

Research Article

The Spectrum of Thyroid Lesions on Cytology in a Secondary Care Centre, Karkala, Karnataka

Rashmi R Shetty^{1*}, Sachin S Shetty² and Sushma Nagireddy³

¹Kasturba Medical College, Manipal, MAHE, Karnataka, India

²Srinivas Institute of Medical Sciences and Research Institute, Mukka, Mangalore, Karnataka, India

³Gitam Institute of Medical sciences and Research Centre, Vizag, Andhra Pradesh, India

Abstract

Background: Fine Needle Aspiration Cytology (FNAC) is a cost effective, minimally invasive procedure with less complications. It can be used in the diagnosis of thyroid lesions, aiding the clinician in the patient management and reducing the incidence of unnecessary surgeries. Thyroid profile test, ultrasonography and radionuclide scan are used as adjuvant diagnostic modalities.

Aim: To estimate the cytomorphological spectrum and to categorize the thyroid lesions based on the Bethesda system for Reporting Thyroid Cytopathology (2017). Age and sex distribution of thyroid lesions were also calculated.

Methods: This is a retrospective observational study carried out in the pathology department at secondary care centre. FNAC was done by non-aspiration technique, slides were prepared, fixed in 95% ethyl alcohol and processed with routine stains.

Results: Out of 25 cases, 16 cases (64%) were benign lesions, 2 cases (8%) of Follicular Lesion of undetermined significance, 5 cases (20%) were Unsatisfactory/Nondiagnostic, and 2 cases (8%) were suspicious for follicular neoplasm. The number of benign cases were higher and the number of suspicious for follicular neoplasm were lower with female preponderance.

Conclusion: FNAC is one of the safe, rapid and sensitive diagnostic tool. The Bethesda system is used to categorise the thyroid lesions

*Corresponding author: Rashmi R. Shetty, Kasturba Medical College, Manipal, MAHE, Karnataka, India, E-mail: shetty.rashmi@manipal.edu

Citation: Shetty RR, Shetty SS, Nagireddy S (2024) The Spectrum of Thyroid Lesions on Cytology in a Secondary Care Centre, Karkala, Karnataka. J Toxicol Cur Res 8: 028.

Received: April 09, 2024; **Accepted:** May 28, 2024; **Published:** June 05, 2024

Copyright: © 2024 Shetty RR, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

and helps in better communication between clinicians and pathologists in patient management.

Keywords: Bethesda system; Cytomorphology; Fine-needle aspiration cytology; Thyroid lesion

Introduction

Thyroid swelling is the most common presentation seen in routine practice. Approximately 67% of people with thyroid nodules are non-palpable and asymptomatic [1]. The main objective of Fine-Needle Aspiration Cytology (FNAC) of the thyroid is to categorise those patients who need surgery from those who have a functional or inflammatory lesion and can be followed up or treated medically. Children and adolescents should be included as they may also harbour malignant tumors [2].

The cytologic criteria to classify thyroid lesions varies between pathologists and between institutions [3]. "The Bethesda System for Reporting Thyroid Cytopathology" (TBSRTC) was introduced to improve communication between pathologists and clinicians [4]. TBSRTC was introduced in 2007 to standardize terminology and to categorize morphological criteria in Fine Needle Aspirations (FNAs) of thyroid lesions [5].

However, the success of FNA is dependent on several important contributing influences including pathologist experience, technician skill in smear preparation, cytological interpretation and a rational analysis, correlating cytological and clinical information of an individual patient [6].

Materials and Methods

The study was done in Dr.T.M.A Pai Rotary hospital, Karkala, Udupi between April 2023 to March 2024. A retrospective analysis of 25 cases with thyroid swelling was done.

Inclusion Criteria

All patients presenting with thyroid swelling referred by the clinician were included in this study. Clinical details like age, sex and relevant investigations like USG, thyroid profile was considered. FNA of thyroid swelling was done using 24-gauge disposable needles under all aseptic precautions. Minimum four slides were prepared for each case. The slides were immediately fixed in 95% ethyl alcohol for a period of 40 minutes. The slides were stained with haematoxylin and eosin and Papanicolaou stain (PAP). In cases where cellularity was scanty, FNAC was repeated.

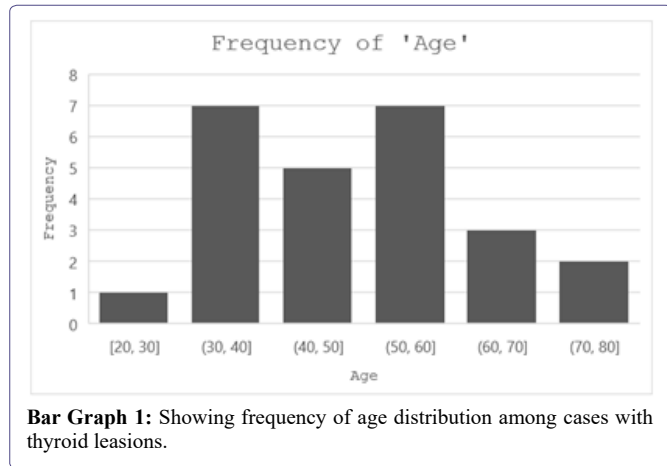
All the thyroid lesions were categorised according to TBSRTC as follows: Category I-Non-diagnostic or Unsatisfactory, Category II-Benign, Category III-Atypia of Undetermined Significance/Follicular Lesion of Undetermined Significance (AUS/FLUS), Category IV-Follicular neoplasm/Suspicious for Follicular Neoplasm (SFN), Category V-Suspicious for Malignancy (SFM) and Category VI-Malignant.

Statistical Analysis

The results were analysed using descriptive statistics.

Results

The study included 25 cases with the minimum presenting age 20 years to maximum presenting age 73 years. Majority of the case are falling between the age group of 30-40 years and 50-60 years of age as shown in the bar graph 1.

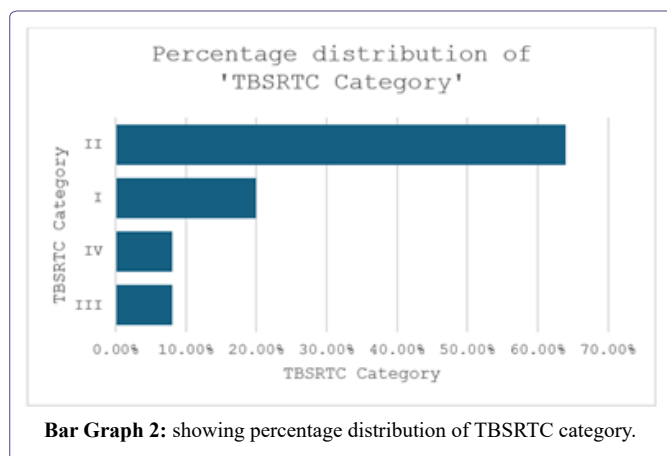


Bar Graph 1: Showing frequency of age distribution among cases with thyroid lesions.

As per table 1 and bar graph 2, most cases in the study population presented with Bethesda Category II lesion (60%) which was found to be statistically significant ($p < 0.05$), (Benign follicular nodule +/- lymphocytic thyroiditis, colloid nodule, adenomatoid nodule).

TBSRTC Category	Count of TBSRTC Category
II	64.00%
I	20.00%
IV	8.00%
III	8.00%
Grand Total	100.00%

Table 1: Showing distribution of TBSRTC category.



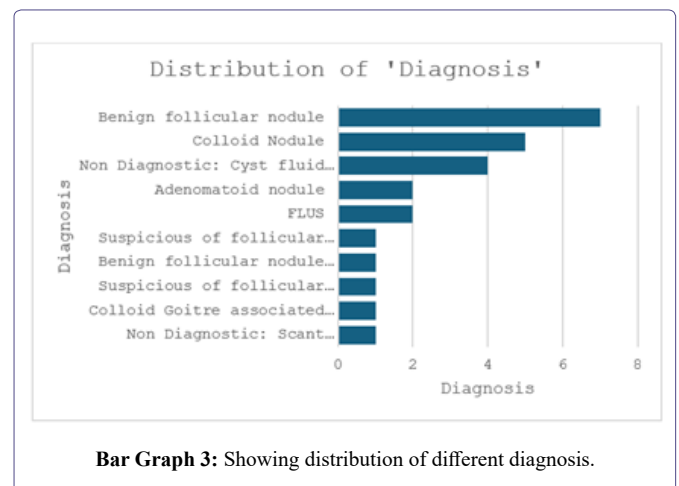
Bar Graph 2: showing percentage distribution of TBSRTC category.

As per table 2 and bar graph 3, spectrum of thyroid lesions is seen that the most common spectrum was seen, which was benign follicular nodule +/- lymphocytic thyroiditis in 32% of cases categorized

to Bethesda Class II. This was found to be statistically significant ($p < 0.05$), followed by colloid nodule +/- lymphocytic thyroiditis in 24% of cases also in Category II.

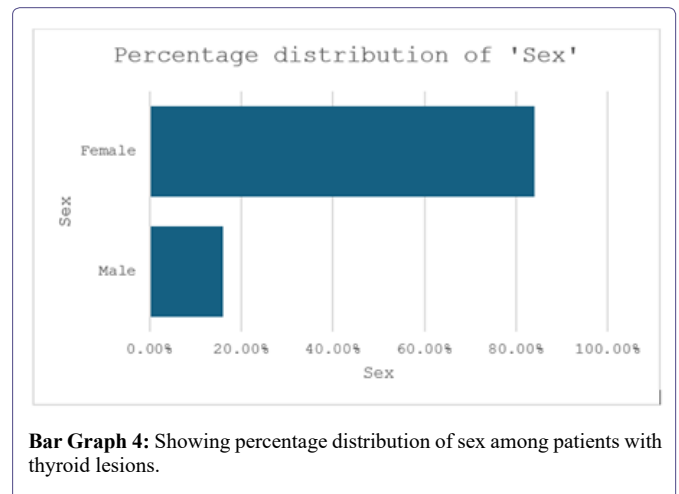
Diagnosis	Count of Diagnosis
Benign follicular nodule	7
Colloid nodule	5
Non diagnostic: Cyst fluid only	4
Adenomatoid nodule	2
FLUS	2
Suspicious of follicular neoplasm	1
Benign follicular nodule associated with lymphocytic thyroiditis	1
Suspicious of follicular neoplasm (Oncocytic type)	1
Colloid goitre associated with lymphocytic thyroiditis	1
Non diagnostic: Scant cellularity	1
Grand Total	25

Table 2: Showing distribution of different diagnosis.



Bar Graph 3: Showing distribution of different diagnosis.

As per bar graph 4, the study was female preponderance with the age groups 30-40 years and 50-60 years were found to be statistically significant ($p < 0.05$) that was estimated to be 84% of the total number of cases and the male population contributed to 16% of the cases.



Bar Graph 4: Showing percentage distribution of sex among patients with thyroid lesions.

Discussion

FNAC is practised worldwide, as the initial test for thyroid lesions to categorise patients in planning treatment modalities [7]. FNAC has become essential in selecting cases that need surgery and in providing a pre-operative morphological diagnosis in obviating unnecessary surgeries as well as in planning proper surgical and other treatment protocols [8].

Different classification system had been used for thyroid FNAC before introduction of Bethesda system of thyroid cytology. TBSRTC complements cytological findings from thyroid FNA and represents a unity among clinicians and pathologists in different areas of medicine [9]. This study was done with the aim to categorize various thyroid lesions and to evaluate the efficacy of the newly proposed six-tier classification system in reporting thyroid FNA results.

The sensitivity and diagnostic accuracy of thyroid surgery have been shown to be as high as 85-95% in experienced hands [10,11]. Positive predictive value of 89-98%, negative predictive value of 94-99%, [12,13], and false negative rates as low as 5-10% [14], have established FNA as an invaluable diagnostic modality. There are literatures claiming the accuracy and usefulness of thyroid cytology and there is also evidence showing possible limitations and pitfalls of this procedure [15].

In this study, 64% of thyroid lesions were in Category II, 8% were in Category IV, 8% were in Category III and 20% were in Category I. The number of benign cases were high in our study. The higher rate of benign cases are also seen in other studies [16-18]. Upadhyaya et al, found that TBSRTC helps in reduction in percentage of indeterminate cases and uniformity in reporting among pathologists [19]. The thyroid lesions which were of TIRADS IV and TIRADS V category were referred to tertiary care centre which could be the reason for TBSRTC category IV and V lesions not being reported in our study.

Study of Mehra P and Verma AK showed the following distribution of various categories from 225 evaluated thyroid nodules: 7.2% ND/UNS, 80.0% benign, 4.9% AUS/FLUS, 2.2% FN, 3.5% SFM, and 2.2% malignant [20].

Yang et al, found 10.4% cases as unsatisfactory, 64.6% were benign, 3.2% were AUS, 11.6% were follicular neoplasm, 2.6% were suspicious for malignancy and 7.6% were classified as malignant [16].

Theoharis et al, found 11.1% unsatisfactory, 73.8% benign, 3% indeterminate, 5.5% follicular neoplasm, 1.3% suspicious for malignancy and 5.2% malignant [17].

Similar study was done by Sarkis et al. [19]. They found 12.8% were non-diagnostic, 74.7% benign, 4.7% atypia of uncertain significance, 4.7% suspicious for follicular neoplasm, 0.8% suspicious for malignancy and 2.3% malignant.

However, this study was found to be effective in categorizing the thyroid lesions based on The Bethesda system of Reporting Thyroid Lesions and avoiding unnecessary surgical intervention for benign cases who could be managed by non-surgical modalities [21-23].

Limitations of Study

The sample size in this study was small compared to other studies carried out in tertiary centres within the same given time. Therefore,

accuracy of the result could be significant on increasing the sample size. Due unavailability of Anti TPO test a complete workup of thyroiditis was not done.

Conclusion

FNAC is the first line screening test that is cost effective and rapid test to assess different thyroid lesions. Also, TBSRTC is very useful as a standardized system of reporting thyroid cytopathology, that has brought uniformity in reporting, improving communication between cytopathologists and clinicians resulting in best management approaches, avoiding unnecessary surgeries and their complications. However, there are a few draw backs in missing the diagnosis on FNAC could be mainly due to sampling error, or co-existing benign and malignant lesion leading to erroneous interpretation. These pitfalls can be corrected by ultrasound guided FNAC especially for impalpable small thyroid lesions. However, clinical findings along with thyroid profile and thyroid scan should be assessed for comprehensive approach, definitive diagnosis and proper management of the patients.

Funding

No funding sources.

Conflict of Interest

None declared.

Author's Contribution

Data collection and data interpretation was done by Dr. Rashmi R Shetty, manuscript writing by Dr. Sachin S. Shetty and Dr. Prashanthi Sushma Nagireddy and proof reading by Dr. Shantha Kumari and Dr. Namrata Rao.

References

1. Wong LQ, Baloch ZW (2012) Analysis of the Bethesda system for reporting thyroid cytopathology and similar precursor thyroid cytopathology reporting schemes. *Adv Anat Pathol* 19: 313-319.
2. Sanchez MA, Stahl RE (2006) *Koss' Diagnostic Cytology and its Histopathologic Bases*. Lippincott Williams and Wilkins, Philadelphia, USA.
3. Williams MD, Suliburk JW, Staerke GA, Busaidy NL, Clayman GL, et al. (2009) Clinical significance of distinguishing between follicular lesion and follicular neoplasm in thyroid fine-needle aspiration biopsy. *Ann Surg Oncol* 16: 3146-3153.
4. Zarif HA, Ghandurah SE, Al-Garni MA, Binmahfooz SK, Alsaywid BS, et al. (2018) Thyroid nodules cytopathology applying the Bethesda system with histopathological correlation. *Saudi J Med Med Sci* 6: 143-148.
5. Kannan S, Raju N, Kekatpure V, Chandrasekhar NH, Pillai V, et al. (2017) Improving Bethesda reporting in thyroid cytology: A team effort goes a long way and still miles to go. *Indian J Endocr Metab* 21: 277-281.
6. Handa U, Garg S, Mohan H, Nagarkar N (2008) Role of fine needle aspiration cytology in diagnosis and management of thyroid lesions: A study on 434 patients. *J Cytol* 25: 13-17.
7. Jayaram G, Basu D (1993) Cytology in the diagnosis of thyroid lesions- A review. *J Assoc Physicians India* 41: 164-169.
8. Dash M, Chandrasekhar KP, Raghu K, Kethireddy S (2016) Histopathological study of neoplastic and non neoplastic thyroid lesions: An institutional experience of 2 years. *J Evol Med Dent Sci* 12: 5348-5511.
9. Melo-Urbe MA, Sanabria Á, Romero-Rojas A, Pérez G, Vargas EJ, et al. (2015) The Bethesda system for reporting thyroid cytopathology in Colombia: Correlation with histopathological diagnoses in oncology and non-oncology institutions. *J Cytol* 32: 12-16.

10. Nandedkar SS, Dixit M, Malukani K, Varma AV, Gambhir S (2018) Evaluation of thyroid lesions by fine-needle aspiration cytology according to Bethesda system and its histopathological correlation. *Int J Appl Basic Med Res* 8: 76-82.
11. Bhartiya R, Mallik M, Kumari N, Prasad BN (2016) Evaluation of thyroid lesions by fine-needle aspiration cytology based on Bethesda system for reporting thyroid cytopathology classification among the population of South Bihar. *Indian J Med Paediatr Oncol* 37: 265-270.
12. Arif M, Sunil H (2013) Benefits and limitations of FNAC in thyroid diseases: Our institutional experience. *Int J Res Med Sci* 1: 435-440.
13. Hajmanoochehri F, Rabiee E (2015) FNAC accuracy in diagnosis of thyroid neoplasms considering all diagnostic categories of the Bethesda reporting system: A single-institute experience. *J Cytol* 32: 238-243.
14. Guhamallick M, Sengupta S, Bhattacharya NK, Basu N, Roy S, et al. (2008) Cytodiagnosis of thyroid lesions-usefulness and pitfalls: A study of 288 cases. *J Cytol* 25: 6-9.
15. Gupta M, Gupta S, Gupta VB (2010) Correlation of fine needle aspiration cytology with histopathology in the diagnosis of solitary thyroid nodule. *J Thyroid Res* 2010: 379051.
16. Yang J, Schnadig V, Logrono R, Wasserman PG (2007) Fine-needle aspiration of thyroid nodules: A study of 4703 patients with histologic and clinical correlations. *Cancer* 111: 306-315.
17. Theoharis CG, Schofield KM, Hammers L, Udelsman R, Chhieng DC (2009) The Bethesda thyroid fine-needle aspiration classification system: Year 1 at an academic institution. *Thyroid* 19: 1215-1223.
18. Upadhyaya P, Dhakal S, Adhikari P, Adhikari B, Khadka D, et al. (2019) Histopathological review of diagnostic categories of the Bethesda system for reporting thyroid cytopathology-An institutional experience of 5 years. *J Cytol* 36: 48-52.
19. Sarkis LM, Norlen O, Aniss A, Watson N, Delbridge LW, et al. (2014) The Australian experience with the Bethesda classification system for thyroid fine needle aspiration biopsies. *Pathol* 46: 592-595.
20. Mehra P, Verma AK (2015) Thyroid cytopathology reporting by the Bethesda system: A two-year prospective study in an academic institution. *Patholog Res Int* 2015: 240505.
21. Reena N, Megha G, Jyoti C, Chawda H, Manoj MK (2022) Estimation of cytomorphological spectrum of thyroid lesions by fine-needle aspiration cytology based on Bethesda system for reporting in tertiary care hospital. *Asian J Pharm Clin Res* 15: 134-136.
22. Jaiswal YP, Chawhan S (2020) The spectrum of thyroid lesions on fine needle aspiration cytology. *Int J Res Med Sci* 8: 630-635.
23. Akshatha N, Patil S, Bommanahalli BP (2019) Clinical and cytological spectrum of thyroid lesions and the role of fine needle aspiration cytology in its diagnosis at a tertiary care hospital. *Tropical Journal of Pathology and Microbiology* 5.



- Advances In Industrial Biotechnology | ISSN: 2639-5665
- Advances In Microbiology Research | ISSN: 2689-694X
- Archives Of Surgery And Surgical Education | ISSN: 2689-3126
- Archives Of Urology
- Archives Of Zoological Studies | ISSN: 2640-7779
- Current Trends Medical And Biological Engineering
- International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X
- Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276
- Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292
- Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370
- Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594
- Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X
- Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562
- Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608
- Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879
- Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397
- Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751
- Journal Of Aquaculture & Fisheries | ISSN: 2576-5523
- Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780
- Journal Of Biotech Research & Biochemistry
- Journal Of Brain & Neuroscience Research
- Journal Of Cancer Biology & Treatment | ISSN: 2470-7546
- Journal Of Cardiology Study & Research | ISSN: 2640-768X
- Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943
- Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771
- Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844
- Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801
- Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978
- Journal Of Cytology & Tissue Biology | ISSN: 2378-9107
- Journal Of Dairy Research & Technology | ISSN: 2688-9315
- Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783
- Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X
- Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798
- Journal Of Environmental Science Current Research | ISSN: 2643-5020
- Journal Of Food Science & Nutrition | ISSN: 2470-1076
- Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X
- Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566
- Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485
- Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662
- Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999
- Journal Of Hospice & Palliative Medical Care
- Journal Of Human Endocrinology | ISSN: 2572-9640
- Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654
- Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493
- Journal Of Light & Laser Current Trends
- Journal Of Medicine Study & Research | ISSN: 2639-5657
- Journal Of Modern Chemical Sciences
- Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044
- Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X
- Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313
- Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400
- Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419
- Journal Of Obesity & Weight Loss | ISSN: 2473-7372
- Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887
- Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052
- Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X
- Journal Of Pathology Clinical & Medical Research
- Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649
- Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670
- Journal Of Plant Science Current Research | ISSN: 2639-3743
- Journal Of Practical & Professional Nursing | ISSN: 2639-5681
- Journal Of Protein Research & Bioinformatics
- Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150
- Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177
- Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574
- Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060
- Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284
- Journal Of Toxicology Current Research | ISSN: 2639-3735
- Journal Of Translational Science And Research
- Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193
- Journal Of Virology & Antivirals
- Sports Medicine And Injury Care Journal | ISSN: 2689-8829
- Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.heraldopenaccess.us/submit-manuscript>