Risk Perception and Preventive Issues for Breast Cancer among Female Employees

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Abstract

Background: The most common cancer among women is breast cancer which accounts for 27% of all cancers. According to the National Cancer Institutes' reports, the risk of breast cancer among American women is 13%. The current study aims to evaluate the level of risk perception of breast cancer and to identify its related factors amongst female employees.

Methods: This project was a cross-sectional study and participants were female employees working in hospitals and other organizations in the city of Ilam,Iran. A standard questionnaire was prepared using the Gail's model. Excluding criteria for perception risk were age less than 20 years and a history of breast cancer.

Results: Two hundred forty nine women participated in the study, and their mean age and standard deviation were 33.4 and 7 years respectively. The participants were divided into the medical and non- medical employee groups. Ninety seven point two percent of the participants had high school diploma or higher education levels, and 80.3% were married. Twelve subjects (4.8%) had a history of breast cancer among their first- grade relatives (mother or sisters); and 16 subjects had a history of breast cancer among their second- grade relatives. Occupation, familial history of cancer and breast tissue biopsy were significantly related to perception risk in this study, and the breast cancer perception risk was higher in the medical group compared to the non-medical group.

Conclusion: Most women did not show a true estimation of breast cancer; however, those working in the relevant professions such as nurses and midwives can show a higher estimation. A higher knowledge of breast cancer will result in a higher perception risk and chasing relevant preventive and remedial cares.

Keywords: Perception risk; Calculated risk; Women employees; Breast cancer

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Introduction

Epidemiology of Breast Cancer

According to different studies, the most common cancer among women is breast cancer which accounts for 27% of all cancers. This cancer is the second cause of cancer deaths. According to the National Cancer Institutes' reports, the risk of breast cancer among American women is 13%. One out of eight American women suffers from breast cancer [1, 2]. The risk ratio for death due to breast cancer is also estimated as 33%. The age-standardized incidence rate of all cancers in Iran in 2005-2006 was 98 and 110 per 100 000 population among females and males; and the most common cancers among women and men were breast cancer and stomach cancer respectively. Breast cancer was accounted for 24% of all female cancers among Iranian women in 2006 [3, 4]. Although breast cancer is the most common cancer among women in Iran, it is less prevalent compared to European and American countries. In Iran, breast cancer ranks first among cancers diagnosed in women, comprising 24.4% of all malignancies and an ASR of 23.65 and 0.66 per 100,000 among women and men respectively [3, 4].Some screening methods which are currently in use for breast cancer diagnosis are self-examination, examination by health care workers or doctors and using mammography. Using preventive issues and screening methods for breast cancer requires a high level of risk awareness for this disease [5]. Some risk

factors related to breast cancer are age, fatness, and familial history, age of first pregnancy, premature puberty, inheritance factors and higher menopausal age [6]. The incidence rate of breast cancer is highly variable among different countries. According to different reports, England and Wales have the highest rate of death adjusted for age due to breast cancer (27.7/100,000 population); this figure is the least for South Korea (2.6/100,000 population). The risk ratio for breast cancer among American newborns is estimated as 12% and this risk has a reciprocal relationship with age: it is 11% in the age fifty and 7% in the age seventy [5].

Diagnosis

Breast cancer is commonly diagnosed at the upper external quadrant of breast tissue, and a mass is detected by the patient in about 33% of the cases [6]. About 50% of women who report some breast symptoms have no abnormal sign in their breast tissue. The highest cause for the patients referring to their doctors is a wrong detection of breast cancer by their self examinations. In this case, to avoid any latency in the patients' diagnosis, they should be examined by mammographic or ultrasonic tools or even by biopsy [5]. Usually 30-40% of those defects which are clinically considered as breast cancer are diagnosed as benign in biopsy investigations; and conversely, 20-25% of those defects which are clinically diagnosed as benign are identified as malignant in biopsy investigations [6].

Self-Examination

A palpable mass which is detected by patients is the most common compliant for breast cancer [7]. Self-examination is the best method to identify the breast cancer at the first stages and it causes a decrease in the chance of death by 50%; and therefore, it should be started at the age of 20 [6].

Mammography

The main objective for mammography is to identify breast cancer at its first stages among women who do not show any signs or symptoms. Mammography is the most sensitive test for breast cancer and it should be applied as a screening tool for all women above 40 years. It reduces the mortality rate due to breast cancer by 20-30% and this rate is more significant among women above fifty years of age [7].

The five -year survival rate for patients suffering from breast cancer is 70-75% globally; however, a relative 5-year survival rate for breast cancer in Iranian women has been reported to be 62% [8]. Both benign and malignant tumours may be started by abnormal excretion, bloody discharge, ulceration, exanthema and therefore any abnormal variation at the breast skin, nipple and its tissue should not be ignored [9].

Risk Determination Models

Two evaluation models are currently in use for predicting breast cancer. Gail and co-workers introduced the most usable model for breast cancer prediction using mammography. They used age at menarche, the number of breast biopsies, age at first live birth and the number of first-degree relatives with breast cancer in their model. According to these factors, a cumulative risk for breast cancer is estimated for the relevant decade of life of each individual. In this model, all relative risk ratios for different variables are summed up to get a total risk score for an individual and this score is compared to the adjusted risk ratio in the population. A software program of this model has also been prepared in the National Cancer Institute of America (NCI) [5]. Claus and colleagues, using data from the Cancer and Steroid Hormone Study, a case-control study of breast cancer, developed the other frequently used risk assessment model, which is based on assumptions about the prevalence of high-penetrance breast cancer susceptibility genes. Compared with the Gail model, the Claus model incorporates more information about family history, but excludes other risk factors [5]. The current study aims to evaluate the risk perception level of breast cancer and to identify relevant factors amongst female employees in the city of Ilam.

Materials and Methods

This project was a cross-sectional study and participants were female employees working in hospitals and other organizations in the city of Ilam. Using the Gail's model, a standard questionnaire including demography and other information needed for the estimation of perception risk and calculated risk was prepared. Excluding criteria for perception risk were age less than 20 years and a history of breast cancer. Criteria used in the Gail's model included the menstrual cycle starting age, the number of breast biopsies, the age for the first live childbirth, person's race and the number of grade- one relatives who suffered from breast cancer.

Two different methods for estimating the perception risks in the questionnaire were used which included 1- Five point Likert scales and 2- Estimation upon percentages.

Table 1. General characteristics of women participated in the study of risk perception and preventive issues for breast cancer

Title	Variable	Number	Percentage
Occupation group	Medical	53	21.3
	Nonmedical	194	77.7
	Total	249	100
Age of starting menstrual cycle (year)	11-12	18	7.2
	13-15	175	70.3
	16-18	56	22.5
Age of first pregnancy (year)	No history of pregnancy	71	28.5
	15-19	20	8
	20-29	149	59.8
	≥30	9	3.7
Marital status	Married	200	80.3
	Single	48	19.3
	Divorce	1	0.4
	Total	249	100
Educational status	Unread	7	2.8
	Diploma & technician	107	43
	Bachelor	126	50.6
	Master	9	3.6
	Total	249	100
Familial history of breast cancer	Negative history	221	88.8
	Positive history among first grade relatives	12	4.8
	Positive history among second grade relatives	16	6.4
Perception risk level upon Likert scale	Low	184	73.9
	Medium	52	20.9
	High	13	5.2

Table 2. The difference between perception risk and calculated risk among women participated in the study of risk perception and preventive issues for breast cancer regarding to occupation groups

Variable	Occupation group	Mean	SD	P- value
perception risk	Medical	27.8	23.4	0.001
	Non-medical	15.9	20.3	
calculated risk	Medical	12.0	6.3	0.2
	Non-medical	11.2	4.1	
perception risk	Medical	27.8	23.4	0.001
calculated risk		12.0	6.3	
perception risk	Non-medical	15.9	20.3	0.001
calculated risk		11.2	4.1	

A Likert scale is a psychometric scale commonly used in questionnaires and is the most widely used scale in survey research such that the term is often used interchangeably with even though the two are not synonymous. When responding to an item in the Likert questionnaire, respondents specify their level of agreement to a statement.

Using the Gail's model, the possibility of breast cancer for each variable estimated by participants was calculated and the total relative risk for breast cancer predicted by each individual was consequently identified.

Data were analyzed using SPSS 12.0. The relationship between the perception risk and the calculated risk and obligation for preventive issues (self-examination, doctor examination and mammography) was analyzed using Pearson correlation coefficient. Logistic regression was used to evaluate the relationship between demographic factors and the perception risk as well as factors related to calculated risk and the preventive issues.

Table 3. Factors related to perception risk among women participated in the study of risk perception and preventive issues for breast cancer (logistic regression)

Variable	weighting	P- value
Occupation	21.1	0.001
History of breast cancer among first grade relatives	15.7	0.001
History of self-examination of breast	11.3	0.001
Individual estimation of cancer fatality rate	8.2	0.004
History of doctor examination	7.3	0.007
History of breast tissue biopsy	5.2	0.02
History of mammography	2.2	0.1
Number of children	2.1	0.2
Number of pregnancy	1.7	0.2
Age	1.6	0.2
Education level	0.7	0.4
Age of first pregnancy	0.6	0.5
Marriage status	0.003	0.9

Table 4. Factors related to self-examination among women participated in the study of risk perception and preventive issues for breast cancer (logistic regression)

Variable	weighting	P- Value
History of doctor examination	28.4	0.001
History of mammography	17.3	0.001
calculated risk	13.9	0.001
Occupation	10.9	0.001
perception risk	9.3	0.002
History of breast tissue biopsy	8.4	0.004
History of breast cancer among first grade relatives	5.8	0.02
Age	5.3	0.02
History of lactation	4.1	0.04
Marriage status	3.4	0.07
Age of first pregnancy	2.2	0.1
History of contact with cancerous patients	1.8	0.2
History of radiation	0.8	0.4
Age of starting menstrual cycle	0.6	0.5
History of malignancy	0.5	0.5
Education level	0.001	0.9

All the participants were informed about this project and participated in the study freely. This study was approved by the ethics committee of Ilam University of Medical Sciences.

Results

A total number of 249 women with a mean age (±SD) of 33.4 (±7) years participated in the study. The participants were divided into the medical group (midwives, nurses and other health carers) and the non- medical employee group. Ninety seven point two percent of the participants had a high school diploma or higher education levels, and 80.3% were married. The mean age for the first menstrual period and the first pregnancy were 14.5 and 24 years respectively. 12 women (4.8%) had a history of breast cancer among their first- grade relatives (mother or sisters) and 16 others had a history of breast cancer among their second- grade relatives.

Some factors such as occupation, familial history of cancer and breast tissue biopsy were significantly related to perception risk in this study; and the perception risk for breast cancer was higher among the medical group compared to the non-medical group.

The mean perception risk among the medical group was significantly higher than the non-medical group (27.8 vs. 15.9, $p<0.001$); however, no significant difference was observed between the mean calculated risk for these two groups ($p= 0.24$). The mean perception risk was higher than the calculated risk among either medical or non-medical groups with a significant difference ($p<0.001$). The results of logistic regression for the relationship

Table 5. Factors related to doctor-examination among women participated in the study of risk perception and preventive issues for breast cancer (logistic regression)

variable	weighting	P- Value
History of mammography	43.5	0.001
History of breast tissue biopsy	14.3	0.001
History of self- examination	10.9	0.001
perception risk	5.1	0.02
calculated risk	2.9	0.08
History of malignancy	2.8	0.09
Occupation	1.6	0.2
History of contact with cancerous patients	1.6	0.2
History of lactation	1.3	0.3
History of breast cancer among first grade relatives	0.5	0.5
Marriage status	0.6	0.5
Age of first pregnancy	0.2	0.7
Age	0.1	0.7
Age of starting menstrual cycle	0.1	0.8
Education level	0.1	0.8
History of radiation	0.03	0.9

Table 6. Factors related to mammography among women participated in the study of risk perception and preventive issues for breast cancer (logistic regression)

Variable	weighting	*P- Value*
History of doctor examination	43.5	0.001
History of breast tissue biopsy	14.6	0.001
History of self- examination	11.4	0.001
History of malignancy	3.6	0.06
calculated risk	2.1	0.2
Marriage status	2.1	0.2
perception risk	1.5	0.2
Age of first pregnancy	1.4	0.2
Occupation	0.7	0.4
History of radiation	0.1	0.7
Education level	0.8	0.4
Age	0.02	0.9
Age of starting menstrual cycle	0.006	0.9
History of breast cancer among first grade relatives	0.005	0.9

between demographic factors and the perception risk as well as factors related to calculated risk and preventive issues are indicated in the table 3.

According to the logistic regression results, the highest score for perception risk is attributed to occupation followed by a history of breast cancer in grade- one relatives and history of self-examination with a significant p value.

This study showed that the most important predicted factors related to self-examination among participants were as follows: a history of examination by doctors, history of mammography, the calculated risk, occupation, the perception risk, a history of cancer in the family, a history of breast tissue biopsy and participants' age.

The most important predicted factors related to doctor-examination among participants were a history of mammography, history of breast tissue biopsy, self-examination and the perception risk respectively.

The most important predicted factors related to mammography were a history of doctor-examination, history of breast tissue biopsy and self-examination respectively.

Pearson correlation coefficient revealed that the maximum relationship between the perception risk and preventive issues as well as between the calculated risk and preventive issues both were attributed to mammography.

Table 7. The relation between perception risk and calculated risk with preventive issues among women participated in the study of risk perception and preventive issues for breast cancer (correlation coefficient)

Variable	Correlation Coefficient	P- value
perception risk and self- examination	0.2	0.001
perception risk and doctor- examination	0.2	0.001
perception risk and mammography	0.3	0.009
calculated risk and self- examination	0.2	0.001
calculated risk and doctor- examination	0.2	0.001
calculated risk and mammography	0.3	0.001
perception risk and calculated risk	0.2	0.001

Discussion

The percentage of perception risk was predominantly higher than the percentage of the calculated risk among both the medical and the non-medical groups. However, using Likert scales, a lot of participants reported a perception risk for breast cancer as rare or little in the future. Therefore, the use of numerical criteria for estimation of breast cancer could not show a virtual risk of cancer in the future. It seems that a higher estimation of perception risk reported by some studies is due to this problem. For example, a 20% risk of cancer for one may be interpreted as high, for another as low, and for others as a middle risk. It is also important whether participants do or do not have a good medical knowledge.

Graves and others from the South and Central America have reported an 81% higher perception risk compared to calculated risk (virtual risk) by participants. However, according to Gail's model calculation, only 6.9% of the participants had a high risk for cancer. They also reported that only 30% of women in the screening ages have performed mammography, and there was not a significant relationship between the perception risk of breast cancer and obligation for preventive issues [10].

Ceber and coworkers from Turkey reported a higher perception risk compared to calculated risk among nurses and midwives; however, they have reported that regarding the participants' occupations, these two groups showed a lower obligation level for preventive issues than it was expected [11]. Their study included only a medical group (nurses and midwives) of participants; however, in the current study both medical and nonmedical groups were evaluated. In addition, the Ceber study was evaluated by a single criteria (four point Likert scale) compared to the current study which was evaluated with both five point Likert scale (increasing the ability of participants to answer the relevant questions) and a numerical criteria (using percentage of perception risk) [11].

A meta-analysis by Katapod and others, which assessed 42 different studies, verified that women generally do not show a precise estimation for risk of breast cancer. They also reported that a positive familial history of breast cancer was related to a higher perception risk, and that age as well as educational level could be weakly related to the perception risk. A positive relationship between perception risk and preventive issues such as mammography was also reported by these authors and this was in accordance with the results of the current study [12].

Skinner and colleagues assessing 1803 people who attended the health centres reported that 55% of all participants explained a medium risk for breast cancer, and 26% illustrated a higher risk of breast cancer than a virtual risk [13]. Obligation for preventive issues was significantly related to mammography, self-examination and doctor-examination in the Skinners' study which was in accordance with the results of the current study.

In the current study, some variables such as occupation, positive familial history and history of breast tissue biopsy were significantly related to the perception risk. The knowledge of some employees such as nurses and midwives about breast cancer is higher than other professions since it is normally related to their careers and they are expected to report a higher perception risk. The positive relationship between higher knowledge and breast cancer perception risk in this study reveals that as people's information about breast cancer increases, so does the perception risk .Consequently, the preventive issue will also increase which results in indirect reduction of the mortality rate due to this disease.

Madanat and others worked on 153 nurses and 178 teachers on their knowledge about breast cancer risk factors and their relevant screening methods. The result of their study was relatively similar to the current study. Nurses illustrated a significantly higher knowledge of the relevant

questions than teachers (88.5% vs. 35.7%, p<0.007) [14].

Another study from Germany reported that among 2108 participants, about 79% showed a good knowledge for breast cancer, but they showed a poor knowledge for risk factors of breast cancer. About 95% of the participants reported that positive family history is the most important risk factor for breast cancer and only 57% recognised age as a risk factor [15].

Two different studies in American hospitals which assessed 862 and 111 participants respectively reported that women's knowledge was low about risk factors of breast cancer and preventive issues [16, 17]. The results of these studies are relatively in accordance to what is reported by the current study.

Another Iranian study reported that there is no significant relationship between risk of breast cancer and some variables such as number of pregnancies, age of first pregnancy, number of abortions, lactation, history of benign diseases in the breast, breast tissue biopsy and menopausal age [18]. The results of this study are in contrast to what is reported by the current study.

As a conclusion, the results of the current study revealed that most women do not show a true estimation of breast cancer; however, those working in the relevant professions such as nurses and midwives can show a higher estimation of breast cancer and therefore they follow preventive cares such as self-examination, doctor examination and mammography better than other employees. A higher knowledge of breast cancer will result in a higher perception risk for this disease and chasing preventive and remedial cares for it.

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Conflict of Interest

There is no conflict of interest for this study.

Authors' Contribution

RS designed the study, literature review and wrote the first draft of the paper. KA contributed to the study design, literature review, data analysis and English writing of the manuscript. PA contributed to the data entry, data collection and writing-up process. All authors read and approved the final manuscript.

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