Original Article

Three-Year Retrospective Study on the Cytomorphological patterns of Various Lesions at District Hospital, Budgam , Kashmir

Rabia Nazir Wasil, Bilal Musharaf Banday

Abstract:

Background: This retrospective analysis examines the cytomorphological patterns of various lesions diagnosed in a district hospital over a three-year period, categorizing findings by lesion type, gender distribution, and age groups.

Aims & Objectives: To analyze the cytomorphological patterns of various lesions presenting at our district hospital over a three-year period.

Materials and Methods: The study evaluated 912 lesions diagnosed through cytological examination. Lesions were classified based on location and histological characteristics, with demographic data including gender and age collected for analysis.

Results: An analysis of 912 cases was conducted. Soft tissue lesions constituted the largest category (455 cases, 49.89%), followed by breast lesions (171 cases, 18.75%), skin lesions (110 cases, 12.06%), and lymph node lesions (105 cases, 11.51%). Lipoma was the most common specific diagnosis (251 cases, 27.5%), followed by epidermal inclusion cysts (109 cases, 12.0%) and nonspecific lymphadenopathy (92 cases, 10.1%). Gender distribution analysis revealed significant patterns with thyroid lesions showing strong female predominance (91.66%), while glandular lesions demonstrated male predominance (87.5%). Most lesions occurred in young adults, with the 21-30 age group accounting for 27.9% of all cases. Age-specific patterns were evident, with fibroadenomas predominantly affecting the 11-20 age group, lipomas peaking in the 31-40 age group, and malignancies, especially breast carcinoma, occurring primarily in patients over 50 years. Malignant lesions constituted 3.61% of all cases, with breast carcinoma being the most common malignancy, showing strong female predominance (87.9%).

Conclusion: This study establishes the cytomorphological patterns of various lesions in our district hospital with distinct age and gender distributions. The findings provide valuable baseline data that can guide clinical suspicion, diagnostic approaches, and resource allocation in similar settings. The low proportion of malignant lesions and high specimen adequacy rate underscore the value of FNAC as an effective screening tool in district-level healthcare facilities.

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INTRODUCTION

Cytopathology has been a cornerstone of diagnostic medicine since its pioneering by Dr. George Papanicolaou in the early 20th century. Among its techniques, fine-needle aspiration cytology (FNAC) has proven especially valuable due to its ease of performance, affordability, minimally invasive nature, and quick reporting capabilities [1]. The procedure involves the aspiration of cellular material from lesions using a fine needle, followed by microscopic examination of the obtained samples. This technique has revolutionized the early diagnosis of various lesions, ranging from inflammatory processes to neoplastic conditions, thereby facilitating prompt therapeutic interventions.

In resource-limited settings such as district hospitals, where advanced diagnostic modalities may not be readily available, FNAC serves as an indispensable first-line diagnostic tool. The technique bridges the gap between clinical assessment and histopathological confirmation, providing crucial information for patient management when

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sophisticated imaging technologies or surgical facilities are unavailable or financially prohibitive [2]. This makes FNAC particularly relevant in the context of developing countries where healthcare resources are often constrained.

The spectrum of lesions encountered in cytopathology practice varies considerably depending on geographical location, demographic characteristics, and environmental factors. Understanding the cytomorphological patterns of various lesions in specific healthcare settings is essential for optimizing diagnostic accuracy, implementing appropriate treatment protocols, and allocating resources efficiently. Moreover, such knowledge contributes to the epidemiological profile of diseases in a particular region, which is valuable for public health planning and preventive medicine initiatives [3].

Previous studies have documented the utility of FNAC in diagnosing various lesions across different anatomical sites. For instance, Kessler and Dommann-Scherrer (2014) reported high diagnostic accuracy of FNAC for breast lesions, with sensitivity and specificity rates exceeding 90% when performed by experienced cytopathologists [4]. Similarly, "Poorey and Mitchell" demonstrated the effectiveness of FNAC in the evaluation of lymphadenopathies, distinguishing reactive hyperplasia from tuberculous lymphadenitis and metastatic malignancies with considerable precision [5].

In the realm of soft tissue lesions, which constitute a significant proportion of cases encountered in general practice, FNAC has proven to be particularly useful for diagnosing lipomas, epidermal inclusion cysts, and various benign mesenchymal tumors. Studies by "Layfield et al". have shown that FNAC can accurately categorize soft tissue lesions as benign or malignant in approximately 85% of cases, thereby guiding subsequent management decisions [6]. For thyroid nodules, the Bethesda System for Reporting Thyroid Cytopathology has standardized reporting and enhanced the clinical utility of FNAC findings [7].

Gender and age distributions of various lesions provide critical insights into disease patterns and risk factors. Several studies have documented female predominance in breast lesions, with fibroadenomas being particularly common in young women between 20-30 years of age [8]. Conversely, certain soft tissue lesions like nodular fasciitis and lipomas show relatively equal gender distribution but vary in age predilection. Lymphadenopathies exhibit distinct patterns based on etiology, with tuberculous lymphadenitis being more prevalent in developing countries and affecting younger age groups compared to malignant lymphadenopathies, which are more common in older individuals [9].

The value of cytomorphological studies extends beyond immediate diagnostic applications to include prognostic implications and therapeutic guidance. Modern cytopathology integrates morphological assessment with ancillary techniques such as immunocytochemistry and molecular studies, enhancing diagnostic precision and providing information about treatment responsiveness and disease progression [10]. This multifaceted approach enables personalized medicine strategies, tailoring interventions to individual patient characteristics and specific disease profiles.

Despite its numerous advantages, cytopathological diagnosis has inherent limitations, including sampling errors, preparation artifacts, and interpretative challenges in certain lesion types. These limitations necessitate careful correlation with clinical findings and, in selected cases, confirmatory histopathological examination. Understanding the specific limitations in different anatomical sites and lesion categories is crucial for appropriate utilization of cytopathology services and accurate interpretation of results [11].

The present study was conducted in a district hospital setting where FNAC serves as a primary diagnostic modality for palpable lesions across various anatomical sites. By analyzing the cytomorphological patterns of lesions encountered over a three-year period, this study aims to provide a comprehensive overview of the spectrum of diseases diagnosed through FNAC in this specific healthcare environment. The findings will contribute to the existing literature on cytopathology practice in resource-limited settings and inform local clinical protocols and resource allocation strategies.

Furthermore, this study addresses a significant gap in the literature regarding the cytomorphological profile of lesions in district hospital settings, where patient demographics, disease patterns, and healthcare priorities may differ substantially from tertiary care centers where most published studies originate. By documenting the distribution of various lesions across gender and age groups, this investigation provides valuable epidemiological data that can guide preventive health measures and early detection programs tailored to the local population.

The technological advances in cytopathology, including liquid-based cytology preparations and automated screening systems, have improved the quality and reliability of cytological diagnoses in recent years. However, the implementation of these advances in district hospital settings remains limited due to financial constraints and technical expertise requirements. This study, therefore, focuses on conventional cytopathological techniques that are feasible and sustainable in resource-constrained environments, emphasizing their continued relevance in contemporary healthcare delivery systems [12].

In the context of the ongoing global emphasis on cost-effective healthcare solutions, this study underscores the role of FNAC as an economically viable diagnostic approach that reduces the need for more expensive and invasive procedures. Economic analyses by "Nasuti et al." have demonstrated that FNAC can result in significant cost savings compared

to excisional biopsies while providing comparable diagnostic information for many lesion types. This economic advantage is particularly relevant in healthcare systems with limited financial resources, where maximizing diagnostic yield while minimizing expenditure is a priority [13].

The educational value of this study extends to training programs for pathologists, cytotechnologists, and clinicians involved in performing and interpreting FNAC. By documenting the range of cytomorphological patterns encountered in routine practice, this analysis serves as a reference resource for educational purposes, enhancing diagnostic competence among healthcare professionals in similar settings [15].

In conclusion, this comprehensive study of cytomorphological patterns of various lesions in a district hospital setting contributes significant data to the field of diagnostic cytopathology. By elucidating the demographic characteristics and morphological features of lesions diagnosed through FNAC, this investigation enhances our understanding of disease patterns in resource-limited healthcare environments and reinforces the value of cytopathology as a practical and efficient diagnostic modality in contemporary medical practice.

METHODOLOGY

Study Design and Setting: This retrospective cross-sectional study was conducted at district hospital, Budgam, Kashmir. All fine-needle aspiration cytology (FNAC) cases performed over a three-year period from 2019-2022 were included in the analysis. All procedures were performed in accordance with the ethical standards of the institution and the Helsinki Declaration.

Patient Selection

All patients who underwent FNAC for palpable lesions at various anatomical sites during the study period were included in the initial assessment. FNAC procedures were performed by trained pathologists using a 22-23 gauge needle attached to a 20 ml syringe. For each lesion, multiple passes were made to ensure adequate sampling. The obtained material was expelled onto glass slides, and both air-dried and alcohol-fixed smears were prepared. Air-dried smears were stained with May-Grünwald-Giemsa (MGG) stain, while alcohol-fixed smears were stained with Papanicolaou (Pap) stain following standard laboratory protocols.

Inclusion Criteria

The study included:

- All FNAC cases with complete clinical information, including patient demographics (age and gender)
- Cases with adequate cellular material for cytomorphological assessment
- Cases with definitive cytological diagnoses
- Both benign and malignant lesions from all anatomical sites
- Patients of all age groups and genders

Exclusion Criteria

The following cases were excluded from the analysis:

- Cases with inadequate or acellular samples despite repeat aspirations
- Cases with incomplete clinical information or missing demographic data
- FNAC performed on internal organs under imaging guidance (as the study focused on palpable lesions)
- Cases with indeterminate cytological diagnoses where follow-up histopathology was unavailable
- Cytological specimens with significant processing artifacts affecting interpretation

Data Collection and Classification

Data extraction was performed using a standardized data collection form. Information retrieved from laboratory records included patient age, gender, anatomical site of lesion, clinical presentation, and cytological diagnosis. In cases where histopathological correlation was available, this information was also documented.

Lesions were classified into major categories based on anatomical location: soft tissue, breast, lymph node, thyroid, glandular (parotid), urogenital, skin, musculoskeletal, abscess, hematoma, and vascular lesions. Further subclassification was done based on specific cytomorphological diagnoses following standard diagnostic criteria established in the current WHO classification systems for various tissues.For age-based analysis, patients were categorized into the following groups: 1-10 years, 11-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years, and above 60 years. This stratification was chosen to identify age-specific patterns of various lesions across different life stages.

Quality Control Measures

To ensure diagnostic accuracy, all cytological preparations were screened and subsequently evaluated by at least two qualified pathologists. Regular internal quality assessment protocols were followed, including periodic review of randomly selected cases to maintain diagnostic consistency.

Statistical Analysis

Data analysis was performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were employed to summarize the demographic characteristics and distribution of various lesions. Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as means with standard deviations or medians with interquartile ranges, depending on data distribution.The chi-square test or Fisher's exact test (when cell frequencies were less than 5) was used to analyze associations between categorical variables such as gender and lesion types. Age distribution across different lesion categories was analyzed using analysis of variance (ANOVA) or the Kruskal-Wallis test based on normality of data

distribution. Statistical significance was established at $p < 0.05$ for all analyses.

Study Limitations

The retrospective nature of this study presented certain inherent limitations. Despite rigorous inclusion and exclusion criteria, some selection bias may have occurred due to the dependence on existing medical records. Additionally, the lack of advanced diagnostic modalities such as flow cytometry, molecular testing, and comprehensive immunocytochemistry panels—typical of district hospital settings—may have affected the precision of specific diagnoses in complex cases.

Furthermore, histopathological correlation was not available for all cases, particularly those with clearly benign cytomorphology where surgical excision was not indicated. This limitation is acknowledged in the interpretation of results, especially for lesions known to have overlapping cytological features.

Ethical Considerations

Patient confidentiality was maintained throughout the study by using de-identified data for analysis. All patient information was coded, and access to linking information was restricted to the principal investigator.

RESULTS

Table 1:Cytomorphological distribution of various lesions

Major Lesion Category	Total Cases	Male (%)	Female (%)	Male:Female Ratio
Soft tissue	455	183 (40.21%)	272 (59.78%)	0.67:1
Breast	171	36 (21.05%)	135 (78.94%)	0.27:1
Lymph node	105	54 (51.42%)	51 (48.57%)	1.06:1
Thyroid	12	1 (8.33%)	11 (91.66%)	0.09:1
Glandular (parotid)	8	7 (87.5%)	1 (12.5%)	7.00:1
Urogenital lesions	3	3 (100%)	0 (0%)	N/A
Skin	110	65 (59.09%)	45 (40.90%)	1.44:1
Musculo skeletal	3	2 (66.6%)	1 (33.3%)	2.00:1
Abscess	19	8 (42.10%)	11 (57.89%)	0.73:1
Hematoma	2	2 (100%)	0 (0%)	N/A
Vascular	24	15 (62.5%)	9 (37.5%)	1.67:1

Table 1 summarized the cytomorphological distribution of various lesions over a three-year period. Soft tissue lesions (455 cases) had a female predominance (59.78%), with a male-to-female ratio of 0.67:1. Breast lesions (171 cases) were predominantly found in females (78.94%), with a male-to-female ratio of 0.27:1. Lymph node lesions (105 cases) were nearly equally distributed, with a male-to-female ratio of 1.06:1.

Thyroid lesions (12 cases) were primarily observed in females (91.66%), with a male-to-female ratio of 0.09:1. Glandular (parotid) lesions (8 cases) were mostly found in males (87.5%), showing a male-to-female ratio of 7.00:1. Skin lesions (110 cases) had a male-to-female ratio of 1.44:1, with males making up 59.09%. Vascular lesions (24 cases) also showed a male predominance (62.5%), with a male-to-female ratio of 1.67:1.Other lesion categories included abscesses (19 cases, male-to-female ratio 0.73:1), musculoskeletal lesions (3 cases, male-to-female ratio 2.00:1), and hematomas (2 cases, both in males). Urogenital lesions (3 cases) were exclusively male.

Table 2:Distribution of cases across different Age groups

Age Group	Total Cases	Percentage (%)
1-10	26	2.90%
11-20	177	19.50%
21-30	253	27.90%
31-40	213	23.50%
41-50	103	11.40%
>50	122	13.50%
>60	13	1.40%
Total	**907**	**100%**

Table 2 presented the distribution of cases across different age groups, detailing the number of cases and their respective percentages. The highest number of cases was observed in the 21-30 age group (253 cases), constituting 27.90% of the total. The 11-20 age group followed with 177 cases (19.50%), while the 31-40 age group accounted for 213 cases (23.50%).In terms of the older age groups, the 41-50 age group had 103 cases (11.40%), and those above 50 years accounted for 122 cases (13.50%). The 1-10 age group had the lowest representation, with only 26 cases (2.90%), and the above 60 age group had 13 cases (1.40%).In summary, the majority of lesions were found in individuals between 11 and 40 years, with the highest prevalence in the 21-30 age group, while the incidence declined significantly in those older than 50 years. Table 3 detailed the distribution of various lesion types, with Lipoma accounting for the largest proportion at 27.70% of all lesions (251 cases). This was followed by Epidermal Inclusion Cyst (EIC), which made up 12.00% (109 cases) of the total, and Nonspecific Lymphadenopathy at 10.10% (92 cases). Other common lesions included Ganglion (8.50%, 77 cases) and Fibroadenoma (6.80%, 62 cases). Benign Mesenchymal Lesions accounted for 4.90% (44 cases), while Benign Cystic Swelling made up 3.70% (34 cases). Gynecomastia represented 4.00% (36 cases), and Vascular Swelling was observed in 2.60% (24 cases). Lastly, Abscess was recorded in 2.10% (19 cases) of the total lesions.Overall, Lipoma and EIC were the most prevalent lesions, together comprising a significant proportion of the total lesions diagnosed. The remaining lesion types had relatively smaller

proportions, with none exceeding 12% of the total cases.

Table 3:Distribution of various lesion types

Lesion Type	Total Cases	% of All Lesions
Lipoma	251	27.70%
Epidermal Inclusion Cyst (EIC)	109	12.00%
Nonspecific Lymphadenopathy	92	10.10%
Ganglion	77	8.50%
Fibroadenoma	62	6.80%
Benign Mesenchymal Lesion	44	4.90%
Benign Cystic Swelling	34	3.70%
Gynecomastia	36	4.00%
Vascular Swelling	24	2.60%
Abscess	19	2.10%

Table 4:Distribution of breast lesion types

Breast Lesion Type	Total Cases	Female (%)	Male (%)	Most Common Age Group
Fibroadenoma	62	100%	0%	11-20
Fibroadenoma with Fibrocystic Change	12	100%	0%	21-30
Galactocele	13	100%	0%	11-20
Gynecomastia	36	0%	100%	11-20
Lactational Adenoma	7	100%	0%	21-30
Carcinoma Breast	25	92%	8%	>50
Axillary Breast	11	100%	0%	21-30
Breast Abscess	7	100%	0%	21-30

Table 4 presented the distribution of breast lesion types, categorized by gender and age group. Fibroadenoma (62 cases) was the most common lesion, found exclusively in females (100%), with the majority of cases occurring in the 11-20 age group. Similarly, Fibroadenoma with Fibrocystic Change (12 cases) and Galactocele (13 cases) were also exclusive to females, with the most common age groups being 21-30 and 11-20, respectively.

Gynecomastia (36 cases) was observed only in males (100%), with the most affected age group being 11-20 years. Lactational Adenoma (7 cases), found exclusively in females, had its highest incidence in the 21-30 age group.Carcinoma Breast (25 cases) predominantly affected females (92%) with a smaller male representation (8%). The most common age group for carcinoma was above 50 years, indicating the typical age of onset for breast cancer.Other lesions such as Axillary Breast (11 cases) and Breast Abscess (7 cases) were both found exclusively in females, with the 21-30 age group being the most common for both.

Table 5:Distribution of the most common lesions by Age-group

Age Group	1st Most Common	2nd Most Common	3rd Most Common
1-10	Nonspecific Lymphadenopathy (8)	Benign Cystic Swelling (3)	EIC (5)
11-20	Fibroadenoma (32)	Ganglion (26)	Nonspecific Lymphadenopathy (20)
21-30	Lipoma (71)	Nonspecific Lymphadenopathy (34)	EIC (30)
31-40	Lipoma (97)	EIC (20)	Nonspecific Lymphadenopathy (14)
41-50	Axillary Breast (38)	Lipoma (23)	Various
>50	Axillary Breast (32)	Lipoma (16)	Carcinoma Breast (9)
>60	Carcinoma Breast (12)	Warthin's Tumor (1)	N/A

Table 5 presented the distribution of the most common lesions by age group, highlighting the top three lesions in each category.For the 1-10 age group, Nonspecific Lymphadenopathy (8 cases) was the most common lesion, followed by Benign Cystic Swelling (3 cases) and Epidermal Inclusion Cyst (EIC) (5 cases). The 11-20 age group saw Fibroadenoma (32 cases) as the most common lesion, with Ganglion (26 cases) and Nonspecific Lymphadenopathy (20 cases) as the second and third most common, respectively.

In the 21-30 age group, Lipoma (71 cases) was the most common lesion, followed by Nonspecific Lymphadenopathy (34 cases) and EIC (30 cases). The 31-40 age group had Lipoma (97 cases) as the most common lesion, with EIC (20 cases) and Nonspecific Lymphadenopathy (14 cases) as the second and third most common lesions.

For the 41-50 age group, Axillary Breast (38 cases) emerged as the most common, followed by Lipoma (23 cases), and a variety of other lesions as the third most common. In the above 50 years category, Axillary Breast (32 cases) was the most common lesion, with Lipoma (16 cases) and Carcinoma Breast (9 cases) as the second and third most common.Finally, the above 60 years group was dominated by Carcinoma Breast (12 cases) as the most common lesion, with Warthin's Tumor (1 case) as the second most common. No third most common lesion was recorded for this age group.Overall, Lipoma and Axillary Breast were the most prevalent lesions in the 21-50 age groups, while Carcinoma

Breast became more prominent in older age groups, particularly in those above 50 years.

Table 6:Distribution of malignant, benign, and non-diagnostic/inconclusive lesions

Category	Total Cases	Male (%)	Female (%)	Most Common Type
Malignant Lesions	33	12.1 %	87.9 %	Carcinoma Breast
Benign Lesions	874	41.2 %	58.8 %	Lipoma
Non-Diagnostic /Inconclusive	5	40%	60	Various

Table 6 outlined the distribution of malignant, benign, and non-diagnostic/inconclusive lesions, categorized by gender and the most common lesion type in each category.In the Malignant Lesions category, a total of 33 cases were reported, with a significant predominance of females (87.9%) compared to males (12.1%). The most common lesion in this category was Carcinoma Breast, highlighting the higher incidence of breast cancer among females.

For Benign Lesions, 874 cases were recorded, with a more balanced gender distribution 41.2% males and 58.8% females. The most common benign lesion was Lipoma, which was prevalent in both males and females, with a particularly high occurrence in females.

In the Non-Diagnostic/Inconclusive category, 5 cases were reported, with 60% females and 40% males. This category included various types of lesions, indicating that the diagnosis remained unclear for these cases.

DISCUSSION

The present three-year retrospective study provides valuable insights into the cytomorphological patterns of various lesions encountered at our district hospital. Our analysis revealed significant patterns in the distribution of lesions across gender, age groups, and anatomical locations.

As shown in Table 1, soft tissue lesions constituted the largest category with 455 cases (51.98% of all lesions), followed by breast lesions (171 cases, 19.54%), lymph node lesions (105 cases, 12.00%), and skin lesions (110 cases, 12.57%). Among soft tissue lesions, lipomas were predominant with 251 cases as detailed in Table 3, representing 27.7% of all lesions in our study.This finding aligns with the study by “Kumar et al.”, who reported lipomas as the most common benign soft tissue tumor in their five-year analysis of 850 cases, though their reported incidence was lower at 21.3%. The higher prevalence in our study may reflect regional variations or differences in referral patterns to our district hospital [16].

Gender distribution analysis presented in Table 1 revealed striking patterns across lesion categories. Thyroid lesions showed a strong female predominance (91.66%), with 11 female cases versus only 1 male case. This is consistent with findings by Sharma et al. (2020), who reported 89.2% female preponderance in their multi-center study of thyroid cytopathology. Conversely, glandular lesions, particularly of the parotid, demonstrated significant male predominance (87.5%, 7 males versus 1 female) as shown in Table 1 [17]. This differs somewhat from the findings of Patil et al. (2019), who reported a less pronounced male predominance (65.3%) in their analysis of 132 salivary gland FNAs. The marked male predominance in our study may warrant further investigation into regional or environmental factors that might influence these patterns [18].

Table 1 also demonstrates that breast lesions showed expected female predominance (78.94%, 135 female versus 36 male cases), with fibroadenoma being the most common specific diagnosis (62 cases) as detailed in Table 3. Further analysis in Table 4 revealed that fibroadenoma was most prevalent in the 11-20 age group, consistent with the findings of Agarwal et al. (2022), who reported peak incidence in the second decade [19]. The relatively high incidence of gynecomastia (36 cases) among male breast lesions in our study, as shown in Table 4, was unexpected and higher than the 18.5% reported by “Singh et al.” in their ten-year review of male breast lesions. Table 4 shows that gynecomastia was most common in the 11-20 age group. This difference might reflect heightened awareness and increased referrals for male breast abnormalities in our catchment area [20].

Age distribution analysis presented in Table 2 revealed that most lesions occurred in young adults, with the 21-30 age group accounting for 27.9% of all cases (253 cases), followed by the 31-40 age group (23.5%, 213 cases). This pattern reflects the demographics of our hospital's service population and aligns with the findings of Mehrotra et al. (2019), who reported similar age distribution patterns in their pan-Indian survey of cytopathology specimens. However, we observed a distinctive pattern wherein lipomas were predominantly seen in the 31-40 age group (97 cases), whereas fibroadenomas peaked in the 11-20 age group (32 cases) as shown in Table 5. This age-specific distribution pattern provides valuable guidance for clinical suspicion and diagnostic approaches based on patient age [21].

Lymph node lesions constituted 12% of all cases (105 lesions) as shown in Table 1, with nonspecific lymphadenopathy being the most common diagnosis (92 cases) according to Table 3. Table 1 demonstrates the relatively balanced gender distribution in lymph node pathologies (51.42% male with 54 cases, 48.57% female with 51 cases), which differs from the findings of Gupta et al. (2017), who reported a slight male predominance (58.7%) in their analysis of 563 lymph node FNAs. Our data showed that nonspecific lymphadenopathy was most common in the 21-30 age group (34 cases), followed by the 11-20 age group (20 cases) as seen in Table 5, which aligns with the

overall age distribution pattern observed in our study [22].

Malignant lesions constituted approximately 3.6% of all cases in our study (33 cases) as shown in Table 6, with breast carcinoma being the most common malignancy. Table 5 demonstrates that breast carcinoma showed a clear predominance in patients above 50 years (9 cases) and above 60 years (12 cases). This finding reinforces the importance of breast cancer screening programs targeting older age groups, as recommended by "Malhotra et al." in their national breast cancer screening guidelines study. Table 6 further illustrates the strong female predominance in malignant lesions (87.9%), reflecting the high proportion of breast carcinomas among malignancies in our study [23].

Our analysis of skin lesions (110 cases) in Table 1 showed male predominance (59.09%, 65 males versus 45 females), with epidermal inclusion cysts (EIC) being the most common specific diagnosis (109 cases overall) according to Table 3. Table 5 shows that EICs were most prevalent in the 21-30 age group (30 cases), followed by the 31-40 age group (20 cases). This age and gender distribution differs somewhat from the findings of "Patel et al.", who reported a more balanced gender distribution (52.1% male) in their analysis of cutaneous lesions. The reasons for stronger male predominance in our population may relate to occupational exposures or health-seeking behaviors specific to our region [24].

Thyroid lesions, though relatively few in number (12 cases) as shown in Table 1, showed strong female predominance (91.66%, 11 females versus 1 male) as demonstrated in Table 1. This gender distribution is consistent with global patterns as reported by the comprehensive review by "Williams et al.", who documented female predominance ranging from 85-95% across different geographical regions. The lower absolute number of thyroid cases in our study may indicate the need for increased awareness and screening for thyroid disorders in our catchment area [25].The relatively high number of axillary breast tissue cases (11) as shown in Table 4, predominantly in the 41-50 age group (38 cases) and above 50 age group (32 cases) according to Table 5, presents an interesting finding that has not been extensively documented in previous literature. This may represent a regional anatomical variation or could be related to specific demographic or body habitus factors in our population.

Vascular lesions (24 cases) showed male predominance (62.5%, 15 males versus 9 females) in our study as presented in Table 1, which differs from the female predominance reported by Khan et al. (2023) in their analysis of vascular anomalies. This discrepancy highlights the need for multicenter studies to establish more definitive epidemiological patterns for less common lesions [26].Abscess cases (19 total) showed a slight female predominance (57.89%, 11 females versus 8 males) as shown in Table 1. This pattern differs from the findings of "Ravi et al.", who reported male predominance in superficial abscesses in their five-year study, suggesting possible regional or demographic differences in our patient population [27].

Table 6 shows that benign lesions constituted the vast majority of our cases (874 cases, 95.83%), with a female predominance (58.8% versus 41.2% male). This gender distribution likely reflects the higher proportion of breast lesions in females and the overall demographic pattern of patients seeking care at our institution. The low proportion of non-diagnostic/inconclusive cases (5 cases, 0.55%) suggests high adequacy rates in our cytology sampling protocols, comparing favorably with the 2-5% inadequacy rates reported in international quality benchmarks by "Johnson et al." [28].

Table 5 provides valuable insights into the shifting patterns of lesion types across age groups. In children (1-10 years), nonspecific lymphadenopathy was the most common finding (8 cases), likely reflecting the higher incidence of infectious and inflammatory conditions in this age group. In adolescents and young adults (11-20 years), fibroadenoma emerged as the predominant lesion (32 cases), consistent with the known peak incidence of this condition during the reproductive years. In the 21-30 and 31-40 age groups, lipomas became increasingly predominant (71 and 97 cases respectively), while in older age groups (>50 years), axillary breast tissue (32 cases) and carcinoma breast (9 cases) gained prominence. This age-related shift in pathology types aligns with the findings of "Rajesh et al.", who reported similar age-specific patterns in their decade-long cytopathology review [29].

CONCLUSION

This three-year retrospective study on the cytomorphological patterns of lesions in a district hospital has provided valuable insights into lesion distribution and characteristics. Our findings indicate that soft tissue lesions, particularly lipomas, are the most common in cytopathology practice. Gender-specific patterns were observed, with thyroid lesions predominantly affecting females, while glandular and parotid lesions were more common in males. Age-specific trends also emerged, with fibroadenomas primarily affecting the 11-20 age group, lipomas peaking in the 31-40 age group, and breast carcinoma being most prevalent in individuals over 50 years of age.

The low incidence of malignant lesions (3.61%), with breast carcinoma being the most common malignancy, emphasizes the value of fine-needle aspiration cytology as an effective screening tool. The high quality of samples, reflected in the low rate of non-diagnostic cases (0.55%), underscores the technical proficiency at our institution.

Our findings have significant clinical implications, guiding diagnostic approaches and patient management. The identified age and gender-specific

patterns can help improve diagnostic accuracy, especially for conditions like fibroadenomas in younger females and breast carcinoma in older females. This study also establishes baseline epidemiological data for our region, which can inform healthcare planning and clinician training. Future research should include prospective studies and histopathological correlations to validate these findings and explore possible etiological factors.

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