Original Article

Kinesiophobia in Breast Cancer Survivors and its Relationship with Quality of Life, Comorbidity and Other Clinical Parameters

Meme Kanseri Hastalarında Kinezyofobinin Hayat Kalitesi, Komorbidite ve Diğer Klinik Özellikler ile İlişkisi

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ABSTRACT

Objectives: This cross-sectional study aims to determine the frequency of kinesiophobia in breast cancer survivors and evaluate its relationship with mainly quality of life and comorbidities, also fatigue, lymphedema, and depression.

Material Methods: This study included 54 women with breast cancer who were followed in remission in Aydın Atatürk State Hospital Medical Oncology Clinic between November-December 2020. Clinicopathological characteristics of the patients were recorded. Kinesiophobia was assessed using the Turkish version of Tampa Scale for Kinesiophobia (TSK). Lymphedema was evaluated with bilateral upper extremity measurements. Depressive status and quality of life were determined using the Beck Depression Inventory (BDI) and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Version 3.0 (EORTC QLQ-C30 v3). Comorbidities were assessed using the Charlson Comorbidity Index (CCI) while fatigue was evaluated by 10 cm visual analogue scale (VAS). The relationship between the TSK and CCI, BDI, VAS-F, EORTC-30 were investigated.

Results: The mean age of patients was 52.11±11.10 years. Of the patients, 36 (66.7%) had kinesiophobia based on having TSK scores above 37. The rate to recieve adjuvant radiotherapy was higher in kinesiophobic group. Kinesiophobic patients had statistically significantly lower global health, physical functioning, and emotional functioning scores, and higher depression and VAS-fatigue scores. Kinesiophobic patients also had higher financial difficulty and higher sypmtom scale scores. Comorbidities and presence of lymphedema did not differ between groups ($p>0.05$). All EORTC QLQ-30 sub-parameter scores except for financial difficulty and symptom severity had negative significant correlations with TSK scores while VAS-fatigue, BDI, EORTC QLQ-30 symptom scale, and financial difficulties showed significant positive correlations. TSK score was not correlated with CCI.

Conclusion: Kinesiophobia is rather frequent in breast cancer survivors and has associations with worse quality of life and higher depression and fatigue scores. These patients should be trained and encouraged for an active life style.

Keywords: breast neoplasms; quality of life; comorbidity; kinesiophobia

ÖZET

Amaç: Bu kesitsel çalışma meme kanseri hastalarında kinezyofobi sıklığının belirlenmesi ve hayat kalitesi ve komorbidite başta olmak üzere yorgunluk, lenfödem, depresyon gibi klinik özellikler ile ilişkisini araştırmayı amaçlamaktadır.

Materyal Metod: Çalışmaya Kasım-Aralık 2020 tarihlerinde Aydın Atatürk Devlet Hastanesi Tıbbi Onkoloji Polikliniği'nde meme kanseri tanısı ile remisyonda izlemde olan 54 kadın dahil edilmiştir. Hastaların tanı anındaki klinikopatolojik özellikleri kaydedildi. Hareketten kaçınma durumu Tampa Kinezyofobi Skalası (TKS) ile değerlendirildi. Lenfödem varlığı her iki koldan çap ölçümüleri ile değerlendirildi. Depresyon varlığının araştırılması için Beck depresyon ölçeği (BDÖ), hayat kalitesinin değerlendirilmesi için Avrupa Kanser Araştırma ve Tedavi Organizasyon Grubu (EORTC) hayat kalitesi formu QLQ-C30 (versiyon 3.0) kullanıldı. Komorbiditelerin belirlenmesi için Charlson Komorbidite

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Indexi (CKI) ve yorgunluk için 10 cm'lik vizüel analog skala (VAS) kullanılmıştır. TKS ile CKI, BDÖ, VAS-yorgunluk, EORTC-30 arasındaki ilişki değerlendirildi.
Sonuçlar: Hastaların ortalama yaşı 52.11±11.10 yıl idi. Hastalardan 36'sı (%66,7) TKS skorlarına göre kinezyofobik olarak sınıflandırıldı (TKS>37). Kinezyofobik grupta adjuvan radyoterapi alma oranı anlamlı olarak daha yüksekti. Ayrıca kinezyofobik hastaların EORTC-30 hayat kalitesi anketinin genel sağlık, fiziksel ve duygusal işlev puanları anlamlı olarak daha düşük; maddi zorluk, semptom skalası, BDÖ ve VAS-yorgunluk puanları ise anlamlı olarak daha yüksekti. Lenfödem varlığı, CKI ve diğer klinik parametrelerde fark tespit edilmedi (p>0.05). Maddi zorluk ve semptom skalası dışındaki tüm EORTC QLQ-30 sub-grup skorları ve TKS arasında negatif yönde anlamlı ilişki saptanırken, VAS-yorgunluk, BDÖ, EORTC QLQ-30 semptom skalası ve maddi zorluk puanları ile anlamlı pozitif ilişki gözlendi. TSK ile CKI arasında ilişki bulunmadı.
Sonuç: Kinezyofobi meme kanseri hastalarında oldukça sık görülmekte olup hayat kalitesi, depresyon ve yorgunlukla ilişkili bulunmuştur. Hastaların bu konuda biligilendirilip daha aktif bir hayat tarzı için motive edilmesi yararlı olabilir.

Anahtar kelimeler: meme kanseri; hayat kalitesi; komorbidite; kinezyofobi

Introduction

Breast cancer is the most common cancer type and leading cause of cancer-related death among women in Turkey [1]. Cancer survivors may experience depression, anxiety, and poor health-related quality of life [2]. Furthermore, fatigue and pain are frequent in cancer patients and survivors and might lead to low level of physical activity and sedentary lifestyle [3-6]. Kinesiophobia is defined as the fear and anxiety of movement and activity due to belief of fragility or susceptibility to injury [7]. The Cognitive Fear Avoidance Model suggests that pain-related fear leads to escape mechanisms resulting in avoidance of movement and activity. Thereafter, in prolonged avoidance, they run a vicious circle occurring due to non-use, disability, and depression [8]. Although there are several papers on kinesiophobia and chronic back pain, musculoskeletal disorders, and cardiovascular diseases, there are few studies about breast cancer and kinesiophobia [9-11]. Previous studies showed that approximately 40% of pain-related disability could be attributed to kinesiophobia [12]. Also, it was propounded that kinesiophobia increased the risk for lymphedema, depression, and poorer upper extremity function in breast cancer survivors [13].

A previous study assessing the relationship between kinesiophobia and global health status on 1236 cancer survivors concluded that fear of movement was significantly related to global health status. The paper further reported that kinesiophobia decreased significantly after rehabilitation with graded activity in high TSK scorers [14].

Approximately 60%-96% of the cancer patients are reported to have high levels of fatigue during or after cancer treatment, which often leads to diminished quality of life [15]. In a study evaluating the quality of life using the Short form-36 (SF-36) in breast cancer survivors, SF-36 physical component score (PCS) and mental component score (MCS) were lower in kinesiophobic patients, where only SF-36 PCS difference was statistically significant. Kinesiophobic patients had also significantly higher mean scores of depression and significant correlations between presence of lymphedema, depression scores, and the TSK score were noted [13]. In this study on 81 breast cancer survivors, a significantly higher rate of lymphedema was also reported in patients with kinesiophobia [13].

We consider that the desire to engage in physical movement may be hampered in breast cancer survivors along with depression and fatigue particularly in case of comorbid diseases. Therefore, we aimed to determine the frequency of kinesiophobia in breast cancer survivors and investigate its relationship with mainly quality of life and comorbidities, secondly lymphedema, fatigue, and depression in the current study.

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Material Methods:

This cross-sectional study included 54 patients with breast cancer who were followed in remission in Aydın Atatürk State Hospital Medical Oncology Clinic beetwen November and December 2020. The inclusion criteria were having breast surgery at least a year ago and being followed in remission with diagnosis of breast cancer, at least 6 months since last adjuvant chemotherapy cycle or radiotherapy, being over 18 years, and being able to read and write in Turkish. The exclusion criteria were having metastatic disease, co-existent second malignancy, chronic inflammatory diseases, and cognitive or psychiatric disturbances that may impede with fulfilling the questionnaires.

The demographic characteristics including age, marital and educational status, body mass index, stage of disease, side and type of surgery, hormon receptor status, history of adjuvant chemotherapy, radiotherapy and hormonotherapy were recorded. Lymph-edema of the arm was evaluated by circumferenial measurements of bilateral upper extremities. Measurements were performed at four levels of metacarpal, wrist, 10-cm below and above the lateral epicondyle using a standard retractable fiberglass tape in sitting position with 90° shoulder flexion, elbow extension, and forearm pronation. Assessments were fulfilled by the same physician and noted in cm unit in cm unit. A difference of ≥2 cm at any single location in the affected arm led to the diagnosis of lymphedema.

Kinesophobia

Kinesophobia was evaluted using the Turkish version of Tampa Scale for Kinesophobia (TSK) [16, 17]. This scale is a 17-item scale widely used for chronic musculoskeletal disorders. A 4- point likert questionnaire ranging from “I fully disagree” to “I fully agree” is applied for each item. After reversing the 4th, 8th, 12th, and 16th items, total score of 17-68 is reached. The higher scores indicate higher kinesiophobia level. While the use of total score is advocated in studies, the cut off point of 37 is determined to define severe and mild kinesiophobia [8].

Comorbidity

The presence and intensity of comorbidities was assessed using the Charlson Comorbidity Index (CCI). The index predicts 10-year mortality for patients with various comorbid conditions depending on their strength of association with mortality. Total score is counted summing the scores of 16 available clinical conditions. Higher scores indicate higher mortality risk [18].

Quality of Life

The quality of life was evaluated using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Version 3.0 (EORTC QLQ-C30 v. 3.0). The EORTC QLQ C- 30 is a cancer-specific QOL questionnaire with four-point likert scale with items ranging from 1:not at all to 4: very much. This 30-item self-administered questionnaire evaluates five functional scales physical (PF), role (RF), cognitive (CF), emotional (EF) and social (SF) functioning, and three symptom scales (fatigue, pain, and nausea/vomiting), a global Quality of Life scale, and some single items for evaluation of other complaints of cancer patients (e.g. dyspnea, loss of appetite, sleep disturbances, constipation, and diarrhea), and financial effects of the disease and treatment. All functional scales and individual item scores are indicated on a 0–100 scale. Higher functional scale values indicate better functioning while increased scores of symptom scales and financial difficulties suggest worse symptoms and poorer financial status [19].

Beck Depression Invantory

The depressive status was assessed using the Beck Depression Invantory (BDI). It is a 21-item scale scored 0-3 for each item. Higher scores indicate more severe depressive state, namely 10 refers to minimal depression; 10-18 to mild to moderate depression, 19-29 to severe depression; and above 30 is determined as severe depression [20]. Fatigue severity according to visual analogue scale (VAS 10 cm) was noted where increased scores corresponded to more intense fatigue. The ethics committee aproval was obtined from

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Table 1. Demographic and clinical characteristics of breast cancer survivors (n=54)

Clinical variable	% or Median (Interquartile range
Age (years), [Median (Interquartile range)]	53 (16.25)
Education level, n (%)	
Primary and secondary school	35 (64.8)
High school	10 (18.5)
University graduate	9 (16.7)
Body Mass Index (kg/m^2) [Median (Interquartile range)]	28.26 (8.33)
Occupation, n (%)	
Retired	2 (3.7)
Worker	16 (29.6)
Housewife	36 (66.7)
Histological type, n (%)	53 (98.1)
Invasive ductal carcinoma	1 (1.9)
Medullary carcinoma	
Stage at diagnosis, n (%)	
Stage 1	15 (27.8)
Stage 2	26 (48.1)
Stage 3	13 (24.1)
Type of surgery, n (%)	
Breast conservative surgery	34 (63)
Modified radical mastectomy	20 (37)
Side of surgery, n (%)	
Right	25 (46.3)
Left	28 (51.9)
Bilateral	1 (1.8)
Hormone receptor status, n (%)	
Positive	43 (79.6)
Negative	11 (20.4)
Lymph node dissection, n (%)	
ALND	32 (59.3)
SLND	22 (40.7)
Menopausal status, n (%)	
Premenapouse	20 (37)
Menapouse	34 (63)
Adjuvant chemotherapy, n (%)	
Yes	40 (74.1)
No	14 (25.9)
Adjuvant hormonotherapy, n (%)	
Tamoxifen	21 (38.9)
Aromatase inhibitor	22 (40.7)
None	11 (20.4)
Adjuvant radiotherapy, n (%)	
Yes	49 (90.7)
No	5 (9.3)
Lymphedema, n (%)	
Yes	29 (53.7)
No	24 (46.3)
EORTC QLQ-C30 subscales [Median (Interquartile range)]	
Global health status	75 (33.3)
Physical functioning	80 (25)
Role functioning	100 (16.67)
Emotional functioning	83.3 (39.59)
Social functioning	100 (33.33)
Cognitive functioning	83.3 (33.33)
Symptom scales	13.88 (27.78)
Financial difficulties	33.33 (33.33)
Beck Depression Inventory [Median (Interquartile range)]	8 (14)
Charlson Comorbidity Index [Median (Interquartile range)]	3 (2.25)
Tampa Scale of Kinesiophobia (mean±SD)	39.31 ±5.89
VAS-Fatigue [Median (Interquartile range)]	3 (4)

ALND: Axillary lymph node dissection, SLND: Sentinel lymph node dissection, EORTC QLQ-C30: The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire, SD: Standard deviation, VAS: Visual analogue scale

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Table 2. Comparison of clinical characteristics of patients with and without kinesiophobia

Clinical variable	Kinesiophobic (n:36)	No kinesiophobia (n:18)	*p*
Age (years) [Median (Interquartile range)]	53.5 (13)	50.5 (22.5)	0.575
Education level, n (%)			0.059
Primary and secondary school	25 (46.3)	10 (18.5)	
High school	8 (14.8)	2 (3.7)	
University graduate	3 (5.6)	6 (11.11)	
Body Mass Index (kg/m^2) [Median (Interquartile range)]	28.26 (8.47)	28.11 (9.16)	0.811
Occupation, n (%)			0.185
Housewife	27 (50)	9 (16.7)	
Worker	8 (14.8)	8 (14.8)	
Retired	1 (1.9)	1 (1.9)	
Histological type, n (%)			0.667
Invasive ductal carcinoma	35 (64.8)	18 (33.3)	
Medullary carcinoma	1 (1.9)	0 (0)	
Disease duration (months), Median (Interquartile range)]	47.5 (51.25)	43 (43.25)	0.847
Type of surgery, n (%)			
Breast conservative surgery	25 (46.3)	9 (16.7)	0.163
Modified radical mastectomy	11 (20.4)	9 (16.7)	
Side of surgery, n (%)			0.526
Right	15 (27.8)	10 (18.5)	
Left	20 (37)	8 (14.8)	
Bilateral	1 (1.9)	0 (0)	
Hormone receptor status, n (%)			0.232
Positive Negative	16 (50) 9 (16.7)	27 (29.6) 2 (3.7)	
Lymph node dissection, n (%)			0.845
ALND SLND	21 (38.9) 15 (27.8)	11 (20.4) 7 (13)	
Menopausal status, n (%) Premenapouse Menapouse	 13 (24.1) 23 (42.6)	 7 (13) 11 (20.4)	0.842
Adjuvant chemotherapy, n (%)			0.380
Yes No	28 (51.9) 8 (14.8)	12 (22.2) 6 (11.1)	
Adjuvant hormonotherapy, n (%)			0.365
Tamoxifen	12 (22.2)	9 (16.7)	
Aromatase inhibitor	15 (27.8)	7 (13)	
None	9 (16.7)	2 (3.7)	
Adjuvant radiotherapy, n (%)			0.038
Yes No	35 (64.8) 1 (1.9)	14 (25.9) 4 (7.4)	
Lymphedema, n (%)			0.335
Yes No	21 (38.9) 15 (27.8)	8 (14.8) 10 (18.5)	
EORTC QLQ-C30 subscales Median (Interquartile range)]			
Global health status	66.67 (47.92)	83.32 (31.25)	0.014
Physical functioning	73.34 (25.42)	80 (18.3)	0.009
Role functioning	100 (29.16)	100 (0)	0.091
Emotional functioning	75 (47.92)	100 (14.61)	0.015
Social functioning	91.67 (50)	100 (16.69)	0.162
Cognitive functioning	83.33 (33.33)	91.67 (16.70)	0.139
Symptom scales	19.4 (30.55)	11.11 (10.43)	0.013
Financial difficulties	33.33 (33.33)	0 (33.32)	0.034
Beck Depression Inventory Median (Interquartile range)]	12 (17)	5 (9.25)	0.006
Charlson Comorbidity Index Median (Interquartile range)]	4 (1.75)	3 (3)	0.340
Tampa Scale of Kinesiophobia Median (Interquartile range)]	41.5 (6.75)	34 (3.25)	<0.001
VAS-Fatigue Median (Interquartile range)]	4.5 (4.75)	2 (4.5)	0.040

ALND: Axillary lymph node dissection, SLND: Sentinel lymph node dissection, EORTC QLQ-C30: The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire, VAS: Visual analogue scale.

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Adnan Menderes University Clinical Researches Ethics Committee. All patients were provided with information about the study and were given informed consent forms.

Statistical analysis

The SPSS version 11.5 software (SPSS Inc., Chicago, IL, USA) was used for analyses. Histogram and p-plots were examined and Kolmogorov Smirnov test was used to assess data normality before statistical analyses. Continuous variables were presented as mean ± standard deviation and median (interquartile range) and tested by student's t test or Mann Whitney U test. Categorical variables were described as numbers and percentages, and tested by Chi-square or Fisher's Exact tests. Pearson correlation coefficient was used to determine the relationship between continuous variables. Patients were determined to be kinesiophobic if TSK scores were above 37 [8]. Patients with and without kinesiophobia were compared in terms of clinical parameters. $p<0.05$ was considered statistically significant.

Results

The mean age of patients was 52.11±11.10 years. The mean disease duration of 54 patients was 51.61±5.91 months. The clinical characteristics of patients were given in Table 1. Of the patients, 36 (66.7%) had kinesiophobia based on having TSK scores above 37. The mean TSK score was 39.31±5.89 in the whole group. When patients were further divided into as kinesiophobic patients and others, the rate to have recieved adjuvant radiotherapy was higher in kinesiophobic group (p=0.038). Furthermore, kinesiophobic patients had statistically significantly lower global health, physical functioning, and emotional functioning scores and higher depression and VAS-fatigue scores (p=0.014, p=0.009, p=0.015, p=0.006, p=0.040 respectively). Kinesiophobic patients also had higher scores of financial difficulty and sypmtom scales indicating worse financial and somatic symptom burden (p=0.034, p=0.013 respectively). Comorbidities, presence of lymphedema, and other clinical factors did not differ between groups (p>0.05). (Table 2). The Kruskal Wallis test revealed no difference among patients with stage 1, 2, and 3 breast cancer in terms of TSK scores (X^2=2.139, p=0.343).When the correlations between TSK and EORTC scores were analysed, all sub-parameters had significant negative correlations with TSK scores except for scores of the symptom scale and financial difficulties which demonstrated significant positive correlations. Also there were positive significant correlations between TSK scores and VAS-fatigue and BDI scores (p=0.001, r=0.438, p<0.001, r=0.597 respectively). Table 3 shows the correlations between fear of movement, fatigue severity, and comorbidities in patients with breast cancer.

Table 3. Correlations between TSK scores and other clinical characteristics

Clinical variable	p	r
Age (years)	0.973	-0.005
Body Mass Index (kg/m^2)	0.627	0.068
Disease duration (months)	0.931	-0.12
EORTC QLQ-C30 subscales		
Global health status	0.005	-0.381
Physical functioning	<0.001	-0.523
Role functioning	0.002	-0.422
Emotional functioning	<0.001	-0.513
Social functioning	0.027	-0.307
Cognitive functioning	0.027	-0.307
Symptom scales	<0.001	0.522
Financial difficulties	0.022	0.317
Beck Depression Inventory	<0.001	0.597
Charlson Comorbidity Index	0.377	0.123
VAS-Fatigue	0.001	0.438

EORTC QLQ-C30: The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire, VAS: Visual analogue scale.

Discussion

In this study, the frequency of kinesiophobia and its association with quality of life and comorbidities were investigated in breast cancer survivors. This study revealed that almost two third of breast cancer survivors suffer from kinesiophobia. Also we have observed that patients with kinesiophobia had poorer quality of life, higher depression, and fatigue scores. Comorbidity and lymphedema were not found to have significant relationship with kinesiophobia in breast cancer survivors. In our study group, 66.7% of patients had kinesiophobia which seems higher than

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previous studies [13]. The socioeconomic differences of groups assessed might have led to this discrepancy. In the prior studies, it was stated that cancer survivors with increased fear of movement might benefit from rehabilitation programs with graded activity [14]. Therefore, we consider these programs may be offered to all patients with suspected fear of movement.

In a study on 1236 cancer survivors among whom 615 had breast cancer, which evaluated the relationship between kinesiophobia and global health status, kinesiophobia was reported to be inversely associated with global health status determined by the EORTC QLQ-30, similar to our results [14]. Similarly, another study on 62 women with breast cancer evaluating the quality of life using the functional assessment of cancer therapy-breast (FACT-B+4), a significant negative relationship between kinesiophobia and quality of life was reported [21]. In the current study, we also detected significant relationship between kinesophobia and physical and emotional functioning sub-scales of the EORTC QLQ-30.

The breast cancer patients with upper extremity lymphedema may have a belief that their arms might become swollen if they move them and avoid daily activities which can contribute to kinesiophobia [21]. The frequency of lymphedema is 53.7 % in our study group. While previous papers suggest distinct results, a report remarks a cumulative incidence of 41.1% [22]. The study by Gencay et al. noted a significant association between presence of lymphedema and the TSK scores whereas we did not observe such a relationship [13]. Similar to their results, our patients with kinesiophobia had worse quality of life and higher depression scores [13]. The relationship between depression and fear of movement was also revealed in other patient groups [23, 24].

It is known that up to 40% -80% of cancer patients undergoing active treatment suffer from cancer related fatigue which can result in decreased quality of life [25]. In a study evaluating the relationship between kinesiophobia and fatigue, fatigue severity was found to be associated with kinesiophobia in patients with chronic obstructive pulmonary disease [26]. Similarly, we observed a positive correlation between fatigue and kinesiophobia scores in breast cancer survivors and statistically significant difference in terms of fatigue between patients with and without kinesiophobia in our study group. In that study by Vardar et al., kinesiophobia was strongly associated with multisystemic comorbidities in patients with chronic obstructive pulmonary disease [26]. However, we detected no relationship between kinesiophobia and comorbidity in breast cancer survivors in contrast to the case in aforementioned study.

As far as we are concerned, this is the first study to evaluate the relationship between kinesiophobia and comorbidity in breast cancer survivors. Another strong element of the current study is assessing the quality of life with a cancer-specific scale. The limitation of our study is the small sample size. Further studies are required to assess the role of comorbidity on kinesiophobia in these patients.

In this study, we found that kinesiophobia is rather frequent in breast cancer survivors and has relationship with quality of life, depression, and fatigue. These patients should be encouraged for an active life style.

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