Original Article

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Assessment of Knowledge, Attitude, nutritional Practice and physical activity and its relation with quality of life in patients with breast cancer

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ABSTRACT

Background: The aim of this study was to assess the correlation between nutritional knowledge, Attitude, and Practice (KAP) and physical activity (PA) on the quality of life (QOL) in women with breast cancer (BC).

Methods: This cross-sectional study involved all women with BC who referred to Imam Khomeini Hospital in Tehran during the years 2018-2019 that by using Cochran formula, 220 of them were selected by convenience sampling and answered the questionnaire including Global Physical Activity Questionnaire (GPAQ), Nutritional Knowledge, Attitude, Practice Survey (KAP) and Quality of life Questionnaire for breast cancer patients (QLQ-30). To determine the share of nutritional variables and physical activity (PA) in predicting QOL, standard multiple regression was used by SPSS 22 software.

Results: The findings of the study showed that the BC patients' PA (109.61±110.831), QOL (49.805±16.830) and KAP (K= 46.028±11.879; A=45.540±19.754; P=46.870±12.362) were not in a good condition.The best functional outcomes of QLQ-30 questionnaire were found for social functioning (73.560±26.873) and role functioning (73.560±26.873) subscales whereas emotional functioning was found lowest (58.257±24.298).Also, the results showed thatNutrition-RelatedKnowledge (β=144; P=0.036), Attitudes (β=160; P=0.038), and Practice (β=0.596; P=0.045) and PA (β=0.042; P=0.001) were significant factorsinpredictingcancer patients' quality of life.

Conclusion: The study showed that active patients have a good QOL, also, right nutritional choices and performance by the patients can result in better quality of life, therefore, the patients should receive special interventions at this time.

Keywords: Breast Cancer, Nutritional Knowledge, Nutritional Attitude, Nutritional Function, Physical Activity, Quality of Life

INTRODUCTION:

Breast cancer (BC) is known as the most common cancer among women and also the second most common cause of death worldwide (1). According to the World Health Organization, the incidence rate of this disease will annually increase from 1.8 to 2 percent (2) and they are at a high risk of developing some complications that can influence their quality of life (QOL).

QOL is a subjective phenomenon, so, it is difficult to give a clear definition of it. However, Some researchers defined it as "individuals' overall satisfaction with life and their general sense of personal well-being, that could be affected by the physical and mental health status (3). Even though, nowadays several advance clinical procedures in BC treatment have allowed patients to live for a longer time; however, patients are concerned about the symptoms of disease and side effects of cancer therapy, including infertility problems, symptoms of menopause, recurrence and the incidence of secondary malignancies (4). These problems also include the psychological and emotional effects of illness, stress, pain, depression, effects of illness on family, social relationships and economic problems, nutritional issues and physical activity (PA) (5). These facts may create some important problems in psychological adjustments and caused the reduced QOL (6). Because women are one of the most important pillars of the family and society, improving the QOL in women afflicted with BC could lead to the improvement of the QOL in the family and the society (7). On the other hand, since the primary goal of treating chronic diseases is improving the QOL by reducing the effects of the disease, the study of QOL and the factors related to QOL in these patients can be considered as one of the important indicators of treatment and care worldwide (8).

So far, different tools have been used to assess the quality of life of patients. The treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) is the most frequently used questionnaires to measure QOL in patients with cancer. In this way, many studies suggested a poor QOL in women with BC in Iran (9-12), whereas, others showed that QOL of cancer patients was suitable in Tehran (13). On the other hand this questionnaire covers multiple functioning domains and symptoms, and it also has 2-item scale for making a global assessment of QOL (9). In fact, one of the most important therapeutic goals in these patients,is to maximize occupational abilities and improving performance of physical, mental and social aspects of QOL. (14) However, many studies indicated there was no significant correlation between some demographic characteristics and patients' QOL (12, 15), in some other studies there was such a correlation (14), forexample a study suggest that educated group compare with uneducated group was more concerned about their future that may affected QOL, also a better performance status correlated very well with better Functioning scores (3). Therefore, further clarifications are required in this regard.

Nevertheless, it has suggested that regular PA might help manage the side effects of a cancer diagnosis and treatment because PA is an intervention that improves muscular strength and cardiovascular endurance, increases overall energy levels and the physical capability to complete daily tasks, and reduces risk for chronic diseases. Research indicates that regular PA or exercise, also, stimulates positive psychological functioning and can be considered as an integral part of supportive care for these patients (16, 17). Hence, A growing number of clinical trials, suggested that being physically active after breast cancer diagnosis improved the survivors' QOL, while reducing their psychosocial distress and producing beneficial health outcomes for them (18-20), and lack of physical exercises is related to cancer development (21), whereas, a study concluded that PA had no effect on the psychological outcomes measured in breast cancer (22). On the other hand, the results of a research on the nutritional status of patients with BC showed that the risk of chronic diseases could be reduced when positive changes have been made in dietary habits (23). Therefore, the status should be immediately evaluated after diagnosis. Besides, the patients should be encouraged to maintain body weight and body mass index in an appropriate and healthy range, because the treatment can greatly improve life quality of these patients following a

balanced diet during and after BC (24). Also, factors that potentially facilitate or inhibit knowledge and attitude towards mental and physical health, have a considerable importance.Thus, the relationship between these critical factors and determining the factors affecting the QOL can provide some new solutions for medical staff to help cancer patients in managing their lives independently (25). Although, somestudies have suggested a link between nutritional knowledge, attitude, and practice(nutritional KAP) in cancer prevention or prevalence (26), the relationship between these factors with other factors affecting quality of life such as physical activity, educational and social levels and with quality of life in BC patients in Iran is still unknown. Because, due to the high prevalence of BC in Iran and the long survival of the patients with this disease (27), which causes them to be more involved with the effects and consequences of cancer (28), studies on identifying the factors affecting the QOL of BC patients are necessary. In the public health context, understanding how a healthy lifestyle like PA and nutritional status can influence QOL might aid in the formulation of policies that encourage PA participation and adherence to nutritional guidelines.However, little research has been done on performing a comprehensive study on the relationship among nutritional KAP and PA on the QOL of women with BC up to now,since research has mostly focused on specific interventions. Therefore, the researchers in this study attempted to address this issue- and our results may be of importance to such patients.

Material and methods

2.1 Participants and eligibility criteria

This descriptive cross-sectional study was performed on 220 patients with breast cancer, undergoing chemotherapy, treated in the Oncology department of Imam Khomeini Hospital in Tehran from 2018 to 2019 considering the Ethical issues in data collection. Theparticipants were selected using convenience sampling methods. Moreover, the sample size was calculated based on the Cochran's formula as follows, N= Z2P (1-P)/d2, with a=0.05, error level, d=0.01 and P=0.5(With assuming the maximum variability, which is equal to 50%). Therefore, a total of 250 people were included in this study, and in the data analysis, complete information of 220 of them was used. Figure 1 shows how to determine the sample size and the final number of subjects at the end

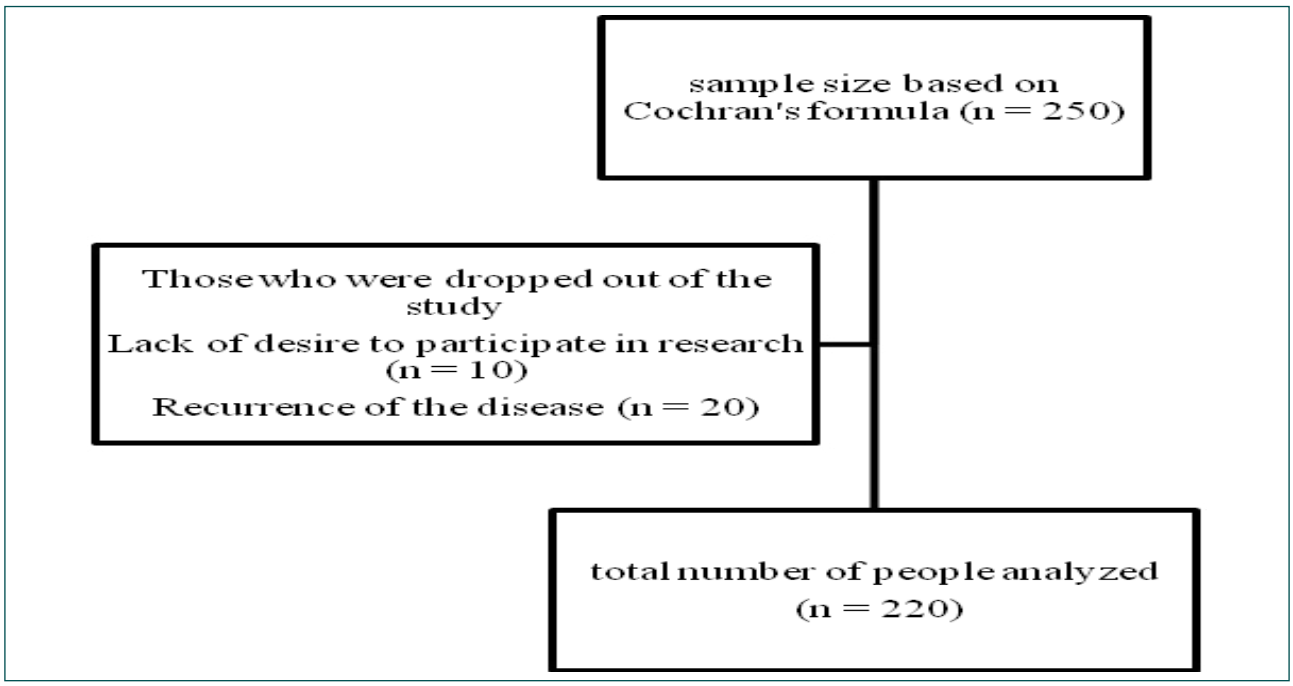

Figure.1. Participant flow chart

of the research period.Criteria for entering the research sample included the age range from 30 to 50 years old, being afflicted with breast cancer (all the patients were at the second stage of the diseases), not being concomitantly afflicted with other chronic diseases, no specific incident prior to the study, no history of psychiatric medication consumption, having no special diet for the past six months, and not being afflicted with sensory disturbances such as vision or hearing impairment affecting learning and narcotics taking. Accordingly, the above-mentioned criteria were assessed through the patient's medical file and self-report. The exclusion criteria were non-cooperation with the research process or inability of the subjects to answer the questionnaire, also, Patients with progression and the end-stage cases were not followed-up.After taking the permission from the research deputy of Imam Khomeini Hospital, the consent was obtained from all the participants in the study, and they were assured that the questionnaires were anonymous and confidential and the data would be analyzed as a group.

Socio-demographic data included age, education, marital status and clinical data consisting of disease stage and initial management were extracted from case records. Finally, the subjects completed the questionnaires in a quiet place provided for them in the hospital. We interviewed subjects who were unable to complete the questionnaire.

Patients responded to Global Physical Activity Questionnaire (GPAQ); Nutritional Knowledge, Attitude, and Practice (KAP) questionnaireand QLQ-C30 questionnaire.The value of $p = 0.05$ was considered to obtain the maximum sample size. Also, At the end of the study, people who could not fully answer the questions were excluded from the study.

2.2 Research Tools:

1-Global Physical Activity Questionnaire (GPAQ): this test has been used to examine the status of physical activity of the patients. This questionnaire, containing 14 questions, examines the level of physical activity of people in three situations (work, travel, and recreation) in the last 7 days. Subjects were defined as sufficiently active if they reported ≥150 min/week of PA as measured by the Active Australia Survey. If we consider based on MET (metabolic equivalent of task), according to the WHO guidelines, insufficient PA is defined as less than 600 MET-minutes/week of total energy expenditure from moderate or vigorous PA.The MET value of 4 was assigned for moderately intense PA and a value of 8 was assigned for vigorously intense PA. The assigned value MET was then multiplied by the number of days per week of PA and duration on a typical day for each domain of PA to create the amount of PA in metabolic equivalent of task-minutes per week (MET-minutes/week). The MET-minutes/week spent on each domain was then summed to create an overall PA level.The validity and reliability of this test has been reviewed and then confirmed by GholamiFesharaki and Azad (2011), respectively. Moreover, the reliability of the questionnaire using Cronbach's alpha and the open (re) test methods was found as 0.40 and 0.70, respectively (29).

2-Nutritional Knowledge, Attitude, and Practice (KAP) questionnaire special for cancer patients: This questionnaire is used to evaluate the status and level of nutritional information of patients. this questionnaire consists of three sections as follows: nutritional knowledge, attitude, and Practice. The knowledge section consisted of 10 questions which could be answered as "true" or "false". Each correct response scored as "1" and the incorrect one as "0". In the attitude section, 27 questions were given, which could be answered on Likert scale ranging from "strongly agree" to "strongly disagree". The scores ranged from "1-5", where "5" was the most positive and "1" was the most negative (total raw scores of "nutritional knowledge" ranged from 27 to 135). In the practice section, 17 questions were prepared with their response as" yes" or "no". each positive response in this section scored as "1"and negative responses were scored as "0". Finally, the total raw scores of "Knowledge, Attitude, and Practice" were proportionately transformed to 0–100. In order to evaluate the status of nutritional knowledge, attitude and practice, after calculating the scores of the three sections, the quarters of scores were

calculated and the first quarter was considered as weak, the second and third quarters as moderate and the last quarter as desirable. In addition, its validity and reliability have been evaluated and confirmed by Sasanfar et al (30).

3- EORTC QLQ-C30. V.3: This questionnaire belongs to the European Organization for Research and Treatment of Cancer, which is generally used to assess the quality of life in breast cancer patients. Accordingly, it measures 5 areas of physical function (5 questions): role play (2 questions), emotional function (4 questions), cognitive function (2 questions), and social function (2 questions) as well as 9 areas of severity of symptoms including fatigue (3 questions), nausea and vomiting (2 questions), pain (2 questions); shortness of breath; decreased sleep; decreased appetite; constipation; diarrhea; financial problems (each one question); and overall quality of life (19). After gathering the information from subjects the raw score for each subscale was calculated which then transferred to 0-100 scales according to the guidelines of EORTC (European Organization for Research and Treatment of Cancer) scoring manual. Higher scores in functional areas and overall score of quality of life indicate a person's better status in that area; however, in the area of symptoms, higher scores indicate that the symptoms and problems of the disease are more in the individual. The validity and reliability of this questionnaire have been evaluated and also confirmed in Safaei et al.'s (2007) study (31).

Cronbach's alpha value ranges from 0 to 1, and a score above 0.7 is generally regarded as acceptable. In this research, Reliability analysis yielded Cronbach's alpha value of 0.70; 0.739; 0.712; 0.766 and 0.795 for GPAQ, knowledge and attitude and practice scales and QLQ-C30. V.3 respectively.

for all scales, the raw score, RS, is the mean of the component items:

$$\text{Raw Score} = RS = \frac{(I_1 + I_2 + \ldots + I_n)}{n}$$

Standard Score, SS, for global health status/functional scales are calculated as:

$$SS = \{1 - \frac{(RS-1)}{range}\} \times 100$$

And SS for symptom scales/items are calculated as(32):

$$SS = \{1 - \frac{(RS-1)}{range}\} \times 100$$

2.3 Statistical analysis:

In order to analyze the data obtained from the research questionnaires, SPSS-22 statistical software was used at a statistical significance level of less than 0.05. Multiple regression model was also used to indicate the contribution of physical activity and nutrition components in prediction of the quality of life. To evaluate the research variables at the levels two demographic variables as the education and the social levels, independent t-test was used.

RESULTS:

In the present study, after data collection, descriptive and inferential statistics were used to analyze the obtained data. Table 1 shows an overview of demographic characteristics of breast cancer patients in this study. In this study, the mean age was 41.27±6.316 years old. The highest percentage of people were in the body mass index range (BMI) of 18.5 to 24.9.60% of people had an academic education.A high percentage of patients had mastectomy (73.6%).The reported HER2-positive percentage was low among patients (27.7%) which This type of cancer is invasive and grows rapidly.

Results of QOL questionnaire were summarized in figure 2 and 3 according to functional and symptoms scales. The best functional outcomes were found for social functioning (73.560±26.873) and role functioning (73.560±26.873) subscale whereas emotional functioning was low (58.257±24.298).

Table 2 shows the mean and standard deviation of the variables as well as the results of multiple regression coefficients to determine the share of nutritional variables and physical activity in predicting the quality of life of women with cancer. In the case of the PA variable, the

	Variable	Frequency (%)
BMI	Less than 18.5	7 (3.2)
	Between 18.5 and 24.9	84 (38.2)
	Between 25 and 29.9	60 (27.3)
	Between 30and 34.9	54 (24.5)
	More than 35	14 (6.4)
Education level	Illiterate	11 (5)
	Under Diploma	77 (35)
	Academic	132 (60)
Marital status	Single	32 (14.5)
	Married	188 (85.5)
Chemotherapy	Yes	190 (86.4)
	No	30 (13.6)
Hormone therapy	Yes	55 (25)
	No	165 (75)
Surgery type	Mastectomy	162 (73.6)
	Lumpectomy	56 (25.5)
	Breast restoration	2 (0.9)

Table 1. Demographic characteristics of the participants in the study (n=220)

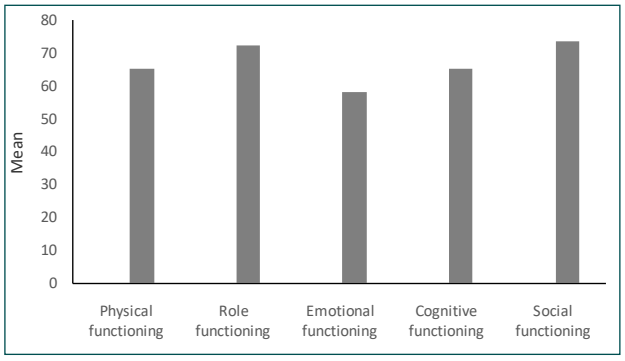

Figure.2. Distribution of mean scores of functional domains of quality of life in breast cancer patients

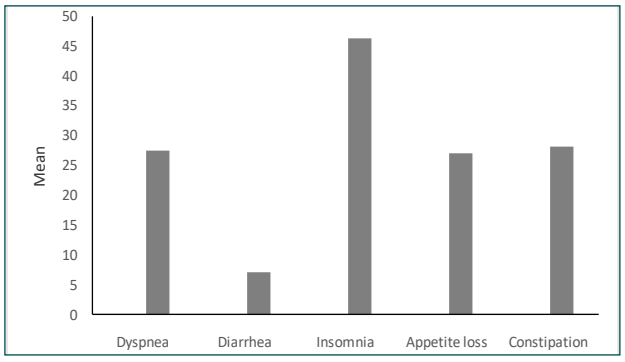

Figure.3. Distribution of mean scores of symptoms in breast cancer patients

minimum value was obtained as 0 and the maximum value was 540. Considering that the mean of this variable is 109.61±110.831, and it is less than 150 minutes per week; physical activity of cancer patients is not sufficient. According to MET, the average physical activity is 442.818±45.209 MET-minutes/week, which is well below the 600 MET-minutes/week recommend by the World Health Organization. The mean values of knowledge, attitude and practice were 46.028±11.879, 45.540±19.754 and 46.870±12.362 from 100 respectively. The level of variables of nutritional knowledge, nutritional attitude, and nutritional performancewere Less than 75% of the maximum score and therefore, were not in a desirable condition among the participants. Regarding the Total Quality of life Score of breast cancer patients, its average value was 49.805±16.830Which was less than the desirable situation.

Table 2 shows the results of multiple regression coefficients to determine the share of nutritional variables and physical activity in predicting the quality of life of women with cancer.The results of regression analysis, which was performed to predict quality of life through

Total Quality of life Score								
Predictor variable	**Mean ±SD**	**Min**	**Max**	**B**	**SE**	**β**	**T**	**P-value**
Nutritional knowledge	**46.028±11.879**	**27.7**	**64.3**	**0.023**	**0.011**	**0.144**	**2.119**	**0.036***
Nutritional attitude	**45.540±19.754**	**11**	**79**	**0.186**	**0.089**	**0.160**	**2.090**	**0.038***
Nutritional Practice	**46.870±12.362**	**24.11**	**69.5**	**0.596**	**0.296**	**0.158**	**2.014**	**0.045***
Physical activity	**109.61±110.831**	**0**	**540**	**0.042**	**0.009**	**0.310**	**4.832**	**0.001***

SD= standard deviation, SE= Standard Error, Min= Minimum level, Max= Maximum level, P= Level of Significance, B=Unstandardized coefficient, β=Standardized coefficient.

Table 2. Results of multiple regression of quality of life of women with breast cancer based on nutritional components and physical activity

		Variables	N	Mean±SD	T	P-value
Social levels	**Low Moderate**	**Nutritional knowledge**	**105** **115**	**45.070±11.572** **46.991±12.083**	**-1.325**	**0.139**
	Low **Moderate**	**Nutritional attitude**	**105** **115**	**44.832±4.567** **45.417±6.565**	**-0.561**	**0.314**
	Low **Moderate**	**Nutritional performance**	**105** **115**	**9.564±6.085** **64.905±16.729**	**-3.853**	**0.001***
	Low **Moderate**	**Physical activity**	**105** **115**	**93.857±105.706** **124±113.870**	**-2.029**	**0.034***
	Low **Moderate**	**Quality of life**	**105** **115**	**38.843±16.548** **50.683±17.107**	**2.858**	**0.002***
Educational level	**Under Diploma Diploma or Academic**	**Nutritional knowledge**	**88** **132**	**40.255±10.671** **51.621±11.960**	**-2.104**	**0.028***
	Under Diploma Diploma or Academic	**Nutritional attitude**	**88** **132**	**37.754±4.614** **47.050±6.166**	**-2.168**	**0.012***
	Under Diploma Diploma or Academic	**Nutritional performance**	**88** **132**	**57.558±11.288** **66.529±14.347**	**-2.012**	**0.041***
	Under Diploma Diploma or Academic	**Physical activity**	**88** **132**	**113.295±138.333** **107.159±88.381**	**0.369**	**0.113**
	Under Diploma Diploma or Academic	**Quality of life**	**88** **132**	**51.687±16.109** **47.667±17.368**	**1.438**	**0.087**

*Level of Significance (P<0.05)

Table 3. Comparison of Research Variables according to the Variable of Social Level and Educational Level

nutritional components and physical activity, showed that the coefficient of determination among nutritional and physical activity variables and the quality of life of cancer patients was 0.05. This value indicates that the regression model can relatively well fit the data. Table 2 shows the significance of the effect of independent variables or regression coefficients. In this regard, it can be said that Nutrition-Related Knowledge (β=144; P=0.036), Attitudes (β=160; P=0.038), and Practice (β=0.596; P=0.045) and PA (β=0.042; P=0.001) were significant factors in predicting cancer patients' quality of life.According to Table 3, the significance of the t-test of independent groups for the variable "nutritional performance, physical activity, and quality of life" was less than 0.05; we can conclude that the mean of this variable is significantly higher in people with moderate social status.Also, Since the significance value of t-test of independent groups for the variable "nutritional knowledge, nutritional attitude, and nutritional performance" was less than 0.05; we can conclude that the mean of these variables is significantly higher in individuals with Diploma or other academic studies degrees.

DISCUSSION

The results of the present study showed that the QOL of women with BC was low (49.805±16.830).In our study, were found the best functional outcomes for social functioning (73.560±26.873) and rolefunctioning (73.560±26.873) subscales whereas emotional functioning was low (58.257±24.298). In this regard, a study by Fincket et al. (2018) on 95 BC patients showed that the average QOL of these patients was low, too (9). These findings are also consistent with other studies (10, 11), but Hasanpour showed that the QOL in majority of studied subjects was fairly favourable (66%) andalso, factors which affected QOL of patients were performance score of the patients and socioeconomic status of disease (13). Jassimand et al in a study from Bahrain with a good sample size (n = 239), showed that global health score was good, and fatigue, sleep disturbance, and pain were the most upsetting symptoms. Moreover, scores for social functioning and emotional functioning were highest and lowest respectively (33). It seems that the differences can be due to the accuracy of these studies or different tools.

The level of nutritional knowledge, nutritional attitude, and nutritional performance, were not in a desirable condition(Less than 75% of the maximum score). The result for the mean of variable "nutritional performance, physical activity, and quality of life" can show that they are significantly higher in people with moderate social status. Also, we can conclude that "nutritional knowledge, nutritional attitude, and nutritional performance" are significantly higher in individuals with Diploma or other academic studies degrees. There are limited studies in this field in Iran and there was no study that was exactly the same as the present study for comparison, but in this regard Mardani and et al was determined that QOL had no correlation with higher education level and the circumstance of communicational life (12).Likewise, Nematolahi found no significant correlation between education and marital status as well as physical, mental, social and religious aspects and QOL (15). Also, Abdollahzadeh and et al showed that improving relationship with others along with providing mental and social support can provide social and individual development of patients (14).

Another result of the study is low level of PA in patients with BC. It can be stated that the participants were not in a good position in terms of PA status (109.61±110.831). Correspondingly, low level of PA can be one of the reasons for the low quality of life score in these patients. The results of our study are in line with the results of Nurnazahiah and et al' study that reported, Longer time spent on moderate to vigorous physical activity was significantly associated with an improvement of QOL, because, longer time spent on sedentary behaviour significantly reduced the functioning score (34). Also, Chen and et al suggested that regular exercise after breast cancer diagnosis improves QOL and women with higher exercise-MET scores (> or =8.3 MET-hours/week) were more likely to have higher scores for total QOL and specific QOL domains (19). However, another study reported that Exercise was not associated with QOL benefits,

but exercise was associated with improved social functioning among post-treatment survivors who reported low social functioning at baseline (22). It seems that, the differences between this result with our result may be due in part to relatively high baseline functioning among participants in both studies.

The research results also showed that there is relationship between nutritional KAP and QOL of the participates. Unfortunately, there is currently limited evidence that KAP is related to QOL in women with BC. Thus, these findings of our study may emphasize the need of further prospective and interventional studies on the factors related to nutrient and improvement of QOL among long-term BC survivors. The results of this study showed that the variables of nutritional KAP was not in a good condition among the patients and only were contradict with a research by Shorvarzi et al. (2016) which examined 385 households in urban and rural areas of Neishabour city showed that the levels of awareness, attitude, and performance in the field of practical principles of nutrition were moderate to good. They are also reported that lack of nutritional knowledge is one of the most important reasons for nutritional problems and consequently im¬proper practice which can lead to several complications (35). The findings of peresent study indicated significant relationship between PA and nutritional knowledge and attitude. Nutrition-Related Knowledge (β=144; P=0.036), Attitudes (β=160; P=0.038), and Practice (β=0.596; P=0.045) and PA (β=0.042; P=0.001) were significant factors in predicting cancer patients' quality of life. However, the results of a study by Kurniawan, (2018) suggest no significant relationship between the levels of PA and nutritional status while knowledge has a significant relationship with PA in pregnant women (36). On the other hand, this study showed that there is a significant relationship between PA and nutritional performance. At present it is unclear if the behaviors share a common determinant and whether interventions should target PA and nutrition separately or simultaneously to maximize its effectiveness. Therefore, we believed that using the data in the present study, in finding the associations between diet and PA can bring some novel findings for BC patients, which may not have been examined before.The present study also showed that there is a significant correlation between PA and QOL of patients with BC; and PA also has a significant effect on predicting the variable of QOL of cancer patients. Since, the BC patients often interrupted their work during treatment and become less physically active, thus spending more time each day seated at home, which may result in their overweight phenotype. Research has shown that an increased BMI is associated with a higher risk of disease recurrence (37). In addition, several studies have found that some specific PA programs have positive effects on muscular fitness and body composition, as well as positive biological changes such as immune function, psychosocial measures and other aspects of QOL (38, 39). For instance, study by Cenik et al. (2020) wasconcluded that exercise could improve patients' QOL by enhancing hand strength and body composition (39). On the other hand, fatigue and general pain are the most common side effects of cancer, that can ultimately reduce the QOL of the patients. However, there are negative correlations between physical functioning and these side effects of the disease. Moreover, there are positive correlations between physical, social, emotional functioning and a better self-evaluated QOL in cancer patients (37, 38, 40). In this regard, Shin et al. (2017) examined the effect of the relationship between PA and QOL using researcher-made questionnaires. They concluded that increasing the level of PA improves the physical performance of patientsand enhances their life quality in general (40).

In addition, based on the findings of this study, it can be concluded that the average variables of nutritional performance, PA, and QOL are significantly higher in people with moderate social level. These results are consistent with the results of a prospective study performed by Grills et al., (2018) which examined the effect of socioeconomic status on the QOL of patients with BC. According to this study, the QOL of women with BC is closely related to their social and economic statuses as well as the stage of disease progression. Therefore, it is mandatory to make the necessary interventions in the

social and economic statuses of patients to improve their QOL (41).In general, it can be said that patients with BC, experience a low QOL due to having physical, social, and psychological complications, and since having a good QOL is effective on improving cancer treatment, identifying those factors that can improve QOL is of crucial importance. In current study, we showed that QOL of BC patients was low and it was impacted by nutritional knowledge, attitude and practice and PA. Also, there was a positive correlation between educational level and nutritional KAP while there was no relationship between educational level and PA. This is the first studyto examine the relationship between nutrition-related attitude, knowledge and practice and physical activity to improve QOL in women with breast cancer. According to the results of the study, it is suggested that patients can reduce the complications of breast cancer and improve their QOL by increasing nutrition-related awareness and practice and increasing physical activity.

This is the first study that reporting, nutrition-related BC prevention KAP of female university students in Iran.

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The present study has also faced some limitations as follows. Firstly, this study was conducted among women with BC who were under the treatment at Imam Khomeini Hospital in Tehran; therefore, the generalization of the results to the entire community of women with BC should be done with caution. On the other in the present study there is a lack of a disease-free control group.Thus, it is recommended that similar studies be performed more carefully with the control group in the future.

CONCLUSION

Based on the results of the study, it can be stated that PA and nutritional status can predict the QOL in women with BC. Therefore, it is recommended that these factors should be considered in interventions in the field of health of patients with BC, and necessary measures should also be taken to raise the patients' awareness on the impact of sports activities on their QOL. Future studies are also needed by focusing more on the interventions related to the improvement of various dimensions of QOL of these patients in the form of clinical trial research by affecting the stated factors.

Code of Ethics

The present research was taken from the dissertation of the master's degree in sports physiology, which was implemented by the present authors with the ethics code of IR.SSRI.REC.1397.307 obtained from the "Ethics Research Committee" of the Sport Sciences Research Institute.

Acknowledgment

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Right to privacy and informed consent.

The authors declare that no patient data appear in this article.

Conflict of interest.

The authors declare that they have no conflict of interests.

Availability of data and materials

The datasets during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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