

Original Article

ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN DIAGNOSIS OF PALPABLE HEAD AND NECK LESIONS: A HOSPITAL BASED STUDY

Sapna Yadav¹, Mandira Sharma², Meeta Pathak³, O.P. Gupta⁴, Shivesh Kumar⁵

¹Post Graduate Student, ²Professor & Head, ³Professor, Department of Pathology, ⁴Professor, Department of Surgery, ⁵Assistant Professor, Department of ENT, Career Institute of Medical Sciences and Hospital, Lucknow-226013, Uttar Pradesh, India

Corresponding Author

Mandira Sharma

Professor & Head, Department of Pathology, Career Institute of Medical Sciences and Hospital,

Lucknow-226013, Uttar Pradesh, India

Received: 2 July, 2023

Accepted: 17 July, 2023

ABSTRACT

Background: Palpable head and neck lesions (PHNL) comprise a common clinical entity and have a wide etiological profile that includes various non-neoplastic and neoplastic lesions of lymph node (LN), salivary gland, thyroid gland and soft tissue. In the last few decades, FNAC has emerged as a useful modality for evaluation of head and neck masses. Hence, the present study was planned with an aim to assess the role of FNAC in evaluation of palpable head and neck lesions. **Material and methods:** This study was conducted among 278 patients of all age groups presenting with palpable head and neck swelling. FNAC was performed using 10 ml disposable syringe with 23-25 gauge needle under all aseptic precautions. Smears were prepared, stained and observed under microscope. **Results:** In the present study, out of 278 patients presenting with palpable head and neck swelling, 134 (48.2%) patients were females and 144 (51.8%) were males. Maximum number of patients were aged between 31 and 40 years (24.8%) followed by those aged 21-30 years (21.2%). The findings of the study revealed lymph nodes and thyroid gland to be the most commonly involved sites with a dominance of inflammatory lesions. Reactive lymphadenitis was the most common inflammatory lesion, colloid goiter was the commonest benign diagnosis and metastatic SCC was the most common malignancy diagnosed. **Conclusion:** The findings of the present study showed that FNAC is simple, quick, inexpensive and minimally invasive first line investigation for diagnosis of palpable head and neck lesions. The findings confirmed the utility of FNAC as a preliminary screening tool that could facilitate the final diagnosis and management of the patients and helps in avoiding unnecessary surgical interventions.

Keywords : Fine needle aspiration; cytology; palpable; head and neck; lymph node.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

Palpable head and neck lesions (PHNL) comprise a common clinical entity and have a wide etiological profile that includes various non-neoplastic and neoplastic lesions of lymph node (LN), salivary gland, thyroid gland and soft tissue.¹ Swelling is the most common clinical problem occurring in the

region of head and neck.² Owing to superficial nature of these lesions they are recognized easily and can be diagnosed in early stage itself.³ Correct diagnosis of palpable head and neck lesions is quite essential in view of the high risk of underlying malignancy, however, diagnosing these lesions requires a systematic and skillful use of clinical, imaging,

cytological and histopathological (HP) evaluations owing to the fact that because of its complex anatomy and physiology, clinically manifested neck masses can have a spectrum of underlying etiologies that might have a variable pathology and prognosis.⁴ A delay in diagnosis of malignant lesions may directly affect the tumor stage and its unabated progression could result in a poor prognosis.^{5,6} FNAC has emerged as a useful modality for evaluation of head and neck masses.⁷ The role of FNAC becomes more important as it helps to reduce the undesired surgical burden.⁸ FNAC is an outpatient procedure that causes minimal pain, provides fast results and costs very little. FNAC can be done even in the debilitated patients.⁹ Therefore, the present study was planned with an aim to assess the role of FNAC in evaluation of palpable head and neck lesions.

MATERIALS & METHODS

The present non-randomized cross-sectional study was carried out among 278 patients with palpable head and neck swelling in the Department of Pathology in collaboration with Department of Ear, Nose and Throat (ENT) and Department of Surgery, at Career Institute of medical sciences and hospital, Lucknow from January 2021 to August 2022. Ethical permission was obtained from institutional ethical committee. Selection of patients were done by selecting consecutive cases fulfilling the inclusion criteria. Based on the following inclusion and exclusion criteria were enrolled for the study.

Inclusion Criteria comprised of all patients presenting with palpable head and neck swelling, patients of both the gender and patients in age group of one to seventy-five years. Exclusion Criteria comprised of patients less than one year and more than seventy-five years of age, an uncooperative patient, suspected neck masses of vascular origin on clinical examination, patients having bleeding diathesis, inconclusive repeated FNAC, patients who refused for COVID 19 RT-PCR test and inaccessible or deep-seated lesions.

After explaining the procedure, informed written consent was obtained and all the patients queries were answered completely. The lesion was palpated carefully and site for aspiration was identified. The selected area was cleaned with spirit swab. The swelling was fixed between index finger and thumb and a 22-27 G needle was introduced into swelling (non-aspiration technique). Alternatively, in some needle attached to 10 ml plastic syringe with pistol was used (aspiration technique). Plunger was pulled

back to apply negative pressure. Needle was moved back and forth inside the swelling. When adequate material was aspirated into the syringe, the suction was released gently to equalize the pressure, which prevented suction of aspirated material into barrel of syringe. Needle was withdrawn and aspirated material was immediately expelled on the glass slide and smear was prepared. After the completion of procedure patient was observed for a few minutes.

Wet smears were then fixed in 95% ethanol and stained with H&E (haematoxylin & eosin) stain or PAP stain, Dry smears were stained with Leishman stain. ZN stain for AFB was performed as and when required. All the slides were thoroughly screened and studied under light microscopy and the diagnosis was made.

Data was analysed using Statistical Package for Social science (SPSS) version 29.0. Quantitative data has been expressed as mean \pm Standard deviation (SD). Categorical data has been expressed as frequency and percentage. The Chi-Square test of significance was used for comparison of categorical (proportional) data. ANOVA was used to compare continuous data. 'p' value less than 0.05 was considered as significant.

RESULTS

In the present study, a total of 278 patients fulfilling the selection criteria were enrolled. Out of which 51.8% were males and 48.2% were females (Fig. 1.1). Age of patients ranged from 1 to 71 years. Maximum patients belonged to age group 31- 40 years (24.8%) (fig.1.2). Lymph node (n=176; 63.3%) was the most common site followed by thyroid gland (n=58; 20.9%), salivary gland (n=27; 9.7%) and miscellaneous sites respectively (table 1). Majority of lesions were diagnosed as inflammatory (n=176; 53.3%) followed by benign (n=71; 25.5%) and malignant (n=28; 8.6%). A total of 7 (2.5%) aspirates remained inconclusive (Fig 1.3). Among inflammatory lesions, the most common diagnosis was reactive lymphadenitis (n=74; 42%) followed by granulomatous inflammation (n=49; 27.8%). In Benign cases, colloid goiter (n=30; 42.3%) was the most common diagnosis followed by Pleomorphic adenoma (n=13; 18.3%) and metastatic squamous cell carcinoma (SCC) (n=16; 66.7%) was most common malignant diagnosis (Table 2). Lymph nodes had a higher prevalence of inflammatory lesions (86.4%) as well as malignant lesions (11.4%) as compared to other sites (table 3).

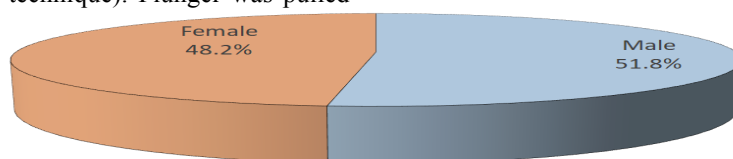


Fig. 1.1: Gender profile of the patients enrolled in the study

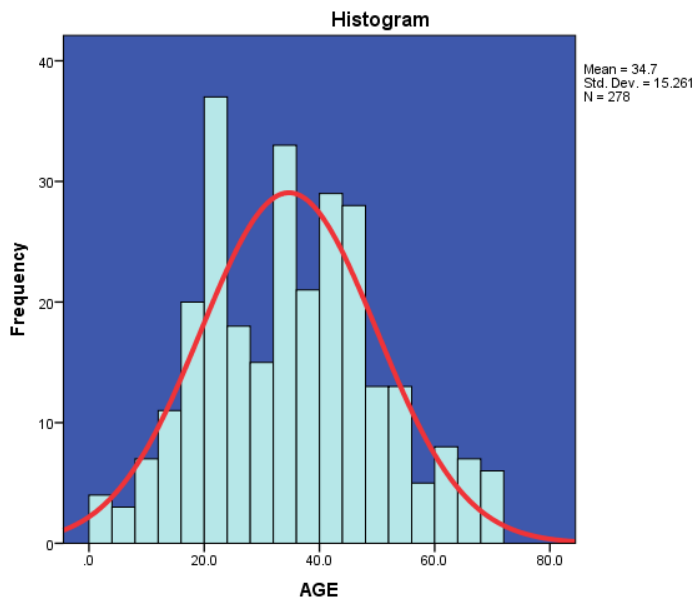


Fig. 1.2: Age profile of the patients enrolled in the study

Table 1: Distribution of cases according to site of lesion

SN	Site of lesion	Number of cases	Percentage
1.	Lymph node (115 Cervical, 28 Supraclavicular, 13 Preauricular, 7 Submandibular, 6 Postauricular, 6 Submental, 1 Occipital)	176	63.3
2.	Thyroid gland	58	20.9
3.	Salivary gland	27	9.7
4.	Miscellaneous (11 Neck swelling, 2 forehead swelling, 1 each below lip, eyebrow, jaw, occipital swelling)	17	6.1

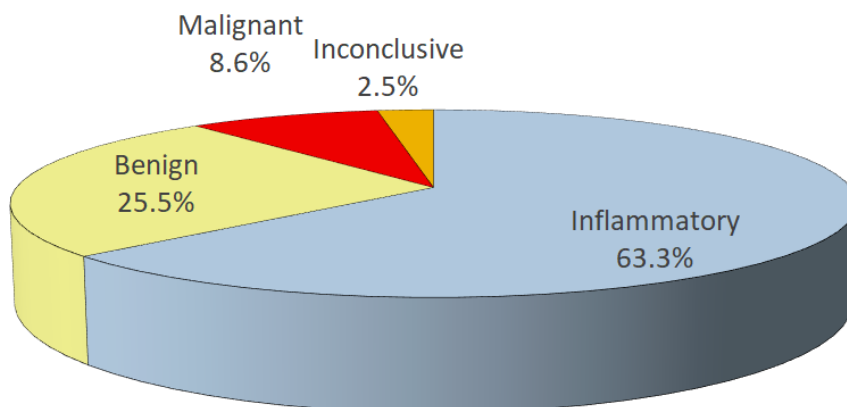


Fig. 1.3 : Nature of FNAC diagnosis based on cytological findings

Table 2: Nature of FNAC Diagnosis (n=278)

SN	Lesion Type	Diagnosis	No. of cases	Percentage
1.	Inflammatory (n=176; 63.3%)	Reactive lymphadenitis	74	42.0
		Granulomatous inflammation	49	27.8
		Necrotizing inflammation	17	9.7
		Acute suppurative inflammation	12	6.8
		Chronic lymphocytic thyroiditis	9	5.1
		Chronic sialadenitis	7	4.0
		Others (organizing inflammation-4; Acute sialadenitis – 3; Sialadenosis-1)	8	4.5
2.	Benign (n=71; 25.5%)	Colloid goiter	30	42.3
		Pleomorphic adenoma	13	18.3
		Follicular neoplasm	10	14.1
		Epidermal inclusion cyst	6	8.5
		Lipoma	5	7.0
		Colloid cyst	3	4.2
		Others (Two thyroglossal cysts, one each mucocele and spindle cell lesion)	4	5.6
3.	Malignant (n=24; 8.6%)	Metastatic squamous cell carcinoma	16	66.7
		Lymphoproliferative disorder	3	12.5
		Papillary Thyroid carcinoma	2	8.3
		Others (one adenoid cystic carcinoma, Medullary carcinoma and Metastatic adenocarcinoma)	3	12.5
4.	Inconclusive (n=7; 2.5%)	Blood only	7	100.0

Table 3: Site-wise distribution of head and neck lesions

SN	Site	Type of lesion	Diagnosis	No.	%
1.	Lymph node (n=176)	Inflammatory (n=152; 86.4%)	Reactive lymphadenitis	74	48.7
			Granulomatous inflammation	49	32.2
			Necrotizing inflammation	17	11.2
			Acute suppurative inflammation	12	7.9
		Malignant (n=20; 11.4%)	Metastatic SCC	16	75.0
			Lymphoproliferative disorder	3	27.3
			Others (Metastatic adenocarcinoma)	1	5.0
Inconclusive (n=4; 2.3%)	Blood only	4	100		
2.	Thyroid gland (n=58)	Inflammatory (n=9; 15.5%)	Chronic lymphocytic thyroiditis	9	100
		Benign (n=45; 77.7%)	Colloid goitre	30	66.7
			Follicular neoplasm	10	22.2
			Colloid cyst	3	6.7
			Others (Thyroglossal cyst)	2	4.4

		Malignant (n=3; 5.3%)	Papillary thyroid carcinoma	2	66.7
			Medullary thyroid carcinoma	1	33.3
		Inconclusive (n=1; 1.7%)	Blood only	1	1.7
3.	Salivary gland (n=27)	Inflammatory (n=11; 40.7%)	Chronic sialadenitis	7	63.6
			Others (3 acute sialadenitis, 1 sialadenosis)	4	36.4
		Benign (n=14; 51.9%)	Pleomorphic adenoma	13	92.9
			Others (Mucocele)	1	7.1
		Malignant (n=1; 3.7%)	Adenoid cystic carcinoma	1	100
		Inconclusive (n=1; 3.7%)	Blood only	1	100
4.	Miscellaneous (n=17)	Inflammatory (n=4; 23.5%)	Organizing inflammation	4	100
		Benign (n=12; 70.6%)	Epidermal inclusion cyst	6	50.0
			Lipoma	5	41.7
			Others (Spindle cell lesion)	1	25.0
		Inconclusive (n=1; 5.9%)	Blood only	1	100

Percentages have been calculated from site total

DISCUSSION

Swellings in the head and neck region are frequently encountered clinical entities across almost all the age groups.¹⁰ Correct diagnosis of neck masses is quite essential in view of the high risk of underlying malignancy.¹¹ A delay in diagnosis of malignant head and neck lesion directly affects the tumor stage and its unabated progression could result in a poor prognosis.^{12,13} FNAC have emerged as a useful modality to evaluate palpable head and neck lesions with high precision and accuracy¹⁴⁻²⁶ and has decreased the dependence on histopathology to a great extent. Keeping in view the high diversity in the profile of underlying pathologies in head and neck lesions, the present study was planned to study the role of FNAC and its utility in diagnosis of palpable head and neck lesions.

In the present study, a total of 278 patients with palpable head and neck lesions were enrolled. The age of patients ranged from 1 to 71 years. Mean age of patients was 34.70 years and majority of patients were males. Age group 21 to 40 years was the most commonly affected age group (n=128; 46.0%).

With respect to age and sex profile, the present study showed that palpable head and neck lesions seem to affect all the age groups, with young adults being most commonly affected age groups. With respect to age, the findings of the present study are in agreement with the observations of Kapoor S et al²⁷ who also reported the age range of the patients between 1.5 to 86 years, thereby showing that palpable head and neck lesions could affect almost all

the age groups as also seen in the present study. However, in their study mean age of patients was 44.5 years, thereby showing a dominance of mature adults instead of young adults in the present study. They also showed a dominance of males (67%) as compared to a rather even sex-distribution in the present study. However, Banstola L et al²⁸ presented an entirely different picture with respect to age and sex profile of the patients. In their study, majority of patients were not only females (60%) but were also aged below 30 years (52%), thus showing a dominance of younger predominantly female population.

In the present study, Lymph nodes (n=176; 63.3%), thyroid gland (n=58; 20.9%), and salivary gland (n=27; 9.7%) were the most common sites involved contributing to 93.9% of total palpable head and neck lesions. Kapoor S et al²³ also similar to the present study found a lymph-nodes to be the most common site involved followed by thyroid and salivary glands and reported their total contribution to be 92% which is close to 93.9% in the present study. However, in their study, the proportion of lymph nodes, thyroid and salivary glands was 43%, 34% and 15% as compared to 63.3%, 20.9% and 9.7% respectively in the present study. The proportional representation of lymph nodes and thyroid gland in the present study is close to that reported by Banstola L et al²⁵ who found 55% of their cases to have involvement of lymph node and 21.5% having involvement of thyroid. However, in their study, skin and subcutaneous tissue was the third most common site (11.6%) and salivary

glands included only 6.1% of total study sample. The inadequacy rate in the present study is similar to that reported by Jadhav DS et al⁸¹ who also found 2% of their specimen as inadequate.

In the present study, according to nature of lesion, the most common lesion type was inflammatory (n=176; 63.3%) followed by benign (n=71; 25.5%) and malignant (n=24; 8.6%) lesions. Similar to the present study, a dominance of inflammatory and benign lesions as compared to malignancy has been reported in other studies too. Padia B et al² in their study found 57.6% inflammatory and 34.5% benign lesions as compared to malignancy in only 6.5% cases. Jadhav DS et al²⁷ found approximately 7% of their cases as malignant. Other studies also reported malignancy rate in 3 to 12% of cases.²⁸⁻³⁰

In the present study, we found that risk of malignancy was higher in lesions involving lymph nodes, while benign lesions were most common in thyroid and miscellaneous sites. There was a significant association between site and FNAC diagnosis.

In the present study, we found older age as well as male sex to be significantly associated with malignancy. Compared to the present study, Singh A and Parihar PH¹⁹ found malignant lesions to be more common in females. As far as age related association is concerned, the association between malignant lesions and age has also been reported previously.¹⁰ In fact, the associations of the age and sex of with type of head and neck lesions needs further exploration with respect to level of exposure to different risk factors in context with age and sex.

CONCLUSION

The findings of the present study showed that FNAC is simple, quick, inexpensive and minimally invasive first line investigation for diagnosis of palpable head and neck lesions. The findings confirmed the utility of FNAC as a preliminary screening tool that could facilitate the final diagnosis and management of the patients and helps in avoiding unnecessary surgical interventions.

REFERENCES

- Suryawanshi KH, Damle RP, Dravid NV, Tayde Y. Spectrum of FNAC in palpable head and neck lesions in a tertiary care hospital in India- a 3 years study. *Indian Journal of Pathology and Oncology* 2015; 2(1): 7-113.
- Padia B, Dhokiya M. A study of FNAC of head and neck lesions at a tertiary care centre. *Trop J Path Micro* 2018;4(8):592-596.
- Poorey VK, Tyagi A. Accuracy of Fine Needle Aspiration Cytology in Head and Neck Masses. *Indian J Otolaryngol Head Neck Surg* 2014; 66(2):182-186.
- Goutam AK, Avadhesh P, Kushwah S, Pande S. Ultrasonography and CT evaluation of neck masses. *International Journal of Contemporary Medical Research* 2017;4(6):1392-1397.
- Patel UA, Brennan TE. Disparities in head and neck cancer: assessing delay in treatment. *Laryngoscope*. 2012 Aug;122(8):1756-60.
- Rammeh S, Romdhane E, Sassi A, Belhajkacem L, Blel A, Ksentini M, Lahiani R, Farah F, Salah MB, Ferjaoui M. Accuracy of fine-needle aspiration cytology of head and neck masses. *Diagn Cytopathol*. 2019 May;47(5):394-399.
- Rathi M, Ahmad F, Budania SK, Awasthi S, Kumar A, Dutta S. Cytomorphological Aspects of Hashimoto's Thyroiditis: Our Experience at a Tertiary Center. *Clinical Medicine Insights: Pathology* 2014;7 1-5.
- Todsen T, Bennedbaek FN, Kiss K, Hegedüs L. Ultrasound-guided fine-needle aspiration biopsy of thyroid nodules. *Head Neck*. 2021 Mar;43(3):1009-1013.
- Khattak MS, Ahmad F, Khalil Ur Rehman. Role of Fine Needle Aspiration Cytology In Diagnosis of Palpable Breast lesions and their Comparison with Histopathology. *J Ayub Med Coll Abbottabad*. 2020 Jan-Mar;32(1):83-86.
- Pynnonen MA, Gillespie MB, Roman B, Rosenfeld RM, Tunkel DE, Bontempo L, et al. Clinical Practice Guideline: Evaluation of the Neck Mass in Adults. *Head and Neck Surgery* 2017; 157(2S): S1-S30.
- Goutam AK, Avadhesh P, Kushwah S, Pande S. Ultrasonography and CT evaluation of neck masses. *International Journal of Contemporary Medical Research* 2017;4(6):1392-1397.
- Urjeet AP, Brennan TE. Disparities in head and neck cancer: assessing delay in treatment initiation. *Laryngoscope*. 2012;122:1756-1760.
- Seoane J, Taccouche B, Varela-Centelles P, Tomas I, Seoane Romero JM. Impact of the delay in diagnosis in survival of head and neck carcinomas: a systematic review with meta-analysis. *Clin Otolaryngol*. 2012;37:99-106.
- Mittra P, Bharti R, Pandey MK. Role of Fine Needle Aspiration Cytology in Head and Neck Lesions of Paediatric Age Group. *Journal of Clinical and Diagnostic Research*. 2013; 7(6): 1055-1058.
- Gupta G, Joshi DS, Shah A, Ganshi M, Shah NR. FNAC of head and neck swellings. *GCSMC J Med Sci* 2014;3:38-41.
- Anandam G, Kashif MM, Srikanth S. A comparative study of fine-needle aspiration and fine-needle non-aspiration techniques in head and neck swellings. *Indian Journal of Cancer* 2014; 51(2): 98-99.
- Singal P, Bal MS, Kharbanda J, Sethi PS. Efficacy of Fine Needle Aspiration Cytology in Head and Neck Lesions. *Int. J. Med. Dent. Sci*. 2014; 3(2): 421-430.
- Khetrpal S, Jetley S, Jairajpuri Z, Rana S, Kohli S. FNAC of head & neck regions and its utility in clinical diagnosis: A study of 209 cases. *Nat J. Med Res* 2015;5:33-8.

19. Singh A, Parihar PH. Role of High Resolution Ultrasonography and Color Doppler in Assessment of Thyroid Swelling in Correlation with USG Guided FNAC. *International Journal of Anatomy, Radiology and Surgery* 2015; 1-5.
20. Goyal D. Study of Cystic Neck Swellings over a Period of 5 Years. *International Journal of Anatomy, Radiology and Surgery*, 2015; 4(2):1-4.
21. Thakur AS, Gahine R, Kulkarni V. Evaluation of fine needle aspiration cytology in the diagnosis of head and neck masses and its correlation with histopathological findings. *Int J Adv Med* 2016;3:699-707.
22. Jacob A, Zazgyva A, Ormeniřan A, Mezei T, Sin A, Tulinca M. Effectiveness of fine-needle aspiration cytology in the diagnosis of lateral cervical nonthyroid tumors. *Medicine (Baltimore)*. 2016 Aug;95(31):e4448.
23. Kapoor S, Bagga PK, Rupesh S, Singh A, Kumar A, Singh H. Diagnostic accuracy of fine needle aspiration cytology in palpable lesions of head and neck in comparison to histopathology. *IJCMR*. 2017; 4(2): 449-53.
24. Shobha SN, Rajashekar YR. Role of Fine needle aspiration cytology in Head and neck lesions. *Indian Journal of Pathology and Oncology*, July-September 2017;4(3):408-412.
25. Banstola L, Sharma S, Gautam B. Fine needle Aspiration Cytology of various Head and Neck Swellings. *Medical Journal of Pokhara Academy of Health Sciences (MJPAAHS)* 2018; 1(2): 83-86.
26. Khokle P, Garud S, Lahane VJ, Mishra S, Prakash NP. Role of Fine Needle Aspiration Cytology in Evaluation of Neck Masses: Our Experience. *Int J Otorhinolaryngol Clin* 2018;10(3):99-105.
27. Jadhav DS, Barge AK, Valand AG, Study of fine needle aspiration cytology of palpable head and neck lesions in tertiary care centre. *Indian J Pathol Oncol* 2018;5(3):375-381.
28. Khandakar B, Chen H. Ultrasound-guided fine needle aspiration cytology of angiosarcoma of head and neck: a review of cytomorphologic features and discussion of diagnostic pitfall of aspiration cytology of vascular lesions. *Diagn Cytopathol*. 2021 Jul;49(7):902-906.
29. Verma N, Singh P, Tyagi PK, Rathi M. Role of FNAC in Head and Neck Lesions. *JMSCR* 2020; 8(10): 20-30.
30. Qadri S, Khan SP, Bhat AR, Shah B. Role of Fine Needle Aspiration Cytology in Assessment of Head and Neck Lesions - A Study at a District Hospital. *Int. J. Res. Rev.* 2022; 9(8): 180-183.