



## **Assessing Risk and Knowledge of Women on Breast Cancer and Providing Lifestyle Advice for the Management of Breast Cancer Risk**

**Ishrar Shaik Mohammad Ghouse <sup>1\*</sup>  , Neeluri Prasanth<sup>2</sup>, GaddiGeetha Reddy<sup>2</sup>  
And Madamanchi Ganga Manasa<sup>2</sup>**

<sup>1</sup>Assistant Professor, Department of Pharmacy Practice, Raghavendra Institute of Pharmaceutical Education and Research, Anantapur-515001, Andhra Pradesh, India.

<sup>2</sup> Resident Interns, Department of Pharmacy Practice, Raghavendra Institute of Pharmaceutical Education and Research, Anantapur-515001, Andhra Pradesh, India.

**Abstract:** Breast cancer is the most common cancer and is the main cause of cancer mortality among women in the world. Overall, 1 in 28 women is likely to develop breast cancer during her lifetime. Although the mortality rate is decreasing, the incidence is persistently increasing due to urbanization and lifestyle changes. So, there is a need to assess the personal breast cancer risk and increase the knowledge of women on early detection. The present study aims to assess the risk and knowledge of women on breast cancer. The main objective of the study is to identify the women at high risk, to create awareness among women about early screening and detection and to educate lifestyle management to decrease breast cancer risk. A descriptive cross-sectional study was performed during the period of June 2019 to November 2019 in the women attended for mammographic examination. A total of 270 women responded to the study. The results showed that five-year risk is found to be high for 31.1% of women and low for 68.8% of women with a mean of 1.4 and the standard deviation is 1.24. About 14.81% of women were found to have strong lifetime risk and 30.37% of women had average lifetime risk and 54.81% women had usual lifetime risk. The mean lifetime risk of the women is 16.09 and the standard deviation is 10.2. The majority of the participants have low knowledge on breast cancer; BSE, and mammography i.e., 80% of them were lack of knowledge. The mean knowledge score is 6.34 and the standard deviation is 5.45. The women who had high five-year and strong lifetime risk are eligible for breast cancer prevention and management approaches. The women with moderate lifetime risk were advised with regular screening and Breast Self-Examination practices.

**Keywords:** Breast cancer, Incidence, Knowledge, Prevention, Risk, Urbanization

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**\*Corresponding Author**

**Ishrar Shaik Mohammad Ghouse , Assistant Professor,  
Department of Pharmacy Practice, Raghavendra Institute of  
Pharmaceutical Education and Research,  
Anantapur-515001, Andhra Pradesh, India.**



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## I. INTRODUCTION

Breast cancer is the most commonly occurring cancer that causes high mortality in women compared to other cancers. According to the World Health Organization, 1 in 28 women are likely to develop breast cancer in their lifetime<sup>1</sup>. It differs among urban and rural women as the urbanized lifestyle is one of the risk factors for breast cancer. Among urban women 1 in 22 has a chance of developing breast cancer in their lifetime and when 1 in 60 women of rural areas are likely to develop breast cancer in their lifetime. According to WHO statistics, 14% of cancer cases are breast cancer<sup>2</sup>. Incidence rates of breast cancer in women begin in their early thirties and rise in their fifties. Women with family history of first-degree relatives having breast cancer are at high risk. Women who lead an urbanized lifestyle which includes late marriages, delayed childbirth, nulliparity, decreased breastfeeding, obesity, smoking, alcohol consumption, type of food intake, high Body Mass Index (BMI) are the risk factors in developing breast cancer<sup>3</sup>. Oestrogen exposure is one of the major risk factors for women. Women with early menarche and late menopause have a high risk of developing breast cancer because these women have longer lifetime exposure to oestrogen<sup>4</sup>. Hormone replacement therapy in menopausal women using an estrogens-progesterone combination increases risk of breast cancer. Exposure to higher radiation at younger ages has more future risk. Breast lumps and atypical hyperplasia later on develops into breast cancer in some women<sup>5</sup>. Although many campaigns are being conducted across the country on Breast Self-Examination (BSE), early detection and screening, mortality rate of women with breast cancer is not decreasing<sup>7</sup>. There are low survival rates of women with breast cancer in developing countries like India mostly due to lack of awareness on early detection which leads detection at late stages of breast cancer. Risk assessment provides the risk occurrence in future and helps in early detection and decrease the chance of developing breast cancer when provided along with regular screening along with adequate therapy<sup>1</sup>. The American Cancer Society (ACS) and National Institute of Health (NCI) both recommended annual and biennial screening for all women aged between 40 and 49 years if they are at average risk. There are adverse consequences of screening like false positive test results, anxiety, over diagnosis, treatment and radiation exposure<sup>8</sup>.

### 1.1. Gail model

Gail model, developed by Mitchell Gail and his colleagues at National Institute of Health (NIH) is the most widely used and well-validated mathematical model used for breast cancer risk assessment. It predicts both 5-year risk and lifetime risk among women older than 35 years<sup>3</sup>. It primarily focuses on non-genetic risk factors, familial history and menstrual history unlike other models which use genetic history and testing<sup>8</sup>. Of all other models which are used for breast cancer risk assessment Gail model is accurate and achievable. It contains the following questionnaire<sup>9</sup>:

- Medical history of Breast Cancer (BC) or Ductal Carcinoma in situ (DCIS) or Lobular Carcinoma in situ (LCIS), previous radiation therapy for Hodgkin lymphoma

- History of Breast Cancer (BRCA) mutations or any genetic syndromes related to breast cancer risk

- Age
- Race
- Previous breast biopsies with or without atypical hyperplasia
- Age at menarche
- Age at first childbirth
- Number of first-degree relatives with breast cancer

Knowledge on breast cancer, BSE, mammography, plays a significant role in early detection of breast cancer at an early stage. Although BSE practices are not burdensome, many women do not practice regularly as a result of lack of awareness.

## 2. MATERIAL AND METHODS

### 2.1. STUDY SITE

The study was conducted at a secondary care referral hospital in Ananthapuramu District, located in the south western part of state Andhra Pradesh in south-central India.

### 2.2. STUDY DESIGN

The study was designed as a Descriptive cross-sectional study to assess women's risk and knowledge of breast cancer

### 2.3. STUDY CRITERIA

#### 2.3.1. Inclusion criteria

- Women  $\geq 35$  years of age.
- Women having no prior history of breast cancer.

#### 2.3.2. Exclusion criteria

- Women with chronic illness.
- Women who had undergone any cancer-directed treatment before to study.

### 2.4. Study period

The study was conducted for a period of six months i.e., from June to November, 2019.

#### 2.4.1. Sampling technique

Systematic random sampling was used to select a representative sample for the survey and a total of 290 women were included in the study.

#### 2.4.2. Study Procedure

The study was performed in women who were referred to mammography and women over 35 years of age. After obtaining an informed consent, data was collected from the participants according to the Gail model which contains questions like age, age at menarche, age at first live birth, history of having biopsy and number of biopsies, family history of breast cancer. Data such as Body Mass Index (BMI), breastfeeding, use of Oral Contraceptive Pills (OCP's) and hormone therapy were also collected.

#### 2.4.3. Outcome assessment

The Gail risk was calculated using breast cancer risk assessment tool (BCRAT) which is readily available on National Cancer Institute's website. For the five-year risk assessment, the Gail score of 1.7% or less was defined as low risk, while the score of 1.7% or greater were defined as high risk. Lifetime risk was classified as usual (<15%), moderate (15 to 30%) and Strong (>30%). A questionnaire was developed based on published information in the literature to assess women's knowledge of breast cancer, symptoms, BSE and mammogram. The questionnaire was reviewed by two healthcare practitioners and their suggestions were incorporated into the questionnaire. Each correct response will be scored as one while the wrong responses have been assigned zero. The level of knowledge was classified into low (0-7score), intermediate (8-14 score), high (15-21 score). The maximum score was 22. The breast cancer risk was said to every woman and the woman was counselled regarding the breast cancer, symptoms, risk factors, importance of Breast Self-Examination (BSE), how to perform BSE, mammography

and lifestyle changes in order to reduce breast cancer risk. After counselling, questions were asked randomly to determine their level of understanding and leaflet was given to the participants.

#### 2.4.4. STATISTICAL ANALYSIS

To facilitate sorting, all the data was entered into Microsoft Excel (version) and descriptive statistics such as percentage, mean and standard deviation were calculated.

### 3. RESULTS

The study was planned to include 290 women in our study, but 20 women were excluded due to failed consent and inappropriate information. Most women belong to 35-39, 40-44 and 45-49 years. In this study majority of women were from a low-income group and 65.18% were uneducated as shown in Table I.

**Table 1. Distribution of women according to Age, Educational Qualification, Marital status and Level of Income (n=270)**

Variables	Number of women (n)	Percentage (%)
<b>Age in years</b>		
35-39	98	36.29%
40-44	58	21.48%
45-49	66	24.4%
50-54	26	9.62%
55-59	12	4.4%
60-64	4	1.48%
65-69	2	0.74%
70-74	2	0.74%
75-79	2	0.74%
<b>Educational Qualification</b>		
B.Sc	2	0.74%
Intermediate	12	4.4%
MA	4	1.48%
PG	6	2.2%
Ph. D	2	0.74%
Primary	28	10.37%
Secondary	40	14.8%
Uneducated	176	65.18%
<b>Marital Status</b>		
Divorcee	2	0.74%
Married	266	98.51%
Unmarried	2	0.74%
<b>Level of Income</b>		
High Income	16	5.92%
Middle Income	12	4.4%
Low Income	242	89.62%

**Table 2. Distribution of women based on Age at menarche, Age at marriage, Number of children, Age at first child birth, Breast feeding, Age at menopause**

Variables	Number of women (n)	Percentage (%)
<b>Age at menarche</b>		
11	38	14.07%
12	136	50.37%
13	30	11.11%
14	22	8.14%
15	34	12.59%
16	10	3.70%
<b>Age at marriage</b>		

<18	142	52.59%
18-22	96	35.5%
>23	30	11.11%
Unmarried	2	0.74%
<b>Number of children</b>		
0	72	26.60%
1	40	14.87%
2	86	31.85%
3	48	17.7%
4	10	3.7%
5	10	3.7%
6	2	0.74%
7	2	0.74%
<b>Age at first child birth</b>		
14-18	70	25.92%
19-23	96	35.5%
24-28	24	8.8%
≥29	8	2.96%
No child births	72	26.6%
<b>Breast feeding</b>		
Yes	158	58.51%
No	112	41.48%
<b>Age at Menopause</b>		
30-40	8	2.96%
41-50	60	22.2%
>50	2	0.74%
Surgical menopause	18	6.66%
Not attained	182	67.40%

The Majority of the women reported, starting menarche at the ages between 11-13 & 15 years and a total of 52.59% of women were married at less than 18 years of age. Nulliparity is seen in 26.60% of women and about 41.48% of the women as shown in Table 2 did not Breast feed their children which is one of the major risk factors for breast cancer

**Table 3. Distribution of women based on Family history and previous breast biopsies.**

Variables	Number of women(n)	Percentage (%)
<b>Family history of BC</b>		
Yes	78	28.8%
No	192	71.1%
<b>Number of 1<sup>st</sup> degree relatives with BC</b>		
0	202	74.81%
1	68	25.18%
<b>Biopsies</b>		
Yes	122	45.18%
1 biopsy	120	44.44%
2 biopsies	2	0.74%
No	148	54.81%

Women having a family history of breast cancer are at greater risk and 25.18% of women have first degree relatives with breast cancer as shown in Table 3.

**Table 4. Women's five year and lifetime risk**

Risk type	Number of women (n)	Percentage (%)	Mean± SD	P Value
Five-year risk				
High	84	31.1%		
Low	186	68.8%	1.4±1.24	<0.0001
Lifetime risk				
Usual	148	54.81%		
Moderate	82	30.37%		
Strong	40	14.81%	16.09±10.2	<0.0005

About 31.1% of women participated in this study had high five-year risk with a mean of 1.4±1.24. About 14.81% of women had strong lifetime risk and 30.37% of women had an average lifetime risk and 54.81% women had usual lifetime risk as shown in Table 4. The mean lifetime risk of the women is 16.09±10.2.

**Table 4. Women's five year and lifetime risk**

Risk type	Number of women (n)	Percentage (%)	Mean± SD	P Value
Five-year risk				
High	84	31.1%		
Low	186	68.8%	1.4±1.24	<0.0001
Lifetime risk				
Usual	148	54.81%		
Moderate	82	30.37%		
Strong	40	14.81%	16.09±10.2	<0.0005

Values are expressed as Mean ± SD: SD – Standard Deviation

**Table 5. Level of knowledge of women on breast cancer, BSE and mammography**

	knowledge on Breast Cancer	Number of women (n)	Percentage (%)
Have you heard of breast cancer?	84	31.11%	
Breast cancer affects only females?	172	63.70%	
Breast cancer can be transmitted from one person to another?	220	81.48%	
Signs of Breast Cancer	58	21.48%	
	Knowledge on BSE		
Have you heard of Breast Self—Examination	46	17.03%	
Do you know that BSE is a useful tool for early detection of breast cancer?	48	17.7%	
Have you been taught how to do BSE?	40	14.81%	
At what age should BSE be started?	28	10.37%	
How often should BSE be done?	36	13.3%	
What is the best time to do BSE?	40	14.81%	
BSE should be done by	64	23.70%	
BSE is done by	94	34.81%	
The correct method of BSE	48	17.7%	
The appropriate place to perform BSE	98	36.29%	
If you discover any abnormality during BSE, what will you do?	194	71.85%	
Benefits of BSE	116	42.96%	
Do you practice BSE?	34	12.59%	
Do you think BSE is a good practice?	202	74.81%	
	Knowledge on use of Mammography		
Have you heard of mammography	28	10.37%	
Is mammography a useful tool for the early detection of breast cancer?	30	11.11%	
At what age should mammography be started?	20	7.40%	
How often should mammogram be done?	14	5.18%	

The majority of the participants have a low level of knowledge on breast cancer, BSE and mammography i.e., 80% of them have lack of knowledge and 7.40% of them have intermediate knowledge and 12.59% of them with high knowledge as shown in the following Table 5, 6.

**Table 6. Level of Knowledge of women**

Participants level of knowledge on breast cancer		
Level of knowledge	Number of women (n)	Percentage (%)
Low (0-7 scores)	216	80%
Intermediate (8-14 scores)	20	7.40%
High (15-21 scores)	34	12.59%
Total	270	
Mean± SD	6.348±5.45	
P value	<0.0001	

Values are expressed as Mean ± SD: SD – Standard Deviation

#### 4. DISCUSSION

The incidence of breast cancer has gradually increased among women due to urbanized lifestyle. As the incidence of breast cancer is rising, it is important to identify women at high risk for the timely treatment. Most of the cases are detected at later stages leading to lower rates of survival. So, there is a need to

increase the knowledge about breast cancer, its risk factors and screening methods which helps in early detection thereby leading to increased survival. The study aims to assess the risk and knowledge of women on breast cancer. We used the Breast Cancer Risk Assessment Tool (BCRAT) which is available online at National Cancer Institute's website to calculate the five-year and lifetime risk. A self-developed questionnaire was used to assess the level of

knowledge of women on breast cancer. In this study, the estimated mean five-year risk was  $1.4 \pm 1.24$  and a mean lifetime risk was  $16.09 \pm 10.2$ . The results of our study were in accordance with the study led by HalaHazam Al Otaibet al<sup>1</sup> resulted in the mean five-year risk of  $0.87 \pm 0.93$  and mean lifetime risk of  $9.6 \pm 5.4$ . The mean estimated five year risk of  $1.4 \pm 1.24$  and lifetime risk of  $16.09 \pm 10.2$  reported in this study were within the range, comparable with other studies. For instance, in a study conducted by Mojganmirghaourv et al.<sup>6</sup> it was reported that about 560 healthy Iranian women resulted in a mean five-year risk of  $0.6\% \pm 0.2\%$  and mean lifetime risk of  $8.9\% \pm 2.5\%$ . The mean five year and life time risk of our study correlates with the study conducted by Salam Hussein ewaidet al.<sup>9</sup> which resulted in the mean five-year risk of  $0.95 \pm 1.4\%$  for all women and a mean lifetime risk up to age 90 years was  $11.13 \pm 4.7\%$ . The mean five year and lifetime risk of our study were comparable with the study conducted by Majidafikree et al.<sup>8</sup> in which the mean five year and lifetime risks were found to be  $0.7\% \pm 0.37$  and  $9.3\% \pm 3.0$  respectively. In our study, history of breast biopsy, history of first-degree relatives with breast cancer and age at menarche are the factors which gave women a high risk of breast cancer. In a study conducted by Mojganmirghaourv and et al.<sup>6</sup> in 560 Iranian women, the risk factors like age, age at menarche, breast biopsy history and age at first childbirth were the risk factors that gave women high risk of breast cancer. The results of our study were similar with the study conducted by Erbil et al.<sup>5</sup> in 231 Turkish women in which the higher risk was found in the women who had their menarche at 12-13 years of age, woman who gave birth to a child at an older age, i.e.,  $\geq 29$  years and in women who had first degree relatives with breast cancer. Our study revealed that the majority of the participants were with low levels of knowledge regarding breast cancer while only 19.9% of them were rated as having intermediate to high level. These results are inconsistent with previous studies conducted by Dana S Al-Mousaet al.<sup>10</sup> and MajedAlshahraniet al.<sup>11</sup> which showed intermediate and low levels of knowledge respectively. A similar lack of knowledge was reported in a study conducted by NitinGanganeet al.<sup>12</sup> among rural and urban women, rural women showed poor awareness. In contrast, studies conducted by HumariyaHeenaet al.<sup>13</sup> on female health care workers, results were found to be lower than expected. We found that 81.48% of respondents think that breast cancer can be transmitted from one person to another. In our study 68.8% of women haven't heard about breast cancer and only 21.48% of the women knew any one of the signs of breast cancer. About 74.8% of respondents agreed that breast self-examination is a good practice and only 12.5% of women practice BSE. These results are consistent with the study conducted by Sanjay Kumar Shah et al.<sup>14</sup> on women of reproductive age group in which 89.1% of women do not practice breast self-examination regularly and only 46.4%

agreed that breast self-examination is a necessary tool for early detection of breast cancer. In a study conducted by Sherinlshaque et al.<sup>15</sup> participants showed poor knowledge on breast self-examination. These surprising and worrying results indicate that there is a need to increase efforts to promote awareness by conducting frequent health education programs. In addition, there is a need to introduce knowledge of breast health, breast cancer etc., in the school or university level. Till now no specific studies in India to date for assessment of predictive breast cancer risk models. In this study, the Gail score for patients with breast cancer was comparatively lower than normal people. Further studies with a larger size of the population are required to evaluate the GM in a prospective manner including the specific incidence rates of invasive breast cancer and other causes of mortality.

## 5. CONCLUSION

It is well known that breast cancer awareness can lead to lower incidence and mortality of breast cancer. It is important to identify women at high risk of early detection and management of breast cancer and when provided with regular screening and chemoprevention decreases the risk which is not available in most parts of India. The women who had a high five-year risk and strong lifetime risk are eligible for breast cancer prevention and management approaches. Women at moderate lifetime risk were counselled through regular screening and BSE practices. Our study has shown poor awareness of breast cancer. About 80% of women were unfamiliar with breast cancer, its symptoms, BSE and mammogram. However, most of the women displayed positive attitudes towards breast cancer counselling in addition to screening procedures. Hence this study recommends that there is a need of active educational programs and campaigns to be functional in the rural settings to increase the awareness of breast cancer.

## 6. AUTHORS CONTRIBUTION STATEMENT

Dr.Ishrar contributed to the design and implementation of the research, supervised the findings of this work and aided in interpreting the results. Ms.Manasa conceived the presented idea and contributed data analysis tools. Ms.Geetha developed the theory, carried out the study and performed analytical calculations with support from Ms.Manasa. Mr.prasanth has gone through the reference editing and wrote the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

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## 8. CONFLICT OF INTEREST

Conflict of interest declared none.

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