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# Ultrasonography Prevalence Of Thyroid Nodules In Asymptomatic Healthcare Workers

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***Abstract***
*Incidental thyroid nodules are a common imaging finding. Most incidentalomas are benign. It is appropriate to classify the nodules as per ACR TIRADS, which is a 5-point stratification system to predict the risk of cancer in thyroid nodules. Only few studies have documented the prevalence of thyroid incidentalomas in southern Indian states. The primary objective of the study is determining the prevalence of incidental thyroid nodules. Out of the total 123 subjects included in this study, sonographic abnormalities were appreciated in 22 subjects. 14 out of these 22 subjects had a solitary thyroid nodule, and out of the 14 solitary nodules, 10 were of TIRADS-1 category, and 2 of TIRADS-2 and TIRADS-3 category each. The prevalence of incidental thyroid nodules in asymptomatic individuals within our study population was 13.8%. Most of the results of our study correlate accurately with worldwide statistics as well as with the results of previous such studies. This study could be extended in the foreseeable future to arrive at more information about the behaviour of thyroid nodules over time.*

***Keywords***
*Nodule.*
*Prevalence.*
*TIRADS.*
*Health-care.*
*FNAC.*

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## I. Background

Incidental thyroid nodules are a common finding, and ultrasound is a great imaging investigation to detect as well as characterize them. Most incidentalomas are benign (up to 95%) [1] in nature with low potential for malignant change. Once detected, it may lead to unnecessary anxiety in the patients, so it is appropriate to classify the nodule as per the ACR TIRADS and suggest further management. [2].

Several interventions for incidental thyroid lesions could be averted, if there is strong evidence to predict their benign nature and thus reduce unwarranted expenditure of resources. 'American college of radiology thyroid imaging reporting and data systems' (TIRADS) is a 5 point stratification system to predict the risk of cancer in thyroid nodules utilizing ultrasonographic characteristics.

The worldwide trend is that of increasing prevalence of thyroid incidentalomas. This is partly due to increasing use of imaging investigations. There are no attributable risk factors identified yet. However, it is imperative to stay updated with the burden of thyroid nodules to implement screening programs and frame management guidelines in place. [3].

Non-palpable thyroid nodules are a significant incidental imaging finding for many medical reasons, the risk of malignancy being the remotest argument. The prevalence of thyroid incidentalomas and their ultrasonographic spectrum as per TIRADS forms the base before even thinking about clinical correlation and management. [4].

To the best of our knowledge, only few studies have documented the prevalence of thyroid incidentalomas in southern Indian states. Moreover, the studies which did touch upon the topic, reported limited use of TIRADS lexicon for description in reports. So, this study is expected to help overcome the shortcomings of limited data of non-palpable incidental thyroid nodules.

## II. Aim

The primary objective of the study is determining the prevalence of incidental thyroid nodules and categorizing the nodules as per ACR TIRADS, while observing epidemiology trends such as age and sex distribution, with the aim to provide key statistics which may prove helpful in guiding future health programs.

## III. Materials And Methods

**Data collection:**

Focused ultrasound examination of the thyroid gland of voluntarily enrolled study participants was performed in the department of Radiodiagnosis at BGS GIMS, Bangalore. The study was concluded within a period of 3 weeks.

**Design:**

Cross sectional - observational study design was selected to best suit the needs, and included 123 participants selected through a non-probability/ convenience sampling technique.

**Sample size:**

The required sample size was calculated to be at least 97 study subjects, considering a 10% prevalence and 6% precision with 0 non-responses.

**Inclusion criteria:**

1. Age >18 years.
2. Asymptomatic health-care workers.

**Exclusion criteria:**

1. Age <18 years.
2. Congenital anomalies of the thyroid gland.

**Method:**

Participants were enrolled in the study after obtaining informed consent. PHILLIPS EPIC 5Q and GE LOGIQ P9 ultrasound machines were utilized for examination, using a linear probe (of 3-12 MHz) and standard neck software-preset. An ultrasound examination, with B-mode and Doppler mode, of the thyroid gland was performed following standard institutional protocol and procedure. The presence or absence of incidental nodules was documented and the nodules were categorized as per the latest ACR US-TIRADS lexicon. The data obtained was statistically analyzed to arrive at prevalence and other epidemiological parameters of thyroid nodules in the study population. No costs were borne by the study participants.

## IV. Results

Out of the total 123 subjects included in this study; with 73 males and 50 females, normal sonographic appearance of the thyroid gland was appreciated in 101 subjects. Sonographic abnormalities were appreciated in 22 subjects, which includes both focal and diffuse abnormalities. 14 out of these 22 subjects had a solitary thyroid nodule, 3 subjects had multiple thyroid nodules; unilateral in 2 subjects and bilateral in 1 subject, and 5 subjects had a diffuse abnormality of the thyroid gland during the ultrasound examination. Out of the 14 solitary nodules, 10 were of TIRADS-1 category, and 2 of TIRADS-2 and TIRADS-3 category each. No findings of TIRADS-4 and TIRADS-5 category thyroid nodules were detected

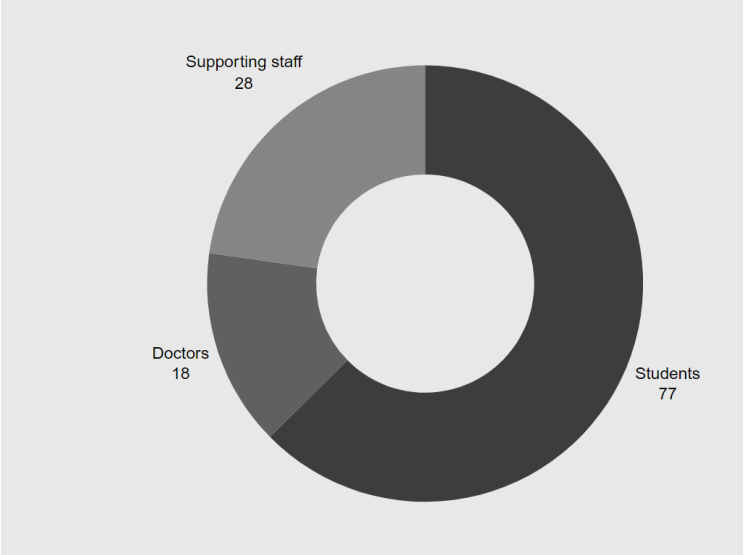


**Figure 1: Distribution of participants based on their occupation.**

**Table 1: Age-wise distribution of thyroid nodules:**

| Age (years) | Total (n) | Male | Female | Nodule present |
|---|---|---|---|---|
| 20-30 | 85 | 57 | 28 | 12 |
| 30-40 | 26 | 9 | 17 | 3 |
| 40-50 | 12 | 7 | 5 | 2 |

**Table 2: Sex-wise distribution of thyroid nodules and diffuse disorders:**

| USG abnormalities | Male | Female |
|---|---|---|
| STN | 7 | 7 |
| Multiple nodules | 2 | 1 |
| Diffuse abnormal echo pattern | 3 | 2 |

**Table 3: TIRADS category-wise distribution of incidental thyroid nodules in males and females:**

| Classification | Male | Female | Total |
|---|---|---|---|
| TIRADS-1 | 7 | 5 | 12 |
| TIRADS-2 | 1 | 2 | 3 |
| TIRADS-3 | 1 | 1 | 2 |
| TIRADS-4 | 0 | 0 | 0 |
| TIRADS-5 | 0 | 0 | 0 |

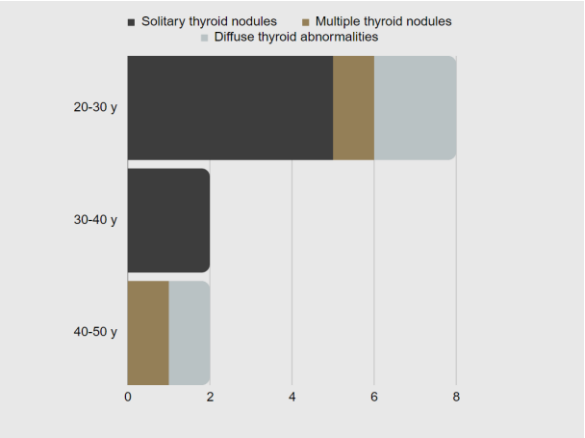


**Figure 2: Males.**

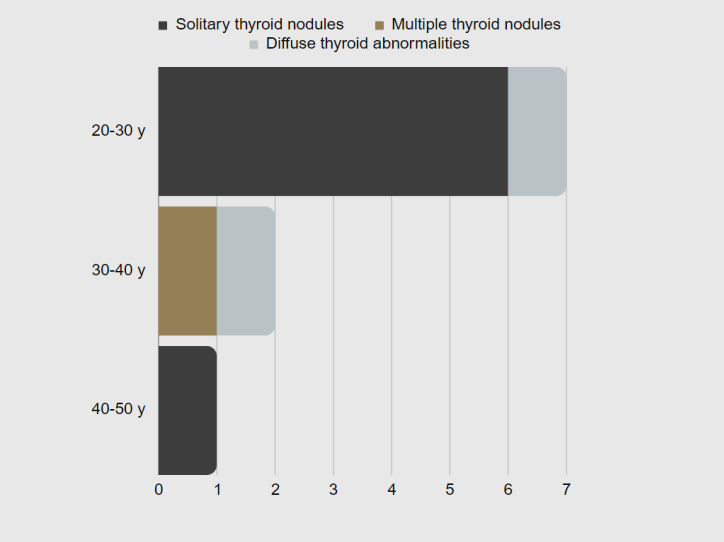


**Figure 3: Female.**

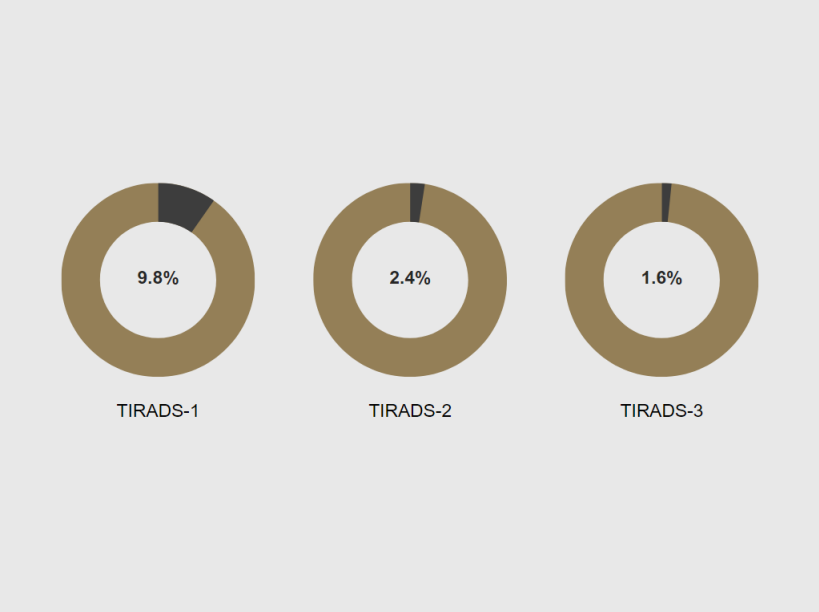


**Figure 4: TIRADS distribution of incidentalomas.**

## V. Discussion

The prevalence of incidental thyroid nodules in asymptomatic individuals within our study population was 13.8%. The prevalence in male and female population separately, was found to be 12.3% and 16.0% respectively; i.e. females had a slight higher prevalence than males. Only a total of 3 patients had multiple nodules; 2 were males and 1 was a female. The mean age of participants in out study came to be 29 y, since most of the participants belonged to the 20-30 y age group, both males and females. This age group distribution could help us narrow down our results only to the subset of students within this study. However, due to lack of enough participants in other age groups, such inferences could remain inconclusive.

Most of the results of our study correlate accurately with worldwide statistics as well as with the results of previous such studies. As expected, the imaging prevalence was higher than that published in clinical prevalence studies employing physical palpation method. The finding of TIRADS-1 lesions being the highest in proportion, by a gross margin, was not a surprise. Most lesions were cystic and smaller than 10 mm in size. Neither TIRADS-4 nor TIRADS-5 category were detected in the study, probably because of the obvious clinical symptoms of thyroid cancer.

Incidental findings of diffuse thyroid abnormalities was noted in 4.1% of individuals. These participants did not have a coexistent thyroid nodule. The abnormalities included multinodular goitre (not

considered in the study as thyroid nodules), thyroiditis and a case of Grave's disease. Since these patients admitted to be asymptomatic, their results were not excluded from the study group.

Certain individuals exhibited anxiety on being informed that they had a thyroid nodule. Such patients were educated about the possibility of lesions being mostly benign and advised follow-up if needed. There were no cases, that required a FNAC correlation as per the latest ACR-TIRADS guidelines. However, the participants with diffuse abnormalities were advised to undergo thyroid function tests and consult a physician for further workup and appropriate management.

## VI. Conclusion

Incidental thyroid nodules are prevalent in all geographical populations. Since most are benign, as seen in multiple research studies, there is no need for over-concern. But, a regular assessment of representative study population groups must be undertaken to pickup any deviation from the expected norms. Such studies could also help identify the prevalence goitre in iodine deficient population, as a secondary objective. Our study concluded that the prevalence of incidental thyroid nodules among the health care workers, mostly young adults, was near equal to that expected in the overall population. The only possible limitation, was that there was no correlation with clinician history regarding risk factors that may be associated with thyroid nodules. The same study could be extended in the future to arrive at more information about the behaviour of thyroid nodules over time.

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