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RESEARCH ARTICLE

Study Of Pattern of Thyroid Dysfunction in North Karnataka – A Hospital Based Study

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Abstract: ***Background***: Thyroid dysfunction is the second most common endocrine disorder preceding diabetes. It has varying prevalence in different regions of the World. This study aimed to investigate the prevalence and patterns of thyroid dysfunction in patients presenting to a tertiary care hospital in northern part of Karnataka. ***Methods***: Our study was a cross-sectional study recruiting 158 patients aged over 15 years undergoing thyroid function test at our tertiary care hospital. Thyroid profile (T3, T4, TSH) and other appropriate tests when indicated were performed. Thyroid dysfunction was determined based on established cut-offs. Patients were classified into euthyroid, subclinical and overt hypothyroid, subclinical and overt hyperthyroid. Data were analysed using descriptive statistics and correlation analysis. Age and gender distribution were analysed using chi square and t tests. ***Results***: Among 158 patients who underwent thyroid function test at our tertiary care hospital 89 (56.3%) patients were euthyroid and 69 (43.6%) patients had thyroid dysfunction. All patterns of thyroid dysfunction were more common in females although it was not statistically significant (p=0.13). Mean age of thyroid dysfunction in females was 39 years and in males it was 52 years. Among patients with thyroid dysfunction, primary hypothyroidism (31.6% of total patients) was the most common disorder followed by subclinical hypothyroidism (8.2% of total patients) and primary hyperthyroidism (3.8% of total patients). There were no cases of subclinical hyperthyroidism in our study. ***Conclusion***: Thyroid dysfunction, particularly hypothyroidism, is the predominant thyroid disease in our part of the World, predominantly in females. Hence adequate screening methods employed early in susceptible population can prevent the adverse consequences related to thyroid ailment.

Keywords: Thyroid, Pattern of dysfunction, North Karnataka.

INTRODUCTION

Thyroid disorders are one of the most common endocrine disorders seen globally ranking second only to diabetes mellitus in various studies[1,2,3]. As per the available literature around 42 million people in India suffer from thyroid disorders with, Kerala having the highest numbers[4].

Thyroid disorders constitute hypothyroidism, hyperthyroidism, goitres/iodine deficiency disorders, autoimmune thyroiditis and neoplasms involving the thyroid. The prevalence of hypothyroidism in a South Indian population-based study was 3.9% and that of hyperthyroidism was 1.2% in a hospital based study[5,6]. The same study has shown that 12% of adults have palpable goitre[5]. The incidence of thyroid neoplasms is increasing day by day with increasing exposure of the general population to the causative risk factors.

Considering the burden of thyroid disorders in the country, numerous studies are available targeting the whole Indian population, south Indian population and north Indian population. However, there is a need to study the same in our part of the world as meagre studies are available so that adequate screening employed early during the course of illness can mitigate the adverse consequences of illness.

MATERIALS AND METHODS

The present hospital based cross-sectional study was conducted at department of Medicine, KAHER'S JGMM Medical college after obtaining institutional ethics committee approval. Study was undertaken from 26 June 2025 and patients in the department of General Medicine were recruited until the calculated sample size was achieved.

Inclusion criteria

All patients aged more than 15 years undergoing thyroid evaluation in the department of medicine at JGMMMC Hubballi who participate with consent**.**

Exclusion criteria

1) Patients who do not give their consent to participate.
2) Age less than 15 years
3) Patients on medications like hormone supplements etc, interfering with thyroid function tests.
4) Patients who are critically ill.
5) Patients in intensive care units.

Sample size calculation: Considering the population of 300-400 cases per year (Finite population), margin of error as 5%, confidence interval of 95% and prevalence of 40% among tested (study by Gairola et al).

Sample size(n) = $\frac{Z\alpha^2\, p(1-p)}{e2}$

$Z\alpha^2$= Std normal variate $(1.96)^2$

P = Expected proportion from population

E = Absolute error

For finite population correction:

For 6 months duration ~150 –200 cases

$$\text{Finite population: } n' = \frac{n}{1+\frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

$$\text{For N = 150: } n = \frac{369}{1+\frac{368}{150}} \; n = \frac{369}{1+2.453} \; n = \frac{369}{3.453} \; n \approx 106.9 \approx 107$$

$$\text{For N = 200: } n = \frac{369}{1+\frac{368}{200}} \; n = \frac{369}{1+1.84} \; n = \frac{369}{2.84} \; n \approx 129.9 \approx 130$$

For an expected prevalence of 40% and a 6-month case load of 150–200, the required sample size is:

Approximately 107 participants if case load = 150

Total of 158 patients were studied.

The study was initiated after obtaining consent from the Institutional Ethics Committee. The patients aged more than 15 years who were undergoing thyroid evaluation including thyroid function test were included in the study. Written informed consent was obtained from the study participants in understandable language. Demographic details, medical history, and relevant clinical examination findings were recorded. Blood samples for thyroid function testing were collected under aseptic conditions. Relevant radiological and nuclear imaging studies were conducted whenever relevant.

Patients were classified into the following categories based on thyroid function test reports.

- Euthyroid: Normal TSH, T3, T4.
- Primary Hypothyroidism: Elevated TSH with low T4.
- Subclinical Hypothyroidism: Elevated TSH with normal T4.
- Primary Hyperthyroidism: Suppressed TSH with elevated T3/T4.

Data processing and analysis/statistical analysis: The statistical analysis was conducted using the Statistical Package for Social Sciences (IBM-SPSS software version 20.0). Descriptive data was presented as Mean±SD, frequency, and percentage. Spearman's Rank Correlation test was used to correlate the variables, age and gender with thyroid dysfunction.

RESULTS

1. AGE WISE DISTRIBUTION AND CATEGORISATION OF THYROID DYSFUNCTION PATIENTS

TYPE OF THYROID DISORDER	AGE				TOTAL
	≤18	19-39	40-59	≥60	
EUTHYROID	1	69	13	6	89
PRIMARY HYPOTHYROIDISM	1	24	20	5	50
SUBCLINICAL HYPOTHYROIDISM	1	6	4	2	13
PRIMARY HYPERTHYROIDISM	0	5	1	0	6
TOTAL	3	104	38	13	158
CHI-SQUARE TEST	**P = 0.027 (SIGNIFICANT)**				

When the data collected from our hospital was analysed for age distribution, it was observed that, although thyroid function test was ordered based on high clinical suspicion, euthyroid category constituted the major bulk of patients in all age groups. All patterns of thyroid dysfunction were seen predominantly in the age group category of 19-39 years and was statistically significant (p=0.027).

2. GENDER WISE DISTRIBUTION AND CATEGORISATION OF PATTERN OF EUTHYROID AND THYROID DYSFUNCTION PATIENTS

TYPE OF THYROID DISORDER	FEMALES	MALES	TOTAL
EUTHYROID	87	2	89
PRIMARY HYPOTHYROIDISM	45	5	50
SUBCLINICAL HYPOTHYROIDISM	13	0	13
PRIMARY HYPERTHYROIDISM	6	0	6
TOTAL	151	7	158
CHI-SQUARE TEST	**P = 0.13 (NOT SIGNIFICANT)**		

There was female predominance as far as the bulk of thyroid disease was concerned. However, in our study it was not statistically significant because of the small sample size of male patients. Primary hypothyroidism was the most common disorder in both sexes.

3. MEAN AGE ACCORDING TO GENDER

GENDER	MEAN	SD
FEMALES	35.56	13.96
MALES	49	16.16

The mean age of the patients studied in our tertiary care hospital for males was 49 years whereas it was 35.5 years for females.

GENDER	MEAN AGE±SD (IN YEARS) EUTHYROID PATIENTS (89)	MEAN AGE±SD (IN YEARS) IN THYROID DYSFUNCTION CASES (69)	T-TEST
FEMALE	32.86±13.82	39.23±13.40	**0.005**
MALE	39.5±21.92	52.8±14.44	**0.54**

Our study depicted that mean age of patients suffering from thyroid dysfunction in females was 39 years whereas it was 52 years for males. Male patients suffering from thyroid dysfunction had relatively higher mean age as compared to females as per the data collected.

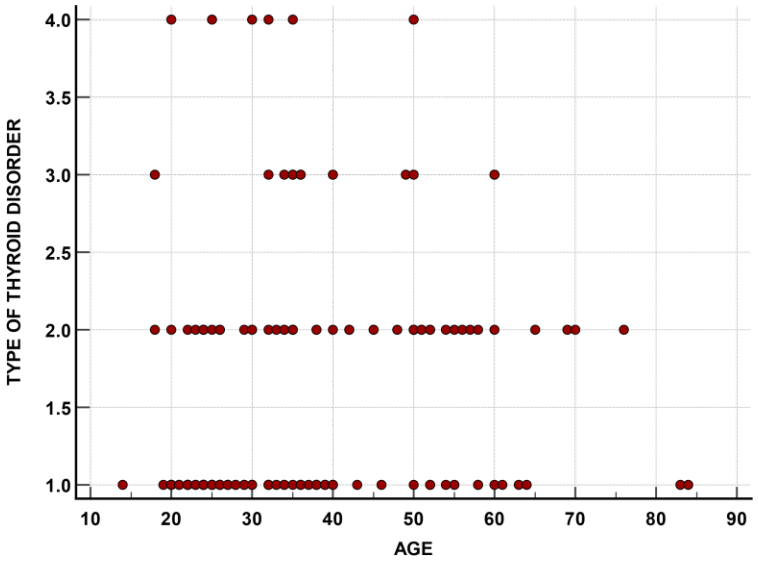
4. MEAN AGE ACCORDING TO EUTHYROID STATUS OR THYROID DISORDER

TYPE OF THYROID DISORDER	AGE (IN YEARS) MEAN±SD
EUTHYROID	33.0±13.9
PRIMARY HYPOTHYROIDISM	41.2±14.6
SUBCLINICAL HYPOTHYROIDISM	40.4±11.7
PRIMARY HYPERTHYROIDISM	32.0±10.3

Our study noted that all types of thyroid disorders were more common in the age group of 30-45 years.

5. AGE VS THYROID DISORDER

A WEAK CORRELATION IS OBSERVED BETWEEN THYROID DISORDER AND AGE WHEN THE SPEARMAN'S RANK CORRELATION WAS APPLIED.
SPEARMAN CORRELATION CO-EFFICIENT = 0.263 (WEAK)
LEVEL OF SIGNIFICANCE = 0.008 (SIGNIFICANT)



Type of thyroid disorder: 1: Euthyroid, 2: Primary hypothyroidism, 3: subclinical hypothyroidism, 4: Primary hyperthyroidism

The correlation between gender and thyroid disorder is not appropriate with spearman's test as gender is nominal data. Hence chi-square test applied in table 2 can be considered.

DISCUSSION

Our study was a hospital based cross sectional study conducted to know the patterns of thyroid dysfunction in a particular geographic area in the latter half of year, 2025. Total of 158 patients were recruited in the study.

The prevalence of thyroid dysfunction among the population studied was 43.6%. Among patients with thyroid dysfunction, it was noted that hypothyroidism was the most common thyroid disorder across all age groups, both in males and females. In a study conducted by Unnikrishnan AG et al[7] observing the epidemiological perspective of thyroid diseases in Cochin among 971 adult subjects, it was seen that prevalence of thyroid dysfunction was 20%. It was higher in females as compared to males. However, in their publication subclinical hypothyroidism had higher prevalence of 9.4% as compared to overt hypothyroidism (3.9%), unlike our study where number of overt hypothyroidism patients was higher than the subclinical hypothyroidism patients. In a study conducted by Mitra B et al[8] the prevalence of hypothyroidism in women was found to be 20.7% in Jharkhand, India. The study also observed that prevalence of subclinical hypothyroidism was higher than overt hypothyroidism ang in total hypothyroidism was the most common thyroid dysfunction. The discrepancy showing overt hypothyroidism being more common than subclinical hypothyroidism in our study may be due to the fact that our study was a hospital-based study where thyroid function tests were conducted in patients where the suspicion of thyroid disorder was present.

Thyroid disorder as per our study was more common in women but was not statistically significant because of smaller sample size of male patients. A study undertaken by Yang M et al[9] showed that females had a significantly higher rates of thyroid disease as compared to males. Similarly in a study done on young females by Velayutham K et al[10] in Tamil Nadu showed that one in every eight women had thyroid dysfunction. Hence, we can note that thyroid disease is more common in females, the difference noted in our study was due to the confounding factor mentioned above.

The mean age of presentation of thyroid disorders as per our study was 39 years and 52 years in females and males respectively. In a study conducted by Jose AM et al major thyroid disease burden in females was seen in the age group of 30-59 years. However, a study conducted by Yadav M et al[12] had an observation that thyroid diseases were more common in postmenopausal women. In males, thyroid diseases are more common in 40–60-year age group as per the study conducted by Antony J et al[13]. So, our conclusion that thyroid diseases present a later age in males is supported by other studies.

When a general comparison was done in total regarding the mean age of presentation of thyroid diseases it was noted that middle age group was the susceptible age group for developing thyroid disease both in males and females, although the age of presentation was slightly higher for males.

CONCLUSION

In conclusion, there is a high prevalence of thyroid disease in northern part of Karnataka among patients attending General Medicine clinics. The middle-aged males and females are most affected with overt hypothyroidism being the most common disorder. Hyperthyroidism of autoimmune aetiology presents at a slightly earlier age as compared to other thyroid diseases. There is a need for population based studies in our part of the world to support the findings of our study and undertake age and gender specific screening techniques and preventive measures.

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