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RESEARCH ARTICLE

Reproductive, Lifestyle, and Genetic Risk Factors in Breast Cancer Among Iranian Women- A Cross-sectional Study During the Breast Cancer Screening in a Community in Iran

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Abstract:

Aim:

Breast cancer is one of the most common malignancies in women. The present study is aimed to investigate the risk factors of this disease among the Iranian women of Arak city.

Background:

Breast cancer is one of the most common malignancies in women.

Objective:

To study the reproductive, lifestyle, and genetic risk factors.

Methods:

This cross-sectional study was conducted in Arak city. The sampling was conducted in a clustering method in a way that 4 health centers (surveying cancer in the country; October 2018 to March 2019) were investigated. The women willing to fill up the breast cancer risk factors were entered into the research. 1000 women (above 18) were included. After filling the questionnaires, the data were analyzed by SPSS Ver. 21 using descriptive statistics such as percentage and mean values.

Results:

4% of the participants (40) had a history of breast cancer among their first-degree relatives. Only 1.9% (19) of the women reported eating fast-food twice a day. 1.7% (16) of the studied women drank alcohol in the last month. 70.3% of the women (691) had children with an average age at first birth of 22.32±4.87. 1.3% (13) of the participants were under hormone-therapy during their menopause, with an average duration of 4±6.87 years.

Conclusion:

It seems that the risk factors of breast cancer are not low among Iranian women. Screening tests such as self-examination of the breasts and periodic examinations by the physicians or midwives as well as the mammography protocols are essential

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1. INTRODUCTION

Breast cancer is one of the most common malignancies, known as the main mortality cause among women throughout the globe [1, 2]. The breast cancer risk during the life of a woman is 12.5% (1 per 8 cases) [3]. According to the WHO report, in 2015, breast cancer caused 571 thousands of death cases throughout the world [4]. According to the statistics, this

disease has an increasing trend in Iran and from 2000, it has scored the first rank among the recorded cancer cases in the country. From 2001 to 2006, breast cancer has shown a 2% increase each year [5]. The trend of breast cancer emergence was matched with the global standard population, during an 11-year study (2000-2011), the breast cancer emergence was ascending increasing from 20.3 per 100 thousand in 2000 to 32.08 cases in 2010. Statistics of breast cancer cases also show the rising trend of this disease [6]. It seems that by 2020, a 26% increase occurs in the current breast cancer cases, which are mainly related to the developing countries [7]. The increase in breast cancer cases in recent decades in Iran can be attributed to the changes in the lifestyle and reproduction behavior relative to the western countries [8]. The age of breast cancer diagnosis is 10 years lower in Iran [9, 10].

Some of the known cancer etiologic factors are also involved in breast cancer. Although all the women are exposed to the risk of breast cancer, it is more probable in some of them. The breast cancer risk is higher in the following groups: increased age, history of cancer (history of breast cancer especially in the first-degree relatives before menopause; the history of ovarian cancer especially before the age of 50; or breast cancer or ovarian cancer in two relatives first- and second-degree), high calorie and fat diet; obesity, alcohol, reproduction and hormonal factors (menarche before the age of 12, late menopause, nulliparous women, the birth of the first child after the age of 30, and hormone-therapy among the menopause women); a personal history of breast, endo-metriosis, ovarian, and colon cancers; and history of radiotherapy for Hodgkin lymphoma [11, 12]. Regarding low awareness of the women about the risk factors as well as their negative insights toward the screening tests, increasing the public awareness about the growth of the risk factors sounds crucial [9]. Given the high prevalence of breast cancer in Iran, the present study is aimed to investigate the risk factors of this disease among the Iranian women of Arak city.

2. METHODS

This cross-sectional study was conducted after attaining the approval of the ethics committee of the Arak University of Medical Science. The population included women older than 18. The cluster sampling was conducted in a way that 4 health centers (campaign of breast cancer screening in the Arak city; October 2018 to March 2019) were held by Arak University of Medical and Health Sciences to assess the health status of women in terms of breast cancer and self-breast examination. 4 Centers in 4 regions of the city held breast examination. All 4 centers were sampled, and each health center was considered as a cluster. The women willing to fill up the breast cancer risk factors were entered into the research. 1000 women (above 18) were included in this study and their breast cancer status was evaluated.

The questionnaire was prepared in two sections: demo-graphic data and risk factors. The prevalent risk factors were collected by the literature review [9, 13 - 15]. The questionnaire was then sent to 10 members of the scientific board of gynecology and midwifery to assess its validity. The final version of the questionnaire was set after the decision of the assessment board. The researcher offered the questionnaires in a sealed packet, and the women were asked to deliver them to the center within a week. The participants were assured about the confidentiality of the questionnaire content. After filling the questionnaires, the data were analyzed by SPSS Ver. 21 using descriptive statistics such as percentage and mean values.

3. RESULTS

The mean age of the participants was 33.78±11.3. In terms of the residential area, 10.5% (105) of the participants lived in the suburb, and 4% of them came from rural areas (40). The other information can be found in Table **1**. The present study also showed that their average age of menopause was 47.16±5.18. 92.4% of the participants experienced menopause at the age of 51 to 55 Table **2**. According to Table **3**, 4% of the participants (40) had a history of breast cancer among their first-degree relatives; and 6.1% (61) had a history of breast cancer in their second-degree relatives. 0.5% (5) of the studied women had breast cancer. The average age of breast cancer diagnosis was 50.75±90.9. 38.1% of the participants had not consumed fatty-food in the last month, while 29.2% (291) of them ate fast-food once a month, and 14.4% of the participants (144) consumed fatty-food twice a month. Only 1.9% (19) of the women reported eating fatty-food twice a day. Concerning fruit consumption in the last month, only 1.2% (12) of the participants did not eat fruit. 5.2 (52) and 19.2% (192) of the participants consumed fruit once in a month and a week, respectively; while, 52.1% of the participants (521) reported daily fruit consumption. 1.7% (16) of the studied women drank alcohol in the last month. 70.3% of the women (691) had children with an average age at first birth of 22.32±4.87. 40.2% (290) of the women with children were pregnant with their first child below the age of 20. The mean breastfeeding period was 36.74±29.73 months. 62.4% (615) of the women breastfed their children. 1.3% (13) of the participants were under hormone-therapy during their menopause, with an average duration of 4±6.87 years (Table **2**). The life-style, reproductive, and genetic risk factors of breast cancer women are included in Table **3**.

4. DISCUSSION

The results of this study showed the prevalence of breast cancer risk factors among women in Arak city. Saki *et al*. reported 5 major breast cancer risk factors: age over 39, menarche age below 12.5, family history of breast cancer, menarche age younger than 10.5, irregular menstruation, and being single [16]. In the present study, 18.8% of the women with a mean age of 33.78±11.3 were single, indicating the increase of marriage age among Iranian women [17]. In the current study, the menarche age was 13, which was in agreement with another study in Iran reporting the menarche age as 12.9 [18]. Factors such as the increase of BMI and the rise of economic-social levels are effective in the menarche age [18, 19]. In their study conducted in Mazandaran, Holakouee *et*

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al. found no significant relationship between breast cancer and menarche age and irregular menstruation [20]. This study showed that women with breast cancer, menarche age was not lower than 12 and all of them except one had children and more than 50% had delivered under 20years old. A meta-analysis of 117 studies with a total population of 118964 women with cancer showed that early menarche, high BMI, number of pregnancies, age of the first pregnancy and height can play a role in the emergence of breast cancer; but they can not raise the risk alone [21]. Studies have shown that breast cancer risk was 50% lower among the mothers who had their full-term labor before the age of 20. On the other hand, breast cancer risk showed a 22% increment among the women who had their first child over the age of 35. This reduction was higher in hormone receptor-positive cancers [22]. The present research reported the mean BMI of the studied women as 25, implying the overweight among them. Regarding the average age of the women (33 years old), these women are prone to obesity by aging. Post-menopause obesity can also increase the risk of breast cancer. In our study in women with breast cancer, we found out an overweight of them. A study on 493 women with breast cancer showed that overweight women and those with BMI>30 are 1.27 and 2.34-fold more prone to developing breast cancer. The higher the prevalence of these risk factors, the higher their associated risk will be [23]. The present study also revealed that 45% of the women had no regular walking program; life-style with no physical activity is one of the potential risk factors of cancers, including breast cancer. In addition, in this study, 85% of women with breast cancer reported no doing regular walking during the week. A systematic review of 62 studies up to December 2007 about the relationship between physical activity and breast cancer indicated that 47 studies agreed on the reduced risk of breast cancer by an increase in physical activities. They believed that this reduction could be 25-30% [24]. The present study showed that a small percentage of the women smoke or drink alcohol; however, as drinking alcohol is a taboo in Muslim countries, these statistics may be far from reality. Anyway, the results suggest that alcohol consumption is undeniable among women. A study on 7690 cases of invasive breast cancer indicated that elevated alcohol consumption (3-6 times per week) is accompanied by the enhanced risk of breast cancer [25]. In a prospective study, 29117 women with the history of drinking alcohol during their adolescence were followed up; 659 of them were diagnosed with proliferative benign breast diseases during their adulthood which was 1.15 times higher than the women who did not drink alcohol during their adolescence [26]. The present study reported that about 40% of women with children did not breastfeed their children. A meta-analysis of 27 studies on 368881 women with breast cancer indicated the protective role of breastfeeding against the development of hormone receptor-negative (triple-negative) breast cancers; the hormone receptor-positive cancers, however, require further investigations [27]. Another investigation suggested that at least one year of breastfeeding declined the breast cancer risk by 32% among the women carrying BARCA1 gene [28]. In the present study, 4-6% of the participants had a family history of breast cancer in their first or second-degree relatives, but only one women with breast cancer had family history in her second-degree relatives.

Table 1. The demographic status of women.

-	-	Frequency	Percent
BMI	10-24.99	526	52.6
	25-29.99	342	34.2
	30-34.99	109	10.9
	35	22	2.3
Marital status	Married	776	77.6
	Single	188	18.8
	Divorce	18	1.8
	Widow	18	1.8
	Housewife	744	74.4
	Employee	256	25.6
Residential status	City	855	85.5
	Rural area	40	4.0
		105	10.5
Educational status	Writing and reading	63	6.3
	Primary school	159	15.9
	Secondary school	143	14.3
	Diploma	341	34.1
	Upper diploma	89	8.9
	Bachelor degree	135	13.5
	Doctoral	57	5.7

Table 2. Mean and frequency of the breast cancer risk factor among the participants.

-	-	N	%
History of breast cancer among the first-degree relatives (mother, sister)	No	960	96
	yes	40	4
History of breast cancer among the second-degree relatives (aunt)	No	933	93.9
	yes	61	6.1
The history of breast cancer in the participant herself	No	971	98.4
	yes	13	1.3
How often did you eat fatty food(pizza ,sausage, Ham, fatty cheese ,.. in the last month?	Never	381	38.1
	Once a month	292	29.2
	Twice a month	144	14.4
	third a month	82	8.2
	Once a week	79	7.9
	Twice a week	19	1.9
	Every day	2	0.2
How often did you consume fruit in the last month?	never	12	1.2
	Once a month	52	5.2
	Once a week	192	19.2
	Once a day	521	52.1
	Several times a day	223	22.2
How often did you eat vegetables in the last month?	never	11	1.1
	Once a month	65	6.5
	Once a week	367	36.7
	Once a day	389	38.9
	Several times a day	168	16.8
Did you drink alcohol in the last month?	No	936	98.3
	Yes	16	1.7
History of smoking	No	976	97.6
	Yes	4	0.4
Do you have children	No	292	29.7
	Yes	691	70.3
Did you give birth when you were below 20?	No	381	43.2
	Yes	290	56.8
History of ovarian cancer in the participant herself	No	995	99.5
	Yes	5	0.5
Hormone-therapy among the menopause women	No	987	98.7
	Yes	13	1.3
Breastfeeding frequency among women with children	No child	292	30
	Breastfeeding	621	62.4
	No breastfeeding	70	7.6
Did you have uterus cancer?	No	997	99.7
	yes	3	0.3
Did you have colon cancer?	No	999	99.9
	yes	1	0.1
Did you have the history of radiotherapy for Hodgkin lymphoma?	No	998	99.2
	yes	2	0.2
Do you have physical activities (e.g. 30 min fast walking, 5 times a week)?	No	452	45.2
	yes	548	54.8
Have you consumed Oral contraceptive pill (OCP)?	No	717	71.7
	yes	284	28,3
Pregnancy age	Under 20	293	29.3
	21-45	383	38.3
	Single or no child	324	32.4
-	Mean± SD		-

(Table 2) cont.....

How long did you take OCPs?	5.15±4.61	-
The age of diagnosis of breast cancer in your self	50.75±10.90	-
Menarche age	13.49±1.56	-
Menopause age	47.16±5.18	-
First pregnancy age	22.32±4.87	-
Mean of breastfeeding (month)	36.40±26.99	-

Table 3. Mean and frequency of the breast cancer risk factor among the women with breast cancer.

-		Min	Max	Mean	SD
Age (year)	-	33	65	51.92	11.094
BMI	-	21.67	28.40	25.1639	1.79739
Children number	-	1	4	2.67	.985
Breast feed time(month)	-	18	96	56.18	25.635
Menarche age	-	12	16	13.54	1.391
Menopause age	-	45	58	50.00	3.937
How long did you take OCPs? (year)	-	2	5	3.50	2.121
	-	N	%	-	-
BMI	10-24.99	5	38.5	-	-
	25-29.99	6	46.2	-	-
	Missing	2	15.3	-	-
Marital status	Marriage	12	92.3	-	-
	widow	1	7.7	-	-
Residential status	City	13	100	-	-
Cancer information	No	1	7.7	-	-
	Yes	12	92.3	-	-
Who did you get the information from?	Health worker	4	30.8	-	-
	Book/mass media	1	7.7	-	-
	Dr.	5	38.5	-	-
	Cancer Patients	2	15.4	-	-
	Missing	1	7.7	-	-
History of breast cancer among the first-degree relatives (mother, sister)	no	13	0	-	-
History of breast cancer among the second-degree relatives (aunt)	No	12	92.3	-	-
	Yes	1	7.7	-	-
ovarian cancer history	No	12	92.3	-	-
	Yes	1	7.7	-	-
How often did you consume fruit in the last month?	no	3	23.1	-	-
	once a month	1	7.7	-	-
	once a week	3	23.1	-	-
	once a day	3	23.1	-	-
	couple days a day	3	23.1	-	-
How often did you eat vegetables in the last month?	no	1	7.7	-	-
	once a week	8	61.5	-	-
	once a day	3	23.1	-	-
	couple days a day	1	7.7	-	-
How often did you eat fatty food (pizza, sausage, Ham, fatty cheese,. in the last month?	No	7	53.8	-	-
	2times in week	3	23.1	-	-
	Once a week	3	23.1	-	-
Menopause	No	no	4	-	-
	Yes	yes	9	-	-
Do you have children	No	no	1	-	-
	Yes	yes	12	-	-

(Table 3) cont.....

-		Min	Max	Mean	SD
Breastfeeding (month)	Breast feeding	11	84.6	-	-
	No child	1	7.7	-	-
	No breastfeeding	1	7.7	-	-
Pregnancy age (Year)	Under 20	7	53.8	-	-
	Upper 20	6	46.2	-	-
Do you have physical activities (e.g. 30 min fast walking, 5 times a week)?	No	11	84.6	-	-
	Yes	2	15.4	-	-
Have you consumed oral contraceptive pill (OCP)?	No	11	84.6	-	-
	Yes	2	15.4	-	-
History of smoking	no	13	100	-	-
History of Alcohol consumption	no	13	100	-	-
Hormone replacement therapy	No	11	84.6	-	-
	Yes	1	7.7	-	-

A survey showed that the mutation of BARCA ½ gene (with high potential of breast cancer development) is very rare among the general population; the women with a family history of breast or ovarian cancers, however, carry these genes [29]. It recommends in principle that assessment of familial breast cancer risk should consider not only breast cancers observed in the family but also the family size and age-structure too [30]. The current study also showed that about 6.7% of the meno-pause women had hormone-therapy. A study in England indicated that one out of 16 women does not receive hormone-therapy reflecting the high prevalence of hormone adminis-tration in that country. A more recent study revealed that it does not increase the risk of breast cancer [31]. But when accompanied by other risk factors such as obesity and alcohol, hormone-therapy may elevate the risk of breast cancer [32]. The present study showed that only 38% of the parti-cipants did not consume Fatty food in the last month. Studies have shown that high-calorie foods such as fast-foods can enhance the risk of breast cancer [33, 34]. Controversial results have been reported concerning the role of fried meat or low consumption of fiber-rich foods in the development of cancer [35 - 37]. A study in the US on 2386 women with breast cancer and 1703 healthy women suggested that the con-sumption of red meat and well-done red meat are related to the risk of breast cancer [38].

CONCLUSION

It seems that the risk factors of breast cancer are not low among Iranian women. Those related to the life-style should be improved. Moreover, screening tests such as self-examination of the breasts and periodic examinations by the physicians or midwives, as well as the mammography protocols, are essen-tial.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by Arak University of Medical sciences, Iran. The code of ethics is IR.ARAKMU.REC.1397.233.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

The subjects participated in this study after signing the informed consent form.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this study are available within the article.

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CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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