



## General Surgery

## A DEMOGRAPHIC STUDY OF NECK SWELLINGS IN NORTHERN INDIA AND THEIR CLINICAL PROFILE.

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**ABSTRACT** **Introduction:** Neck swellings present a challenging aspect in the diagnosis and treatment of both local and systemic diseases. The intricate anatomy of the neck, with its multiple vital structures, and the wide spectrum of potential diseases contribute to this complexity. Additionally, the distribution patterns of these swellings can vary based on geography, sex, and age, further complicating the diagnostic process. The aim of the present study is to examine the demographic distribution and clinical profile of neck swellings in Northern India. **Material and Method:** This prospective study included 200 patients with complaints of neck swelling, who presented to the Department of General Surgery at Rajindra Hospital, Patiala, Punjab. A detailed history and clinical examination were conducted for each patient and documented in a structured proforma. Each patient underwent radiological investigations, initially sonography, with CT/MRI in certain cases. Fine Needle Aspiration Cytology (FNAC) was performed on all patients to aid in diagnosis. **Observation and Results:** Total of 200 patients were included in the study, out of which majority of patients were female (66.5%) and belonging to the age group 31-40 years. Lymph node swellings were the most common, comprises of 51.5% cases and tuberculosis was seen to be the most common cause. 5% patients were seen to have malignant swelling on FNAC. **Conclusion:** From our study we concluded that in Northern India, females who are in the 4th decade of life are more prone to develop a swelling in the neck region due to thyroid diseases. However, overall lymph nodes are the most commonly involved structure in patient with neck swellings. It is also concluded that socioeconomic status and oral/general hygiene plays an important role in the prevalence of neck swellings as seen in our study.

## KEYWORDS :

## INTRODUCTION

Neck swellings are frequently seen in surgical departments, particularly in developing countries like India. The most common causes of these swellings can differ based on regional factors, as well as variations in age and sex. The cause of neck swellings can vary from infections, congenital to neoplasm which can be benign or malignant. Overall, most swellings are commonly seen to arise from lymph nodes, thyroid, salivary glands but uncommon swellings are from thyroglossal cyst, brachial cyst, hygromas, carotid bodies etc. <sup>(1)</sup> In children, the most common cause of neck swellings is infections followed by congenital. <sup>(2)</sup> Malignant neck mass is very rare in children but 5% of all pediatric neoplasm occurs in the head and neck region. <sup>(3)</sup> In India, thyroid swellings comprises of 4-7% of all neck swelling cases and majority are females. In 5% of these cases, they are malignant. <sup>(4)</sup> Iodine deficiency disorder was once a leading cause of endemic goiter in India, with the highest prevalence reported in Maharashtra (11.9%) and West Bengal (9%). However, the widespread adoption of iodized salt through the Iodine Deficiency Control Programmes (IDCP) has greatly reduced the incidence of goiter caused by iodine deficiency. <sup>(5)</sup> While almost 90% of thyroid swelling are benign, approximately 10% patients with thyroid nodules are at risk of having thyroid cancer. <sup>(6,7)</sup>

While thyroid masses are more commonly observed in urban areas, individuals in rural regions of India, where oral and general hygiene is often poor and socioeconomic conditions are less favorable, are more susceptible to cervical lymphadenopathy. This is particularly due to tuberculosis, which has a high burden in India. <sup>(8)</sup> Secondary metastasis to lymph nodes are the most common cause of malignant lymph node swellings. <sup>(9)</sup> Generally, major salivary gland swellings are benign with parotid gland adenoma being the most common. There is a general rule that the larger the salivary gland, the lesser incidence of malignancy within the gland is seen. <sup>(10)</sup> Of the congenital neck swellings, cystic swellings are the most common, that includes thyroglossal cyst, brachial cyst, cystic hygroma. Thyroglossal cyst and brachial cyst are more commonly seen and occurs equally between female and male.

While thyroglossal cyst are located in midline, brachial cyst are more commonly seen in lateral neck. <sup>(11,12)</sup>

Neck swellings, arising from various underlying conditions, may present similarly, complicating the diagnostic process. While most patients present with isolated neck swellings, additional symptoms such as pain, fever, significant weight loss, and pressure effects like changes in voice, hoarseness, breathing difficulties, or dysphagia may also be present in some cases. Depending on the underlying cause, neck swellings can vary in characteristics: they may be soft, firm, or hard; tender or non-tender; trans-illuminant or pulsatile. Therefore, a thorough evaluation of the swelling's size, duration, location, consistency, associated skin changes, mobility, and any related systemic signs is crucial. Given that neck swellings can result from a range of causes—including local and systemic diseases, infections, neoplasms, and both acute and chronic conditions—persistent neck swellings in adults aged 40 years or older should be regarded as potentially malignant until proven otherwise. <sup>(2)</sup> Research on the diagnostic and management approach to neck swellings is essential for guiding clinicians in accurate diagnosis and effective treatment planning. This study aims to provide insights into the demographic patterns and clinical profiles of neck swellings in Northern India.

## MATERIAL AND METHOD

This prospective study was conducted from January 2023 to March 2024, involving 200 patients who presented with neck swelling to the Department of General Surgery at Rajindra Hospital, Patiala. Detailed history of the patients was taken, clinical assessment was done and each patient was subjected to sonography and FNAC. In selected cases, CT/MRI was also done. Inclusion criteria: Patient in any age-group with neck swellings. Exclusion criteria: Patient who has not given consent for study.

FNAC was done using 24 or 26-gauge needle and disposable syringe, smears were made and fixed using May-Grunwald Giemsa (MGG) stained, hematoxylin and eosin, and Papanicolaou stain.

### Statistical Analysis

Data collected were entered into a Microsoft Excel 365 Spreadsheet. All the statistical calculations were done using (Statistical Package for the Social Science) SPSS version 29 (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows. Data was described in terms of range; mean  $\pm$  standard deviation ( $\pm$ SD), median, frequencies (number of cases), and relative frequencies (percentages) as appropriate. A probability value (p-value) less than 0.05 was considered statistically significant.

### RESULTS

In a total of 200 patients, 133 (66.5%) were female and 67 (33.5%) were male. The male to female ratio was 1:1.99. The mean age observed was 32.93 years with a standard variation of  $\pm$ 13.03 years. Majority of the patients (70, 35%) were between 31 to 40 years old.

Pain and fever was seen in 41 (20.5%) and 40 (20%) cases respectively, other symptoms such as weightloss, pressure symptoms, discharging sinus, cosmesis were also seen in patients included in the study as shown in Table 1.

**Table 1: Other Symptoms Seen In Patients With Neck Swellings**

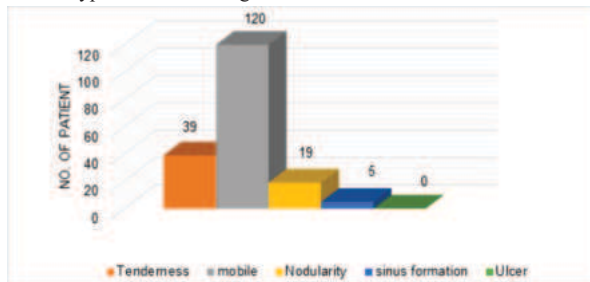
| complaints        | Number | Percentage |
|-------------------|--------|------------|
| Pain              | 41     | 20.5       |
| Fever             | 40     | 20.0       |
| Weight Loss       | 23     | 11.5       |
| Pressure symptoms | 5      | 2.5        |
| Discharge         | 7      | 3.5        |
| Cosmesis          | 32     | 16.0       |

On clinical examination, 156 (78%) patients had neck swellings which are firm in consistency while only 9(4.5%) patients had swellings that are fluctuant. The other various consistencies seen in our study is shown in Table 2

**Table 2: Consistencies Of Neck Swelling**

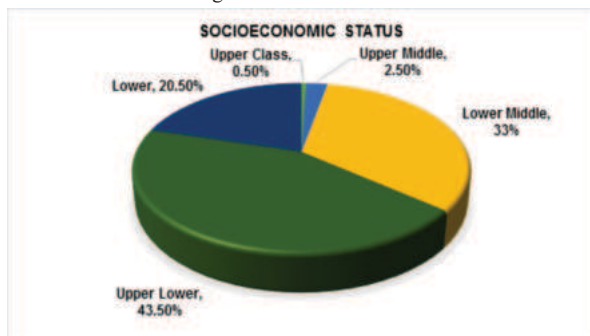
| Consistency | Number | Percentage |
|-------------|--------|------------|
| Cystic/soft | 19     | 9.5        |
| Firm        | 156    | 78.0       |
| Rubbery     | 56     | 28.0       |
| Fluctuant   | 9      | 4.5        |
| Hard        | 19     | 9.5        |

39 (19.5%) patients had tender swellings in the neck region, and skin changes was seen in 5 (2.5%) patients. Figure 1 demonstrates the various type of neck swellings seen base on clinical examinations.



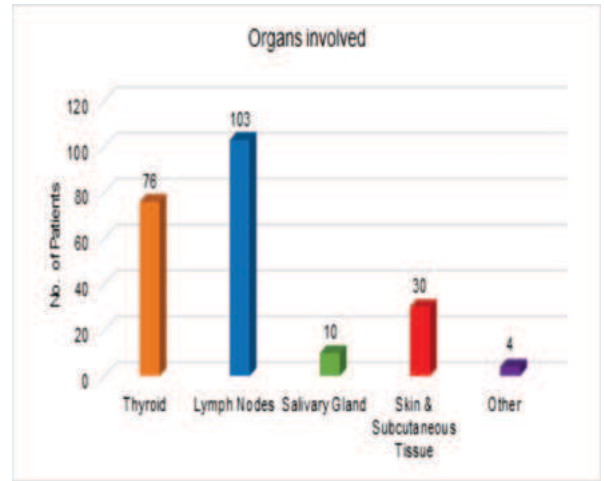
**Fig 1: Clinical Signs On Examination Of Neck Swellings**

Socioeconomic Status was observed as per the modified Kuppuswamy scale and we observed that 128 (64%) patients belong to the lower class. This is shown in Figure 2.



**Fig 2: Socioeconomic Status Of The Study Population**

After clinical and radiological assessment, we observed the distribution of patients with neck swellings according to the organ and tissue involved, as per Figure 3. Lymph node swellings were seen in 103 (51.5%), which was the most common type of neck swelling seen in our study. Thyroid swellings were seen in 76 (38%) cases, in which 72 (36%) were females and 4 (2%) were males.



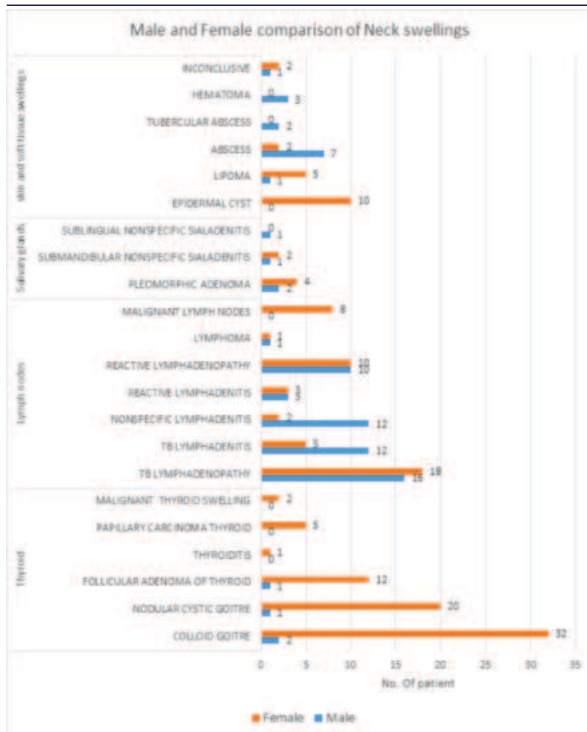
**Fig 3: Distribution Of Patients With Neck Swellings As Per Organ And Tissue Involved**

Out of 200 patients, 219 FNAC samples were taken as some patients had multiple swellings in the neck. In 3 (1.5%) patients, FNAC was inconclusive. Tuberculosis of the cervical lymph nodes was seen to be the most common cause of neck swellings in our study. It was seen in 51 (25.5%) cases. This was followed by colloid goiter which was seen in 34 (17%) cases.

Most of the neck swellings as seen in FNAC, were benign swellings with only 17 (7.8%) cytological samples shown to have malignant features. These samples were taken from 14 patients, so as a result, FNAC detected 14 (7%) patients from our study population, to be having some form of malignancy in the neck.

Out of 133(66.5%) female patients, most common neck swelling seen is of colloid goiter which was seen in 32(24%) female patients while nodular goiter and follicular adenoma were seen in 20(14.3%) and 12(9.0%) female patients, respectively. Thyroiditis was seen in 1(0.8%) female patient. While most of the thyroid swelling in female patient were benign, 7(5.26%) female patients had thyroid cancers, out of which papillary carcinoma was the most common thyroid cancer seen in 5(3.8%) female patients. Most common lymph node swellings in female was observed to be due to tuberculosis which was seen in 22(16.5%) female patients. Malignant nodal swelling was seen in 9(6.8%) female patients, out of which 8(6%) female patients were found to have metastatic lymph node swellings that were secondary from thyroid cancer and oral cancer. 1(0.8%) female patient had lymphoma. We observed that majority of the salivary gland swellings were seen in female which accounted for 6(4.5%) female patients, out of which Pleomorphic adenoma of the parotid gland was seen in 4(3%) female patients, and submandibular sialadenitis was seen in 2(1.5%) female patients. Cystic swelling was the most common skin and soft tissue swelling in female which accounted for 10(7.52%) cases. Lipoma was seen in 5(3.8%) female patients.

Tubercular lymphadenopathy was the most common cause of neck swellings seen in male patients which accounted for 16(23.9%) cases out of the total of 67(33.5%) male patients. 4(5.97%) male patients had thyroid swellings, in which colloid goiter was seen in 2(2.98%) patients while nodular goiter and follicular adenoma, were seen in 1(1.49%) patient each. Lymph nodes were the most commonly affected structure seen in the 67(33.5%) male patients, out of which lymphadenopathy/lymphadenitis due to tuberculosis was seen in 28(41.8%) male patients. Malignant lymph node swelling was seen in 1(1.5%) male patients. 4(5.97%) male patients had salivary gland swellings, out of which 2(2.98%) male patients had pleomorphic adenoma of the parotid gland while submandibular and sublingual sialadenitis was seen in 1(1.5%) male patient each. Frank abscess was seen in 9(13.4%) male patients, out of which 2(2.98%) male patients had tuberculosis along with abscess.



**Fig 4 : FNAC Diagnosis Of The Study Population In Male And Female Patients**

## DISCUSSION

This study was conducted in the department of Rajindra hospital, Patiala from January 2023 till March 2024 and 200 patients with single or multiple neck swellings were included in the study. Our study revealed a higher prevalence among females, with 133 (67.5%) female patients and 67 (33.5%) male patients and male to female ratio of 1:1.99. The majority of the patients were in their 40s, with a mean age of  $32.93 \pm 13.03$  years in our group. Comparable results were seen in studies done by Ali et al<sup>(13)</sup> and Gupta et al<sup>(1)</sup>. This demographic profile is different as compared to study done by Popat et al<sup>(14)</sup> in Gujarat who reported a slight male predominance over female.

In our study, prodromal symptoms like pain ( $n=41, 20.5\%$ ) and fever ( $n=40, 20\%$ ) were the commonest symptoms seen in patient with neck swellings. Pressure symptoms like hoarseness or change of voice, dysphagia, facial nerve palsy, breathing difficulty; were seen in only 5(2.5%). In a study done in Karnataka by Lokesh et al<sup>(15)</sup>, they reported that pressure symptoms were more commonly seen in patients with neck swellings.

In our study, 200 patients were assessed by the modified Kuppuswamy scale<sup>(14)</sup> for their socioeconomic status, in which 128(64%) patients belong to the poor or lower class i.e. upper lower ( $n=87, 43.5\%$ ) and lower ( $n=41, 20.5\%$ ). 71(35.5%) patients belong to the middle class i.e. upper middle ( $n=5, 2.5\%$ ) and lower middle ( $n=66, 33\%$ ), and only 1(0.5%) patient was in the upper or affluent class. This results is similar to results of Ali et al<sup>(13)</sup>. This results in both studies, can be due to the impact of poor socioeconomic status in the incidence of tuberculosis and other infectious disease.

Cervical lymphadenopathy (103 patients, 51.5%) was the most common swelling seen in our study followed by Thyroid swellings (76 patients, 38%). Comparable results were also seen in a studies done by Padia et al<sup>(10)</sup> in Gujarat and Khetrapal et al<sup>(16)</sup> in New Delhi. Among the female patients (133), colloid goiter (32 cases, 24.1%) was the most commonly seen swellings followed by nodular goiter (20 cases, 15%) while 7 cases of thyroid malignancy was diagnosed in females. Only 4 male patients had thyroid swellings. This results is similar to study done in Telangana by Sayanna et al<sup>(17)</sup>. This results can be due to the hormonal risk factors seen in female that predispose them to thyroid swellings. Tuberculosis was the most common neck swelling seen among the male patients in our study which is comparable to study done by Gupta et al<sup>(18)</sup> in Kashmir. However, 8(4%) female patients were seen to have nodal swellings due to secondary metastasis as compared to 2(1%) male patients who had Lymphoma. This was not

comparable to their study.

In our study, majority of the salivary gland swellings were seen among female patients and all of them were benign. Only 2(1%) male patients had salivary gland swelling due to sialadenitis, while 4(2%) female patients had Parotid gland adenoma and 2(1%) female patients had sialadenitis. This finding was not similar to study done by Modi et al<sup>(19)</sup> in Gujarat. This is due to the higher prevalence of tobacco consumption in Gujarat as compared to Punjab in which our study was conducted, which is reported by Agrawal et al<sup>(20)</sup>.

## CONCLUSION

From our study we concluded that in Northern India, females who are in the 4<sup>th</sup> decade of life are more prone to develop a swelling in the neck region due to thyroid diseases. However, overall lymph nodes are the most commonly involved structure in patient with neck swellings. It is also concluded that socioeconomic status and oral/general hygiene plays an important role in the prevalence of neck swellings as seen in our study.

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