Factors Related to Breast Cancer Screening in Women in the Northern Part of Iran: A Cross-Sectional Study

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Abstract

BACKGROUND: Breast cancer is the most common type of cancer in women and affects many women around the world each year. Breast cancer screening is one of the best strategies that can be used to reduce the death rate from the disease. Different factors influence the breast cancer screening rate.

AIM: This study aimed to investigate the factors that affect the screening of women for breast cancer in the northern part of Iran.

MATERIAL AND METHODS: This cross-sectional study was conducted in the Mazandaran Province of Iran in 2016 on 1,165 women who participate in breast cancer screening programs, using a cluster-sampling method. A valid and reliable researcher-made questionnaire was used to collect the data. The collected data were analysed using descriptive and inferential statistics via SPSS 21.

RESULTS: In this study, 62% of the women had a history of breast self-examinations, 41.1% had breast examinations by healthcare staff, and 21.7% received mammography. The woman’s age, age at first marriage, occupation, spouse’s occupation, household income, health status, history of infertility, smoking, and decision-maker on issues of sexual and reproductive health (SRH) were the best predictors of participation in screening for breast cancer (P < 0.05).

CONCLUSION: To encourage participation in breast cancer screening programs, women should be encouraged to seek preventive care. Also, factors that affect screening should be considered an appropriate educational method should be provided.

Introduction

Breast cancer is the most common type of cancer in women in developed and developing countries [1]. It affects 1.5 million women every year and has the highest death rate for all cancers in women [2]. According to the World Health Organization, 570,000 women died of breast cancer in 2015, which was equivalent to 15% of all cancer deaths in women [2]. In Iran, the prevalence and death rate from breast cancer in 2014 was 9,795 and 14.2% respectively [3]. Globally, the incidence of breast cancer in developing countries is rising due to the increase in life expectancy, urban growth, and the acceptance of the Western lifestyle [4]. The goals of the Healthy People 2020 program by the US Office of Disease Prevention and Health Promotion include reducing the breast cancer death rate, reducing the number of people with late-stage cancer, and increasing the participation of women in breast cancer screening [5].

Breast cancer screening is the best strategy to reduce the death rate through early diagnosis, control, and treatment of the disease [1], [6], [7], [8], which improves patient survival and quality of life [4], [9]. Different methods, such as breast self-examination, physical examination by physicians or healthcare staffs, and mammography, are used to screen and diagnose breast cancer in early stages [2]. However, the detection of breast cancer in women in...
developing countries, such as Iran, is often delayed until there is no hope of treating the disease [9]. The reasons for this delay include the lack of awareness of breast cancer screening methods, the lack of a widespread screening program in Iran, the lack of awareness of breast cancer symptoms at early stages, and the poor prognosis of the disease at the late stage. Promoting women’s awareness of screening methods can play a major role in the early detection of breast cancer [4], [10].

Studies in various parts of Iran, such as Kerman [9], [11], Mazandaran [12], Gorgan [13], and Ilam [7], have shown that the breast cancer screening rate is not optimal. Different demographic, economic, social, and cultural factors, including age [1], [7], [13], [14], level of education [1], [7], [11], [14], status of occupation [7], [14], [15], and economic situation [11], can influence the participation of women in breast cancer screening programs.

Because of the high incidence of breast cancer in Iran and its occurrence in young Iranian women, an early diagnosis is important. Thus, this study aimed to investigate the participation rate of women in breast screening programs and its associated factors in women in the northern part of Iran.

Methods

This descriptive cross-sectional study was approved by the Research Council and Ethics Committee of the Mazandaran University of Medical Sciences, Sari, Iran. The study was conducted on 1,165 women in Mazandaran Province in 2016. The sample size was based on a study by Naghibi et al., in which 48.1% of women had a history of breast self-examination [1], and was calculated to be 1,200 women with a 95% confidence level and an error of 0.04 as follows: $n = \left( \frac{Z_{1-\alpha/2} \times P(1-P)}{d^2} \right) = 599 \times 2 \quad \text{(effect size)} = 1198 \approx 1200$

Cluster sampling was used to organise the women into 60 clusters with 20 women in each cluster. The women had an equal chance to be selected from various urban and rural areas. The first household from each cluster was randomly selected based on a 10-digit postal code. The investigation began with the first household in each cluster and proceeded by moving from the right side. The remaining households were questioned by the investigation team until a sample population of 20 women was reached. Follow-ups were made if the eligible woman from the household in the sample was not present. If the researcher was not successful in reaching the woman after two visits, she was removed from the cluster and replaced by a woman from the next household. If more than one person in a household qualified for the study, the person whose birth date was closest to the date of the survey was included.

To collect the data about breast cancer screening and factors related to women’s participation in breast cancer screening, in a deductive approach, an extensive literature review, opinions of 10 experts from various disciplines that included reproductive health PhD, sociologist, community nurse, gynecologists, midwives and surgeons (breast surgery fellowship) and 15 women referring to healthcare centers were used. A questionnaire with 33 questions (6 questions in breast cancer screening and 27 questions in related factors) was developed. Face and content validity and reliability of the instrument were assessed. The quantitative face validity of this questionnaire showed an impact score above 1.5 for all items. In the qualitative content validity process, 5 questions were revised and corrected. Also, 2 questions achieved a CVR less than 0.62, and 1 question had a CVI less than 0.79. The Cronbach’s alpha and ICC of the questionnaire were 0.895 and 0.945, respectively. A dichotomous variable was used and a score of one was given for women who performed regular breast self-examinations, received breast examinations by a healthcare staffs, or were referred for mammography based on indications (every 1-2 years for women 40-74 years of age); a score of zero was given to women who don’t participate in breast cancer screening. For the statistical analysis, descriptive and inferential statistics via SPSS version 21 (IBM Corp., Armonk, NY) were used. The absolute and relative frequency, mean and standard deviation (SD), tables and graphs, chi-square, analysis of variance (ANOVA), student’s t-test, and multivariable logistic regression were used. The level of significance was set at $P < 0.05$.

Results

In this study, 1,165 women were investigated (35 questionnaires were not filled in completely). The mean age of the women was 37.15 ± 8.84 years. In terms of education, 519 women (44.5%) had not earned their high school diploma. In terms of breast examination, 722 women (62%) performed breast self-examinations, 479 (41.1%) received breast examinations by healthcare staffs, and 253 (21.7%) had received mammography. Of the women who performed breast self-examinations, 624 women (86.4%) had normal breasts, 88 women (12.2%) felt a mass, and 10 women (1.4%) observed nipple secretions. For women who received breast examinations by healthcare staffs, 421 women (87.9%) had normal breasts, and a mass was felt in 58 women (12.1%). The mammograms were normal in 204 women (80.6%), while 40 women (15.8%) had
a benign cystic mass, 8 (3.2%) had a benign solid mass, and 1 woman (0.4%) had calcification. The Student’s t-test and chi-square test showed that women with a history of breast self-examination compared with women without a history of breast self-examination had a higher mean age at the onset of sexual intercourse (21.12 years and 20.23 years); a higher frequency of proper decision-maker on issues of SRH (63.8% and 56.2%); and a higher number of pregnancies (2.10 ± 1.16 and 1.93 ± 1.25). Women who received breast examinations by a healthcare staffs had a higher mean age (39.36 years), mean age of spouse (38.15 years), and frequency of infertility (49.6%) healthcare staffs than those who did not receive breast examinations by a healthcare staffs: 35.61 years, 36.52 years, and 40%, respectively. Women who had a history of mammography had a higher body mass index (BMI) (27.91), a mean number of pregnancies (2.36), and frequency of healthy health status (28.7%) than women without a history of mammography: 26.97, 1.95, and 18.9%, respectively.

The following variables were associated with a history of breast self-examination and had a P < 0.1 in the single-variable test and were entered into the multivariable logistic regression model: woman’s age (P < 0.0001), age at onset of sexual intercourse (P < 0.001), age at first marriage (P < 0.008), occupation (P < 0.004), health status (P < 0.062), household income (P < 0.030), the decision-maker on SRH (P < 0.021), number of pregnancies (P < 0.026) and having genital unclear or colored vaginal discharge (P < 0.010). Multivariable logistic regression showed that age, age at onset of sexual intercourse, occupation, and health status had significant statistical relationships with a history of breast self-examinations. The probability of performing breast self-examination increased 1.08 times for every year increase in age at the onset of sexual intercourse. The probability of a housekeeper performing breast self-examination was 32% less than the probability of employed women doing breast self-examination (Table 1).

### Table 1: Multivariate logistic regression to determine the factors related to breast self-examination

| Variable                              | OR     | CI       | P-value |
|---------------------------------------|--------|----------|---------|
| Age (year)                            | 1.02   | 1.00-1.04| 0.007   |
| Age (year) at onset of sexual intercourse| 1.08   | 1.01-1.15| 0.022   |
| Occupation                            | 0.68   | 0.46-0.99| 0.04    |
| Health status                         | 0.71   | 0.54-0.93| 0.015   |
| Ultimate decision-maker on issues of sexual and reproductive health | 1.14   | 0.85-1.52| 0.36    |

P < 0.05; *Odd’s Ratio; **Confidence Interval; Body Mass Index; The desirable decision-maker for issues of sexual and reproductive Health was the woman alone or with her husband; the undesirable decision-maker was the husband alone.

The following variables were associated variables with a history of receiving breast examinations by a healthcare staffs and had a P < 0.1 in the single-variable test and were entered into the multivariable logistic regression model: woman’s age (P < 0.0001), husband’s age (P < 0.009), BMI (P < 0.001), age at first marriage (P < 0.026), number of pregnancies (P < 0.0001), health status (P < 0.095), household income (P < 0.030), decision-maker for self-care (P < 0.022) and issues of SRH (P < 0.001), polygamy (P < 0.75), and a history of infertility (P < 0.030). According to the results of the model, age, age at first marriage, household income, decision-maker on issues related to SRH, and history of infertility had significant statistical relationships with a history of receiving breast examinations by healthcare staffs. The probability of having a breast examination by a healthcare staffs in a household with an income below 5 million Iranian Rials (120 US dollars) was 40% less than the probability of a woman from a household with an income greater than 15 million Rials (360 dollars) having a breast examination by a healthcare staffs. Furthermore, the probability of having a breast examination by a healthcare staffs in a household with an income of 5-10 million Rials (120-240 dollars) or 10-15 million Rials (240-360 dollars) was 35% less and 31% less, respectively, than the probability in households with incomes over 15 million Rials (360 dollars) (Table 2).

### Table 2: Multivariate logistic regression to determine the factors related to breast examination by a medical team

| Variable                              | OR     | CI       | P-value |
|---------------------------------------|--------|----------|---------|
| Age (year)                            | 1.06   | 1.04-1.08| 0.000   |
| Husband’s age (year)                  | 0.99   | 0.97-1.00| 0.185   |
| BMI                                    | 1.02   | 0.99-1.05| 0.199   |
| Age (year) at first marriage          | 0.95   | 0.92-0.98| 0.001   |
| Number of pregnancies                 | 0.906  | 0.826-1.06| 0.299  |
| Health status                         | 1.04   | 0.789-1.37| 0.766  |
| Household income                      | 0.60   | 0.39-0.93| 0.018   |
| Number of pregnancies                 | 0.64   | 0.46-0.92| 0.010   |
| Income (million)                      | 0.68   | 0.48-0.96| 0.026   |
| Ultimate decision-maker on issues of sexual and reproductive health | 1.07   | 0.81-1.41| 0.62    |
| Ultimate decision-maker on issues of sexual and reproductive health | 1.67   | 1.22-2.29| 0.001   |
| Ultimate decision-maker on issues of sexual and reproductive health | 0.62   | 0.29-1.32| 0.22    |
| Infertility                           | 0.62   | 0.43-0.90| 0.014   |

P < 0.05; *Odd’s Ratio; **Confidence Interval; Body Mass Index; The desirable decision-maker for self-care, issues of sexual and reproductive Health was the woman alone or with her husband; the undesirable decision-maker was the husband alone.
on issues of SRH had statistically significant relationships with a history of receiving mammography. The probability of a nonsmoker receiving mammography was 83% less than the probability of a smoker receiving mammography. As each year of age increases, the probability of mammography increases by 7%. Furthermore, women with unemployed husbands received mammography 3.2 times more than those with self-employed husbands. If the decision maker is appropriate for SRH, 76% will increase the probability of mammography (Table 3).

Table 3: Multivariate logistic regression to determine the factor related to mammography

| Variable                                      | OR       | 95% CI     | P-value |
|-----------------------------------------------|----------|------------|---------|
| Age (year)                                    | 1.01     | 0.95-1.08  | 0.32    |
| Husband’s age (year)                          | 0.99     | 0.97-1.00  | 0.189   |
| BMI                                          | 1.01     | 0.97-1.05  | 0.429   |
| Number of pregnancies                        | 0.989    | 0.85-1.14  | 0.882   |
| Educational level                            | 0.96     | 0.60-1.53  | 0.882   |
| Did not eam diploma                          | 0.92     | 0.59-1.44  | 0.735   |
| Diploma and associate degree                 |          |            |         |
| Bachelor degree and higher                   |          |            |         |
| Husband’s occupation                         | 3.20     | 1.58-6.48  | 0.001   |
| Unemployed                                   | 1.11     | 0.74-1.65  | 0.604   |
| Government employee                          | 1.12     | 0.75-1.67  | 0.561   |
| Worker                                       |          |            |         |
| Self-employed                                |          |            |         |
| Smoking                                      | 0.171    | 0.03-0.81  | 0.027   |
| No                                           |          |            |         |
| Health status                                | 1.36     | 0.98-1.89  | 0.059   |
| Healthy                                      |          |            |         |
| III                                          |          |            |         |
| Ultimate decision maker for self-care*       | 1.44     | 0.99-2.08  | 0.054   |
| Desirable                                    |          |            |         |
| Ultimate decision maker for buying home needs* | 0.94   | 0.68-1.29  | 0.717   |
| Undesirable                                  |          |            |         |
| Ultimate decision maker on issues of sexual and reproductive health* | 1.76 | 1.15-2.70 | 0.009 |
| Desirable                                    |          |            |         |
| Ultimate decision maker                      |          |            |         |
| Vaginal discharge in the last 12 months       | 0.8      | 0.57-1.13  | 0.215   |
| Yes                                          |          |            |         |
| No                                           |          |            |         |
| Genital ulcers in the last 12 months          | 0.53     | 0.27-1.02  | 0.061   |
| Yes                                          |          |            |         |
| No                                           |          |            |         |
| Use of a contraceptive method                 | 2.97     | 0.0-0.999  |         |
| Yes                                          |          |            |         |
| No                                           |          |            |         |

Discussion

This study aimed to investigate the factors related to breast cancer screening in women from the northern part of Iran. According to the findings, 62% of women had a history of breast self-examinations, 41.1% had breast examinations by healthcare staffs, and 21.7% received mammography. The results showed that there was a higher rate of breast cancer screening than the rates reported by studies conducted in Nigeria [17] and in other places in Iran, such as Kermanshah, Kerman, Gorgan, Tabriz, and Mazandaran [1], [9], [11], [13], [14], [16]. However, Klug et al., in Germany showed that 82.8% of women had a history of breast examinations by healthcare staffs and 55.5% had a history of receiving mammography [18]. A comparison of the results of this study with the results by Kellogg et al. Indicating that Iran is not in good condition compared to the developed countries. Therefore, there is a need for more efforts to improve women’s knowledge about breast screening methods and the importance of screening about an early diagnosis of breast cancer.

The results of this study showed that the predictors of participation in breast cancer screening were age, age at first marriage, age at onset of sexual intercourse, occupation, the occupation of spouse, household income, health status, history of infertility, smoking, and decision-maker on issues of SRH. Age was a predictor of women performing breast self-examinations, having a clinical examination by healthcare staff, and receiving mammography. For each year increase in age, breast screenings increased 1.02, 1.06, and 1.07 times, respectively. The results of this study were consistent with studies by Avci [19], Berdi-Ghouchaei et al. [13], and Nourizadeh et al. [16]. However, studies by Ahmadian et al. [15], Lee et al. [20], and Godazandeh et al. [14] were inconsistent with the results of this study. Considering the direct relationship between age and onset of breast cancer, as women age they consider themselves to be more at risk of developing cancer. Therefore, the rate of screening increases with age.

Occupation was another predictor of breast cancer screening. The probability that a housekeeper would perform breast self-examination was 32% less than the probability that an employed woman would do breast self-examination. The results of studies by Soltanahmadi et al. [11], Bozorgi et al. [7], Godazandeh et al. [14], and Kim et al. [21] are consistent with the findings of this study. Employed women tend to have higher social relationships and higher levels of education than housekeepers and, thus, have an increased level of knowledge and increased participation rate in breast screening programs [11]. The relationship between job status and participate in a breast screening program indicates that, in addition to contributing to the household income, being employed presents more opportunities to use healthcare and social services [21].

The results of this study showed that household income was also related to breast cancer screening. Women with high household incomes had a high rate of screening. This finding was consistent with the findings by Soltanahmadi et al. [11]. One reason for this association could be the misconception by some women who think that a clinical breast examination must be performed by physicians, whereas clinical examinations are performed by midwives in healthcare centres for free [11]. However, a study by Lee et al., in Korea showed that household income did not influence the screening rate. The Korean government provides free screening services to low-income people, which might reduce the effect of household income on participation in screening programs [20].
In this study, 62% of women had a history of breast self-examinations, 41.1% had a history of receiving breast examinations by healthcare staffs, and 21.7% of them had a history of receiving mammography. Also, it has been revealed that the woman's age, age at first marriage, age at onset of sexual intercourse, occupation, spouse's occupation, household income, health status, history of infertility, smoking, and decision-maker on issues of sexual and reproductive health were the best predictors of participation in screening for breast cancer. To reduce the total burden of disease of breast cancer, factors that are related to performing screening tests should be considered an appropriate educational method should be provided by healthcare providers.

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