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Comparing physical Activity in women with and without breast cancer referred to Mahdieh MRI & CT Scan center of Hamedan in Iran.

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ABSTRACT

Breast cancer is the most common malignancy diagnosed in women. Physical activities are recognized as a way of treating health problems and diseases. Today, the modification of lifestyle including physical activities and exercises are used to improve life expectancy in patients with breast cancer. Based on this, a research aimed to compare physical activities in women with and without breast cancer referred to Mahdieh MRI & CT Scan center of Hamedan in 2013 is conducted .This case- control study is conducted on 232 women with breast cancer and without breast cancer referred to Mahdieh MRI center of Hamedan in 2013 using Random sampling method. Data are collected using the International Physical Activity Questionnaire (IPAQ) and analyzed with the help of SPSS-17 using descriptive statistics and Mann-Whitney test, t-test and Chi-square. Results obtained from data analysis showed that there exists statistically significant difference between the two groups in terms of physical activity ($p < 0.001$) that this statistical difference is significant both in intensity of physical activity and also in sitting time between the two groups. And women with low intensity of physical activity were at greater risk of breast cancer**.** The results of this study demonstrated physical activity is in relation with breast cancer. Therefore, women with breast cancer should be encouraged to increase physical activity.

Keywords: Breast cancer; Lifestyle; Physical Activity.

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BACKGROUND

Breast cancer is the most common cancer in women [1] and the leading cause of deaths in women with cancer [2,3]. It is estimated that one million new cases of breast cancer are diagnosed each year in women and over 400,000 women die of breast cancer each year [4,5]. It is also reported that the incidence of breast cancer is increasing in developing countries by 5% per year [6]. Although genetic influences the incidence of breast cancer, but many non-genetic factors such as weight, physical activity and healthy diet reduce breast cancer progression and death caused by it [7].

Studying lifestyle factors that may affect the survival rate of breast cancer is increasing [8]. Epidemiologic investigation of breast cancer has identified a number of environmental and lifestyle risk factors [9]. One of the factors that affect the lifestyle is physical activity that based on studies is categorized as preventable risk factor [6]. Regular physical activity, as an important health promoting behavior can prevent or delay different types of chronic diseases and early death[10]. Physical inactivity also is linked to lower life expectancy. Conversely, higher levels of physical activity are associated with lower risk of mortality and longer life expectancy. Physical activity reduces the risk of breast cancer, colon cancer and also reduces heart disease, hypertension and diabetes [7].

Beneficial effects of physical activity may be reduction of body fat, changes in body metabolism and sex hormones, reducing blood estrogen and insulin growth factor-1, adipokines, immune function, or inflammation [11]. Because physical activity prevents weight gain and obesity, it also prevents all cancers associated with high weight including breast cancer [7]. Most current studies suggest a reduced risk of breast cancer associated with increased physical activity. Many investigations suggests that exercise may be an effective intervention for enhancing quality of life in women with breast cancer. Also rate of reduction of breast cancer risk in people with high physical activity compared with those who have less physical activity is an average of 20-40% and in some studies, this reduction is reported up to 70%[12]. But in the studies there is no certainty opinion about the effect of physical activity on breast cancer in women[13, 14].

Objectives

Given the consequences of breast cancer and its constant increase and due to the impact of physical activity on breast cancer survival rate of people with breast cancer and lack of a comprehensive study in this area, a study is designed with the objective of comparing physical activity in women with and without breast cancer referred to MRI & CT Scan Center of Hamedan, in 2013.

PATIENTS AND METHODS

Population of the Study and Location

This case- control study was conducted on 116 women with breast cancer and 116 healthy women presenting to Mahdieh MRI center in Hamedan in 2013. After approval of study, the permission obtained from the Research Deputy of Hamedan University of Medical Sciences was presented to the Director of Mahdieh MRI & CT Scan center. This center is a referral public center for patients with breast cancer Who want to complete their treatment. A random sampling method was used, among patients with the following inclusion criteria: age 20-60 years, regular menstrual cycles, no history of hormone-dependent diseases such as diabetes, Hyperthyroidism, polycystic ovary syndrome, the first stage of the breast cancer.

The two groups were matched for variables related to breast cancer including age, Weight, age of menarche, BMI, history of cancer in family, breast feeding and infertility.

Sample Size, Power, and Precision

Sample size was estimated using the following formula: $n \geq [\ \frac{(z_{1-\alpha/2} + z_{\beta})^2}{0.5 \times 1[(1+r)/(1-r)]}\ ]2+3$ with 95% confidence interval, a sample size of 116 participants was required.

Ethical Consideration

Every ethical consideration was observed. Participants were informed about the purpose and methods of the study and the interested women were invited to participate in this study. Also, written informed consents were obtained from these subjects. Pathologically cancer was confirmed in one point in the breast in subjects with breast cancer, and Subjects without breast cancer included those referred to Mahdieh MRI & CT Scan center for other reasons.

Study Tools

Data collection tools included demographic, Physical Activity Questionnaires, Tape measure and scale. Physical activity level is investigated by trained researcher using the long form of the International Physical Activity Questionnaire (IPAQ). The reliability and validity of these questionnaires previously have been studied in Iran[3]. The participants are asked to state their moderate and severe physical activity that is done. This questionnaire consisted of 27 questions to assess the time spent for physical activity per week before breast cancer for different types and intensities. The type and intensity value of physical activities according to published protocols are presented as follows: (for walking= 3.3 MET, moderate activity=4 MET, vigorous activity=8 MET). MET value (metabolic equivalent) for each type of physical activity (i.e., occupational, transportation, domestic chores, gardening and leisure) is first multiplied by minutes and then days of the week. Physical activity is referred to the sum of points obtained from the IPAQ physical activity questionnaire. According to IPAQ, people are classified based on MET values to three groups with low activity (less than 600 MET), moderate activity (between 600 and 3,000 MET) and high activity (more than 3,000 MET). International Physical Activity Questionnaire (IPAQ) is a global standard questionnaire whose validity and reliability have been confirmed in various studies [15-18]. Content validity was used for validity, and test-retest was used for reliability of physical activity questionnaire. Pearson's correlation coefficient was 0.81 for physical activity questionnaire.

A non-flexible metal tape measure (Laika, Italy) and a scale (Secca, Germany) were used to measure height and weight, respectively. The scale was validated using a standard 1-kg weight, and calibrated with the same weight after every 10 times of weighing, according to manufacturer's recommendation. The reliability of the tape measure was measured using a standard non-flexible tape measure that was not affected by climatic conditions.

Data analysis

At the end, data are analyzed using SPSS-16 software. The t-test, Odds ratio, Chi-square test were used to compare between 2 groups and $\alpha = 0.05$ was considered as the level of statistical significance.

RESULTS

Results obtained from Demographic characteristics of 116 women with breast cancer and 116 women without it are shown in Table 1. Distribution and comparison of frequency of physical activity in the 2 groups are shown in Table 2. Present study demonstrates significant statistical differences in terms of physical activity among individuals with breast cancer and without it ($p < 0.001$). In fact, most women with breast cancer had a low-intensity physical activity, while most healthy people had moderate-intensity physical activity. Average physical activity was significantly higher in healthy subjects and there was a significant difference between 2 groups in terms of mean physical activity ($p < 0.001$).

Also, average sitting time and inactivity were significantly higher in people with cancer and there was a significant difference between the 2 groups ($p < 0.001$). In table 2 odds ratio were calculated to determine whether intensity of physical activity is a protective factor for breast cancer. For this purpose, low intensity of physical activity was considered as a risk factor and moderate to severe intensity of PA as a protective factor.After the calculation of the odds ratio was found that low physical activity is a risk factor for breast cancer (OR=5.14,CI:2.8-9.4,P<0.001).

Distribution and comparison of the physical activity average score in different dimensions among 2 groups are shown in Table 3. Average occupational physical activities, commuting physical activities, domestic

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chores and leisure-time activities in healthy subjects were higher than women with breast cancer that this difference was statistically significant in the mean commuting physical activities and leisure-time activities between the two groups.

Table 1. Demographic characteristics of the 2 groups.

Variables	Breast Cancer	Non Breast Cancer	P value
Age (years) (M±D)	50.07±14.92	50.12±6.39	**P=0.8**
Weight (kg) (M±D)	69.65±14.05	63.60±9.11	**P=0.2**
BMI (kg/m²) (M±D)	26.08±4.84	24.52±4.23	**P=0.4**
Menarche age (years)(M±D)	13.77±2.55	13.8 ± 1.56	**P=0.8**
Education (%)			**P=0.35**
>High school	39.5%	62%	
<High school	60.5%	38%	
Husband's education (%)			**P=0.09**
>High school	34.5%	18.5%	
<High school	65.5%	81.5	
Occupation (%)			**P=0.15**
housewife	67.25%	77.5%	
employee	42.24%	67.25%	
Husband's occupation (%)			**P=0.62**
self-employed	34.5%	32.8%	
employee	74.13%	75.86%	
Income ($) (%)			**P=0.21**
<500	65.5%	60.5%	
≥500	19.5%	22%	
Marital status (%)			**P=0.65**
married	53.4%	58.6%	
single	46.6%	41.4%	

Table 2. Comparison of frequency of physical activities in the 2 groups

Intensity of physical activity	Breast Cancer Number (Percent)	Non Breast Cancer Number (Percent)	P value	Odds Ratio OR=5.14
Low-intensity physical activity	60(51.7%)	20(17.25%)	p <0.001	**CI=**2.8-9.4
Moderate-intensity physical activity	40(34.5%)	60(51.75%)	p< 0.001	**Z=**5.31
High-intensity physical activity	16(13.8%)	36(31%)	p < 0.001	**p** < 0.001
physical activity (Mean±SD)	600.15±420.11	1775.5±1510.45	p < 0.001	

Table3. Distribution and comparison of the physical activity average score in different dimensions among 2 groups

Groups	Breast Cancer	Non Breast Cancer	P value
Physical activity	**mean±SD**	**mean±SD**	
Occupational	62.8±32.2	70.6±38.8	p = 0.156
Transportation	237.18±101.5	389.3±152.4	p = 0.004
Domestic chores	404.7±125.12	428.8±136.15	p = 0.2
Leisure	188.77±65.11	265.24±112.8	p = 0.001
Sitting time	60.88±19.5	29.12±13.4	p < 0.001

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DISCUSSION

In this study, mean physical activity was higher in healthy subjects compared to infected subjects and obtained results showed significant statistical difference in terms of physical activity among subjects with breast cancer and subjects without it ($p < 0.001$). Also, average sitting time and inactivity were significantly higher in people with cancer and there was a significant difference between the 2 groups ($p < 0.001$), that demonstrated physical activity's positive affect on breast cancer. Okobia and Bunker showed that physical activity may reduce the risk of breast cancer by reducing the body weight, delaying menarche, and establishing regular menstrual periods [19,20]. There is no study that has examined the impact of physical activity on breast cancer up to now and few studies demonstrate the impact of physical activity prior to breast cancer diagnosis on survival rate [11]. The results of these studies showed positive effects of physical activity on survival rate of people with breast cancer [21]. In study conducted by Holmes and colleagues, increasing physical activity reduced the death rate caused by all kinds of cancers after diagnosis up to 2 years, also it reported that recreational physical activity may increase survival rate, but it is unclear whether activity undertaken either immediately before diagnosis, or after diagnosis, or both influence on survival rate [22].

This complies with the current research. But some studies stated no significant association between physical activities in the years before diagnosis and the survival rate in patients with breast cancer [23]. There are conflicting data about physical activity and the probability of breast cancer recurrence. Some studies have demonstrated that moderate-intensity physical activity may reduce breast cancer recurrence but some have suggested no association between the two [24]. Amount of physical activity to reduce the risk of breast cancer varies in different studies; however, most of the studies necessitate 2-3 hours per week of physical activity. In this study, the intensity of physical activity in healthy subjects was more than infected subjects. Irwin et al. demonstrated in their study that any moderate-intensity physical activity such as quick walking reduced breast cancer by 65% after diagnosis. Also 2.5 hours per week of moderate intensity exercise reduces breast cancer and mortality by 67% compared with passive subjects [11]. The two groups were matched for variables related to breast cancer including age, Weight, age of menarche and BMI, and Two groups were not significantly different in terms of age, Weight, age of menarche, BMI and abortion. In some studies the association between induced abortion and breast cancer was stated and Most studies have stated that increasing the number of accouchements is associated with a lower risk of breast cancer. Menarche age, menopause age, irregular menstruation, lactation and number of accouchements are known as risk factors of breast cancer and it is stated that early Menarche and late menopause increase the risk of breast cancer [19].

Strong points of the Study

Breast cancer is highly prevalent, and physical activity is a risk factor associated with breast cancer that can be modified. Training and increasing awareness of women and girls about physical activity reduce the risk of breast cancer.

Limitations of the Study

This study was done on women referred to MRI center who maybe aren't the representative of all of the women and the results cannot be generalized to all the women of the child-bearing age.

CONCLUSIONS

Women make up nearly half of the world's population and their health is very important. Due to the high prevalence of breast cancer and growing trend of breast cancer in Iran, reflection and addressing this issue through recognition of effective physical activities on breast cancer to reduce the incidence and mortality rate associated with it is necessary. According to the results of this study, most women with breast cancer were more sedentary compared to healthy individuals. It is expected that physical activity is probably one of the most important factors affecting breast cancer and with proper physical activity, breast cancer can be prevented or mortality rate associated with it can be reduced.

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Authors' Contribution

Maryam Atallahi participated in design and data collection, and writing the manuscript, Zahra Masomi helped in design and writing the manuscript, Sedigheh Sedighi helped in statistical analysis, Khodayar Oshvandi helped in writing the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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REFERENCES

[1] Wells BL, Horm JW. Stage at diagnosis in breast cancer: race and socioeconomic factors. American Journal of Public Health. 1992;82(10):1383-1385.
[2] Minn AJ, Kang Y, Serganova I, et al. Distinct organ-specific metastatic potential of individual breast cancer cells and primary tumors. Journal of Clinical Investigation. 2005;115(1):44-55.
[3] Khazaee-Pool M, Montazeri A, Majlessi F, Foroushani AR, Nedjat S, Shojaeizadeh D. Breast cancer-preventive behaviors: exploring Iranian women's experiences. BMC women's health. 2014;14(1):41.
[4] Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. CA: a cancer journal for clinicians. 2005;55(2):74-108.
[5] Anderson BO, Yip CH, Ramsey SD, et al. Breast Cancer in Limited-Resource Countries: Health Care Systems and Public Policy. The Breast Journal. 2006;12(s1):S54-S69.
[6] Coughlin SS, Ekwueme DU. Breast cancer as a global health concern. Cancer epidemiology. 2009;33(5):315-318.
[7] Harrison S. Physical activity among breast cancer survivors. 2008.
[8] Kwan ML, Kushi LH, Weltzien E, et al. Alcohol consumption and breast cancer recurrence and survival among women with early-stage breast cancer: the life after cancer epidemiology study. Journal of Clinical Oncology. 2010;28(29):4410-4416.
[9] Rothman N, Garcia-Closas M, Chatterjee N, et al. A multi-stage genome-wide association study of bladder cancer identifies multiple susceptibility loci. Nature genetics. 2010;42(11):978-984.
[10] Pau CT, Keefe CC, Welt CK. Cigarette smoking, nicotine levels and increased risk for metabolic syndrome in women with polycystic ovary syndrome. Gynecological Endocrinology. 2013;29(6):551-555.
[11] Irwin ML, Smith AW, McTiernan A, et al. Influence of pre-and postdiagnosis physical activity on mortality in breast cancer survivors: the health, eating, activity, and lifestyle study. Journal of Clinical Oncology. 2008;26(24):3958-3964.
[12] Lahmann PH, Friedenreich C, Schuit AJ, et al. Physical activity and breast cancer risk: the European Prospective Investigation into Cancer and Nutrition. Cancer Epidemiology Biomarkers & Prevention. 2007;16(1):36-42.
[13] Chlebowski RT, Aiello E, McTiernan A. Weight loss in breast cancer patient management. Journal of Clinical Oncology. 2002;20(4):1128-1143.
[14] Irwin ML, McTiernan A, Bernstein L, et al. Physical activity levels among breast cancer survivors. Medicine and science in sports and exercise. 2004;36(9):1484.
[15] Dinger MK, Behrens TK, Han JL. Validity and reliability of the International Physical Activity Questionnaire in college students. American journal of health education. 2006;37(6):337-343.
[16] Deng HB, Macfarlane DJ, Thomas GN, et al. Reliability and validity of the IPAQ-Chinese: the Guangzhou Biobank Cohort study. Medicine and science in sports and exercise. 2008;40(2):303-307.

[17] Oh JY, Yang YJ, Kim BS, Kang JH. Validity and reliability of Korean version of International Physical Activity Questionnaire (IPAQ) short form. Journal of the Korean Academy of Family Medicine. 2007;28(7):532-541.
[18] Macfarlane DJ, Lee CC, Ho EY, Chan K, Chan DT. Reliability and validity of the Chinese version of IPAQ (short, last 7 days). Journal of Science and Medicine in Sport. 2007;10(1):45-51.
[19] Okobia M, Bunker C. Epidemiological risk factors for breast cancer–a review. Nigerian journal of clinical practice. 2005;8(1):35-42.
[20] Abrahamson PE, Gammon MD, Lund MJ, et al. Recreational physical activity and survival among young women with breast cancer. Cancer. 2006;107(8):1777-1785.
[21] Meyerhardt JA, Giovannucci EL, Holmes MD, et al. Physical activity and survival after colorectal cancer diagnosis. Journal of Clinical Oncology. 2006;24(22):3527-3534.
[22] Holmes MD, Chen WY, Feskanich D, Kroenke CH, Colditz GA. Physical activity and survival after breast cancer diagnosis. Jama. 2005;293(20):2479-2486.
[23] Enger S, Bernstein L. Exercise activity, body size and premenopausal breast cancer survival. British journal of cancer. 2004;90(11):2138-2141.
[24] Beasley JM, Coronado GD, Livaudais J, et al. Alcohol and risk of breast cancer in Mexican women. Cancer Causes & Control. 2010;21(6):863-870.