



## A Study to Assess Knowledge and Attitude towards Breast Cancer and its Preventive Measures among Rural Women

*Ms. Renuka Sandhu<sup>1</sup>; Dr. N Balasubramanian<sup>2</sup>*

<sup>1</sup>PhD Scholar, Desh Bhagat University, Mandi Gobindgarh, Punjab

<sup>2</sup>Director- Principal, SLM Institute of Nursing, Desh Bhagat University, Mandi Gobindgarh, Punjab

Email id : [renukasandhu88@gmail.com](mailto:renukasandhu88@gmail.com)

DOI: <https://doi.org/10.55248/gengpi.4.1023.102646>

### ABSTRACT

**Background:** Breast cancer is the most prevalent and leading cause of mortality among cancer patients in women all over the world. Breast cancer is the most serious disease among women because it has a bigger impact on their self-image than any other cancer.

**Aim:** The aim of the study is to assess knowledge and attitude towards breast cancer and its preventive measures.

**Material and Methodology :** A descriptive research design was used to conduct the present study. Multistage cluster sampling technique through the lottery method was used to enroll the subjects. A structured knowledge questionnaire regarding breast cancer and a likert Scale of Breast Cancer and its preventive measures was used to collect data from 200 rural women of selected villages of Hoshiarpur, Punjab. Analysis of the data was done by using descriptive and inferential statistics.

**Results:** The study shows that the majority of the level of knowledge among rural women (78%) was associated with very poor knowledge whereas, a majority of low level of negative attitude towards Breast Cancer and its preventive measures was observed (77.5%). There was a significant association between level of knowledge and demographic variables such as marital status and educational status ( $p < 0.05$ ). On other hand, there was a significant association between level of attitude and demographic variables such as age, type of family, educational status ( $p < 0.05$ ).

**Conclusion:** The study findings revealed that the majority of women had low level of knowledge and attitude towards Breast Cancer and its preventive measures which need to be enhanced among women. The study also depicts a positive correlation between knowledge and attitude among rural women.

**Keywords:** Knowledge, attitude, Women, Breast Cancer

### INTRODUCTION

Women are suffering from many health problems but breast illnesses are the highest life-threatening diseases among women. Any suspected diseases or injuries affecting the breast can lead to various stigmas or cultural perceptions for women. In addition, fear of loss of a breast, and mutilation can be devastating for women resulting in disturbance in the psychosocial, sexual, and body image of a woman<sup>1</sup>.

The mortality rates for breast cancer continue to be the highest in the nation despite long-standing national programs, such as the National Cancer Control Programme launched in 1975, under the National Programme for cardiovascular disease, diabetes, cancer, and stroke (NPCDCS launched under the 12th five year Plan from 2012 to 2017). High death rates are a result of obstacles such as an awareness deficit among women, as well as stigma, fear, gender inequality, and limited participation in screening behaviours like breast self-examination<sup>2</sup>.

With reference to WHO, the Global Breast Cancer Initiative's (GBCI) objective is to decrease worldwide breast cancer by 2.5% annual mortality, which would avert 25% of breast cancer deaths by 2030 and by 2040<sup>3</sup>.

Women in their early thirties to fifties are at a high risk of developing breast cancer since it is the most prevalent kind of cancer in Indian women; this risk rises until it peaks between the ages of 50 and 64. In India, the lifetime risk of developing breast cancer is 1 in 28 women. For urban women, it is higher (1 in 22) than it is for rural women (1 in 60). Because breast cancer is detected late in India, the survival chances are dismal. Only by raising awareness will these figures be altered. Breast cancer may be treated, and the prognosis is better if it is found early. The simplest way to achieve this is to be informed of the methods for early detection and diagnosis<sup>4</sup>.

Early detection is facilitated by seeing potential cancer warning signs and acting quickly. The "orange peel" skin, nipple crust, redness or heat of the breast skin, new nipple discharge that is not breast milk (including blood), skin sores, bumps, growing veins on the breast, sunken nipple, changes in the size or shape of the breast, and a hard lump in the breast are among the 12 signs of breast cancer<sup>5</sup>.

Breast Cancer is the most prevalent kind of cancer in Delhi, Mumbai, Ahmadabad, and Kolkata, according to the National Cancer Registries and Regional Cancer Centres. About 115,000 new instances of breast cancer are diagnosed in India each year. In Western nations, breast cancer is more common after the age of 50 than it is in India, where it is more common in younger age groups. It was also found that few of breast tumors were discovered by self-detection and the rest 80% were detected by expert professionals. So, there is a need for educational and awareness programs aimed at younger members of society, as early as 18 years old, to change their attitude towards breast cancer and its preventive measures as cancers in the young (15-34 years) tend to be more aggressive<sup>6</sup>.

#### **PURPOSE OF THE STUDY**

The aim of the article is to assess knowledge and attitude towards Breast Cancer and its preventive measures among rural women of selected villages of Hoshiarpur, Punjab.

---

#### **OBJECTIVES OF THE STUDY**

1. To determine the knowledge towards Breast Cancer and its preventive measures among rural women.
2. To determine the attitude towards Breast Cancer and its preventive measure among rural women.
3. To find out the association between demographic variables with knowledge and attitude towards Breast Cancer and its preventive measures among rural women.
4. To find out the relationship between knowledge and attitude towards Breast Cancer and its preventive measures among rural women.

---

#### **OPERATIONAL DEFINITIONS**

##### **1. Knowledge**

In the present study, knowledge is the correct response to the knowledge items in the structured closed-ended questionnaire regarding Breast cancer and its preventive measures for rural women.

##### **2. Attitude**

In the present study, attitude is the correct response to the attitude items in the likert Scale regarding breast cancer and its preventive measures among rural women.

##### **3. Breast Cancer**

Breast Cancer is the malignant condition of the breast arising from the epithelial lining of the lobule ducts and the nipple.

#### **ASSUMPTIONS**

1. There will be a low level of knowledge of Breast cancer and its preventive measures among rural women.
2. There will be a negative attitude towards Breast cancer and its preventive measures among rural women.
3. There will be a significant association between the level of knowledge among rural women and selected demographic variables.
4. There will be a significant association between the level of attitude among rural women and the selected demographic.
5. There will be a significant relationship between knowledge and attitude scores of rural women on Breast cancer and its preventive measures.

#### **MATERIALS AND METHODOLOGY**

The quantitative research approach was applied using a descriptive, non- experimental research design on 200 rural women of age group 18-55 years in selected village of district Hoshiarpur, Punjab. This study was conducted in randomly selected one block followed by randomly selected one village viz. Kangar of district Hoshiarpur, Punjab through lottery method.

#### **VARIABLES IN THE STUDY**

The dependent variable was knowledge and attitude on Breast cancer and its preventive measures among rural women. Despite this, attribute variables of the study were age, type of family, religion, marital status, educational level, occupation, monthly per capita income, family history of breast cancer, and source of information.

#### **DELIMITATIONS OF STUDY**

1. The study was limited to a selected area of the district Hoshiarpur.
2. The study was limited to a specific group of rural area women between 18 -55 years of age.
3. The study was limited to subjects who were willing to participate in the study.

#### **Inclusion criteria**

- Women who are:
  - i. in the age group 18 - 55 years.
  - ii. residing in selected villages of district Hoshiarpur.
  - iii. willing to participate in the study group.
  - iv. able to read and understand the Punjabi language.

#### **Exclusion criteria**

- Women who are:
  - i. having physical and psychological problems.
  - ii. pregnant during the study period.
  - iii. diagnosed with breast cancer.

#### **DESCRIPTION OF TOOL**

A structured questionnaire was prepared and it consists of two parts: Socio-demographic profile and structured questionnaire were used to assess the knowledge score, and the likert scale to observe attitudes toward breast cancer and its preventive measures among women.

#### **CONTENT VALIDITY**

The standard instrument was submitted for validation to 12 experts from the field of Medical-surgical Nursing, Obstetrical, and Gynaecological Nursing, Community Health Nursing Paediatric Nursing, Oncologist Surgeon and Gynaecologist to establish the validity. Based on the expert opinion some of the questions are modified in the demographic profile and structure questioner followed by an arrangement of the options was done in a proper way according to suggestions given by the expert.

#### **RELIABILITY OF TOOL**

The test-retest method was adopted. The instrument was administered to the samples and was repeated to the same samples, after the gap of one week. Karl Pearson's reliability formula was calculated for the reliability of tool which was 0.88 and 0.94 for knowledge and attitude of breast cancer respectively which shows the tool is reliable.

#### **DATA COLLECTION**

The study received approval from the Desh Bhagat University Ethical Committee as this is part of the doctoral study undertaken by the first author. Permission for data collection was taken from the Sarpanch of selected villages of district Hoshiarpur. The purpose of the data collection was explained to the women, their consent was taken and a structured questionnaire and likert Scale were administered.

---

#### **FINDINGS**

The results were computed using descriptive and inferential statistics based on the basis of objectives. The highest percentage (42.5%) of rural women belonged to 33 to 39 years, (55%) nuclear families. The majority of women (62.5%) were from the Sikh religion and married (50%) The highest percentage of the rural women (45%) had higher secondary education and (47.5) were homemakers, A large proportion of the rural women (47.5%) were in the Rs 1000-1999 category of per capita income and more (92.5%) were not associated with a family history of breast cancer. From 200 women the majority of the rural women (45%) gained knowledge about breast cancer from Health professionals as source information.

Out of 200 rural women, the level of knowledge (78%) was associated with very poor knowledge. Besides, a low level of poor attitude (77.5%) was observed.

The study shows the relationship between knowledge and attitude. The computed findings of Pearson correlation coefficient value show there is a positive correlation between knowledge and attitude with r value of 0.815 which was significant at the level of  $p=0.017$ . Hence, it was found that if knowledge increases, attitude improves in the same direction as knowledge.

**Table 1: Distribution of Demographic variables of rural women**

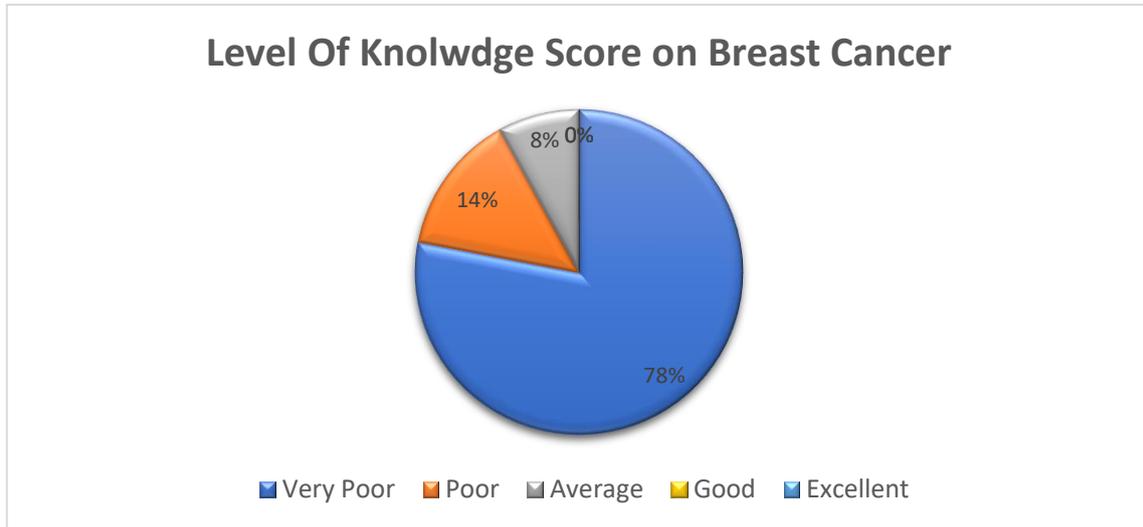
N=200

<b>Demographic Variables</b>		<b>f</b>	<b>%</b>
<b>Age of mother in years</b>	18 -25	20	10.0
	26 -32	35	17.5
	33 – 39	85	42.5
	40 – 46	35	17.5
	47 and above	25	12.5
<b>Type of Family</b>	Nuclear	110	55.0
	Joint	65	32.5
	Extended	25	12.5
<b>Religion</b>	Sikh	125	62.5
	Hindu	55	27.5
	Muslim	10	5.0
	Christian	10	5.0
<b>Marital Status</b>	Unmarried	75	37.5
	Married	100	50.0
	Widow/ Divorce	25	12.5
<b>Educational Status</b>	No formal education	7	4.0
	Elementary Education	18	9.0
	High School Education	35	17.5
	Higher Secondary Education	90	45.0
	Graduate	40	20.0
	Postgraduate	10	5.0
<b>Occupation</b>	Home-maker	95	47.5
	Government employee	35	17.5
	Private employee	40	20.0
	Self – employed	15	7.5
	Student	15	7.5
<b>Monthly income per capita in Rupees as per (Kuppaswamy scale)</b>	≤ 500	8	4.0
	501 – 749	17	9.0
	750 – 999	30	15.0
	1000 – 1999	95	47.5
	≥ 2000	50	25.0
<b>Family history of breast cancer</b>	Yes	15	7.5
	No	185	92.5
<b>Source of information</b>	Friends / Relatives	20	10.0
	Newspaper/ News	20	10.0
	Journal / Magazine	25	12.5
	Social Media – FB / Instagram	45	22.5
	Health professionals	90	45.0

**Table 2: Frequency and Percentage Distribution of Level of Knowledge on Breast cancer and its preventive measures among rural women.**

**N = 200**

Level of Knowledge	f	%
Very Poor	156	78
Poor	28	14
Average	16	8
Good	0	0
Excellent	0	0

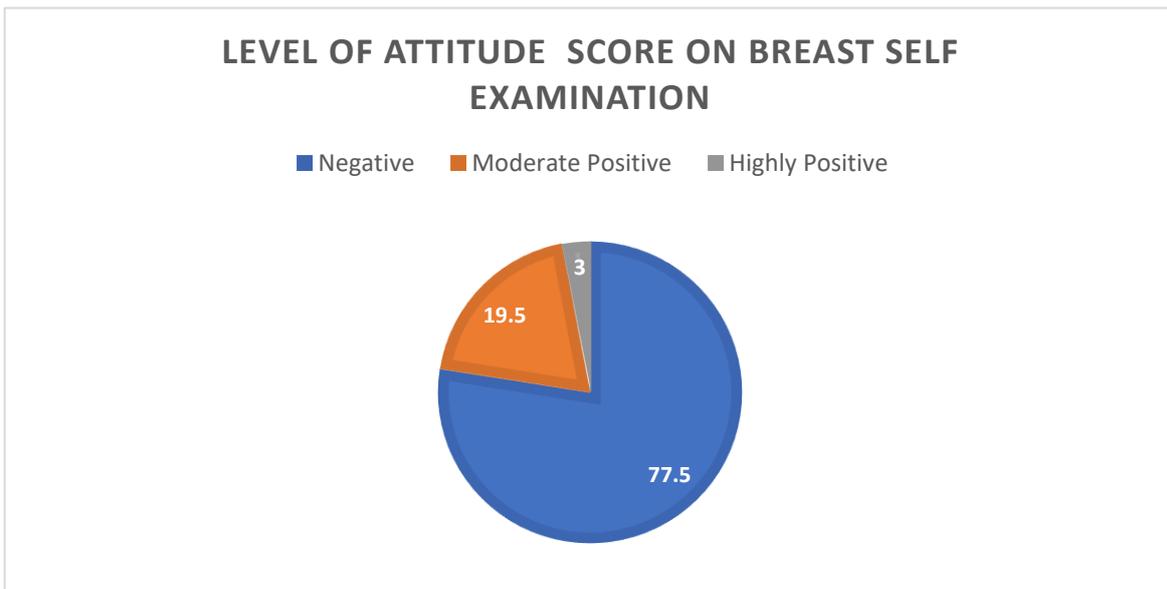


**Figure 1 :** Pie chart illustrating Frequency and Percentage Distribution of Level of Knowledge on Breast cancer and preventive measures among rural women.

**Table 3: Frequency and Percentage Distribution of Level of attitude score towards breast camncer and its preventive measures among rural women**

**N= 200**

Level of Attitude	f	%
Negative	155	77.5
Moderate Positive	39	19.5
Highly Positive	6	3.0



**Figure 2 :** Pie Chart showing Frequency and Percentage Distribution of Level of attitude score of Breast Cancer and its preventive measure among rural women

Table 4: Association between level of knowledge and demographic variables among rural women

N= 200

Demographic Variables		Total	Above Mean (42)	Below Mean (158)	Chi- Square test
Age of mother in years	18 -25	20	8	12	$\chi^2= 3.530$ P=0.473 df= 4
	26 -32	35	6	29	
	33 - 39	85	20	65	
	40 – 46	35	4	31	
	47 and above	25	4	21	
Type of Family	Nuclear	110	30	80	$\chi^2= 4.579$ P=0.101 df= 2
	Joint	65	17	48	
	Extended	25	5	20	
Religion	Sikh	125	23	102	$\chi^2= 1.483$ P=0.686 df= 3
	Hindu	55	9	46	
	Muslim	10	3	7	
	Christian	10	2	8	
Marital Status	Unmarried	75	9	66	$\chi^2= 6.630$ P=0.036* df= 2
	Married	100	28	72	
	Widow/ Divorce	25	5	20	
Educational Status	No formal education	7	3	4	$\chi^2= 14.63$ P=0.012* df= 5
	Elementary Education	18	7	11	
	High School Education	35	12	23	
	Higher Secondary Education	90	15	75	
	Graduate	40	3	37	
	Postgraduate	10	2	8	
Occupation	Home-maker	95	21	74	$\chi^2= 2.145$ P=0.708 df= 4
	Government employee	35	7	28	
	Private employee	40	8	32	
	Self – employed	15	5	10	
	Student	15	6	9	
Monthly income per capita in Rupees as per (Kuppaswamy scale)	≤ 500	8	2	6	$\chi^2= 0.727$ P=0.866 df= 4
	501 - 749	17	3	14	
	750 – 999	30	7	23	
	1000 - 1999	95	18	77	
	≥ 2000	50	12	38	
Family history of breast cancer	Yes	15	4	11	$\chi^2= 0.313$ P=0.575 df= 1
	No	185	38	147	
Source of information	Friends / Relatives	20	3	17	$\chi^2= 6.751$ P=0.149 df= 4
	Newspaper/ News	20	5	15	
	Journal / Magazine	25	9	16	
	Social Media – FB / Instagram	45	5	40	
	Health professionals	90	20	70	

\*\*\* Significant at 0.001 level (P&lt; 0.001), \* Significant at 0.05 level, (P&lt; 0.05)

Table 5: Association between attitude and demographic variables among rural women

Demographic Variables		Total	Above Mean (59)	Below Mean (141)	Chi- Square test
Age of mother in years	18 -25	20	7	13	$\chi^2= 11.788$ $P=0.018^*$ $df= 4$
	26 -32	35	5	30	
	33 - 39	85	25	60	
	40 – 46	35	17	18	
	47 and above	25	5	20	
Type of Family	Nuclear	110	37	73	$\chi^2= 7.952$ $P=0.034^*$ $df= 2$
	Joint	65	10	55	
	Extended	25	12	13	
Religion	Sikh	125	40	85	$\chi^2= 5.282$ $P=0.152$ $df= 3$
	Hindu	55	12	43	
	Muslim	10	1	9	
	Christian	10	3	7	
Marital Status	Unmarried	75	20	55	$\chi^2= 3.934$ $P=0.139$ $df= 2$
	Married	100	35	65	
	Widow/ Divorce	25	4	21	
Educational Status	No formal education	7	2	5	$\chi^2= 14.52$ $P=0.012^*$ $df= 5$
	Elementary Education	18	5	13	
	High School Education	35	6	29	
	Higher Secondary Education	90	37	53	
	Graduate	40	5	35	
	Postgraduate	10	4	6	
Occupation	Home-maker	95	31	64	$\chi^2= 1.163$ $P=0.884$ $df= 4$
	Government employee	35	9	26	
	Private employee	40	12	28	
	Self – employed	15	5	10	
	Student	15	6	9	
Monthly income per capita in Rupees as per (Kuppaswamy scale)	$\leq 500$	8	2	6	$\chi^2= 2.304$ $P=0.511$ $df= 4$
	501 - 749	17	5	12	
	750 – 999	30	8	22	
	1000 - 1999	95	25	70	
	$\geq 2000$	50	19	31	
Family history of breast cancer	Yes	15	3	12	$\chi^2= 0.703$ $P=0.401$ $df= 1$
	No	185	56	129	
Source of information	Friends / Relatives	20	4	16	$\chi^2= 3.870$ $P=0.423$ $df= 4$
	Newspaper/ News	20	3	17	
	Journal / Magazine	25	7	18	
	Social Media – FB / Instagram	45	15	30	
	Health professionals	90	30	60	

\* Significant at 0.05 level, (P&lt; 0.05)

---

## DISCUSSION

The present study revealed that rural women have a lack in knowledge related to breast cancer and a negative attitude towards breast cancer and its preventive measures. A similar study by S.K., Pradhan A., et al., shows that the majority of findings were 30 years above age group (50.9%) and types of family (79.1%) belonging to a nuclear family, whereas, education with the majority belonging to secondary level (44.5%) and occupation about half of them were housewives (46.4%) shown contradictory to the findings of the present study<sup>7</sup>. However, another parallel study on the prevalence and risk factors of breast cancer conducted by Madhukumar S., Thambiran U. R. et al. (2017), depicts 58% of respondents were aware of at least one symptom and 59% were aware of at least one risk factor<sup>8</sup>. Alike cross sectional survey was conducted by **Gebresillassie BM, Gebreyohannes EA. Et al.** (2018) on evaluation of knowledge, perception, and risk awareness about breast cancer and its treatment outcome, in which it was revealed that majority of study participants (30%) had positive perception about breast cancer management and its outcomes. however, they had negative perception (21.3%) of breast cancer treatment by considering it to be a long-term and painful process<sup>9</sup>. Sarker R, Islam MS, et al (2022) conducted a related study on knowledge of breast cancer and breast self-examination practices and its barriers among university female students in Bangladesh. The study exhibit that total knowledge score about breast cancer and attitude towards breast cancer and breast self- examination were significantly correlated with each other ( $r = 0.81$ ;  $p < 0.05$ )<sup>10</sup>.

---

## LIMITATION

1. The researcher felt it difficult to seek permission from the administration.
2. The researcher faced difficulty in convincing the women to participate in the research study.
3. The researcher found some difficulties raised while collecting data from the rural women.
4. This study was focused only on selected villages as per the researcher's convenience. It would be conducted at the state level in order to improve awareness related to breast cancer and its preventive measures.

---

## RECOMMENDATION

On the basis of this present study, the following recommendations are to be considered.

- A retrospective study can be carried out to evaluate knowledge and attitude related to breast cancer and its preventive measures among women.
- A quasi-experimental study can also be conducted to assess the effectiveness of self structured health education on breast cancer and its preventive measures among community people.
- An exploratory study can be done to assess knowledge and attitude regarding breast cancer and breast self-examination among community people.
- The study's findings can be generalized to a larger population by replicating it with a different demographic on a large sample.
- Similar studies can be conducted on different populations and in different settings in urban.

## ACKNOWLEDGEMENTS

The professionals who verified the instruments and every subject who took part in the data collection to determine reliability are both sincerely thanked by the authors.

## FINANCIAL SUPPORT AND SPONSORSHIP

Nil

## CONFLICTS OF INTEREST

There are no conflicts of interest.

---

## CONCLUSION

It is concluded from the study findings that the majority of women have a low level of knowledge and attitude towards breast cancer and its preventive measures which need to be enhanced among women for positive health by means of early detection and early treatment. Moreover, there is a positive correlation between knowledge and attitude among rural women was observed.

---

## REFERENCES

1. NCD Alliance. Cancer. 2022 [cited 2022Jan10]. Available from: <https://ncdalliance.org/why-ncds/ncds/cancer>.

2. Chalkidou K, Marquez P, Dhillon PK, Teerawattananon Y, Anothaisintawee T, Gadelha CA, Sullivan R. Evidence-informed frameworks for cost-effective cancer care and prevention in low, middle, and high-income countries. *Lancet Oncol.* 2014 Mar;15(3):e119-31. doi: 10.1016/S1470-2045(13)70547-3. Epub 2014 Feb 14. PMID: 24534293.
3. Dey S, Sharma S, Mishra A, Krishnan S, Govil J, Dhillon PK. Breast cancer awareness and prevention behavior among women of Delhi, India: Identifying barriers to early detection. *Breast Cancer: Basic and Clinical Research.* 2016;10.
4. Breast cancer [Internet]. World Health Organization. World Health Organization; [cited 2021Jan10]. Available from: <https://www.who.int/news-room/fact-sheets/detail/breast-cancer>
5. Sharma K, Costas A, Shulman LN, Meara JG. A systematic review of barriers to breast cancer care in developing countries resulting in delayed patient presentation. *J Oncol.* 2012;2012:121873. doi: 10.1155/2012/121873. Epub 2012 Aug 22. PMID: 22956949; PMCID: PMC3432397.
6. Cytecare T. Statistics of breast cancer in India: Cytecare Hospitals [Internet]. Cytecare Hospital in Bangalore; 2023. Available from: <https://cytecare.com/blog/breast-cancer/statistics-of-breast-cancer/>
7. Sah SK., Pradhan A, et al. Knowledge, Attitude and Practice Regarding Prevention and Screening of Breast Cancer among Reproductive Age Women. *iMedPub Journals.* 2019;8(1:1). doi:10.36648/2254-6081.8.1.1
8. Madhukumar S, Thambiran UR, Basavaraju B, Bedadala MR. A study on awareness about breast carcinoma and practice of breast self-examination among Basic Sciences' College students, Bengaluru. *Journal of Family Medicine and Primary Care.* 2017;6(3):487. Available from: <https://doi.org/10.4103/2249-4863.222026>
9. Gebresillassie BM, Gebreyohannes EA, et al. Evaluation of Knowledge, Perception, and Risk Awareness About Breast Cancer and Its Treatment Outcome Among University of Gondar Students, Northwest Ethiopia. *Front Oncol.* 2018 Nov 2;8:501. doi: 10.3389/fonc.2018.00501. PMID: 30456205; PMCID: PMC6230991.
10. Sarker R, Islam MdS. Effectiveness of educational intervention on breast cancer knowledge and breast self-examination among female university students in Bangladesh: A pre-post quasi-experimental study. *BMC Cancer.* 2022;22(1). doi:10.1186/s12885-022-09311-y.
11. Shahid Siraj S, Arifa S. A pre-experimental study to assess the effectiveness of structured teaching programme on knowledge regarding breast self examination among fmpwh ist year students at Ramzan Institute of Paramedical Sciences, Gulshan Nagar, Nowgam Srinagar, Kashmir, India. *IP Journal of Paediatrics and Nursing Science.* 2020;3(1):1-14.
12. Ozaydin, A. N., Bozdoğan, B. Men's knowledge and attitudes towards breast cancer: A descriptive study [Internet]. [2020]. Available from: [https://www.researchgate.net/profile/AyseOzaydin/publication/340406097\\_Men's\\_Knowledge\\_and\\_Attitudes\\_Towards\\_Breast\\_Cancer\\_A\\_Descriptive\\_Study/links/5faa4cff458515157bfc0d75/Mens-Knowledge-and-Attitudes-Towards-Breast-Cancer-A-Descriptive-Study.pdf?origin=journalDetail](https://www.researchgate.net/profile/AyseOzaydin/publication/340406097_Men's_Knowledge_and_Attitudes_Towards_Breast_Cancer_A_Descriptive_Study/links/5faa4cff458515157bfc0d75/Mens-Knowledge-and-Attitudes-Towards-Breast-Cancer-A-Descriptive-Study.pdf?origin=journalDetail).
13. Sindi, R. A., & Alzahrani, A. A., et al Awareness level, knowledge and attitude towards breast cancer between medical and non-medical university students in Makkah Region: A Cross Sectional Study [Internet]. Awareness Level, Knowledge and Attitude towards Breast Cancer between Medical and Non-Medical University Students in Makkah Region: A Cross Sectional Study. *clinmed journals;* 2019 [cited 2021Jan15]. Available from: <https://clinmedjournals.org/articles/ijccr/international-journal-of-cancer-and-clinical-research-ijccr-6-106.php>.
14. Laws he CH. A quantitative approach to content validity. [Last accessed on 2013 March 15]; *Pers Psychol.* 1975 28:563-75. Available from: [http://www.Bwgriffin.com/gsu/courses/edur9131/content/Lawshe\\_content\\_valdity.pdf](http://www.Bwgriffin.com/gsu/courses/edur9131/content/Lawshe_content_valdity.pdf) . [Google Scholar]
15. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health* 2007;30:459-67.
16. Polit DF, Beck CT. 7th ed. New York City: Lippincott; 2011. *Nursing Research, Principles and Methods.* [Google Scholar]