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Original article

The prevalence, epidemiology and screening results of breast cancer in women of Guilan province, north of Iran: A cross-sectional study during 2017–2018

Milad Nasrollahzadeh[a,1], Mohammad Sadegh Esmaeili Delshad[b,1], Roya Mansour-Ghanaei[c], Zahra Maleki[d], Farahnaz Joukar[a,c,e], Soheil Hassanipour[e], Mohammad-Javad Khosousi[a], Fariborz Mansour-Ghanaei[c,**]

[a] Gastrointestinal and Liver Diseases Research Center, Guilan University of Medical Sciences, Rasht, Iran
[b] Department of General Surgery, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran
[c] Caspian Digestive Disease Research Center, Guilan University of Medical Sciences, Rasht, Iran
[d] Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran
[e] GI Cancer Screening and Prevention Research Center, Guilan University of Medical Sciences, Rasht, Iran

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ABSTRACT

Objective: Breast cancer is one of the most common types of cancer in women, affecting many women worldwide every year. Breast cancer screening is one of the best strategies to reduce the death rate caused by this cancer. The aim of this study was to evaluate the prevalence, epidemiology and screening results of breast cancer in women in Guilan province.

Methods: This cross-sectional study was carried out on 300 women who participated in the screening program in Guilan province during 2017–2018. The data were collected by a breast screening questionnaire. Finally, the data were analyzed using chi-square and independent t-tests.

Results: The mean age of the patients was 49.96 ± 6.53 years old and the estimated prevalence of breast cancer was 1.7% (95% Confidence interval (CI): 0.6–3.6). Physicians examination were significantly associated with breast cancer status (P = 0.003). The results also showed that the percentage of malignancy and benignity in the center (69 patient, 52.3%), west and northwest of Guilan (69 patient, 54.8%) was more than descriptive in East Guilan (20 patient, 47.6%). But it was not statistically significant (P = 0.730). The accuracy of mammography results (BIRADS) and sonography were 69.76% and the kappa coefficient was 0.44 (p < 0.001).

Conclusion: Implementation of screening programs in women should be considered and breast screening using mammography is one of the valuable methods for early detection of breast lesions, which is associated with a better prognosis of cancer.

1. Introduction

Breast cancer is a major public health problem and the most common progressive cancer in women, which accounts for high mortality rates worldwide.[1] In 2018, approximately 1.2 million new cases were diagnosed, accounting for approximately 1 in 4 cases of cancer among women.[2] Various studies have shown that the annual incidence of breast cancer in developing countries is increasing. The highest incidence is in North America with 99.4 per 100,000 while the lowest incidence is in African countries.[3,4] For total world countries, the mean breast cancer mortality rate was 13.77 per 100,000 in 1990 and the overall slope of mortality rate was 0.7 per 100,000 from 1990 to 2015. The results showed that Latin America and Caribbean the highest increasing trend of breast cancer mortality rate during the years 1990–2015 (1.48 per 100,000).[5] The incidence of this cancer is increasing more rapidly in Asia and Africa than in North America and Europe.[6,7]

According to the International Agency for Cancer Research, approximately 10980 new cases of breast cancer in Iran have been identified that family history, delay in menopause,[8] reproductive behaviors,

* Corresponding author. Gastrointestinal and Liver Diseases Research Center, Guilan University of Medical Sciences, Razi Hospital, Sardar-Jangle Ave., P.O. Box: 41448-95655, Rasht, Iran
E-mail address: fmansourghanaei@gmail.com (F. Mansour-Ghanaei).
[1] **Note:** Milad Nasrolahzade and Mohammad Sadegh Esmaeili Delshad have contributed equally to this report and are considered co-first authors.

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and lifestyle-related factors such as obesity, smoking, physical activity decline, and exposure to radiation, stress, and anxiety have been reported to be characteristic of the disease incidence.[1] Most patients with advanced disease are younger than those in eastern countries.

Delay in the diagnosis and treatment of breast cancer is an important issue that can lead to disease progression and ultimately increase mortality and decrease the survival rate of patients.[9–12] Breast cancer screening is one of the best strategies to reduce mortality through early diagnosis, control, and treatment of disease that improves the survival and quality of life of patients.[13–15] Therefore, due to the lack of a regular training or screening program for early detection of breast cancer in Iran, about 70% of women go to advanced stages of the disease.[9] Screening methods used for early diagnosis of breast cancer include breast self-examination, clinical breast examination (CBE), and mammography.[6,16] Mammography has been called the best method of early detection of breast cancer, which reduces the mortality rate by 15–25%.[17,18]

In addition, studies in different parts of Iran such as Kerman,[19] Mazandaran,[20] Gorgan,[21] and Ilam[22] have found that breast cancer screening rates are not optimal.[6] Due to the increasing trend of breast cancer, the high cost of treatment and the fact that it affects most economically and socially productive women, early detection through screening methods, such as mammography, is important and it reduces the burden of disease mortality. Since no such study has been performed in this area so far, so screening programs may be necessary to reduce the mortality rate of this cancer. The purpose of this study was to evaluate breast cancer screening and mammography findings among women covered by Guilan Relief Committee at Rasht's Razi Gastrointestinal and Liver Research Center during 2017–2018.

2. Materials and methods

This cross-sectional study was performed on 300 women covered by the Guilan Relief Committee during 2017–2018. All participants referred systematically by the Head of the Department of Health and Social Insurance of this local relief foundation from the cities over the Guilan province. The sample size was calculated by using similar studies in north of Iran.[23,24]

2.1. Inclusion and exclusion criteria

Inclusion criteria were age 40–70 years, having prognosis and history of breast cancer in their first-degree relatives and the exclusion criterion is an unwillingness to complete the questionnaire. The sampling method in this study was simple random. Participants' data were collected using a Breast Disease Screening Questionnaire, including demographic and clinical information, disease history and preventive measures, gynecological and obstetric history, family cancer history, irregular, general and monthly medical examinations, menopause, diabetes mellitus, hypertension, and thyroid disorder. Body mass index (BMI) was calculated which is expressed as kg/m^2. BMI less than 18.5, 18.5 to 24.9, 25.9 to 30 and more than 30 are considered underweight, normal, overweight and obese respectively.[25] The questionnaire was completed by an expert in the Razi Gastrointestinal and Liver Research Center of Rasht Hospital.

Mammography interpretation is based on the BIRADS reporting system. BIRADS stands for Breast Imaging-Reporting and Data System. It is a tool for qualitative expression and risk assessment in mammography and breast sonography.

Therefore, after referring to the designated mammography unit, all participants were divided into the following categories based on the BI-RADS results:

- score of zero means insufficient mammography and need for sonography,
- score 1 no problem or lesion,
- score 2 benign findings,
- score 3 probably benign,
- score 4 suspected of malignancy,
- score 5 clear evidence of malignancy,
- and score 6 was performed for a known malignancy biopsy.[26]

After mammography, sonography was also performed for patients with focal asymmetry or mass or BI-RADS zero.

Table 1
Demographic information of women undergoing breast cancer screening based on breast cancer status (negative, benign and malignant).

Variables	Negative	Benign	Malignant	P-value
	n (%)	n (%)	n (%)	
Age (years)				
< 40	8 (5.6)	5 (3.3)	1 (20)	0.250
41-50	79 (55.6)	77 (50.3)	1 (20)	
51-60	45 (31.7)	61 (39.9)	3 (60)	
> 60	10 (7)	10 (6.5)	0 (0)	
Marital status				
Single	5 (3.5)	6 (3.9)	0 (0)	0.999
Married	44 (31)	45 (29.4)	2 (40)	
Divorce	36 (25.4)	40 (26.1)	1 (20)	
Widow	57 (40.1)	62 (40.5)	2 (40)	
BMI				
< 18.5	4 (3)	0 (0)	0 (0)	0.251
18.5-25	26 (19.5)	31 (21.1)	0 (0)	
25-30	50 (37.6)	47 (32)	1 (33.3)	
> 30	53 (39.8)	69 (46.9)	2 (66.7)	
Educational level				
Sub-diploma	125 (88)	131 (85.6)	5 (100)	0.805
Diploma	17 (12)	22 (14.4)	0 (0)	
Diabetes				
yes	27 (19)	33 (21.6)	2 (40)	0.384
No	115 (81)	120 (78.4)	3 (60)	
Hypertension				
Yes	29 (20.4)	37 (24.2)	1 (20)	0.789
No	113 (79.6)	116 (75.8)	4 (80)	
Thyroid diseases				
Yes	24 (16.9)	18 (11.8)	0 (0)	0.352
No	118 (83.1)	135 (88.2)	5 (100)	

2.2. Ethical consideration

All included participants provided written informed consent and the aims of the study were described for all of them. The present study was approved by Ethics Committee of Guilan University of Medical Sciences (**IR.GUMS.REC.2018.116**).

2.3. Statistical analysis

Qualitative data were reported as a percentage (%) and quantitative data were analyzed by Kolmogorov-Smirnov test with mean ± standard deviation. Also, the chi-square test used to investigate the relationship between two qualitative variables and the independent *t*-test was used for the relationship between quantitative variables with two-dimensional qualitative variables. The Kruskal-Wallis test was used for the measure relationship between more than two groups. Data were analyzed by SPSS software version 16 and tests at a significance level of less than 5%.

3. Results

The mean age and body mass index of the participants were respectively 49.96 ± 6.53 years old and 29.68 ± 5.86 kg/m^2. 294 (98%) of them were housewives. The age of the first menstrual cycle of 87 (29.2%) participants was 13 years old but menopause of 22 (13.3%) of them were 45 years old. 266 (94.3%) patients had breastfeeding, of

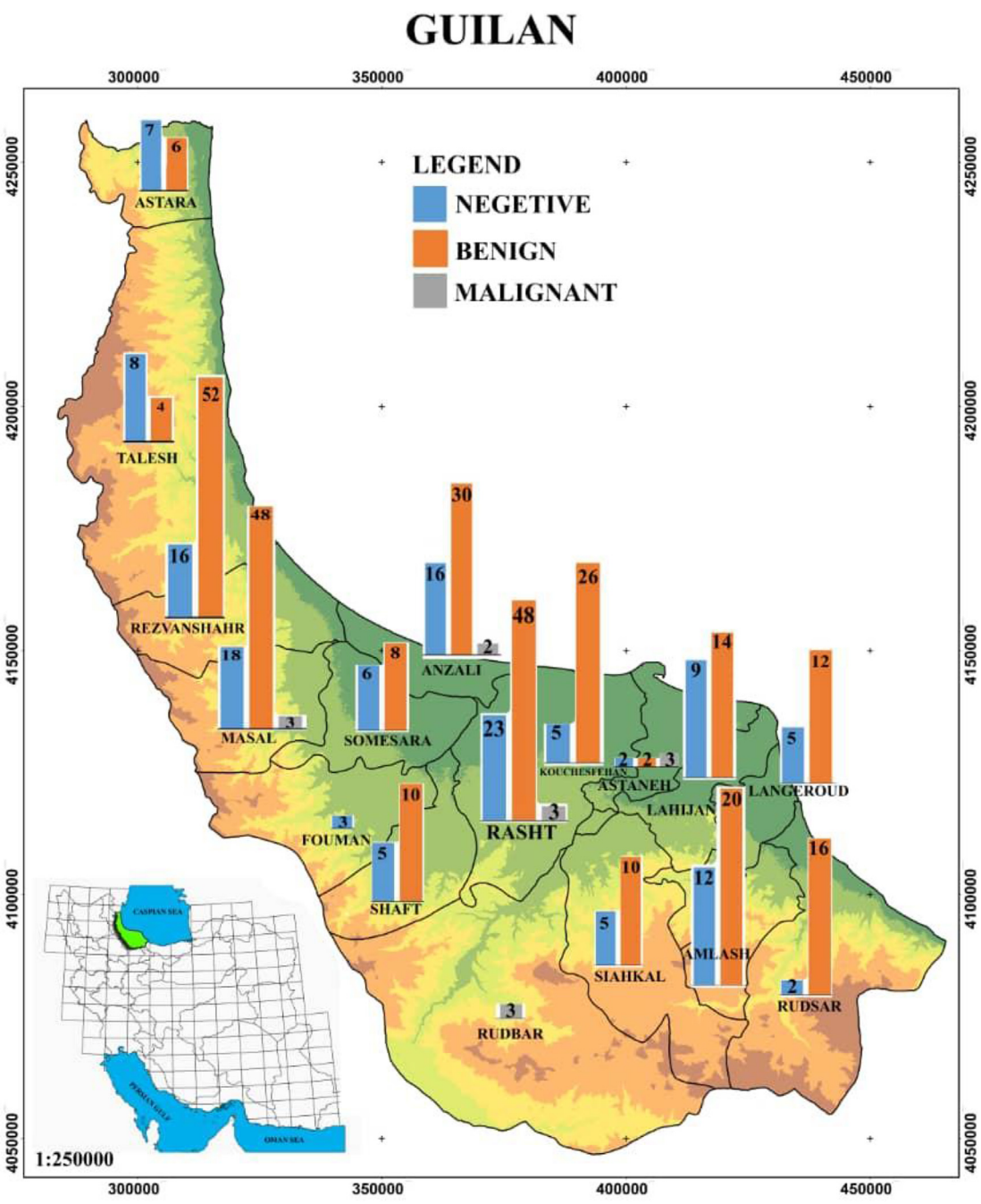

Fig. 1. Geographical pattern of Breast cancer in different cities of Guilan province during 2017–2018.

which 169 (63.3%) of them reported breastfeeding for more than 24 months.

Evaluation of clinical records showed that 178 (61.6%) participants had history of using birth control pills, 53 (17.7%) had history of aspirin use, 47 (15.7%) had history of mammography, 15 (5%) patients had a history of mastitis and 29 (9.7%) and 27 (9%) of them had breast cancer in the first and second-degree relatives, respectively.

The relationship between demographic variables and breast cancer status (negative, benign and malignant) is shown in Table 1, all of which had no significant relationship with breast cancer status (all $P > 0.05$). As most malignancies were in the age group of 51–60 years old, as breast cancer rates increased with age, most of these cancer cases were also found in married and widowed women, under-educated and obese and overweight women, which these relations were not statistically significant.

There was no significant relationship between monthly, irregular and total breast examinations according to breast cancer status (negative, benign and malignant) ($P = 0.483$, $P = 0.952$, $P = 0.265$), but physician examination had a significant relationship with breast cancer status ($P = 0.003$), the percentage of benign and malignant women who had visited a doctor was higher than those who did not visit a doctor.

Variables of menopausal or non-menopausal also had a significant relationship with breast cancer status, so that in menopausal women the percentage of malignancy was 1.8% and the percentage of benign lesions was 57.7%, which was higher than non-menopausal women. The results showed that the percentage of malignancy and benignity of the center (69 patients, 52.3%) west and northwest of Guilan (69 patients, 54.8%) was descriptively more than of east Guilan (20 patients, 47.6%), but it was not statistically significant ($P = 0.730$). Also,

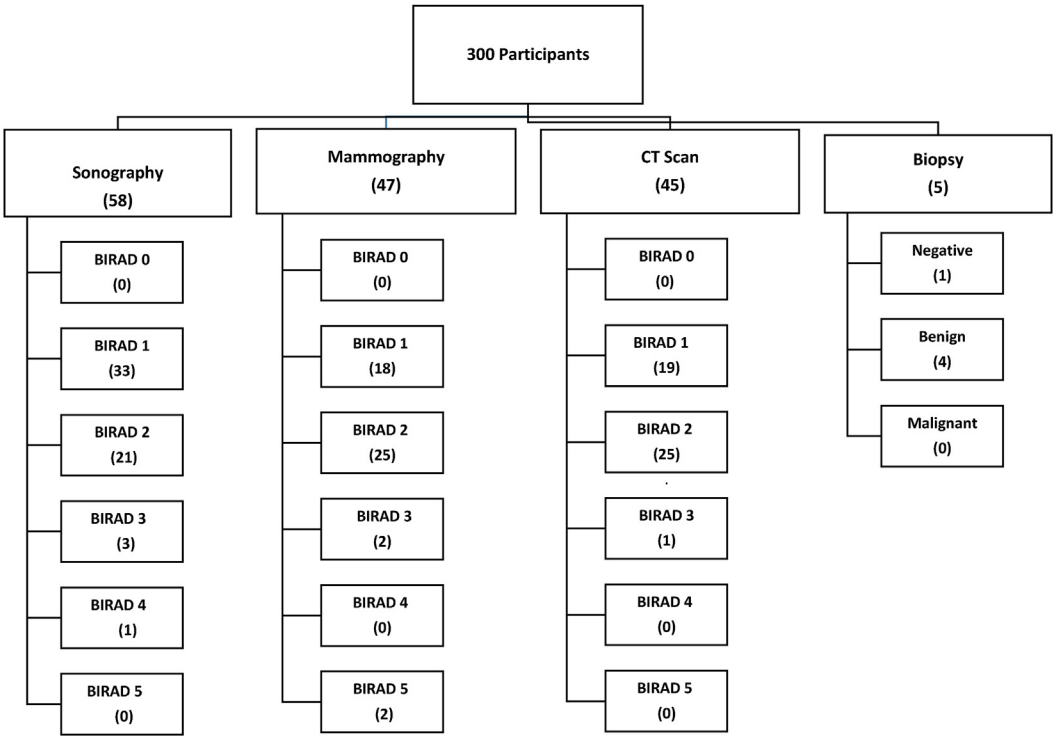

Fig. 2. Frequency of services and diagnosis of BI-RAD breast cancer.

Table 2
Comparison of mammographic results with sonography based on biopsy results.

Test		BIRADS (mammography) n (%)			Total n (%)
		Negative	Benign	Malignant	
sonography n (%)	Negative	54 (87.1)	28 (45.2)	0 (0)	82 (63.6)
	Benign	8 (12.9)	31 (50)	0 (0)	39 (30.2)
	Malignant	0 (0)	3 (4.8)	5 (100)	8 (6.2)

according to the BI-RADS criteria, there is no grade 5 patient in eastern areas, but there was 0.8% in the center and 1.6% in the west and northwest of Guilan. In general, the Kruskal-Wallis test showed that the distribution of degrees in the three areas was almost identical and not significant (P = 0.839). Geographical pattern of Breast cancer in different cities of Guilan province during 2017–2018 was show that in Fig. 1.

The estimated prevalence of breast cancer in our study was 1.7% (95% CI: 0.6–3.6), with 1 out of every 60 people having cancer.

Of the 300 participants in the study, 58 (19.3%), 47 (15.7%), and 45 (15%) of them performed chest X-ray, mammography, and CT scans, respectively. Of those who did these three tests respectively, 4 (6.9%), 4 (8.6%) and 1 (2.2%) participant had BIRAD above 2, and of the 5 biopsies, 1 (20.0%) was negative and 4 (80.0%) were benign (Fig. 2).

Kappa coefficient was used to evaluate the agreement between mammography results (BI-RADS) and sonography. The accuracy rate was 69.76% and the kappa coefficient was 0.44 ($p < 0.001$), which was in good agreement. Table 2 shows more details. Since eight women were reported malignant by both mammography and sonography, they were biopsied and it also confirmed the malignancy in all cases. While sonography reported malignant lesions in 3 cases, the mammography identified 3 benign lesions (Table 2).

4. Discussion

Breast cancer is the most common type of cancer in women worldwide, and the incidence rate is rapidly increasing. The aim of this study was to determine the prevalence and factors associated with breast cancer screening in Guilan province.

The estimated prevalence of breast cancer in this study was 1.7%, whereas, in the study of Rezaianzadeh et al., 2011, the prevalence of breast cancer in Iran was reported to be 0.15%,[27] which was not consistent with our study. This discrepancy may be due to the disregard of other provinces, the low sample size and the way of data collection in his study. In general, the prevalence of breast cancer is high in developed countries but has a better prognosis. In Iran, the incidence of this cancer is lower and has a worse prognosis than in developed countries.[27]

The mean age of the participants was 49.96 years old, which was reported in Mirfarahadi studies in Rasht and Yazdani in Babolsar were 49.80 and 49.70 years old, respectively,[1,9] which was consistent with our study. This average age is lower than the numbers reported in Western countries. The low age of cancer in our country can be due to the young population of the country and racial differences.[9] There was no statistically significant difference between the ages in this study, but the prevalence of benign cancers increased with age. Breast cancer in Iran is more prevalent at an early age, which can be attributed to the low life expectancy, lack of care, and timely referral by older women and a number of unknown causes.

The majority of participants in this study were housewives, married or widowed, had a low level of education, a history of first-degree family cancer, and a history of taking birth control pills, consistent with other studies.[1,6,9] Being a housewife can also be due to being covered by the committee.

The overweight and obese BMI in this study were higher in women with malignancy than in other groups, which was consistent with the study of Gahramanian in Tabriz in 2016.[28,29] In this study, women who had been examined by a physician were more likely to report malignancy than women who had irregular, general, and monthly examinations, consistent with other studies.[9,29]

This study showed that chronic diseases such as thyroid, hypertension, and diabetes have no significant relationship with breast

cancer status, which is consistent with a study in 2017.[9]

Breastfeeding and its prolongation are associated with the incidence of breast cancer, thereby reducing the incidence of cancer.[30–32] Also among menstruation information of women, only menopause was significantly associated with mammographic screening results. In a study by Keyhanian et al. had reported that the risk of breast cancer in menopausal women was higher than non-menopausal in Ramsar and Tonekabon, which was statistically significant.[33] A study conducted in 2019 in Mazandaran found that 21.7% of women were screened by mammography, whereas in our study only 15.7% of women performed mammography.[29]

In study of comparing mammography and MRI to breast cancer screening, Kriege found that mammography was more sensitive than MRI to breast cancer detection, and MRI results in more than double unnecessary examinations as mammography. An MRI screening program can detect early-stage breast cancer in women at high risk of breast cancer.[34] Complementary sonography after dense breast mammography screening can be useful in early detection of breast cancer, as well as early detection of lesions in BIRAD 0 mammography, which is consistent with the study of Ranj et al. as in all 100% of cases reported by malignant mammography, all results were consistent with sonography.[35] In the present study, a biopsy was performed on all cases that reported malignant by sonography or mammography, and biopsy confirmed the malignancy in all the cases which were reported malignant by sonography, but in cases where the sonography reported malignant lesion while mammography reported benign, the biopsy revealed that the lesion was benign. This demonstrates the accuracy of mammography in breast cancer detection and can reduce breast cancer by approximately 25%.[36]

4.1. Limitations

Due to the low number of patients with malignancy, it is not possible to make definitive decisions about the specificity and sensitivity of sonography and mammography diagnostic tests.

4.2. Recommendation for future research

Performing further studies with higher sample size and mostly focused on the occupational risk factors are highly recommended.

5. Conclusion

The estimated prevalence of breast cancer in our study was 1.7%. This is lower than in other areas, which may be due to the selection of women with lower economic income and lower social status. The study also found the severity of agreement between sonography and mammography at 63%, which is statistically well within the range, but a larger sample size study is suggested to determine the sensitivity and specificity of these two modalities.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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