OPEN ACCESS ORIGNAL ARTICLE

A CROSS-SECTIONAL STUDY ON PREVALENCE OF DIFFERENT BREAST LESIONS AND ASSOCIATED FACTORS AMONG WOMEN OF NAWABSHAH CHARACTERIZED ON MAMMOGRAPHY.

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ABSTRACT

BACKGROUND: Breast cancer stands as a formidable group health challenge and its impact is particularly profound in Pakistan. As the second leading cause of cancer related deaths among women worldwide, it demands urgent and comprehensive action. Pakistan faces a particularly heavy burden of breast cancer with a disproportionately high incidence rate compared to to other South Asian countries. The alarming trend underscores the urgent need for a multifaceted approach to combat thus growing health crisis. This disparity highlights the critical need for improved access to early detection methods such as mammography. Mammography as a cornerstone of breast cancer screening, plays a pivotal role in early detection and improved prognosis. This practice approach is particularly crucial for high risk individuals, such as those with family history of breast cancer. Despite proven efficacy of mammography in reducing breast cancer mortality, awareness and access to this vital tool remain limited in Pakistan. **OBJECTIVE:** This research study was aimed to measure the prevalence of the different breast lesions and associated factors among women characterized on Mammography at NORIN Hospital, Nawabshah. **DESIGN OF STUDY:** Descriptive Cross-Sectional study. **PLACE AND DURATION:** NORIN Hospital Nawabshah from April,2024 to September,2024. **METHOD:** This retrospective cross-sectional study was conducted at NORIN Hospital Nawabshah. The study included 286 female patients who underwent mammography. Mammography reports and patient records were reviewed, patients with incomplete data were excluded. Mammography findings were categorized using BIRADS SYSTEM. Data analysis involved Descriptive statistics and inferential statistics were applied using Statistical Package for Social Sciences SPSS software. Chi-square tests and logistic regression analysis were performed to examine associations between variables. The study was approved by Ethics Committee/Institutional Review Board. Patient confidentiality and anonymity were maintained. The study variables included: •Mammography findings dependent variable •Age, marital status, number of children, symptoms, and consanguinity independent variables **RESULT:** A total of 286 females participated in this study at Norin Hospital, out of which 80% were diagnostic and 20% were screening cases. Amongst which 36.71% Benign cases and 3.1% of the Malignant cases. From mammography findings BIRAD 3 is more prevalent. **CONCLUSION**: Due to lack of knowledge, women were ignorant about mammography screening and breast cancer, women who were infertile or were in a consanguinity were more susceptible.

KEYWORDS: mammography, breast lesions, risk factors.

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INTRODUCTION

Breast cancer ranks as the second deadliest cancer among women worldwide and accounts for a quarter of all reported female cancer cases. According to the International Agency for Research on Cancer IARC, approximately 1.7 million women were diagnosed with breast cancer between 2012 and 2014, resulting in 8.2 million female deaths. Pakistan has the highest burden of breast cancer among Asian countries, ranking 58th worldwide[1].There are three methods that are used for breast cancer screening: Mammography, Breast self-examination, Physical examination by trained professional. Among them mammography is the best method use to examine the breast

cancer and other breast diseases.[2]Mammography, a type of X-ray imaging, is the mainstay for examining the breast to detect cancer and other breast diseases early[3]. It serves two main purposes, diagnostic and screening mammography. Diagnostic mammography is usually performed for patients with breast cancer symptoms while screening mammography aims to identify breast cancer in asymptomatic women. The primary objective of screening mammography is to detect cancer at an early stage[4] . The standard mammogram typically includes bilateral mediolateral oblique MLO and craniocaudal CC views. Supplementary views may include true lateral, spot compression, and magnification views. Specific mammographic signs of breast lesion include speculated mass, architectural distortion, and clustered microcalcifications. Associated findings may involve nipple retraction, skin thickening, and enlarged lymph nodes. These signs and findings are crucial for accurate diagnosis and early detection of breast cancer during mammographic screening[5]. According to the World Health Organization WHO, the incidence of breast cancer in Middle Eastern countries is expected to significantly increase over the next 15 years. Despite advancements in treatment, mortality rates associated with breast cancer remain high, with 626,679 deaths reported globally in 2018.There is a notable disparity in mortality rates between high-income countries HICs and low- and middle-income countries LMICs. High-income countries have seen a significant reduction in breast cancer mortality rates, thanks to better access to screening, early detection, and advanced treatment options. In Pakistan, the incidence of breast cancer is alarming, with approximately one in every nine women affected by the disease. This incidence rate is the highest among South Asian countries, emphasizing the urgent need for enhanced awareness, screening programs, and access to quality healthcare services to address the growing burden of breast cancer in the region[6]. Estimates suggest that the number of breast cancer cases will increase to 2.1 million by 2030, highlighting the growing importance of early detection and screening efforts. Studies have demonstrated that individuals at high risk for breast cancer, such as those with a family history of the disease or those undergoing estrogen therapies, can benefit greatly from regular mammography. Regular screening allows for the early detection of abnormalities, facilitating timely intervention and potentially improving treatment outcomes. Therefore, encouraging regular mammography in high-risk groups remains crucial in the ongoing fight against breast cancer [7].

How can surveillance affect outcomes related to prognosis, cancer which are invasive, cancer that are larger than 2 cm and breast cancer related to nodal involvement?Does the postulate change between pre-menopausal and post-menopausal women?[8]In women of child-bearing age, it's more common to see benign breast changes, which tend to peak between the ages of 30 and 50. On the other hand, the incidence of the malignant breast cancer tends to increase during the menopausal period [9].The term "benign breast diseases" encompasses a heterogeneous group of lesions that may present a wide range of symptoms or may be detected as incidental microscopic findings. The incidence of benign breast lesions begins to rise during the second decade of life and peaks in the fourth and fifth decades, as opposed to malignant diseases, for which the incidence continues to increase after menopause. The range of benign breast disease BBD encompasses numerous physiological and pathological lesions affecting various components of the breast Fibroadenoma is the most prevalent type among the benign breast conditions[10] . The main things that affect the chance of getting breast cancer are age and gender. Many risk factors for benign breast lesion are linked to hormone exposure, especially estrogen and progesterone. Non-modifiable risk factors it include early menarche, late menopause, family history of breast cancer, race, height mammographic density, and certain gene alterations. Modifiable risk factors include age at first live birth, parity, breastfeeding, exogenous hormones, postmenopausal body mass index, physical activity, educational level, alcohol consumption, and menopausal hormone therapy[11]. Risk factors for malignant breast tumors can be categorized into non-modifiable and modifiable factors. Non-modifiable factors include age, with most breast cancers diagnosed after age 50, genetic mutations, reproductive history, dense breast tissue, personal or family history of breast or ovarian

cancer, and previous radiation therapy, Modifiable factors influence hormonal replacement therapy, Physical activity body weight, alcohol intake, smoking vitamin supplementation, exposure to artificial light, diet, and exposure to certain chemicals[12-13] . It is believed that multiple births reduce the risk of breast cancer but now multiple articles prove that this hypothesis is not that strong at all. One of the articles published by Philip C. Nasca[14]. Another article published tells multiple births cause increases in pregnancy estrogen which promotes breast cancer[15] . Hormones that predispose to preeclampsia are hormones that decrease the risk of breast cancer, i.e. reduced levels of insulin-like growth factor 1 and estrogen and increased levels of progesterone, androgens, human chorionic gonadotropins, IGF-1 binding protein, corticotropin-releasing factor, cortisol, and insulin Preeclampsia in turns decreases the risk of breast cancer[16] . Obesity due to increased fats reduces the chances of prognosis at an early age compared with leaner women[17]. Local estrogen production as well as elevated serum estrogen levels are the primary mediators of breast cancer associated with increased body weight so an obese or overweight woman is at higher risk for breast cancer[18]. GDM gestational diabetes mellitus develops during pregnancy in some women with Type2-DM, a family history of DM, Hyperinsulinemia, and decreased sensitivity of insulin receptors are women at increased risk of breast cancer[19]. Certain substances present in tobacco smoke like polycyclic hydrocarbons, aromatic amines, and N-nitrose amines have the potential to cause the development of breast tumors. A woman who smokes is associated with breast cancer whether she is an active or passive smoker. Passive smokers are associated with breast cancer in the same ratio as active smokers[20]. Younger females are at a lower risk of breast cancer compared to older females[21] like a woman who gives birth to her 1st child at a later age has a higher risk of breast cancer than a woman who has her 1st child at a younger age. It is seen younger females' breast cancer is more aggressive than older females' breast cancer[22]. In 15% to 20% of women who have a family history of breast cancer have an increased risk of breast cancer due to some genetic factors mammography is helpful to evaluate the tumors in these high-risk patients[23]. Estrogen affects the epithelial cells of breast tissue in the mid-luteal phase when there is a peak level of circulating estrogen and progesterone that act on myoepithelial cells and accelerate their proliferation[24]. There is a reduced risk of cancers in women with long menstruation i.e. between ages 18 to 20 years[25]. Hepatitis C is more common in causing breast cancer than hepatitis B due to chronic exposure to HCV-promoting carcinogenesis in females younger than 50 years[26]. During pregnancy and lactation, the estrogen level remains low and becomes normal after 6 months of lactation greatly reducing the risk of breast cancer than in non-lactating and nulliparous women[27], it was found that lactation only reduces the risk in pre-menopausal women due to reduced estrogen and there was no significant effect was found in postmenopausal women[28]. The relation between hypothyroidism and hyperthyroidism with breast cancer is seen in women, hypothyroidism increases the sensitivity of estrogen and prolactin receptors on the mammary gland which induces carcinogenesis[29]. Hyperthyroidism increases thyroid levels itself has a proliferative effect on breast tissue but at a higher level it also has an estrogen-like effect on breast tissue which increases the risk of breast cancer[30]. One of the most common causes of benign breast disease and breast cancer is hormonal imbalance most commonly in postmenopausal women taking hormone replacement therapy increases the level of estrogen causes a proliferative effect on breast tissue and accelerates breast cancer while progesterone opposes the estrogen epithelial growth[31]. There is a certain link between psychiatric disorders with breast diseases like depression and schizophrenia increased risk of benign breast disease and inflammatory breast disease but due to a lack of systemic and comprehensive research it has not been evaluated yet[32]. A female with longer exposure to oral contraceptives compared with those not taking pills is at higher risk of getting breast cancer due to the direct increase of estrogen in the body which acts on the breast receptors and proliferates the mammary glands, but some research does not support this statement[33]. So, there are no definite studies supporting a definite relationship between OCP and breast cancer. On mammography screening, the benign findings can include architectural distortion, masses,

calcification asymmetries, and calcifications. It is important to note that calcifications and asymmetries are more commonly associated with benign breast diseases BBD rather than malignant diseases. Masses on the other hand, can be found in both malignant and nonmalignant lesions[34]. The malignant findings can be evident mass without calcification, malignant calcification without mass, evident mass with calcification, architectural distortion or asymmetrical density without mass or calcifications and no visible changes[35].

The purpose of studying the prevalence of different breast lesions and associated factors among women offers significant benefits for improving breast health outcomes and help reduce the mortality and morbidity due to CA Breast in Pakistan and another advantage that by knowing the most prevalent types of breast lesions allows healthcare systems to allocate resources effectively. with the help of study we can be able to identify risk factors in community of Nawabshah in the end Research findings can guide the development of healthcare policies, resource allocation, and screening programs customized to meet the specific requirements of the Nawabshah population.

MATERIAL AND METHODS

This Descriptive cross-sectional study was conducted on female general population visiting at NORIN Hospital at Nawabshah, A total 286 females were participated in study. The duration of study started from April 2024 to September 2024. Data collected after approval of Research. Proposal and permission of Ethical committee, approval was taken from Institutional Review Committee IRC of department of Community Medicine. Permission was also taken from the Head of Oncology Department of NORIN Hospital.

SAMPLE SELECTION

Inclusion Criteria

- Consent to participate
- Who have lesion for the breast symptoms
- Referred by doctor for breast screening without breast symptoms

Exclusion Criteria:

- Anyone not willing to participate.

The questionnaires were anonymously administered to the female at OPD. Before administrating the questionnaire, informed consent was taken from the participants. Participants were free to refuse to participate in this study. Data were kept confidential and anonymous. Following study instruments were used during data collection, the mammography machine and the structured questionnaire, consists of 35 multiple-choice and closed ended questions.

STATISTICAL DATA ANALYSIS:

Analysis of data was done by using software that is SPSS version 25.0. Demographic data were summarized by descriptive statistics, which was presented by using frequency tables and expressed as mean±.

DATA ANALYSIS

Questionnaires will be checked for errors. Data will be entered into SPSS version 25.0. Frequency and associated factors will be analyzed through chi-Square test test of significance. The variables and the data will be presented by tables and charts.

RESULTS

PREVALANCE OF BREAST LESION ACCORDING TO MAMMOGRAPHY FINDINGS

Table 1

Mamography findings					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	85	29.7	29.7	29.7
	Benign	105	36.7	36.7	66.4
	Malignant	96	33.6	33.6	100.0
	Total	286	100.0	100.0	

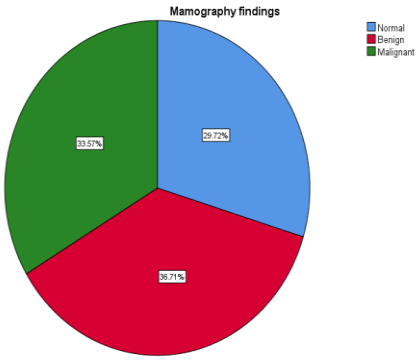


Figure 1

The evidence from this pie chart shows the most prevalent breast lesion is benign with the percentage of 36.71%.From table 1 it is cleared that majority of the patients105 cases out of 286 are diagnosed with benign breast lesion as compared to malignant breast lesions96 cases with the difference of only 3.1%.

Table 2:

Key

BIRADS 0-1=Normal;

BIRADS 2-3=Benign;

BIRADS 4-6=Malignant

Mammography findings					
		Right		Left	
		Frequency	Percent	Frequency	Percent
Valid	BIRADS 0	42	14.6	45	15.7
	BIRADS 1	108	37.8	108	37.8
	BIRADS 2	37	12.9	41	14.3
	BIRADS 3	43	15.0	42	14.7
	BIRADS 4a	28	9.8	17	5.9
	BIRADS 4b	8	2.8	7	2.4
	BIRADS 4c	4	1.4	8	2.8
	BIRADS 5	10	3.5	10	3.5
	BIRADS 6	6	2.1	8	2.8
	Total	286	100.0	286	100.0

Table 2 showsthecomparisonofbilateralmammography elaborates the highest frequency of BIRADS 3 in both right and left breast and least frequency of BIRADS 4c in right breast and BIRADS 4b in left breast.

Table 3**Age Mammography findings Cross tabulation**

			Mammography findings			Total
			Normal	Benign	Malignant	
age	below 30 years	Count	28	29	16	73
		% of Total	9.8%	10.1%	5.6%	25.5%
	above 30 years	Count	57	76	80	213
		% of Total	19.9%	26.6%	28.0%	74.5%
Total		Count	85	105	96	286
		% of Total	29.7%	36.7%	33.6%	100.0%

Table 4

Chi-Square Tests			
	Value	df	Asymptotic Significance 2-sided
Pearson Chi-Square	6.664[a]	2	.036
Likelihood Ratio	6.906	2	.032
Linear-by-Linear Association	6.365	1	.012
N of Valid Cases	286		
a. 0 cells 0.0% have expected count less than 5. The minimum expected count is 21.70.			

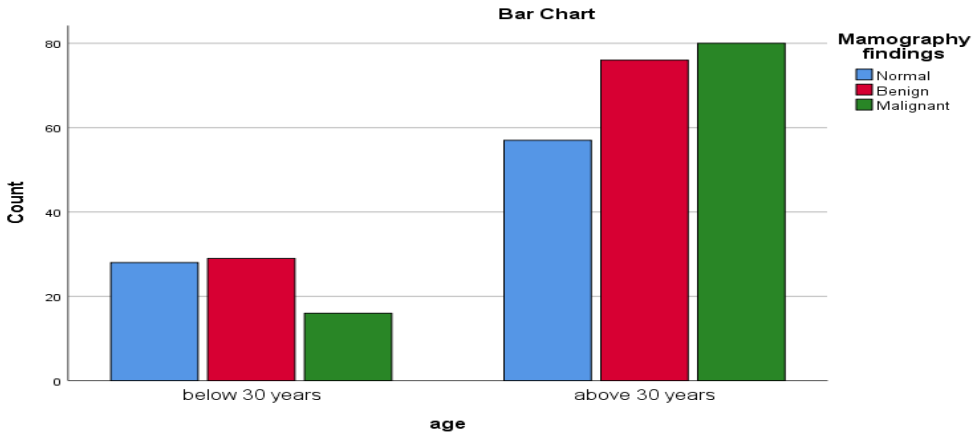


Figure 2

AGE ASSOCIATION WITH MAMMOGRAPY FINDING:

This Fig 2.0 shows the association of age with prevalence of mammographic findings p=0.036 among the study population of 286 females divided into two categories, <30 and >30, visiting NORIN Hospital Nawabshah, having a significant highest prevalence of <30years of age with 10% of benign breast lesions and >30 age with 28% malignant breast lesions.

MARITAL STATUS

Table 5

Crosstab

			Mammography findings			Total
			Normal	Benign	Malignant	
marital status	yes	Count	71	95	87	253
		% of Total	24.8%	33.2%	30.4%	88.5%
	no	Count	14	10	9	33
		% of Total	4.9%	3.5%	3.1%	11.5%
Total		Count	85	105	96	286
		% of Total	29.7%	36.7%	33.6%	100.0%

There are 51 females with 0 number of children, the above table illustrates 33 females in this study are unmarried. Therefore, it can be interpreted that 18 are married with 0 number of children fig 3 defining that 35.3% population to be infertile.

RELATIONSHIP OF NO: OF CHILDREN WITH MAMMOGRAPHY FINDING

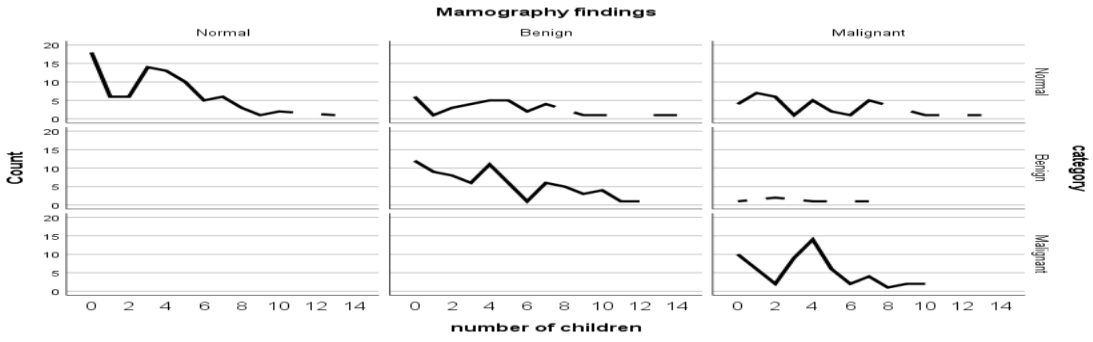


Figure 3

This line graph depicts the trend in mammographic findings and number of children, a significant spike can be appreciated in females with positive findings in both benign and malignant with 4 number of children. . The second spike is observed in females with 0 number of children, representing 35.3% of infertile females to be diagnosed positive with breast lesion both benign and malignant.

SIGN AND SYMPTOM ASSOCIATED TO MAMMOGRAPHY FINDING

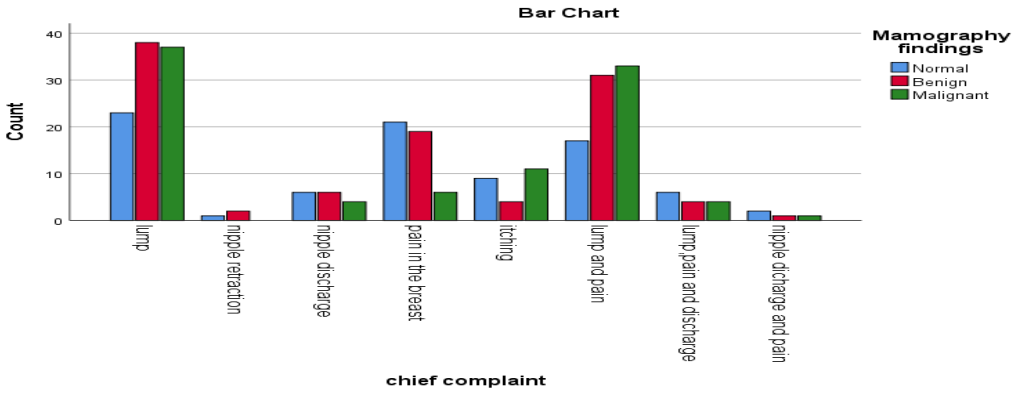


Figure 4

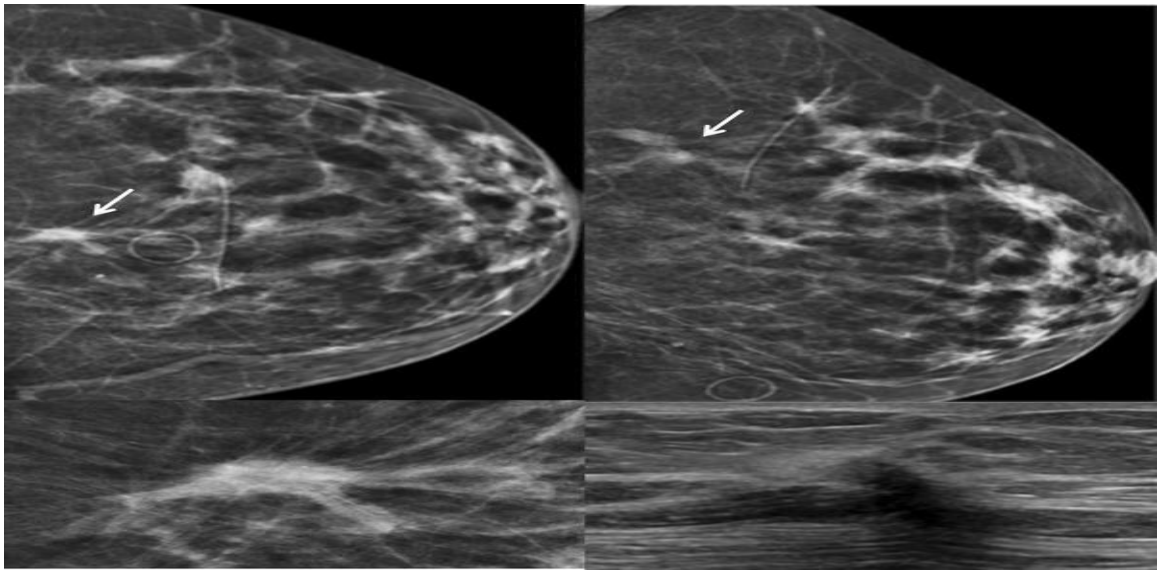
Multivariate logistic analysis uncovers the warning signs and symptoms for the breast lesions p=0.048, a notable trend can be seen in figure. Majority cases presented with lump are suspected with benign lesion whilst the malignant are presented with lump and pain. In contrast, other symptoms exhibits ambiguity in mammographic results.Table 6

Chi-Square Tests			
	Value	df	Asymptotic Significance 2-sided
Pearson Chi-Square	23.837[a]	14	.048
Likelihood Ratio	26.532	14	.022
Linear-by-Linear Association	.139	1	.709
N of Valid Cases	286		
a. 9 cells 37.5% have expected count less than 5. The minimum expected count is .89.			

CONSANGUINITY: Table 7:

Crosstab						
			Mammography findings			
			Normal	Benign	Malignant	Total
Consanguinity	0	Count	6	4	4	14
		% of Total	2.1%	1.4%	1.4%	4.9%
	yes	Count	42	37	47	126
		% of Total	14.7%	12.9%	16.4%	44.1%
	no	Count	37	64	45	146
		% of Total	12.9%	22.4%	15.7%	51.0%
Total		Count	85	105	96	286
		% of Total	29.7%	36.7%	33.6%	100.0%

The information in the table 7 reveals that the consanguinity is at the high risk to develop 29.3% of breast lesion Malignant 16.4% and Benign 12.9% diagnosed through mammography.



BIRAD 3 Mammographic Scan Courtesy of

DISCUSSION

In this study, 286 patients underwent mammography, with 80% of these procedures being diagnostic. In contrast, 20% of the mammograms were screening cases. This distribution reveals a major emphasis on diagnostic mammography within the study, highlighting the primary goal of assessing and addressing breast health issues.[36] It is evident that the most prevalent type of breast lesion is benign, accounting for 36.71% of the cases. Further analysis reveals that out of the 286 cases, the majority of patients, totaling 105 cases, were diagnosed with benign breast lesions, while 96 cases were diagnosed with malignant breast lesions, representing a difference of only 3.1%.[37]. The higher frequency of breast lesions were predominantly observed in right breast with 244 cases which is contradictory to several other researches[38]. It also indicates the comparison of bilateral mammography results, highlighting the distribution of BIRADS categories in both the right and left breasts. The data reveals that BIRADS 3 has the highest frequency in both the right and left breasts, indicating a significant number of cases where findings are probably benign but require follow-up. Conversely, the least frequent category in the right breast is BIRADS 4c, suggesting fewer instances of high suspicion of malignancy that might warrant biopsy. In the left breast, the least frequent category is BIRADS 4b, indicating fewer cases with a moderate suspicion of malignancy. This distribution underscores the varied nature of mammographic findings and the importance of nuanced interpretation in bilateral breast assessments.[39,40]. The data reflects the correlation between age and the prevalence of mammographic findings p=0.036 among 286 female participants at NORIN Hospital Nawabshah. The study categorized the participants into two groups: those aged under 30 and those over 30. The results revealed a notably higher prevalence of benign breast lesions among those under 30 years of age 10% and malignant breast lesions among those over 30 years of age 28%.[41].The study involves 51 in 0 number of females, with 33 unmarried and 18 married. It also shows that 35.3% of the married group is infertile, highlighting infertility's significance in this population.[42] The study also indicates the correlation between mammographic findings and the number of children. A noticeable peak can be seen in women with four children, indicating a high rate of positive findings for both benign and malignant conditions. There is also a second peak for women with zero children, with 35.3% of infertile women being diagnosed with positive breast lesions, both benign and malignant.[43] Several research studies contradict our results, however, some studies validate our conclusions. [44]. The multivariate logistic analysis reveals critical warning signs and symptoms associated with breast lesions, with a statistically significant finding p=0.048. There is a notable trend where the majority of cases presenting with a lump are typically suspected of having benign

lesions. In contrast, cases that present with both a lump and pain are more frequently associated with malignant lesions. Other symptoms, however, show less clear patterns and contribute to ambiguous mammographic results. This distinction emphasizes the importance of specific symptom combinations in diagnosing the nature of breast lesions and highlights the variability in mammographic interpretations based on differing symptomatology.The study provides insightful data on the impact of consanguinity on the risk of developing breast lesions. The findings indicate that individuals with a consanguineous background have a heightened risk, with 29.3% of breast lesions occurring in this group. This percentage is further broken down into 16.4% for malignant lesions and 12.9% for benign lesions as diagnosed through mammography. These statistics underscore the significant role of consanguinity as a risk factor in the development of both malignant and benign breast conditions, highlighting the importance of genetic factors in breast health.[44]

CONCLUSION

This study conducted at NORIN Hospital, Nawabshah, highlights the significance of the breast cancer screening and early detection by high resolution mammography as a diagnostic of early detection through mammography, and available treatment options. Develop targeted educational programs for high-risk groups, such as women with a family history of breast cancer or those undergoing estrogen therapies or those who have SBLA syndrome, emphasizing the significance of regular mammography screenings. Dispel myths and misconceptions surrounding breast cancer and mammography through culturally sensitive messaging and community engagement initiatives. Allocate increased government funding to expand mammography services, particularly in underserved rural areas and low-income communities. Deploy mobile mammography units by health council to reach remote and marginalized populations, ensuring equitable access to screening services. Provide subsidies or financial assistance programs to make mammography more affordable for low-income women. Invest in training programs for healthcare professionals, including undergraduates, graduates, post graduates, nurses and midwives, to enhance their knowledge and skills in breast cancer tool for breast lesions to reduce the mortality rate. Females in 4th decade of life have a high risk of benign breast lesions, whilst who conceive in late age are prone for exposure of benign breast lesions. Although this risk is comparatively lower in females who are in their prime childbearing age. The findings emphasize that women who have greater estrogen level have higher percentage of breast cancer which is contradictory to many other researches. Our research further reflects that the incidence of breast lesions is more frequently seen in right breast which is again not supporting previous researches. The study also highlights a lack of awareness, leading to late detection of benign diseases categorized as BIRADS III. It recommends increased public education and suggests that the Pakistani government implement WHO guidelines for routine mammographic screening for high-risk women.

RECOMMENDATION

The study's findings will provide knowledge to implement comprehensive public awareness campaigns utilizing diverse media platforms television, radio, social media, print to educate women about breast cancer, its risk factors, the beneficial effects of the breast feeding, the importance

screening and early detection.Develop and implement evidence-based national guidelines for breast cancer screening, diagnosis, treatment, and palliative care. Invest in strengthening healthcare infrastructure, including diagnostic facilities, treatment centers, and palliative care services, to ensure timely and effective care for breast cancer patients. Encourage research on breast cancer prevalence, risk factors, and treatment outcomes in the Pakistani population to inform policy decisions and interventions. Foster collaboration among government agencies, healthcare providers, non-governmental organizations, and international partners to leverage resources and expertise in breast cancer control efforts. By implementing these recommendations, Pakistan can make significant strides in reducing the burden of breast cancer, improving treatment outcomes, and ultimately saving lives.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.
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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.
CONFLICT OF INTEREST: No competing interest declared

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