteem score (median. minimum- maximum)	0.82 (1–4)	0.68 (1–4)	**0.033**	–	–	–	–
Personality type; n (%)							
A type	–	–	–	0	7 (78)	99 (69)	0.280
B type				1 (100)	2 (22)	45 (31)	

TNM tumor, *Node* metastasis

*A p value less than 0.05 was considered statistically significant and shown in bold font

**It is an anti-cancer therapy that includes parenterally and orally administered chemotherapeutics and targeted drugs

Table 4 Comparison of demographic and clinical characteristics in terms of quality of life scores in patients with breast cancer

Features	GHS	Functional scales					TSS	Symptom scale								
		PF	RF	EF	CF	SF		W	N/V	Pain	SB	I	Loss of appetite	C	D	EB
All patients	66.66 (0–100)	73.33 (7–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–90)	6 (3–12)	2 (2–8)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
Status of breast surgery																
Absent	70.83 (42–100)	80 (60–93)	83.33 (50–100)	75 (33–100)	83.33 (67–100)	100 (16–100)	21.79 (3–36)	7 (3–9)	2 (2–4)	3 (2–7)	1 (1–3)	2 (1–3)	2 (1–3)	1 (1–3)	1 (1–3)	1.5 (1–3)
BCS	66.66 (0–100)	73.33 (7–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–72)	6 (3–12)	2 (2–6)	4 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
TM	75 (8–100)	73.33 (0–100)	83.33 (0–100)	83.33 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (3–90)	6 (3–12)	2 (2–8)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
p value*	0.952	0.613	0.790	0.235	0.141	0.882	0.929	0.909	0.169	0.573	0.296	0.876	0.404	0.884	0.924	0.861
Presence of organ loss																
Absent	66.66 (0–100)	73.33 (7–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–72)	6 (3–12)	2 (2–6)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
Present	75 (8–100)	73.33 (13–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (3–90)	6 (3–12)	2 (2–8,)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
p value*	0.858	0.323	0.594	0.197	0.385	0.639	0.859	0.980	0.151	0.766	0.691	0.855	0.195	0.755	0.911	0.703
Treatment status																
Absent	79.16 (8–100)	79.16 (13–100)	91.66 (0–100)	75 (0–100)	83.33 (0–100)	100 (0–100)	17.94 (3–82)	6 (3–12)	2 (2–6)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
Adjuvant endocrine	66.66 (0–100)	73.33 (13–100)	83.33 (0–100)	83.33 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–72)	6 (3–12)	2 (2–6)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–3)	1 (1–4)	1 (1–4)	2 (1–4)
Active systemic treatment**	75 (8–100)	73.33 (8–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.32 (0–100)	23.07 (3–90)	7 (3–12)	2 (2–8)	3.50 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
p value*	0.718	0.894	0.191	0.613	0.474	0.111	0.267	0.342	0.030	0.386	0.277	0.934	0.063	0.839	0.866	0.722
Status of metastatic disease																
Non-metastatic	66.66 (0–100)	73.33 (13–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–90)	6 (3–12)	2 (2–8)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
Metastatic	66.66 (8–100)	73.33 (7–93)	83.33 (0–100)	75 (0–100)	83.33 (33–100)	66.66 (0–100)	35.89 (3–69)	7 (3–12)	2 (2–7)	3 (2–8)	1 (1–3)	2 (1–4)	2 (1–4)	1 (1–3)	1 (1–4)	2 (1–4)
p value*	0.104	0.247	0.018	0.793	0.091	0.137	0.043	0.031	0.084	0.236	0.954	0.753	0.005	0.325	0.356	0.504
Hobby status																
Absent	66.66 (17–100)	66.66 (7–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	26.92 (3–82)	6 (3–12)	2 (2–7)	4 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)

Table 4 (continued)

Features	GHS	Functional scales					TSS	Symptom scale								
		PF	RF	EF	CF	SF		W	N/V	Pain	SB	I	Loss of appetite	C	D	EB
Present	75 (0–100)	80 (13–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	17.94 (0–90)	6 (3–12)	2 (2–8)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)
p value*	0.353	0.011	0.517	0.118	0.707	0.298	0.003	0.048	0.266	0.017	0.049	0.114	0.319	0.264	0.163	0.001
Personality type																
Type A	66.66 (0–100)	73.33 (7–100)	83.33 (0–100)	75 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–90)	6 (3–12)	2 (2–8)	3 (2–8)	1 (1–4)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
Type B	75 (8–100)	73.33 (13–100)	83.33 (0–100)	79.16 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (3–82)	6 (3–12)	2 (2–6)	4 (2–8)	1 (1–3)	2 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)
p value*	0.564	0.895	0.832	0.382	0.445	0.832	0.888	0.875	0.285	0.279	0.610	0.708	0.127	0.282	0.739	0.581
Self-esteem degree																
Low and medium	50 (8–92)	53.33 (20–100)	66.66 (33–100)	33.33 (0–75)	66.66 (0–83)	66.66 (0–100)	43.58 (3–59)	8 (4–10)	3 (2–6)	4 (2–6)	2 (1–3)	2 (1–4)	2 (1–4)	2 (1–3)	1 (1–4)	3 (1–4)
High	75 (0–100)	73.33 (7–100)	83.33 (0–100)	83.33 (0–100)	83.33 (0–100)	83.33 (0–100)	20.51 (0–90)	6 (3–12)	2 (2–8)	3 (2–8)	1 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	1 (1–4)	2 (1–4)
p value*	**0.011**	**0.01**	**0.049**	**0.000**	**0.001**	**0.018**	**0,008**	**0.015**	**0.007**	**0.043**	**0.007**	0.258	0.053	0.279	0.603	**0.033**

GHS general health status, *PF* physical function, *RF* role function, *EF* emotional function, *CF* cognitive function, *SF* social function, *TSS* total symptom score, *W* weakness, *N/V* nausea/vomiting, *SB* shortness of breath, *I* insomnia, *C* constipation, *D* diarrhea, *EB* economic burden, *BCS* breast-conserving surgery, *TM* total mastectomy

* A *p* value less than 0.05 was considered statistically significant and shown in bold font

**It is an anti-cancer therapy that includes parenterally and orally administered chemotherapeutics and targeted drugs

Table 5 Correlation of demographic and clinical characteristics with personality type, self-esteem status, and quality of life scores in women with breast cancer

Variable	Value	Personality type	Self-esteem degree	GHS	FF	RF	EF	CF	SF	SS
Age	r	−0.003*	0.023	0.102	−0.140	0.036	0.093	0.115	0.089	−0.031
	p	0.972*	0.779	0.208	0.083	0.656	0.251	0.155	0.272	0.704
Age at diagnosis	r	−0.011	0.044	0.101	−0.113	0.047	0.095	0.137	0.081	−0.007
	p	0.890	0.591	0.213	0.164	0.566	0.242	0.089	0.317	0.927
Time elapsed after cancer diagnosis	r	0.040	−0.133	0.18	−0.052	−0.016	0.033	−0.071	0.077	−0.035
	p	0.624	0.101	0.829	0.525	0.843	0.689	0.381	0.342	0.670
Educational status	r	−0.005	0.153	0.003	0.148	−0.012	−0.091	−0.097	−0.072	−0.112
	p	0.951	0.057	0.972	0.067	0.886	0.264	0.229	0.372	0.165
Active work life	r	0.005	0.027	−0.036	−0.043	0.072	0.130	0.042	0.034	−0.013
	p	0.951	0.738	0.662	0.597	0.378	0.109	0.608	0.671	0.868
Marital status	r	−0.003	0.148	0.039	0.041	0.087	0.068	0.003	0.008	−0.044
	p	0.970	0.066	0.635	0.611	0.281	0.402	0.972	0.922	0.588
Economic level	r	−0.079	−0.002	−0.145	0.000	−0.090	−0.055	−0.048	−0.055	−0.045
	p	0.329	0.983	0.072	0.995	0.267	0.501	0.554	0.501	0.582
Hobby status	r	−0.113	0.123	0.07	**0.205**	0.052	0.084	0.030	0.084	**−0.236**
	p	0.161	0.129	50.354	**0.011**	0.518	0.300	0.709	0.300	**0.003**
Metastatic disease state	r	0.008	0.045	−0.131	−0.094	**−0.191**	−0.021	0.137	−0.120	**0.164**
	p	0.923	0.579	0.104	0.249	**0.018**	0.794	0.091	0.137	**0.043**
Breast surgery type	r	−0.009	0.038	−0.016	0.052	0.055	−0.123	−0.121	0.028	−0.016
	p	0.910	0.639	0.847	0.521	0.499	0.127	0.134	0.729	0.842
Organ loss status	r	−0.017	0.061	−0.014	0.080	0.043	−0.104	−0.070	0.038	−0.014
	p	0.830	0.453	0.859	0.325	0.595	0.198	0.387	0.640	0.860
Breast reconstruction status	r	0.107	0.069	0.006	0.106	0.09	0.060	0.064	0.077	−0.067
	p	0.186	0.392	0.938	0.190	80.228	0.458	0.432	0.343	0.411
Systemic treatment status	r	0.072	−0.090	0.000	−0.038	0.140	0.042	−0.063	**−0.161**	−0.130
	p	0.378	0.265	1.000	0.638	0.082	0.607	0.439	**0.046**	0.108
Self-esteem degree	r	0.004	–	**0.207**	**0.208**	**0.161**	**0.287**	**0.281**	**0.193**	**−0.216**
	p	0.960		**0.010**	**0.009**	**0.046**	**0.000**	**0.000**	**0.016**	**0.007**
Personality type	r	–	0.004	−0.047	−0.011	−0.017	0.071	−0.062	−0.017	0.011
	p		0.960	0.565	0.896	0.833	0.383	0.447	0.833	0.889

GHS general health status, *PF* physical function, *RF* role function, *EF* emotional function, *CF* cognitive function, *SF* social function, *SS* total symptom score

*In the entire table, the values in each row show the Spearman's correlation coefficient (r) at the top and the p value at the bottom. A p value less than 0.05 was considered statistically significant and shown in bold font. The correlation coefficient of the significant p value is also indicated in bold

Table 6 Correlation of demographic and clinical characteristics as well as personality type and self-esteem status with symptoms in women with breast cancer

Variable		*W*	N/V	Pain	SB	*I*	Loss of appetite	*C*	*D*	EB
Age	r	**0.314***	0.245	**0.351**	0.198	**0.245**	**0.211**	0.218	0.240	**−0.198**
	p	**0.031***	0.218	**0.034**	0.452	**0.048**	**0.041**	0.375	0.227	**0.018**
Age at diagnosis	r	0.125	0.377	0.414	0.245	−0.346	0.345	0.227	0.337	0.198
	p	0.346	0.098	0.108	0.179	0.208	0.209	0.208	0.296	0.269
Time elapsed after cancer diagnosis	r	**0.345**	0.245	**0.293**	0.198	**0.211**	**0.319**	0.315	0.145	**−0.183**
	p	**0.022**	0.176	**0.018**	0.480	**0.027**	**0.031**	0.179	0.379	**0.021**
Educational status	r	0.245	0.229	0.176	0.205	0.256	0.345	0.109	0.256	0.128
	p	0.148	0.307	0.402	0.196	0.137	0.297	0.096	0.648	0.506
Active work life	r	−0.245	0.196	0.212	0.215	−0.245	0.304	0.256	0.204	−0.208
	p	0.396	0.376	0.486	0.337	0.069	0.196	0.509	0.317	0.169
Marital status	r	0.268	0.109	0.212	0.376	0.215	0.227	0.345	0.229	−0.345
	p	0.503	0.216	0.345	0.408	0.196	0.183	0.226	0.105	0.102
Economic level	r	0.102	0.307	0.107	0.245	0.113	0.346	0.207	0.205	0.455
	p	0.501	0.269	0.115	0.304	0.245	0.368	0.197	0.334	0.066
Hobby status	r	**−0.251**	0.345	0.201	0.196	**−0.245**	**−0.279**	**−0.179**	0.304	**0.263**
	p	**0.014**	0.209	0.114	0.345	**0.024**	**0.036**	**0.031**	0.243	**0.032**
Metastatic disease state	r	**0.424**	**0.378**	**0.389**	0.345	**0.215**	**0.245**	0.108	0.196	**0.301**
	p	**0.031**	**0.011**	**0.017**	0.066	**0.044**	**0.039**	0.345	0.318	**0.046**
Breast surgery type	r	0.201	0.102	0.205	0.307	0.117	0.189	0.205	0.219	0.227
	p	0.145	0.409	0.193	0.245	0.349	0.396	0.388	0.509	0.396
Organ loss status	r	0.307	0.296	−0.405	0.302	0.356	0.203	0.198	0.245	0.205
	p	0.133	0.117	0.096	0.245	0.104	0.415	0.516	0.196	0.328
Breast reconstruction status	r	0.245	0.356	0.291	0.198	0.245	0.386	0.379	0.137	0.269
	p	0.109	0.237	0.304	0.274	0.106	0.334	0.480	0.313	0.412
Systemic treatment status	r	**0.404**	**0.338**	**0.109**	−0.269	**0.315**	**0.332**	0.463	0.398	**0.342**
	p	**0.011**	**0.009**	**0.014**	0.095	**0.014**	**0.031**	0.074	0.087	**0.043**
Self-esteem degree	r	**0.196**	**0.217**	**0.163**	**0.217**	0.507	0.187	0.337	0.506	**0.173**
	p	**0.015**	**0.007**	**0.043**	**0.007**	0.237	0.403	0.174	0.289	**0.032**
Personality type	r	**0.545**	0.452	0.345	0.127	**0.439**	0.224	0.245	0.367	**0.513**
	p	**0.004**	0.112	0.108	0.368	**0.007**	0.416	0.204	0.209	**0.017**

W weakness, *N/V* nausea/vomiting, *SB* shortness of breath, *I* insomnia, *C* constipation, *D* diarrhea, *EB* economic burden

*In the entire table, the values in each row show the Spearman's correlation coefficient (r) at the top and the *p* value at the bottom. A *p* value less than 0.05 was considered statistically significant and shown in bold font. The correlation coefficient of the significant *p* value is also indicated in bold

The concept of type A personality and type B personality, independent of the big 5 personality trait theory, was first put forward by two cardiologists as a hypothesis based on observation [23]. Two cardiologists, Friedman and Rosenman, concluded that heart patients are often anxious with the knowledge that most of the chairs in their office's living room have been torn from the front [23, 24]. In this way, these characteristics of people who are overly competitive, dedicated, impatient, and highly sensitive to time were defined as type A behavior in 1976 [23–25]. They determined that type B behavior traits were completely opposite to type A personality.

Stress has been investigated for many years as an important risk factor for cancer development as well as cancer progression, and is also thought to be a negative condition closely related to poor prognosis [26, 27]. In a 16-year follow-up of 13,768 people for cancer risk, type A personality structure was not found to be associated with cancer risk regardless of cancer site [27]. In our study, we could not find any difference in personality type between women diagnosed with breast cancer and healthy women with similar age characteristics. However, we could not establish a relationship between personality type and cancer because the occupational characteristics, as well as economic and educational status of the healthy individuals in the control group, were significantly different from the patient group, and the distribution of the variables was unequal.

Stress has been investigated for many years as an important risk factor for cancer development and progression and is thought to be an adverse condition closely associated with poor prognosis [26]. Patients diagnosed with lung cancer often exhibit high levels of extraversion and low levels of neurotic behavior. Thus, there may be the concept of a "cancer-prone" personality type, and stress-related factors may

Table 7 Determining the independent factors affecting self-esteem, quality of life, and personality type, respectively, by multivariate logistic regression analysis

Self-esteem[a]

Step 1	p value*	OR	95% CI for OR Lower	95% CI for OR Upper
Age (≥60 year)	0.668	0.466	0.014	15.343
Age at diagnosis (≥60 year)	0.427	4.551	0.108	191.377
Stage (Metastatic)	0.106	0.067	0.003	1.777
Total organ loss (Present)	0.538	0.488	0.05	4.771
Systemic treatment (Chemotherapy and Targeted)	0.235	11.216	0.203	665.97
Occupational status (actively working)	0.103	0.143	0.014	1.485
Hobby Presence (Yes)	0.437	0.386	0.035	4.245
Hobby orientations (Social hobbies)	**0.032**	**4.131**	**1.248**	**9.189**
Number of hobbies (at least 2)	**0.041**	**3.256**	**1.745**	**6.483**
Quality of life (High)	0.198	5.023	0.43	58.749
Symptom status (Intense)	0.099	0.082	0.004	1.603
Personality type (Type A)	**0.034**	**1.035**	**1.124**	**13.686**

Quality of life[b]

Step 1	p value	OR	95% CI for OR Lower	95% CI for OR Upper
Age (≥60 year)	0.409	1.894	0.416	8.626
Age at diagnosis (≥60 year)	0.253	0.401	0.084	1.919
Stage (Metastatic)	0.117	3.261	0.745	14.272
Total organ loss (Present)	0.946	1.031	0.433	2.453
Systemic treatment (Chemotherapy and Targeted)	0.502	0.658	0.193	2.236
Occupational status (actively working)	0.853	1.100	0.401	3.016
Hobby Presence (Yes)	0.872	0.932	0.397	2.189
Hobby orientations (Social hobbies)	**0.004**	**4.246**	**1.897**	**8.336**
Number of hobbies (at least 2)	**0.007**	**3.678**	**2.436**	**9.896**
Economic status (Low)	0.915	1.072	0.295	3.895
Symptom status (Intense)	**0.000**	**0.229**	**0.106**	**0.497**
Self-esteem degree (High)	0.058	5.482	0.945	31.803
Personality type (Type A)	0.953	0.976	0.432	2.202

Personality type[c]

Step 1	p value	OR	95% CI for OR Lower	95% CI for OR Upper
Age (≥60 year)	**0.015**	**8.924**	**1.536**	**51.855**
Age at diagnosis (≥60 year)	0.701	0.686	0.101	4.680
Stage (Metastatic)	0.129	19.535	0.420	909.502
Total organ loss (Present)	0.991	1.014	0.084	12.204
Systemic treatment (Chemotherapy and Targeted)	0.157	0.355	0.085	1.488
Occupational status (actively working)	0.676	0.711	0.143	3.528
Hobby Presence (Yes)	0.284	0.552	0.187	1.635
Hobby orientations (Social hobbies)	**0.014**	**6.448**	**3.256**	**11.457**
Number of hobbies (at least 2)	**0.027**	**5.107**	**2.478**	**8.736**
Symptom status (Intense)	0.762	0.799	0.186	3.422
Quality of life (High)	0.445	4.049	0.112	146.078
Self-esteem degree (High)	0.866	0.838	0.107	6.537

OR Odds ratio, *CI* confidence interval

The variables in the table were included in the model because they were found to be significant in the univariate analysis. The variables that were not significant in the univariate analysis

* A p value less than 0.05 was considered statistically significant and shown in bold font

[a] While the probability of predicting high self-esteem was 93.5% at the beginning, this rate increased to 95.5% with the model created. The p value for the Omnibus test for the adequacy of the model was calculated as 0.05. The Nagelkerke R^2 value was 0.559

[b] While the probability of predicting high quality of life was 55.8% at the beginning, this rate increased to 72.1% with the model created. The p value for the Omnibus test for the adequacy of the model was calculated as 0.027. The Nagelkerke R^2 value was 0.246

[c] While the probability of predicting personality type was 68.8% at the beginning, this rate increased to 77.3% with the model created. The p value for the Omnibus test for the adequacy of the model was calculated as 0.730. The Nagelkerke R^2 value was 0.293

play an important role in this [26]. One study investigated the relationship between known histopathological indicators and predicted prognosis in 59 patients with cutaneous malignant melanoma and a comprehensive range of physical risk, demographic, psychosocial, and situational variables [28]. In conclusion, it has been reported that a certain group of patients is included in a 'Type C' personality trait, and the role of behavioral and psychological factors in prognosis is more prominent in patients under 55 years of age. Following this work, type C personality has been defined using concepts derived from personality types A and B created for research on the relationship between stress and cardiovascular disease, assuming theoretical constructs in psychosocial research are lacking [29].

It has been observed that there is no significant relationship between personality type and cancer progression or risk of developing cancer in prospective well-designed studies involving large numbers of patients, in which the big 5-factor personality types are at the forefront [30]. Indeed, in a meta-analysis of 6 prospective cohort studies involving 42,843 male and female individuals without a diagnosis of cancer, it was reported that there was no significant relationship between cancer frequency and cancer-related death and personality type [31].

In our study, we could not establish a significant relationship between personality type and metastatic disease status in women diagnosed with breast cancer. This situation can be explained by the relatively small number of patients in the study group and the inadequacy of the number in the classification made considering the metastatic situation, as well as the unequal distribution in terms of disease stage.

Previous research has reported that personality can have a significant impact on quality of life [32–34]. In addition to the close association of type A personality structure with stress, cancer and cardiovascular diseases, similar studies have subsequently focused on type D personality with the expansion of personality types. Patients with cancer and cardiovascular disease with type D personality traits characterized by negative activity and social inhibition have been shown to have worse health status and impaired quality of life [32–34]. Indeed, in a meta-analysis of 6 cohort studies and 6 cross-sectional studies involving female patients with non-metastatic breast cancer, personality type was reported to have a low-to-moderate effect on quality of life [35]. In one of the studies on the super 3-factor personality model proposed by Eysenck, a negative correlation was found between neurotic personality score and quality of life subdomain scores in women with breast cancer [36]. In the same study, a positive and significant relationship was reported between neurotic personality score and anxiety, depression, and hopelessness scores [36]. A direct study examining the quality of life of patients diagnosed with cancer with type A personality traits could not be found in the literature. In

our study, no direct correlation or relationship was found between personality type and quality of life.

It has been reported that people's reactions when faced with stress may differ according to their personality traits, and there may be changes in self-esteem in this process [37]. Indeed, psychosocial adjustment to cancer can be defined as a process in which people try to cope with their pain, solve certain problems, and control the events triggered by the disease [37]. It is stated that individuals with low self-esteem do not have positive feelings toward themselves. Lack of positive feelings for themselves seems to be a highly influential factor in individuals' relationships with others and their performance toward future goals [36, 37].

Individuals diagnosed with cancer may experience problems such as changes in their physical appearance, decrease in routine social activities, social stigma, suffering from long-term side effects of treatments, fear of cancer recurrence, and difficulty in adapting to cancer treatment due to cancer treatment. Especially in female patients with breast and gynecological cancer, changes in self-esteem due to body image perceptions are among the psychosocial problems they may experience while adapting to this new life condition [36, 37]. In fact, self-esteem, which is often seen as responsible for developing positive attitudes about the abilities and values that individuals have, is also self-efficacy. It is stated that the self-esteem of individuals is related to their level of self-confidence and may also be affected by their emotional state [37].

Self-esteem was defined by Rosenberg in 1965 as an indicator of tolerance, acceptance, and self-satisfaction, and was reported to result from an emotional evaluation of the qualities an individual attributes to himself. In later definitions, it was emphasized that self-esteem stems from individuals' self-perceptions in various areas of life and the importance they attach to these areas [additional approach] and that it can vary according to the individual's ideals about life [13, 14, 38].

It has been shown that self-esteem increases in parallel with the psychosocial processes that individuals experience over time when they are diagnosed with cancer. In a study conducted with a total of 156 patients (51.9% men), 19.9% of whom were diagnosed with breast cancer, who received chemotherapy in different types of cancer, it was stated that 70.5% of the participants had high self-esteem. In the same study, the rate of patients with moderate self-esteem was 28.2%, and the rate of patients with low self-esteem was 1.3%. Moreover, in this study, it was reported that no significant relationship was found between study variables and self-esteem [38]. In a study in which 30% of all patients were diagnosed with breast cancer and 88.8% of patients received chemotherapy, it was reported that 11.2% of patients had low self-esteem but no patients with high self-esteem [39]. In our study, we

found that 93% of 154 patients diagnosed with breast cancer had high self-esteem. We determined that the presence of metastases did not make a significant difference in the degree of self-esteem. On the other hand, in a study that included 953 chemotherapy patients whose cancer types and stages were not specified, age, gender, marital status, family members living together, education level, employment status, income, cancer stage, chemotherapy cycle, pain, anxiety, depression, nausea, vomiting, anemia, hair loss, skin and nail changes, physical health, psychological health, social relationships, and general quality of life have been shown to affect self-esteem ($p < 0.05$ for all listed variables) [40]. In a Korean study, a total of 214 patients with stage I-III breast cancer reported that self-esteem was directly affected by perceived health status, religious beliefs, economic status, family support, and fatigue [41]. Although the scales used and the study target were different, we found that self-esteem did not show a significant relationship with all demographic and clinical characteristics, except for quality of life and symptom status analyses. We found that the presence of advanced age at the time of diagnosis directly interacted with high self-esteem in the regression analysis performed only according to the model created.

In particular, low-to-moderate self-esteem has been associated not only with psychological problems such as anxiety and depression but also with the high frequency and intensity of physical symptoms [40, 41]. A negative correlation between emotional stress and self-esteem was reported in a total of 104 women diagnosed with early-stage breast cancer who continued adjuvant therapy with tamoxifen or an aromatase inhibitor [42].

In our study, we found a significant relationship between the degree of self-esteem and the frequency and intensity of symptoms. We found that women with breast cancer with high self-esteem scores experienced symptoms less frequently.

Studies have shown that individuals diagnosed with cancer can adapt to cancer with the coping methods they have developed in this process. It has been reported that there is a relationship between these coping methods and self-esteem levels [42]. Mingorance et al. emphasized that there is an important relationship between the development of adaptive adaptation methods such as positive reframing, use of emotional support, active coping, acceptance and planning in the post-diagnosis period in breast cancer patients and high self-esteem [43].

In a cohort of 2754 male and female adults, the possible association of individuals' reported social relationships and activities with death over the next 9 to 12 years was examined, and it was reported that men who reported higher levels of social relationships or activities were significantly less likely to die during follow-up. It was noted that this result showed a similar trend for women, but did not reach statistical significance if age and other risk factors were adjusted [44].

It has been reported that patients with hobbies live longer than those without hobbies, and the risk of death decreases as the number of hobbies increases after adjustments for age, disease stage, and treatability. Hobbies such as painting, composing haiku poems, dancing, and keeping the garden beautiful can give patients vitality and reduce stress associated with the disease as they improve quality of life [45]. In addition, networks established through hobbies can reduce feelings of loneliness and isolation by providing opportunities for social contact. They suggested that for a leisure activity or relationship to have beneficial effects, the individual must make more active efforts and involve some contact with other people [43].

In our study, we found that self-esteem increased in women who were diagnosed with breast cancer and took up hobbies, and this had a significant effect on their quality of life. We conclude that hobbies that provide socially active communication not only independently determine the independent effect on self-esteem and quality of life, but also the type A personality trait. Similarly, we found that type A personality trait structure was associated with a greater number of hobby preferences. Our findings regarding self-esteem and quality of life were consistent with the literature. The conclusion we reached regarding personality type was the only finding in the literature that could show a relationship on this subject. Here, we concluded that type A personality trait, which exhibits an active, restless, and hasty behavior pattern, may be effective in turning to hobbies that provide more active and social communication. In addition, although there was no difference between women diagnosed with breast cancer and healthy women in terms of the presence of hobbies and personality type, the fact that the patients turned to hobbies that involve more socially active communication compared to healthy controls suggested that they may have adopted hobbies suitable for their personalities. Although the control group was younger than the patient group, it was concluded that they might have turned to hobbies where they spent their individual time because they worked more actively.

In our study, we found that the personality type of women diagnosed with breast cancer had no effect on self-esteem and quality of life. However, we have also shown that there is a significant relationship between self-esteem and quality of life. The most important conclusion after the research was that women diagnosed with breast cancer took up a hobby as a way of coping with cancer and stress. We found that this trend positively affects self-esteem and also significantly improves quality of life.

We think that our results may be controversial as our study is limited in some points. The first reason limiting

the study is the relatively low number of participants in both the study group and the control group. This limited situation is due to the fact that the study was conducted during different fluctuation periods of the pandemic. The fact that the healthy women in the control group were demographically incompatible with the study group is another limiting factor. The main reason for this is the limited reach of healthy volunteers during different fluctuations in the pandemic process due to both the symptoms associated with COVID-19, the limitations in life, and the decrease in face-to-face meeting opportunities.

The second important limitation of the study was the inclusion of both metastatic and non-metastatic patients, considering that the heterogeneity in clinical and psychosocial characteristics of breast cancer may differ in personality types.

The fact that the scale we used to determine the personality type does not allow the elaboration of personality traits may be another factor limiting the study. However, we thought that a detailed classification of personality types with different scales would not provide the necessary sufficiency for the number of patients. In addition, since patients receiving cancer treatment were selected as the target population, we hypothesized that difficulties in distinguishing whether some personality traits change after cancer diagnosis and during treatment may affect the outcome of the study. As a matter of fact, it will be very difficult to comment on both C type and D type personality structures and whether some personality traits in the five major personality type models are acquired after the diagnosis or during the treatment process. For this reason, we found it appropriate to determine a more basic personality type and to associate personality type with more stress.

In conclusion, we found that personality type did not significantly affect self-esteem and quality of life in women diagnosed with breast cancer. Here, we believe that determining whether there is a change in the personality traits of individuals after the diagnosis of cancer can be a very important emphasis. Considering high self-esteem as a coping method, it can be predicted that women diagnosed with cancer may experience an evolution process in terms of their psychological, social, and personality traits in terms of adapting to life with cancer. The significant impact of self-esteem on quality of life may be another important indicator of adjustment to living with cancer. With all these considerations, we concluded that this study should be conducted in a way that includes more participants, examines social and traditional perspectives in different areas of life, and examines the possible relationship between personality type and cancer separately in terms of social support in terms of individual characteristics of cancer patients.

Declarations

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