RESEARCH ARTICLE

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Exploring Factors Associated with Fear of Falling among Women with Breast Cancer: Findings from a Cross-Sectional Study

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Abstract

Introduction: Fear of falling (FOF) is common in the cancer population and impact negatively their mental status, physical activity level as well as quality of life. FOF-associated factors are not investigated in women with breast cancer (BC). Therefore, exploring all possible factors associated with FOF was the aim of this study. **Method:** 188 women with BC were recruited from three major hospitals in Jordan. Demographic, disease, and clinical variable information were collected. FOF was measured using the Arabic version of the Fall Efficacy Score International (FESI). Descriptive analyses (means± standard deviation, and frequency) were carried out for the following variables: demographic, disease, and clinical. Regression analyses were conducted to investigate factors associated with FOF. **Results:** The mean age of the 182 women with BC was 52.1±9.8, and most of them had either stage 3 (40%) or stage 4 (30%) with 83% of them having surgery. Regression analyses showed that age, stage of breast cancer, depression, and fatigue were positively associated with FOF (p-value<0.05). **Conclusion:** FOF is associated with multiple factors (age, stage of breast cancer, depression, and fatigue). Healthcare professionals should consider evaluating FOF and its potential contributing factors among women grappling with breast cancer. Doing so can significantly enhance overall outcomes and care for these individuals.

Keywords: Breast cancer- Fear of falling- Fatigue- Depression

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Introduction

Cancer incidence has increased dramatically over the past 3 decades particularly from 1984 to 2017 [1]. From 2007 to 2017, cancer is among top leading causes of death in Jordan [1]. In 2017, the Jordan Cancer Registry reported that Breast Cancer (BC) was highly prevalent among Jordanians of both genders [1] and the incidence was 38.4% [1]. Even for non-Jordanian residents in the country, BC stood out as the primary cancer type, accounting for 22.9% of cases [1]. Furthermore, data from 2017 showed that the death percentage from BC was the highest among Jordanians [1]. However, the survival rate among women with BC is also increased as a result of both early detection and intervention provided [2].

Survivors with BC suffer physical, psychological, and social complications due to either the treatment provided or the progress of the disease [3]. For example, treatment options provided for women with BC (e.g., chemotherapy) could lead to multiple complications such as chemotherapy-induced peripheral neuropathy, joint pain, loss of postural balance, walking disorders, and falling [4–7]. Some other physical and psychological consequences also reported by women with BC include sexual dysfunctions, sleep disorders, falling, fear of falling, anxiety, depression, and decreased life satisfaction [3, 5, 8].

Fear of falling (FOF) is a potential complication in people with cancer and leads to undesirable consequences such as a reduction in both physical and mental performance which will subsequently negatively affect the quality of life [9–11]. As far as we know, only four studies investigated FOF in cancer populations [10–13]. These studies were conducted on older people with a variety of cancer types and showed that the FOF is highly prevalent in the cancer population (the mean FOF score ranges from 20.4 to 26.4) than in healthy individuals [10, 11, 13]. The consequences of FOF among people with cancer were restrictions in physical activity, decreased independence to perform daily activities, and decreased

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participation level [10].

Although increased prevalence (55% of people with cancer reported high FOF) [11] and the consequences of FOF among people with cancer, only one study investigated the factors associated with FOF [13]. This study was conducted in 2020 by Aburub, A.S., et al on 175 older people with several types of cancer and found that FOF is associated with multiple factors such as cognitive level, poor physical performance as well as the number of falls [13]. This later study serves as a start for healthcare providers to understand the importance of assessing the presence of FOF and its associated factors in individuals with cancer [13]. However, two important limitations were presented in their study [13], firstly, incorporating individuals with diverse cancer types hindered the generalizability of findings to a specific cancer type. Secondly, important potential factors, such as anxiety and sleep, were not included despite evidence from various studies about their impact on FOF [14, 15].

To overcome these limitations and to lessen the gap in research work, this study aims to specify the possible factors that could be associated with FOF in women with breast cancer. We assume that FOF is associated with multiple factors (demographic, disease, and clinical factors). Study findings would add valuable information to researchers and clinicians. For researchers, the results would bridge the gap in what exists in the previous studies by having a specific type of cancer and including all potential factors that were not included in the previous literature. For clinicians, the current results would serve as a guide to set the best treatment plan to curtail the complications of FOF in women with breast cancer.

Materials and Methods

From three major hospitals in Jordan, 188 women with BC were recruited for this cross-sectional study. The inclusion criteria were women diagnosed with BC and aged 18 years or above. Women who either had mental disorders or were not able to follow instructions were excluded. Selected women signed a consent form before enrolment. The ethical approval for this study was obtained from the research committee at Isra University (SREC/23/01/075).

Outcome Measures

Demographic, disease, and clinical potential factors were collected. Age, marital status, work status, and level of monthly income were included as demographic factors. Disease factors were duration since diagnoses in months, stage of BC, having surgery or not, and the number of comorbidities. Clinical factors were fear of falling (FOF) as the main outcome of this study, symptoms of women with BC, anxiety, depression, quality of life, sexual function, sleep, and fatigue.

The Arabic version of the Fall Efficacy Score International (FESI) was used to measure fear of falling [16]. FESI consists of 16 questions to assess indoor and outdoor activities. The score ranges from one (not concerned at all) to 4 (very concerned) for each question and summing the scores to calculate the total (0-64) with a higher score indicating a higher concern. The Arabic version of the FES-I validity was tested and used in different populations such as balance and vestibular disorders [16] and people with multiple sclerosis [17].

Ten severity symptoms that could be experienced by women with BC were measured by the Arabic version of the Edmonton Symptom Assessment System (ESAS). The score of each symptom ranges from 0 to 10 with a higher score being the worst possible score. ESAS psychometric properties (validity and reliability) were reported in people with advanced cancer [18].

Fourteen items of the Arabic version of the Hospital Anxiety and Depression Scale (HADS) were used to assess anxiety (7 items) and depression (7 items). The total score of the HADS was calculated out of 21 with a higher score being having worse anxiety and depression. The HADS psychometric properties (validity and reliability) were reported in hospitalized patients [19].

Quality of life was measured using the Quality-of-Life Index-Cancer (QLI-c). Two portions are assessed in the QLI-c. The first portion assesses the satisfaction in life from various aspects while the second assesses the importance of these aspects. The total score of the QLI-c was out of 30 and women with higher scores had better QOL. QLI-c has good psychometric properties [20].

Sexual function was assessed using the Female Sexual Function Index (FSFI). The FESI assesses 6 domains with a total score of 36, a higher score indicating better sexual function. The psychometric properties of the FESI were assessed among women with BC, and it was found to have excellent internal reliability [21]. Furthermore, The Arabic version of the FSFI is a valid and reliable measure [22].

Fatigue was measured using the modified Fatigue Impact Scale (MFIS). The MFIS has 21 items that cover physical, cognitive, and psychological domains. The score of each item ranging from 9 to 4 with a total score of 84 and higher scores indicate worse fatigue. The validity and reliability of the Arabic version of MFIS were assessed in people with multiple sclerosis [23].

Subjective sleep quality was assessed using the Arabic version of the Pittsburgh Sleep Quality Index (PSQI). The PSQI has 19 self-rated questions with a total score of 21. In women of BC, a total score of 8 is considered poor sleep quality. Furthermore, PSQI is a valid and reliable measure [24].

Statistical Analyses

Descriptive analyses (means± standard deviation, and frequency) were carried out for the demographic, disease, and clinical factors. The relationship between the main study outcome (FOF) and the clinical factors (symptoms of women with BC, anxiety, depression, quality of life, sexual function, sleep, and fatigue) was tested using Spearman's correlation coefficient (rho). The correlation was classified into 3 categories (low correlation < 0.3, moderate (0.31 to 0.7), and a strong correlation > 0.70)) [25, 26].

Simple and multiple linear regressions were conducted to identify the possible factors associated with the main study outcome (FOF). Significant factors from the simple linear regression were entered into a four multiple linear regression if they had a P-value of less than 0.05.

Significant demographic, disease, and clinical factors were included in the first, second, and third models, respectively, if they had a p-value of less than 0.05. Finally, all significant factors from models 1, 2, and 3 were entered into the fourth model to identify the final factors associated with FOF. All regression assumptions including multicollinearity were checked before conducting the analysis. Furthermore, a Variance inflation factor (VIF) of less than 10 was considered acceptable multicollinearity [27]. To assess the linear relationship between FOF and all other explanatory factors, a scatter plot was used. All statistical analyses were conducted using SPSS 9.4.

Results

The demographic and disease characteristics of 188 women with BC who were included in the current study are shown in Table 1. The mean age of the women with BC was 52.1±9.8, around 68% of them were married, the majority (80%) of them were working, and 50% had adequate monthly income (Table 1). The disease characteristics of the study sample showed that around 63% of the women were diagnosed with BC a year before enrollment in this study, the majority of them had either stage 3 (40%) or stage 4 (30%), 83% of them had surgery and 65% of them had no comorbidities (Table 1). The total score (means± standard deviation) of the clinical factors among women with BC is shown in Table 2. The average FESI score was 32.0±13.74, while the average scores for ESAS, HADS-A, HADS-D, QLI-c, FSFI, PSQI, and MFI were 35.3±18.8, 7.7±4.2, 7.9±4.4, 20.2±4.33, 10.9±10.01, 8.2±4.62, and 39.9±17.74, respectively.

The results of Spearman's correlation coefficient (FOF vs clinical factors) are shown in Table 3. A moderate significant correlation (0.31 to 0.62) was found between FOF (measured by FESI) and all clinical factors except FSFI where there was a significant weak correlation. A positive correlation was found between FOF (measured by FESI) and all clinical factors except the QLI-c.

Appendix 1 shows the results of the simple linear regression to understand the association between FOF and study factors. FOF was significantly (P<0.05) associated with Age, marital status, and level of monthly income from the demographic and with all disease and clinical factors. The multiple linear regression findings are shown in Table 4. In this table, four models are presented. In model 1 which only included demographic factors, FOF was significantly (P<0.05) associated with age and level of monthly income. Model 2 included only disease variables showing that FOF was significantly (P<0.05) associated with the stage of breast cancer, surgery, and the number of comorbidities. In model 3 which includes only clinical variables, FOF was associated with the following clinical

Table 1. Demographic and Disease Characteristics of the Study Sample (N=188).

Variable	mean±Std	Frequency (%)	Sample size
Demographic variables			
Age	52.1±9.8		188 missing 8
Marital status			
Single		20 (10.2)	188 missing 8
Married		133 (67.9)	
Divorced		7 (3.6)	
Widow		28 (14.3)	
Work			
Yes		158 (80.6)	
No		30 (15.3)	
Level of Monthly Income			187 missing 9
Low		83 (42.3)	
Medium		100 (51.0)	
high		4 (2.0)	
Disease variables			
Disease duration since diagnosis			188 missing 8
Less than 6 months		29 (14.8)	
6-12 months		37 (18.9)	
More than 12 months		122 (62.2)	
Stage of breast cancer			188 missing 8
Stage 1		13 (6.6)	
Stage 2		37 (18.9)	
Stage 3		80 (40.8)	
Stage 4		58 (29.6)	
Surgery			188 missing 8
Yes		25 (12.8)	
No		163 (83.2)	
Number of comorbidities			188 missing 8
0		128 (65.3)	
1		27 (13.8)	
2		24 (12.2)	
3		9 (4.6)	

Table 2. The Mean and Standard Deviation of the Total Score of the Clinical Variables among Women with Breast Cancer (N=188)

Clinical Variables	Mean±Std	Sample size	Total score range
The Fall Efficacy Score International (FESI)	32.0±13.74	188	16-64 higher worse
The Edmonton Symptom Assessment System (ESAS)	35.3±18.8	185	0-100 higher worse
Hospital anxiety scale (HADS-A)	7.7±4.2	188	0-21 higher worse
Hospital depression scale (HADS-D)	7.9±4.4	187	0-21 higher worse
The Quality-of-Life Index-Cancer (QLI-c)	20.2±4.33	188	0-30 higher better
The female sexual function index (FSFI)	10.9±10.01	188	2 to 36 higher better
Pittsburgh Sleep Quality Index (PSQI)	8.2±4.62	187	0-21 higher worse
Modified Fatigue Impact scale (MFIS)	39.9±17.74	186	0 to 84 higher worse

Table 3. Spearman's Correlation Coefficient (rho) between the Main Study Outcome (The Fall Efficacy Score International (FESI)) and the Study Clinical Variables

Clinical variables	The Fall Efficacy Score International (FESI))	
	rho	P-value
The Edmonton Symptom Assessment System (ESAS)	0.35	0
Hospital anxiety scale (HADS-A)	0.31	0
Hospital depression scale (HADS-D)	0.52	0
The Quality-of-Life Index-Cancer (QLI-c)	-0.49	0
The female sexual function index (FSFI)	-0.23	0.002
Pittsburgh Sleep Quality Index (PSQI)	0.39	0
Modified Fatigue Impact scale (MFIS)	0.62	0

variables: anxiety, depression, and fatigue (P<0.05). Model 4 which includes only the significant variables from the previous models (models 1, 2, and 3) shows that age, stage of breast cancer, depression, and fatigue were positively associated with FOF among women with BC.

Discussion

Our current study is the first to explore the potential factors (demographic, disease, and clinical) that could be associated with FOF among women with BC. We assume that FOF is associated with multiple factors (demographic, disease, and clinical factors). Our current study supported our assumption that FOF is multifactorial and associated

Table 4. The association between FOF and Study Variables Using Multiple Linear Regression

Variables	Estimates B	Standard error	P-value
Model 1			
Demographic variables			
Age	0.56	0.09	0.000*
Marital status	0.74	1.1	0.5
Level of monthly income	-0.42	1.7	0.015*
Model 2			
Disease variables			
Disease duration since diagnosis	0.4	1.4	0.77
Stage of breast cancer	5.7	1.2	0.000*
Surgery	6.6	2.7	0.017*
Number of comorbidities	2.6	1	0.013*
Model 3			
Clinical Variables			
The Edmonton Symptom Assessment System (ESAS)	0.01	0.05	0.84
Hospital Anxiety Scale (HADS-A)	-0.1	0.26	0.000*
Hospital depression scale (HADS-D)	0.81	0.26	0.002*
The Quality-of-Life Index-Cancer (QLI-c)	-0.33	0.25	0.18
The female sexual function index (FSFI)	-0.1	0.08	0.26
Pittsburgh Sleep Quality Index (PSQI)	0.07	0.21	0.74
Modified Fatigue Impact scale (MFIS)	0.41	0.06	0.000*
Model 4 (final model)			
Age	0.34	0.9	0.000*
Level of monthly income	-1	1.4	0.47
Stage of breast cancer	1.94	0.9	0.03*
Surgery	2.3	2.1	0.28
Number of comorbidities	0.01	0.9	0.99
Hospital anxiety scale (HADS-A)	-0.38	0.25	0.13
Hospital depression scale (HADS-D)	0.71	0.24	0.003*
Modified Fatigue Impact scale (MFIS)	0.33	0.06	0.000*

*significant variables with P-value less than 0.05; Age, stage of BC, depression, and fatigue are the factors that predict FOF among BC.

with a group of demographic and clinical factors (age, stage of breast cancer, depression, and fatigue).

Our current study showed that age is one of the predictors of FOF among women with BC. This result is aligned with several previous studies conducted on older adults [28–32]. The risk of falling and its psychological consequences including FOF increases with age [33]. Furthermore, several studies conducted on older adults showed that FOF is a major concern in this population [9, 34]. It is known that the aging process could negatively impact people's physical activity, fitness and functional capacity, muscle strength, and balance which could contribute to the increase in the incidence of FOF [35, 36]. Furthermore, it has been found that aged people walk slower and with shorter stride lengths than young and middle-aged people. A study by Gu Eon Kang et al on people with cancer showed that FOF severity correlated significantly with walking speed as well as with stride length.[37]. Although age is non-modifiable factors offer limited intervention potential. We believe that minimizing the consequences of FOF in people with cancer is possible by targeting all modifiable factors. Poor balance and walking impairment are examples of modifiable factors that could be targeted in the rehabilitation protocol.

Our current study showed that the stage of breast cancer as one of the disease factors is associated with FOF among women with BC. Evidence is limited about the relationship between falls, FOF, and the stage of cancer. Our findings in this current study are in contrast with the findings from previous research by Spoelstra SL et al. [38], who found in older survivors of mixed cancer that fall is associated with type and stage of cancer as well as the time of the diagnosis. In our study, we assessed only women with BC, and we focused on the FOF which might explain the results differences. Previous research by Julia de Mello Ramirez Medina et al. [39] has reported that advanced clinical stages of BC are associated with inferior QOL. In our work, we expanded on that to find that FOF is positively associated with the stage of breast cancer.

Depression was in this study a significant predictor for FOF among women with BC. This result is similar to previous studies conducted on older adults [28, 29, 31, 40], rheumatoid arthritis [41], Parkinson's disease [42]. Furthermore, in all types of cancer, depression was independently associated with falls. Many reasons could explain the association between FOF and depression. Depression was found to be linked to both balance and poor walking in both the general population as well as breast cancer survivors, which might cause FOF [43]. Depression is also linked with a decline in cognitive status, lower physical activity, sleep problems, and antidepressant use [43]. These are common complaints experienced by BC survivors, which collectively increase fall risk and explain having FOF. A study that included people with mixed types of cancer showed that depression increases the risk of falling [44]. This current study finds that not only falling but also fear of falling is affected by depression in BC survivors. This finding is particularly important considering the high depression incidence in women with BC [45]. Many studies show that 30-50% of women with BC suffer from psychological disorders such as depression [46, 47]. Therefore, the Depression assessment is especially important. Planning interventions that might target improving depression symptoms might decrease the FOF symptoms. Most recent reviews on cancer and exercise reported that exercise programs during and after treatment improved depression symptoms and QOL [48, 49].

Our current study is the first to explore and find an association between fatigue and FOF among women with BC. The link between falling and its complications in women with BC, older adults and other different disease populations has been reported previously [50–52]. In this current study, we expanded these results to find that fatigue also increases the FOF among women with BC. Fatigue has been linked to many impairments that might cause FOF [50, 51]. The negative impact of fatigue on balance, gait, sleep quality, and depressive symptoms has been repeatedly reported in many populations [50, 52, 53]. Fatigue is a very distressing and common symptom in people with cancer [53, 54]. Fatigue prevalence ranges from 27% to 96% in women with BC [53, 54]. Fatigue also adversely affects daily activities, the ability to return to work, and participation in women with BC [50, 51, 53, 54]. Future research should target detecting fatigue as well as providing a suitable treatment for it to reduce the negative impact of FOF on women with BC.

In the present study, most of the participants were diagnosed with stage 3 or 4 of breast cancer. This would limit the generalizability of the results as women with late-stage (3 or 4) experience greater physical, psychological, and functional limitations compared to those with early-stage (1 or 2). Consequently, the fear of falling may be more pronounced in women with late-stage breast cancer (BC), and the factors associated with fear of falls could differ between early- and late-stage patients. Women with early-stage breast cancer may have distinct needs and health profiles compared to those with late-stage disease. Moreover, several treatment options are used to treat women with breast cancer, including surgery, chemotherapy, radiation, and hormonal therapy. Each of these treatments contributes to increasing the risk of FOF. For example. Surgery can reduce upper body muscle strength; chemotherapy can cause neuropathy; radiation often leads to localized pain and fatigue, and hormonal therapy may result in joint stiffness, pain, and limited mobility. Therefore, further studies including a wide spectrum of breast stages with different treatment options are needed to provide comprehensive insights.

Conclusion and Implications for Physiotherapy Practice

Our current study is the first to specify the potential factors (demographic, disease, and clinical) that could be associated with FOF among women with BC. FOF is associated with multiple factors (demographic, disease, and clinical factors). These factors are age, stage of breast cancer, depression, and fatigue.

The study findings point out the need for physiotherapists to embrace a multifaceted approach when addressing the fear of falling (FOF) among women with breast cancer (BC). As age, cancer stage, depression, and fatigue were identified as key factors associated with

FOF, physiotherapists should integrate comprehensive assessments of these factors into routine clinical evaluations. Planning an Individualized intervention to improve physical function, manage fatigue, and address psychological aspects could significantly reduce FOF and its adverse consequences. Physiotherapists should also collaborate with multidisciplinary teams to ensure full care, including psychological support and patient education, to empower women with BC to regain confidence in their mobility. By prioritizing the evaluation and management of FOF, physiotherapists can play a critical role in improving quality of life, maintaining independence, and promoting overall recovery in this population.

Author Contribution Statement

AAR and AAS contributed to: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. HH contributed to Formal analysis, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing.

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Ethical Approval

The ethical approval for this study was obtained from the research committee at Isra University (SREC/23/01/075).

Conflicts of Interest

All the authors declare no conflicts of interest to disclose.

References

1. Sharkas G, Nimri OF, Tan'ni N. Cancer incidence in Jordan: 2017. Statistical Digest of the Jordan Cancer Registry. Amman (Jordan): Non-Communicable Diseases Directorate, Ministry of Health; 2020
2. Merino Bonilla JA, Torres Tabanera M, Ros Mendoza LH. Breast cancer in the 21st century: From early detection to new therapies. Radiologia. 2017;59(5):368-79. https://doi.org/10.1016/j.rx.2017.06.003.
3. Iddrisu M, Aziato L, Dedey F. Psychological and physical effects of breast cancer diagnosis and treatment on young ghanaian women: A qualitative study. BMC Psychiatry. 2020;20(1):353. https://doi.org/10.1186/s12888-020-02760-4.
4. Basal C, Vertosick E, Gillis TA, Li Q, Bao T, Vickers A, et al. Joint pain and falls among women with breast cancer on aromatase inhibitors. Support Care Cancer. 2019;27(6):2195-202. https://doi.org/10.1007/s00520-018-4495-4.
5. Blackwood J, Rybicki K. Assessment of gait speed and timed up and go measures as predictors of falls in older breast cancer survivors. Integr Cancer Ther. 2021;20:15347354211006462. https://doi.org/10.1177/15347354211006462.
6. Huang MH, Blackwood J, Godoshian M, Pfalzer L. Predictors of falls in older survivors of breast and prostate cancer: A retrospective cohort study of surveillance, epidemiology and end results-medicare health outcomes survey linkage. J Geriatr Oncol. 2019;10(1):89-97. https://doi.org/10.1016/j.jgo.2018.04.009.
7. McCrary JM, Goldstein D, Trinh T, Timmins HC, Li T, Menant J, et al. Balance deficits and functional disability in cancer survivors exposed to neurotoxic cancer treatments. J Natl Compr Canc Netw. 2019;17(8):949-55. https://doi.org/10.6004/jnccn.2019.7290.
8. Maass S, Boerman LM, Verhaak PFM, Du J, de Bock GH, Berendsen AJ. Long-term psychological distress in breast cancer survivors and their matched controls: A cross-sectional study. Maturitas. 2019;130:6-12. https://doi.org/10.1016/j.maturitas.2019.09.003.
9. Scheffer AC, Schuurmans MJ, van Dijk N, van der Hooft T, de Rooij SE. Fear of falling: Measurement strategy, prevalence, risk factors and consequences among older persons. Age Ageing. 2008;37(1):19-24. https://doi.org/10.1093/ageing/afm169.
10. Niederer D, Schmidt K, Vogt L, Egen J, Klingler J, Hübscher M, et al. Functional capacity and fear of falling in cancer patients undergoing chemotherapy. Gait Posture. 2014;39(3):865-9. https://doi.org/10.1016/j.gaitpost.2013.11.014.
11. Sattar S, Spoelstra SL, Alibhai SMH, Puts MTE. Circumstances of falls and fear of falling in community-dwelling older adults with cancer: Results from a mixed-methods study. Journal of geriatric oncology. 2019;10(1):105-11. https://doi.org/10.1016/j.jgo.2018.08.005.
12. Overcash JA, Rivera HR, Van Schaick J. An analysis of falls experienced by older adult patients diagnosed with cancer. Oncol Nurs Forum. 2010;37(5):573-80. https://doi.org/10.1188/10.Onf.573-580.
13. Aburub AS, S PP, Curcio CL, Guerra RO, Auais M. Fear of falling in community-dwelling older adults diagnosed with cancer: A report from the international mobility in aging study (imias). J Geriatr Oncol. 2020;11(4):603-9. https://doi.org/10.1016/j.jgo.2019.09.001.
14. Brown LA, Doan JB, McKenzie NC, Cooper SA. Anxiety-mediated gait adaptations reduce errors of obstacle negotiation among younger and older adults: Implications for fall risk. Gait Posture. 2006;24(4):418-23. https://doi.org/10.1016/j.gaitpost.2005.09.013.
15. Gunn H, Creanor S, Haas B, Marsden J, Freeman J. Risk factors for falls in multiple sclerosis: An observational study. Mult Scler. 2013;19(14):1913-22. https://doi.org/10.1177/1352458513488233.
16. Alghadir AH, Al-Momani M, Marchetti GF, Whitney SL. Cross-cultural adaptation and measurement properties of the arabic version of the fall efficacy scale international. Neurosciences (Riyadh). 2015;20(3):230-5. https://doi.org/10.17712/nsj.2015.3.20140728.
17. Khalil H, Al-Shorman A, El-Salem K, Abdo N, Alghwiri AA, Aburub A, et al. Fear of falling in people with multiple sclerosis: Which clinical characteristics are important? Phys Ther. 2017;97(7):698-706. https://doi.org/10.1093/ptj/pzx044.
18. Salem D, Adel A, Essa A, Alorabi M, Elsayed Z. Feasibility and reliability of the revised edmonton symptom assessment system (esas-r) in egyptian patients with advanced cancer: A single institutional experience. Oncol Transl Med. 2016;2:132-7. https://doi.org/10.1007/s10330-016-0134-z.
19. Terkawi AS, Tsang S, AlKahtani GJ, Al-Mousa SH, Al Musaed S, AlZoraigi US, et al. Development and validation of arabic version of the hospital anxiety and depression scale. Saudi J Anaesth. 2017;11(Suppl 1):S11-s8. https://doi.org/10.4103/sja.SJA_43_17.

20. Halabi JO. Psychometric properties of the arabic version of quality of life index. J Adv Nurs. 2006;55(5):604-10. https://doi.org/10.1111/j.1365-2648.2006.03952_1.x.
21. Bartula I, Sherman KA. The female sexual functioning index (fsfi): Evaluation of acceptability, reliability, and validity in women with breast cancer. Support Care Cancer. 2015;23(9):2633-41. https://doi.org/10.1007/s00520-015-2623-y.
22. Anis TH, Gheit SA, Saied HS, Al kherbash SA. Arabic translation of female sexual function index and validation in an egyptian population. J Sex Med. 2011;8(12):3370-8. https://doi.org/10.1111/j.1743-6109.2011.02471.x.
23. Alawami AS, Abdulla FA. Psychometric properties of an arabic translation of the modified fatigue impact scale in patients with multiple sclerosis. Disabil Rehabil. 2021;43(22):3251-9. https://doi.org/10.1080/09638288.2020.1731853.
24. Buysse DJ, Reynolds CF, 3rd, Monk TH, Berman SR, Kupfer DJ. The pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213. https://doi.org/10.1016/0165-1781(89)90047-4.
25. Akoglu H. User's guide to correlation coefficients. Turk J Emerg Med. 2018;18(3):91-3. https://doi.org/10.1016/j.tjem.2018.08.001.
26. Mukaka MM. Statistics corner: A guide to appropriate use of correlation coefficient in medical research. Malawi Med J. 2012;24(3):69-71.
27. Hair JF. Multivariate data analysis.
28. Hoang OT, Jullamate P, Piphatvanitcha N, Rosenberg E. Factors related to fear of falling among community-dwelling older adults. J Clin Nurs. 2017;26(1-2):68-76. https://doi.org/10.1111/jocn.13337.
29. Scarlett L, Baikie E, Chan SWY. Fear of falling and emotional regulation in older adults. Aging Ment Health. 2019;23(12):1684-90. https://doi.org/10.1080/13607863.2018.1506749.
30. Lee S, Lee C, Ory MG, Won J, Towne SD, Jr., Wang S, et al. Fear of outdoor falling among community-dwelling middle-aged and older adults: The role of neighborhood environments. Gerontologist. 2018;58(6):1065-74. https://doi.org/10.1093/geront/gnx123.
31. Dierking L, Markides K, Al Snih S, Kristen Peek M. Fear of falling in older mexican americans: A longitudinal study of incidence and predictive factors. J Am Geriatr Soc. 2016;64(12):2560-5. https://doi.org/10.1111/jgs.14496.
32. Chang HT, Chen HC, Chou P. Factors associated with fear of falling among community-dwelling older adults in the shih-pai study in taiwan. PLoS One. 2016;11(3):e0150612. https://doi.org/10.1371/journal.pone.0150612.
33. Toraman A, Yildirim NU. The falling risk and physical fitness in older people. Arch Gerontol Geriatr. 2010;51(2):222-6. https://doi.org/10.1016/j.archger.2009.10.012.
34. Murphy SL, Dubin JA, Gill TM. The development of fear of falling among community-living older women: Predisposing factors and subsequent fall events. J Gerontol A Biol Sci Med Sci. 2003;58(10):M943-7. https://doi.org/10.1093/gerona/58.10.m943.
35. Duray M, Genç A. The relationship between physical fitness and falling risk and fear of falling in community-dwelling elderly people with different physical activity levels. Turk J Med Sci. 2017;47(2):455-62. https://doi.org/10.3906/sag-1511-101.
36. Possamai LT, Zogo A, Boni J, Jacques M, Dorst LM, Dorst DB. Fitness for elders: A comparison between practioners and non-practioners of exercise. Age (Dordr). 2015;37(3):9772. https://doi.org/10.1007/s11357-015-9772-2.
37. Kang GE, Murphy TK, Kunik ME, Badr HJ, Workeneh BT, Yellapragada SV, et al. The detrimental association between fear of falling and motor performance in older cancer patients with chemotherapy-induced peripheral neuropathy. Gait Posture. 2021;88:161-6. https://doi.org/10.1016/j.gaitpost.2021.05.022.
38. Spoelstra SL, Given BA, Schutte DL, Sikorskii A, You M, Given CW. Do older adults with cancer fall more often? A comparative analysis of falls in those with and without cancer. Oncol Nurs Forum. 2013;40(2):E69-78. https://doi.org/10.1188/13.Onf.E69-e78.
39. de Mello Ramirez Medina J, de Araujo Trugilho I, Mendes GNB, Silva JG, da Silva Paiva MA, de Aguiar SS, et al. Advanced clinical stage at diagnosis of breast cancer is associated with poorer health-related quality of life: A cross-sectional study. Eur J Breast Health. 2019;15(1):26-31. https://doi.org/10.5152/ejbh.2018.4297.
40. van Haastregt JC, Zijlstra GA, van Rossum E, van Eijk JT, Kempen GI. Feelings of anxiety and symptoms of depression in community-living older persons who avoid activity for fear of falling. Am J Geriatr Psychiatry. 2008;16(3):186-93. https://doi.org/10.1097/JGP.0b013e3181591c1e.
41. Akyol Y, Ulus Y, Tander B, Tomak L, Zahiroğlu Y, Bilgici A, et al. Falls, fear of falling, and associated factors in ambulatory patients with rheumatoid arthritis: A comparative study with healthy controls. Turk J Phys Med Rehabil. 2018;64(3):213-21. https://doi.org/10.5606/tftrd.2018.1687.
42. Lindholm B, Hagell P, Hansson O, Nilsson MH. Factors associated with fear of falling in people with parkinson's disease. BMC Neurol. 2014;14:19. https://doi.org/10.1186/1471-2377-14-19.
43. Huang MH, Blackwood J, Godoshian M, Pfalzer L. Factors associated with self-reported falls, balance or walking difficulty in older survivors of breast, colorectal, lung, or prostate cancer: Results from surveillance, epidemiology, and end results-medicare health outcomes survey linkage. PLoS One. 2018;13(12):e0208573. https://doi.org/10.1371/journal.pone.0208573.
44. Capone LJ, Albert NM, Bena JF, Tang AS. Predictors of a fall event in hospitalized patients with cancer. Oncol Nurs Forum. 2012;39(5):E407-15. https://doi.org/10.1188/12.Onf.E407-e415.
45. Sadaqa D, Farraj A, Naseef H, Alsaid H, Al-Shami N, AbuKhalil AD. Risk of developing depression among breast cancer patients in palestine. BMC Cancer. 2022;22(1):295. https://doi.org/10.1186/s12885-022-09420-8.
46. Tsaras K, Papathanasiou IV, Mitsi D, Veneti A, Kelesi M, Zyga S, et al. Assessment of depression and anxiety in breast cancer patients: Prevalence and associated factors. Asian Pac J Cancer Prev. 2018;19(6):1661-9. https://doi.org/10.22034/apjcp.2018.19.6.1661.
47. Somerset W, Stout SC, Miller AH, Musselman D. Breast cancer and depression. Oncology (Williston Park, NY). 2004;18(8):1021-34.
48. Singh B, Olds T, Curtis R, Dumuid D, Virgara R, Watson A, et al. Effectiveness of physical activity interventions for improving depression, anxiety and distress: An overview of systematic reviews. Br J Sports Med. 2023;57(18):1203-9. https://doi.org/10.1136/bjsports-2022-106195.
49. Aydin M, Kose E, Odabas I, Meric Bingul B, Demirci D, Aydin Z. The effect of exercise on life quality and depression levels of breast cancer patients. Asian Pac J Cancer Prev. 2021;22(3):725-32. https://doi.org/10.31557/apjcp.2021.22.3.725.
50. Ancoli-Israel S, Moore PJ, Jones V. The relationship between fatigue and sleep in cancer patients: A review. Eur J Cancer Care (Engl). 2001;10(4):245-55. https://doi.org/10.1046/

j.1365-2354.2001.00263.x.
51. Jacobsen PB, Donovan KA, Weitzner MA. Distinguishing fatigue and depression in patients with cancer. Semin Clin Neuropsychiatry. 2003;8(4):229-40.
52. He Y, Zhang H, Song M, Wu H, Pi H. Association between fatigue and falls risk among the elderly aged over 75 years in china: The chain mediating role of falls efficacy and lower limb function. Front Public Health. 2022;10:850533. https://doi.org/10.3389/fpubh.2022.850533.
53. Goedendorp MM, Jacobsen PB, Andrykowski MA. Fatigue screening in breast cancer patients: Identifying likely cases of cancer-related fatigue. Psychooncology. 2016;25(3):275-81. https://doi.org/10.1002/pon.3907.
54. Bower JE. Cancer-related fatigue--mechanisms, risk factors, and treatments. Nat Rev Clin Oncol. 2014;11(10):597-609. https://doi.org/10.1038/nrclinonc.2014.127.