

Relationship between breastfeeding factors and breast cancer in women referred to Seyed Al-Shohada Hospital in Isfahan, Iran

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ABSTRACT

Background: Breast cancer is the most common malignancy and a major cause of cancer deaths among women. Breastfeeding is presented as a probable protective factor against breast cancer, however, the effect of different breastfeeding patterns and duration of breastfeeding on this factor is not well determined. Thus, the aim of this research was to evaluate factors related to breastfeeding and breast cancer.

Materials and Methods: This case-control study was conducted on 98 women with breast cancer and 198 healthy women who were selected through systematic random sampling method. Studied variables included demographic characteristics, reproduction characteristics, duration of breastfeeding, and breastfeeding pattern. The study variables were measured using a researcher-made questionnaire through self-report method. The two groups were matched in terms of place of residence and age. The data analysis was performed using logistic regression.

Results: A relationship was observed between breast cancer and marital status ($P = 0.04$), education level ($P = 0.02$), individuals' perspectives of their economic status ($P = 0.001$), and lack of breastfeeding ($P = 0.006$). However, no relationship was found between breast cancer and reproductive factors. Moreover, multiple logistic regression analysis results showed that breast cancer only had a relationship with individuals' perspectives of their economic status with OR of 0.31 (95% CI: 0.16–0.59).

Conclusions: The results showed that there was no relationship between breast cancer and reproductive factors and breastfeeding pattern. Due to the difference between the findings of this research and other researches, genetic, epigenetic, and cultural differences must be considered in the evaluation of risk factors for breast cancer.

Key words: Breast cancer, breastfeeding pattern, Iran, reproduction characteristics

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INTRODUCTION

Breast cancer is the most common cancer among women as well as the leading cause of cancer deaths in women. Every year more than one million new cases are detected worldwide.^[1] With 502,000 deaths in 2005, the World Health Organization (WHO) has introduced breast cancer as the leading cause of cancer deaths among women. In Iran, about 6,000 new cases of breast cancer are detected annually and 70% of such cases are diagnosed in the advanced phase of the disease.^[2]

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Attempts made to identify the causes of this disease reflect the complexity of its etiology. Studies have shown that some factors such as age, gender, race, family history, genetic factors, hormonal factors, ionizing radiation, and lifestyle are associated with breast cancer risk.^[3,4]

Several hypotheses have been presented to explain the relationship between breastfeeding and breast cancer risk. One of the hypotheses regarding this subject suggested that estrogen and progesterone, by increasing the mitotic activity in breast cells, can have a role in the increased risk of breast cancer. Therefore, it is assumed that lactation amenorrhea can impact the reduction of breast cancer by reducing hormone levels.^[5] For this reason, the history and duration of breastfeeding were considered as a possible protective factor.^[6] Although some studies have confirmed this hypothesis, their findings have been contradictory due to the different breastfeeding patterns that can affect the hormonal changes of the woman's body during lactation.^[7] Thus, the results of some studies did not confirm the relationship between breastfeeding and breast cancer.^[8,9] Therefore, to study the relationship between breastfeeding and breast cancer, the breastfeeding pattern of the mother must be considered. The clarification of this relationship can affect breastfeeding counseling and screening for the risk factors of breast cancer by service providers, especially midwives. Thus, the aim of this study was to evaluate the relationship between breastfeeding and breast cancer.

MATERIALS AND METHODS

This case-control study was approved by the ethics committee of Isfahan University of Medical Sciences, Iran, in October 2014 and lasted until March 2015. In this study, the case group was selected from among women with breast cancer whose cancer was confirmed by pathology tests and through referring to their medical files at Seyed-Al Shohada Hospital, Isfahan, Iran. The case group was randomly selected from among those who fulfilled inclusion criteria for this study. The researcher searched through the electronic records of patients diagnosed with breast cancer and prepared a list of women diagnosed with breast cancer. To select the subjects, the last number of the list was divided by the required number of subjects. The resulting number was the distance between the subject numbers. Then, the researcher randomly chose a number between one and the obtained number and sampling began from that number. Inclusion criteria for the study included confirmation of the women's breast cancer by histological examination, willingness to participate in this study, having medical records at Seyed-Al Shohada Hospital for treatment or follow-up after treatment for breast cancer, being Iranian

and a resident of Isfahan, and no history of cosmetic breast surgery or use of contraceptive depot medroxyprogesterone acetate (DMPA) during the first two years after birth. Systematic random sampling was used to select the case group participants. The participants were contacted through phone calls, the purpose of the study was explained, and the inclusion criteria were reviewed. The eligible individuals who were invited to willingly participate in the study referred to the center for breast cancer at Seyed-Al Shohada Hospital. This process continued until the sample size reached 98 subjects. In addition, 198 individuals were selected for the control group. This group was selected from among individuals who reported no history of nonmalignant breast disease and had one mammography with natural result in the past two years or a clinical breast examination by a doctor in the past year. In order to match the two groups in terms of place of residence, the control group participants were selected from among patients of health centers in which the case group had medical records in. Moreover, this group was matched in terms of age (± 2 years) with the case group.

The data collection tool included a researcher-made questionnaire that was designed and developed based on books and questionnaires of other studies. Its content was evaluated and verified by ten reproductive health experts. Its reliability was confirmed through a pilot study on 15 eligible women in the case and control groups. The pilot study was repeated and evaluated after a week and its repeatability was confirmed with an intraclass correlation coefficient (ICC) of 0.84.

After selecting the case and control groups, an informed consent was obtained from the participants and background information regarding demographic characteristics and reproductive traits were collected. Furthermore, for the case group, information regarding breast cancer was collected by referring to the existing documents. The questionnaire on the factors associated with breastfeeding was completed through self-report method. After collecting data, data analysis was performed in Statistical Package for the Social Sciences software (version 19, SPSS Inc., Chicago, IL, USA) using Mann-Whitney test, Chi-square, independent *t*-test, and multiple logistic regression. For all the tests, error of less than 0.05 was considered.

Ethical considerations

The study protocol was by the human research ethics committee in the Isfahan University of Medical Sciences.

RESULTS

In the present study, 98 individuals participated in the case group and 198 individuals participated in the control

group. The demographic information of the participants is presented in Table 1. The comparison of the demographic characteristics of the two groups showed that breast cancer had a significant relationship with marital status, but had no significant relationship with employment status. A significant relationship was also observed between breast cancer and educational and economic status of the family in the individual's view.

Reproductive factors and breastfeeding in the two groups were compared and the results were presented. The results showed no significant differences between the groups regarding age of menarche; age at first pregnancy, first birth, and menopause; number of pregnancies, stillbirths, and abortions; duration of breastfeeding; and the number of children who were breastfed [Table 2].

The mean duration of the breastfeeding pattern of infants during the first 6 months of life were presented in all the births. Findings indicated that there were no significant differences in exclusive breastfeeding during the first 6 months of life, almost exclusive breastfeeding, mixed feeding (partial), and subsidiary feeding between the two groups. Nevertheless, a significant difference was observed between the case and control groups in terms of the relative frequency of the non-breastfeeding pattern [Table 2].

The data indicated that, after using multiple logistic regression, breast cancer was not associated with marital status, education level, and non-breastfeeding pattern, but its relationship with the household economic status from the perspective of the individuals remained significant [Table 3].

DISCUSSION

Extensive studies have been performed on the relationship between breastfeeding and breast cancer. Nevertheless, in the majority of the studies, only factors such as history and duration of breastfeeding in conjunction with other risk factors for breast cancer were briefly investigated. Less attention has been paid to other factors and different breastfeeding patterns that could affect the relationship between breastfeeding and breast cancer.

This study was designed to investigate the relationship between breastfeeding and breast cancer. In this study, the relationship of factors such as history and duration of breastfeeding, the number of breastfed children, and breastfeeding pattern during the first 6 months of life with cancer was investigated in all the studied births.

In the study of breastfeeding factors, findings showed no relationship between duration of breastfeeding and breast cancer. This finding corresponded with the findings of a number of studies.^[10,11] In the study by Newcomb *et al.*,^[11] the study group consisted of women of 50–79 years of age. The findings of this research showed that breastfeeding factors such as breastfeeding duration in total births as well as the duration of breastfeeding in the first lactation was not significantly correlated with breast cancer.^[11] There were also research findings that were not consistent with the present study. Their results demonstrated the protective effect of breastfeeding duration against breast cancer, including the study by Hadjisavvas *et al.*,^[12] which showed a significant relationship between duration of breastfeeding and breast

Table 1: Background characteristics of the participants in the case group and control group

Variable	Classification	Groups				Statistical test, <i>P</i>
		Case group (<i>n</i> =98)		Control group (<i>n</i> =198)		
		Number	Percentage	Number	Percentage	
Employment status	Housewife	87	88.8	165	83.8	0.29
	Practitioner	11	11.2	32	16.2	
Marital status	Married	76	77.6	174	88.3	0.04
	Single	3	3.1	3	1.5	
	Widowed	15	15.3	19	9.6	
	Divorced	4	4.1	1	0.5	
Educational status	Primary	56	60.9	90	45.9	0.02
	Cycle	5	5.4	20	10.2	
	Diploma	21	22.8	51	26	
	College education	10	10.9	35	17.9	
Economic status	Poor	45	46.4	24	12.2	0.001
	Average	45	46.4	144	73.5	
	Good	7	7.2	28	14.3	
	Very well	0	0	0	0	

Table 2: The average of fertility and lactation in the case group and control group

Variable	Classification	Groups					
		Case group (n=98)		Control group (n=198)		Statistical test (independent t-test)	
		Average	SD	Average	SD	t	P
Productivity factors	Age at menarche	13.36	1.64	13.24	1.41	0.63	0.52
	Age at first pregnancy	20.27	4.58	19.75	4.31	0.93	0.35
	Age at menopause	46.88	6.15	48.29	5.53	1.50	0.13
	Parity number	3.94	2.35	3.79	2.29	0.53	0.59
	Stillbirth number	0.02	0.02	0.02	0.01	0.22	0.81
	Abortion number	0.44	0.07	0.42	0.06	0.27	0.78
Breastfeeding factors	Duration of breastfeeding (month)	58.1	43.8	57.6	35.3	0.11	0.91
	Number of breastfed children	3.06	1.76	3.10	1.61	0.21	0.39
Feeding of infants at six months of age	Exclusive breastfeeding	6.4	2.9	6.3	3.1	0.14	0.89
	Almost exclusive	8.2	4.1	7.2	3.8	0.85	0.39
	Partial or mixed	2.9	1.5	4.4	2.1	1.88	0.06
	Token	0.1	0.7	0.2	0.8	0.68	0.49
	Never breastfed	1.3	0.4	0.3	0.1	2.09	0.006

Table 3: Multiple logistic regression analysis

Variable	Wald	P	Exp(B)	95% CI for exp(B)	
				Lowest	Maximum
				Educational status	0.09
Marital status	0.40	0.52	1.15	0.73	1.81
Economic status	12.72	0.001	0.31	0.16	0.59
Never breastfed	2.61	0.10	1.12	0.97	1.30

cancer. The differences in the results of this study and the present study may be due to the differences in the control and case groups' selection. The participants in the study of Hadjisavvas *et al.*^[12] were selected by the National Screening Program for Breast Cancer. Because the age range in this program was between 50 and 69 years, individuals younger than 50 and older than 69 years were excluded from the study. In addition, in this study, the two groups were not matched.^[12] In the study by Kotsopoulos *et al.*,^[13] the mean breastfeeding duration in two case groups with gene mutation [breast cancer gene 1 (BRCA1) or breast cancer gene 2 (BRCA2)] were compared with the control group and significant differences were found between the mean duration of breastfeeding in cases with BRCA1 mutations compared to the control group. Another study was conducted by Liu *et al.*^[14] in 2011 in the Jiangsu Province in China. In this study, history of lactation and breastfeeding duration were investigated. History of breastfeeding had a protective effect against breast cancer; breastfeeding duration differed significantly between the groups; and with the increase in breastfeeding duration the risk of breast cancer decreased.^[14]

The number of breastfed children was another investigated variable. In the present study, there was no significant

relationship between the number of breastfed children and breast cancer. In the study by Newcomb *et al.*,^[11] this relationship was also not significant. However, there are studies that confirmed this relationship including the study by Yoshimoto *et al.*^[15] in Japan. The results of this study showed that there was a significant correlation between the number of breastfed children and breast cancer in postmenopausal women of the receptor-positive subgroup and nonmenopausal and postmenopausal women of the receptor-negative subgroup.^[15] The dividing of the case group according to menopausal status and hormone receptor status as well as the high number of subjects in this study could be effective factors in the results of the study.

In this study, the relationship between the mean duration of breastfeeding pattern for infants in the first 6 months in total births and breast cancer were noted. Among the different patterns of breastfeeding, only the non-breastfeeding pattern was significantly associated with breast cancer. Nevertheless, in this group, there may be individuals who do not have the ability to breastfeed due to disease, use of medications, hormonal imbalances, and structural abnormalities in the breast; these factors could affect the relationship between breastfeeding and breast cancer. To distinguish these individuals, there is a need to specify the cause of the lack of breastfeeding, which in turn requires a comprehensive study with greater sample size; this could be considered in future studies.

The findings of Stuebe *et al.*^[16] also confirmed the results of the present study. In this study, the duration of exclusive breastfeeding in infants was investigated. The findings of this study showed that after adjustment for confounding

variables using the analysis of covariance, the duration of exclusive breastfeeding had no association with the occurrence of breast cancer.^[16] In this regard, a study was conducted by Kawai *et al.*^[17] In this study, first, the reproductive and breastfeeding factors women of different hormone receptor subtypes were evaluated. Then, the reproductive and breastfeeding factors in two hormone receptor subgroups [ER– (estrogen receptor), ER+/PR+, PR– (progesterone receptor)] were analyzed separately in premenopausal and postmenopausal women. In this study, breastfeeding types were classified as formula feeding, breastfeeding and formula feeding, and only breastfeeding. No significant relationship was observed in any of the groups between the type of infants feeding and breast cancer.^[17]

The differences in the results of this study with other studies regarding the effect of breastfeeding on breast cancer may be due to the genetic and epigenetic differences in each region or country. It is also possible that breastfeeding factors associated with breast cancer are influenced by age or menopausal status.^[18] Gajalakshmi *et al.*^[19] showed that breastfeeding reduced the incidence of breast cancer in premenopausal women, but no significant relationship was observed in postmenopausal women. However, due to the characteristics of this disease, which occurs in older age, the majority of the subjects of this study were in the postmenopausal stage and only 25.5% were in the premenopausal age group. Moreover, the relationship between breastfeeding and breast cancer may have been affected by the small sample size, which may be the cause of differences between the findings of the present study and previous studies.

Some studies have reported a relationship between higher socioeconomic status and higher education levels and breast cancer.^[14,19,20] Nevertheless, in the present study, independent *t*-test and Mann–Whitney results showed a significant relationship between low economic status of the family in the participant's view and low education levels as well as increased incidence of breast cancer. However, after using multiple regression analysis, only low economic status in the participant's view had retained its significant correlation. Because the household economic status was consistent with educational status, the low reporting of the economic status appeared unlikely. Further studies are required in this regard. Other characteristics that were studied were employment and marital status of the individuals. There was no significant relationship between employment status and breast cancer; moreover, marital status was nonsignificant after using multiple logistic regression analysis.

In this study, the relationship of reproductive factors such as age at menarche, age at first pregnancy, age at menopause, number of pregnancies, and number of stillbirths and abortions with breast cancer was investigated. The findings indicated that there were no significant relationships between reproductive factors and breast cancer. The results of this study correspond with the results of several previous studies.^[1,10,19] The results of the study by Sharif Zadeh *et al.*^[10] was also consistent with the results of this study, except regarding the significant relationship between the number of abortions. Lodha *et al.*^[1] also did not find any significant differences between the two case and control groups in terms of age at menarche, age at marriage, number of pregnancies and abortions, age at menopause, and age at first pregnancy. Gajalakshmi *et al.*^[19] did not observe any significant relationships between reproductive factors and breast cancer in premenopausal and postmenopausal women. The findings of Ritte *et al.*^[9] and Kotsopoulos *et al.*^[13] also did not correspond with the results of this study.

Based on the contradictions between studies, in assessing the association between breast cancer and breastfeeding factors, gene mutations status of the individuals should also be taken into consideration, which was not done in the present study. It is recommended that future studies focus on this issue. On the other hand, the limited number of individuals with the history of breastfeeding in this study was a factor that could affect the interpretation of the results. In addition, the low mean age of first pregnancy in the population under study decreased the generalizability of the results to other populations of women.

CONCLUSION

In this study, those risk factors for breast cancer were studied that appeared to be the most important. The results of this study indicated that the reproductive and breastfeeding factors did not have significant association with breast cancer. With regards to the involvement of genetic and epigenetic factors in the incidence of this disease and the unknown factors, medical groups with more extensive research are required to identify these factors and local and global differences in the incidence of this disease, and thus, take a step toward the health of women of the society.

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Conflicts of interest

There are no conflicts of interest.

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