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FREQUENCY OF DUCT ECTASIA AND BREAST CANCER IN PATIENTS WITH NIPPLE DISCHARGE IN BMCH QUETTA

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Abstract

Background: *Nipple discharge is a common breast symptom ranging from benign conditions such as duct ectasia to serious malignancies like breast cancer. Differentiating between these causes is clinically important, as pathologic discharge–particularly bloody or unilateral–may indicate underlying malignancy requiring prompt diagnosis and management.*

Objective: *- To determine the frequency of duct ectasia and breast cancer in patient with nipple discharge in tertiary care hospital Quetta.*

Methods: *This was a cross-sectional study carried out in the Department of General Surgery, Bolan Medical Complex Hospital, Quetta, between February 1st and May 31st, 2025, under a non-probability consecutive sampling method. Women aged 25-60 years whose nipple discharge was intermittent within six months or less were considered included, whereas women with nipple trauma, abscess, past breast surgery, and blood disorders were excluded. All participants gave informed consent in writing. Demographic and clinical data like age, weight, height, and body mass index (BMI) were entered. A comprehensive history was recorded about the duration of nipple discharge, its nature, and other related symptoms, and a clinical examination was done to identify the discharge, lump, or any sign of infection. Diagnostic tests such as breast ultrasound, mammography, and biopsy were conducted to diagnose duct ectasia or breast cancer. The trained staff were expected to fill in data on a predesigned proforma, and inter-rater reliability tests were carried out to ensure the data were of quality and confidentiality.*

Results: *There were 118 women, including inpatients and outpatients, with intermittent episodes of nipple discharge included in the study. The mean age was 46.69 ± 7.15 years, the mean weight was 52.89 ± 7.25 kg, and the mean height was 154.86 ± 7.36 cm, corresponding to a mean BMI of 22.16 ± 3.46 kg/m². The mean duration of nipple discharge was 3.69 ± 1.60 months. Duct ectasia was identified in 37 women (31.4%), while breast cancer was diagnosed in 25 women (21.2%). Most participants had matriculation (35; 29.7%) or intermediate education (32; 27.1%), followed by graduates (27; 22.9%), secondary education*

(18; 15.3%), and primary education (6; 5.1%). Regarding socioeconomic status, 52 women (44.1%) were middle class, 38 (32.2%) lower class, and 28 (23.7%) upper class. Duct ectasia was more frequent in urban participants (29) compared to rural (8), showing a significant association (p = 0.032), while breast cancer was also higher in urban women (21 vs 4), with a significant association (p = 0.021). No significant relationships were observed between educational level (p = 0.834) or socioeconomic status (p = 0.369) and residence. The mean duration of nipple discharge did not differ significantly between patients with or without duct ectasia (3.65 vs 3.70 months, p = 0.863) or breast cancer (3.64 vs 3.70 months, p = 0.871). The age distribution showed trends toward higher frequencies in older age groups but was not statistically significant for either condition (duct ectasia p = 0.812, breast cancer p = 0.363).

Conclusion: *The study gives essential information about the women suffering from nipple discharge in the tertiary hospital Quetta, where duct ectasia is the most prevalent benign etiology, and breast cancer is one of the pathologies that determine this phenomenon. The outcomes underscore the importance of careful screening of nipple discharge in every woman, particularly in urban communities and at advanced ages, to facilitate early diagnosis, proper diagnosis, and proper treatment of both benign and malignant.*

INTRODUCTION

Nipple discharge is the most frequently occurring complaint that compels women to visit the doctor as far as their breasts are concerned. This is usually not dangerous; however, it is highly concerning to the clinical participants as well as the patients because, in certain instances, it gives a portrayal of a malignancy [1]. The pathological nipple discharge that is most typically spontaneous, unilateral, and persistent, and may even be bloody or serosanguinous, will be taken into serious consideration. The benign etiology that is most prevalent is duct ectasia, and it comprises subareolar duct dilatation, inflammation of the product, and secretion stasis. Alternatively, breast cancer is not commonly an etiology of discharge disorder as compared to benign lesions, but it is a drastic diagnosis to make [2]. In other populations and health care environments, the ratio of benign to malignant causes of patients who present with nipple discharge is varied. The research conducted in foreign countries has found that malignancy in women who had the pathological discharge of the nipples is within the single digits and is as high as 15%, depending on the referral patterns and approaches to the diagnosis [3]. Similarly, the incidence of duct ectasia, which is presented in the literature, is also heterogeneous, depending on the population of patients and the criteria of its diagnosis. Such differences imply the importance of local data generation since the scope of the disease manifestation might be conditional on the parameters of demographic, cultural, and healthcare access, varying with the region [4]. The incidence of breast cancer in Pakistan is very disturbing. Being the most frequently diagnosed cancer in women, it has one of the highest age-standardized incidences in South Asia. Breast cancer is one of the top causes of morbidity and mortality among women, which is characterized by many of them coming in when the disease is at an advanced stage [5]. The reason this late presentation is usually explained by a lack of awareness, cultural taboos, insufficient access to healthcare facilities, and the absence of resources to perform screening and early detection. The presence of a symptom, like, in the present case, nipple discharge, is even more important in this situation, because it can be an early hint of carcinoma in a population where late diagnoses are already widespread [6]. South Asian reports, as well as those in Pakistan, indicate that benign breast disease still accounts for most cases that occur with breast complaints. However, a high percentage of tertiary care cases of nipple discharge is eventually associated with breast cancer [7]. The differences in reported frequencies between the studies can be attributed to the differences in the study design, age groups in the

population, and referral bias. Nevertheless, one aspect of the discussion is constant: women admitted to tertiary hospitals with nipple discharge are more likely to have a large amount of pathology than those presented in clinics on a community level. This highlights the relevance of precise and contextually relevant information to inform clinical decisions in high-burden environments [8]. In particular, duct ectasia remains a major benign disease that has been seen in middle-aged and elderly women. It is typically described by sticky greenish or serous discharge, nipple retractions, or recurrent periductal inflammation [9]. It is an innocent process, though its clinical manifestation is often confused with the malignant forms of it, and it is very difficult to differentiate between them without applying imaging and histopathology [10]. This overlap generates significant diagnostic issues in low-resource areas, where there are frequently limited resources to access more complex diagnostic modalities. Thus, establishing the prevalence of duct ectasia in local communities may help clinicians to create expectations and diagnostic standards [11]. The issue is also topical, inevitably more in such provinces as Baluchistan, where there are no facilities in terms of healthcare, as opposed to such large cities as Karachi or Lahore. Being the main referral center in the province, Quetta must address a great number of patients, most of whom come late into the disease. The cognizance of the similarities between the benign and malignant etiologies of nipple discharge in this location can provide an important insight into the resource deployment, patient education, and establishment of guidelines that can be localized [12]..Presentation patterns can also be based on socio-demographic factors, including age, education, social status, and residence. One of these is that urban women would be able to be presented earlier since they have been able to access more healthcare compared to rural women, whose presentation might be later and with a more developed disease. Similarly, educational level and socioeconomic status may be used to affect awareness and health-seeking behavior [13]. The correlation of these variables and the clinical prevalence of duct ectasia and breast cancer would provide a more in-depth analysis of the problem and enable the calculation of the groups at risk of subsequent diagnosis [14].It is with this backdrop that the present research work is conducted in a bid to establish the prevalence rate of duct ectasia and breast cancer in women with ductal ectasia nipple discharge referred to a tertiary care hospital located in Quetta. During the study, we analyzed demographic and clinical variables in connection with such outcomes and, therefore, bridged a significant knowledge gap. The findings may be utilized to advise the clinicians according to evidence-based decision-making regarding the assessment of the nipple discharge and its management in the local context, which will eventually result in the diagnosis of breast cancer earlier and improved patient outcomes.

Research Objectives:

To determine the frequency of duct ectasia and breast cancer among patients presenting with nipple discharge at BMCH Quetta and to evaluate associated clinical and diagnostic characteristics.

Materials and Methods:

Study Design & Setting:

This hospital-based cross-sectional study was conducted at the Department of General Surgery, Bolan Medical College Hospital (BMCH), Quetta, over a defined study period from *February 1st to May 31st, 2025.*

Participants:

A total of 118 patients presenting with nipple discharge were enrolled using consecutive sampling. All eligible patients underwent clinical assessment and diagnostic evaluation after informed consent. Both unilateral and bilateral cases were included, irrespective of discharge type or duration.

Sample Size Calculation:

The sample size was calculated using the single proportion formula with a 95% confidence interval, expected prevalence of breast cancer among nipple discharge patients of 20%, and margin of error of 8%. The calculated sample size was 96, rounded to 100 patients.

Inclusion Criteria:

- Patients aged ≥18 years

- Presentation with nipple discharge (spontaneous or expressible)

Exclusion Criteria:

- Lactational nipple discharge
- Recent breast trauma or surgery
- Previously diagnosed breast cancer on treatment
- Incomplete diagnostic evaluation

Diagnostic and Management Strategy:

All patients underwent detailed breast examination followed by ultrasound imaging. Mammography was performed in patients aged ≥40 years or when clinically indicated. Cytology or histopathology was obtained for suspicious lesions to confirm diagnosis.

Statistical Analysis:

Data were analyzed using SPSS version 24.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were reported as frequencies and percentages. Associations were assessed using chi-square test, and p-values <0.05 were considered statistically significant.

Ethical Approval:

This study was approved by the Institutional Research and Ethics Committee of Bolan Medical College / Bolan Medical Complex Hospital, Quetta. The research was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants prior to enrolment, and strict confidentiality of patient data was maintained throughout the study.

Results:

There were **118 women (inpatients and outpatients) with intermittent episodes of nipple discharge** included in the study. The mean age was **46.69 ± 7.15 years**, while the mean weight was **52.89 ± 7.25 kg.** The mean height recorded was **154.86 ± 7.36 cm**, corresponding to a mean body mass index (BMI) of **22.16 ± 3.46 kg/m²** (Table 1) The majority of the participants, 76 (64.4%), resided in urban areas, while 42 (35.6%) were from rural areas. The **mean duration of nipple discharge** among the participants was **3.69 ± 1.60 months** (Figure 1). Among the study population, **duct ectasia** was identified in **37 women (31.4%).** In addition, **breast cancer was diagnosed in 25 women (21.2%).** Regarding characteristics, the **level of education** varied across the study group. The majority of the mothers had achieved **matriculation (35; 29.7%)** or **intermediate education (32; 27.1%),** while **27 (22.9%)** were graduates. A smaller proportion had attained **secondary education (18; 15.3%),** and only **6 (5.1%)** had education limited to the primary level (Table 1). In terms of **socioeconomic status,** the largest proportion of participants belonged to the **middle class (52; 44.1%),** followed by the **lower class (38; 32.2%),** whereas **28 (23.7%)** were categorized as upper class.

Intervention Outcome:

Patients diagnosed with duct ectasia were managed conservatively or surgically as indicated, with good clinical outcomes. All patients with breast cancer were referred for oncological management, including surgery and adjuvant therapy. Early diagnosis facilitated timely referral and initiation of definitive treatment.

Table 1. Baseline Demographic and Clinical Characteristics of Patients with Nipple Discharge (n = 118)

Variable	Frequency (n)	Percentage (%)
Age (years)		
< 40 years	45	38.1
≥ 40 years	73	61.9
Mean age ± SD (years)	43.1 ± 12.0	—
Laterality of discharge		
Unilateral	74	62.7
Bilateral	44	37.3
Presence of palpable mass		

Yes	33	28.0
No	85	72.0

Table 1 summarizes the baseline demographic and clinical characteristics of patients presenting with nipple discharge. Most patients were aged ≥40 years and had unilateral nipple discharge, while approximately one-quarter presented with an associated palpable breast mass.

Table 2. Clinical Characteristics of Nipple Discharge (n = 118)

Characteristic	Frequency (n)	Percentage (%)
Type of discharge		
Bloody	29	24.6
Serous	36	30.5
Colored/Purulent	53	44.9
Nature of discharge		
Spontaneous	66	55.9
Expressible	52	44.1

Table 2 describes the clinical pattern of nipple discharge. Colored or purulent discharge was the most common presentation, while nearly one-quarter of patients presented with bloody discharge, a clinically significant finding.

Table 3. Frequency of Diagnosed Breast Pathologies Among Study Participants (n = 118)

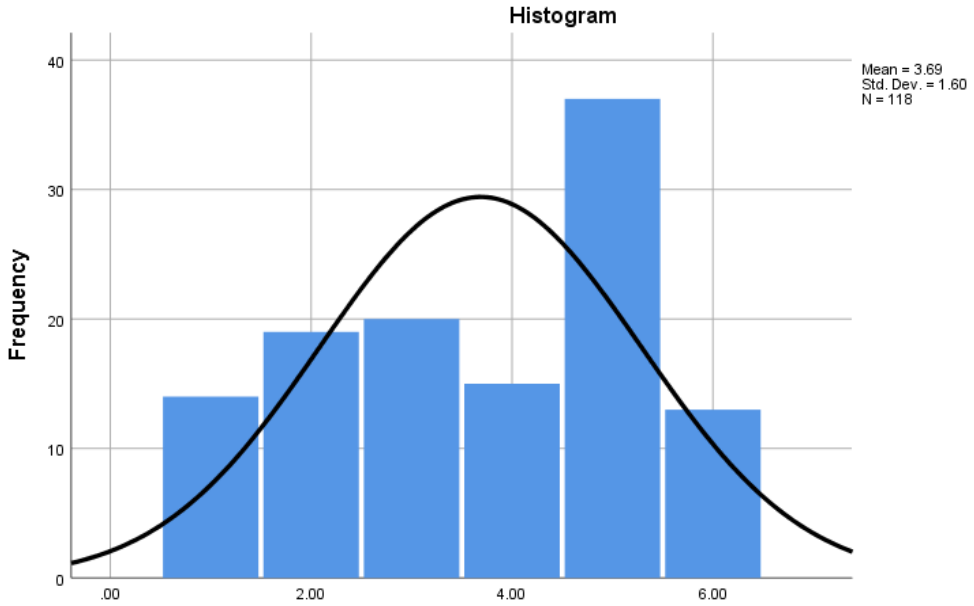
Diagnosis	Frequency (n)	Percentage (%)
Duct ectasia	57	48.3
Breast cancer	21	17.8
Other benign conditions*	40	33.9

Table 3 shows the distribution of final diagnoses. Duct ectasia was the most frequent cause of nipple discharge, while breast cancer constituted a significant proportion requiring prompt diagnosis and management.

Table 4. Association of Clinical Variables with Breast Cancer in Patients with Nipple Discharge (n = 118)

Clinical Variable	Breast Cancer n (%)	Non-Malignant n (%)	p-value
Age ≥40 years	18 (85.7)	55 (56.7)	0.003
Bloody discharge	16 (76.2)	13 (13.4)	0.001
Palpable mass	18 (85.7)	15 (15.5)	<0.001
Unilateral discharge	19 (90.5)	55 (56.7)	0.02

Table 4 demonstrates statistically significant associations between breast cancer and key clinical features. Advanced age, bloody nipple discharge, unilateral presentation, and presence of a palpable mass were strong predictors of malignancy.



Discussion:

The current research paper aims to establish the prevalence of duct ectasia and breast cancer in women with nipple discharge at a tertiary care hospital in Quetta. Our results indicated that 31.4% of the people had duct ectasia, and an additional 21.2% had breast cancer. These findings are consistent with evidence in the world and region that indicates that one of the most common benign causes of nipple pathological discharge is duct ectasia, especially in women around the menopause stage (4). Pakistan and other South Asian studies have also found that duct ectasia is a predominant benign etiology with a prevalence between 25 and 35 %, which confirms the similarity of our results in a similar population [15]. Breast cancer, on the other hand, was observed in a substantial proportion of cases in our study, which was more than a fifth of the participants. This percentage seems larger than previous Pakistani research, which has given a range of 10% to 15% but is similar to new hospital-based series in India and Bangladesh, where the rates are recorded between 18-22% [16]. The fact that we have a relatively higher rate could be attributable to regional variation, late presentation, or low access to early diagnostic services in underserved regions like Quetta. The education level distribution when it came to characteristics did not reveal any association that was significant in the incidence of duct ectasia or breast cancer. This differs from some studies in urban Pakistan and India, which found greater educational attainment on the part of the mother to increase healthcare-seeking behavior, which, in turn, increased breast lesion detection [17]. The lack of such an association in our context might be explained by the fact that, due to the general homogeneity of the population and the effect of cultural obstacles limiting the opportunity to consult a doctor promptly, regardless of the educational level, this result is possible [18].There was also no significant relationship between socioeconomic status and either of the conditions. Whereas the literature in metropolitan areas of South Asia has tended to focus on the explanatory power of socioeconomic inequalities in health, especially in the prognosis of breast cancer, our data indicate that socioeconomic position is not a determining factor in the prevalence of duct ectasia or malignancy in Quetta [19]. This would be attributed to the fact that the majority of women in this cohort used a public sector tertiary hospital to receive care, thus limiting the disparity in healthcare delivery among the socioeconomic groups. It was observed that the prevalence of duct ectasia and breast cancer was more common in urban dwellers

than the rural participants. The high correlation between place of residence and disease incidence is substantiated by the preceding research findings of Karachi and Lahore, which have shown more breast pathology among urban women [20]. Some of the factors could be environmental exposures, changes in lifestyles, like delayed birth of a child and shortened breastfeeding, in which urban cities had greater rates of detection. In rural communities, on the other hand, underdiagnosis is possible because of limited access to specialized treatment [21].Duct ectasia because age distribution showed that it was more prevalent in women aged 36-60 years, in line with the international literature that perimenopausal and postmenopausal women were the most susceptible to duct ectasia. On the same note, older age groups were more likely to have breast cancer, and this is very well-established by South Asian and global research in which age is known to be one of the greatest determinants of the occurrence of malignancy. Interestingly, the youngest age group (25-35 years) has no instances of breast cancer, and this is in line with epidemiological trends that indicate that breast cancer in very young women is on the increase, although it is still relatively uncommon in South Asia [22] .Lastly, there were no significant differences in the mean duration of the nipple discharge in patients who had duct ectasia and those with breast cancer. This observation is contrary to other international reports, whereby the longer the period of discharge, the greater the risk of malignancy. But, in our context, the fact that the average length of symptoms in both groups was short implies that women might have attended to a physician soon after the symptoms manifested, perhaps because of increased awareness of the risk of breast cancer among the people.

Limitations:

This study was conducted at a single tertiary care center with a relatively small sample size, which may limit generalizability. The cross-sectional design precludes causal inference. Advanced imaging and autoscopy were not routinely available, and some benign diagnoses relied on imaging and cytology rather than uniform histopathological confirmation.

Conclusion:

This study gives useful details on the different causes of nipple discharge among women in Quetta, where duct ectasia was the most common benign condition, and breast cancer is a crucial underlying etiology. The findings underscore the importance of considering nipple discharge as a medical issue in all women, regardless of their place of residence or age, to detect the condition at the earliest stage to treat and control it.

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Authors Contributions

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Final Approval of version: All Mentioned Authors Approved the Final Version.

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