

Original Research Article

A prospective study to analyze the etiology, prevalence, clinical presentation, age and sex wise distribution of thyrotoxicosis among thyroid disorders in a tertiary care hospital

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ABSTRACT

Background: Thyrotoxicosis is a clinical syndrome characterized by an excess of free thyroxine and triiodothyronine or both. One of the major and usual causes of thyrotoxicosis is Graves' disease. Morbidity associated with the situation is very high and it demands early diagnosis and treatment. This can reduce the burden of the disease it imparts on the society. The aim of the study is to analyse the etiology, prevalence, clinical presentation, age, and sex-wise distribution of thyrotoxicosis among thyroid disorders presenting to Government Medical College, Thiruvananthapuram.

Methods: It is a prospective study undertaken in tertiary care and teaching hospital over a period of one year. 2401 patients admitted in the general ward with thyroid disorders were included in the study. Definite inclusion and exclusion criteria were followed. Relevant blood tests were done in all cases.

Results: On analysis of the data which were entered in excel format the prevalence of thyrotoxicosis was 2.5%. The majority of the study population was in the twenties and forties. Incidences in females were more mainly due to increased prevalence.

Conclusions: By studying the etiology, prevalence, clinical presentation, age, and sex-wise distribution of Thyrotoxicosis, the disease burden in the population can be understood and early diagnosis and proper treatment can be instituted. Our study prevalence was comparable with similar studies done in other institutions.

Keywords: Thyrotoxicosis, Prevalence, Graves' disease, Age, Sex

INTRODUCTION

Thyroid disorders account for one of the major health problems in developing countries. India amounts to an increased number of thyroid disorders.¹ Thyrotoxicosis is a clinical syndrome due to excess of circulating free thyroxine (T4) and triiodothyronine (T3) or a combination of both.² The most common cause of hyperthyroidism, in general, are due to Graves' disease (70-80%). Other causes include toxic thyroid adenoma, toxic multinodular goitre, and subacute thyroiditis. Overdosing of medicine resulting in thyrotoxicosis is sometimes seen.³

Symptoms of thyrotoxicosis include sweating, weight loss despite increased appetite, heat intolerance, increased thirst, menstrual disturbance, anxiety, diarrhoea, palpitation, hair loss, sleep disturbances.⁴ Thyrotoxicosis can be primary type presenting with symptoms related to the central nervous system. It can be a secondary type that presents with more cardiovascular system involvement such as high output cardiac failure, congestive heart failure, peripheral oedema, and arrhythmias such as ventricular tachycardia and atrial fibrillation.^{5,6} Graves' disease is an autoimmune disorder presenting with painless diffuse goitre in 90%, ophthalmology in 60%

pretibial myxedema 1-5%, a female-male ratio of 10:1. Some develop dermopathy and thyroid acropathy.

Hyperthyroidism in Graves' disease is mediated by stimulant action of thyroid-stimulating hormone receptor autoantibodies (TSH-R) on thyrocytes.⁷ These autoantibodies bind to and activate the TSH-R and mimic the effects of thyroid-stimulating hormone (TSH) resulting in biosynthesis and secretion of thyroid hormone. It stimulates thyrocyte proliferation leading to enlargement of the thyroid gland or may block the synthesis of TSH by blocking autoantibodies.^{8,10} Some people develop one episode of hyperthyroidism and then go in for hypothyroidism years later. Thyroid failure occurs due to thyroid blocking antibodies and tissue destruction by cell-mediated immunity and cytotoxic antibodies.⁹

Grave's disease is managed medically by drugs which include carbimazole, methimazole, and propyl thyo uracil depending on the situation. Treatment duration may last for usually 18 months. Complications include pruritus, arthralgia, alopecia, agranulocytosis, cholestatic jaundice, aplastic anaemia, and thrombocytopenia. The relapse rate of grave's disease is 50% after 18 months. Beta-blockers are used to decrease clinical features such as tremor, palpitation, and anxiety. Iodine 123 (I^{123}) isotope is used in nuclear medicine for treating Graves' disease. It is mainly for elderly people, recurrence after using antithyroid drugs for a long period, and on whom surgery or drug treatment is contraindicated.¹¹

A high relapse rate is associated with a high concentration of TSH-R at the time of diagnosis, large goitre, and severe hyperthyroidism at the time of diagnosis.²¹ Surgery has an important role in the treatment of thyrotoxicosis after making the gland euthyroid. This is mainly for patients who are not fit for medical management or radioactive iodine treatment.³

Graves's ophthalmopathy is a dreaded complication of Graves' disease which needs proper and planned care.²² Treatment includes wearing dark glasses in minor cases to artificial tears, tarsorrhaphy, and orbital decompression, and steroids in more difficult situation.⁹ Toxic nodular goitre and toxic adenoma are associated with hyper-functioning nodule detected in I^{131} scan which is treated by radioactive iodine or by surgery depending on considering various other factors.^{12,13}

The aim of the study is to analyse the etiology, prevalence, clinical presentation, age, and sex-wise distribution of Thyrotoxicosis among thyroid disorders in a tertiary care hospital. This study gives an idea about the hospital prevalence of hyperthyroidism, common age, and sex-wise distribution, the different ways of clinical presentation of thyrotoxicosis, among the thyroid disorders admitted in a tertiary care hospital which will give indirect evidence about the impact of this disease condition in the health care system.

METHODS

This is a prospective study and was set up in the Department of General Surgery, Government Medical College, Thiruvananthapuram during the period from January 2003 to December 2003. 2410 patients admitted to surgical wards with thyroid swelling were included in the study. Proper inclusion and exclusion criteria were made.

Inclusion criteria

All patients with thyroid swelling above the age of 13 years admitted to Medical College Hospital, Thiruvananthapuram during the study period were selected for the study.

Exclusion criteria

All patients below the age of 13 years, those associated with severe co-morbid conditions, patients with thyrotoxicosis treated with other modalities of management were excluded.

Selection of cases was done by senior residents with guidance from the senior faculty member in charge of the wards. All patients with thyroid swelling, who were admitted, were asked about the history related to hyperthyroidism. A clinical examination was carried out. Thyroid function test results were analysed and patients with symptoms, sign, and thyroid function test results showing hyperthyroidism were selected for the study with due importance in matching the inclusion and exclusion criteria. Ethical approval for the study was obtained from the hospital ethical committee.

With a confidence level of 95%, the sample size was calculated using the formula $4pq/l$ square. With p as 2, l is 20% of p which is 0.2; q will be $100-p=98$. The minimum sample size was calculated to be 1960. All patients satisfying the inclusion criteria were consecutively recruited.

The data were entered in excel format in computer and the statistical analysis part was done by using the statistical program SPSS. All observations of frequency are described in percentages. The data were presented with tables, figures, and diagrams.

RESULTS

During the study period of study, of the 2410 patients who were admitted to the general ward of the surgical department with complaints of thyroid problems, 60 patients had proved features of thyrotoxicosis. The prevalence was analyzed and it was found to be 2.5% (Table 1).

Table 1: Prevalence of Thyrotoxicosis.

No. of thyroid cases admitted	Thyrotoxicosis	Prevalence
2410	60	2.5%

In this study, the youngest patient was 14 years old and the oldest was of 65 years. The majority of the study population was in the twenties and forties (Figure 1).

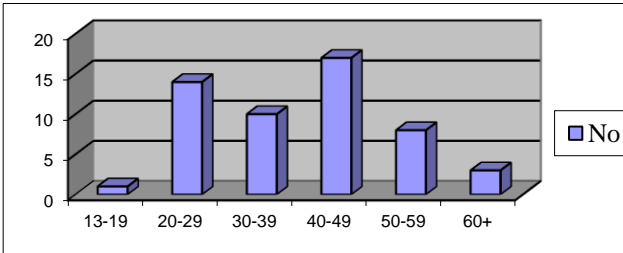


Figure 1: Age-wise distribution of patients.

Considering the total number of admission of any thyroid swelling, the female incidence is more, partly because of increased prevalence and partly because of increased cosmetic awareness among young females (Figure 2).

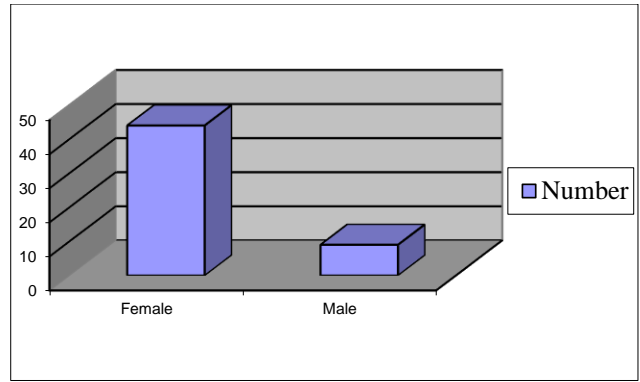


Figure 2: Sex-wise distribution of patients.

This distribution is having similarities with most of the reported series in our country and elsewhere. The main presenting symptoms were analyzed and palpitation was present in 96.7% of patients, swelling in the thyroid region was present in 91.6% and tremor in 88.5%. Hoarseness of voice was low and present only in 1.3%. Heat intolerance was present in 76.6%, loss of weight in 88.5%, whereas increased appetite in 68.4%. Among the female patients, menstrual irregularity was there in 26.7% (Table 2) (Figure 3).

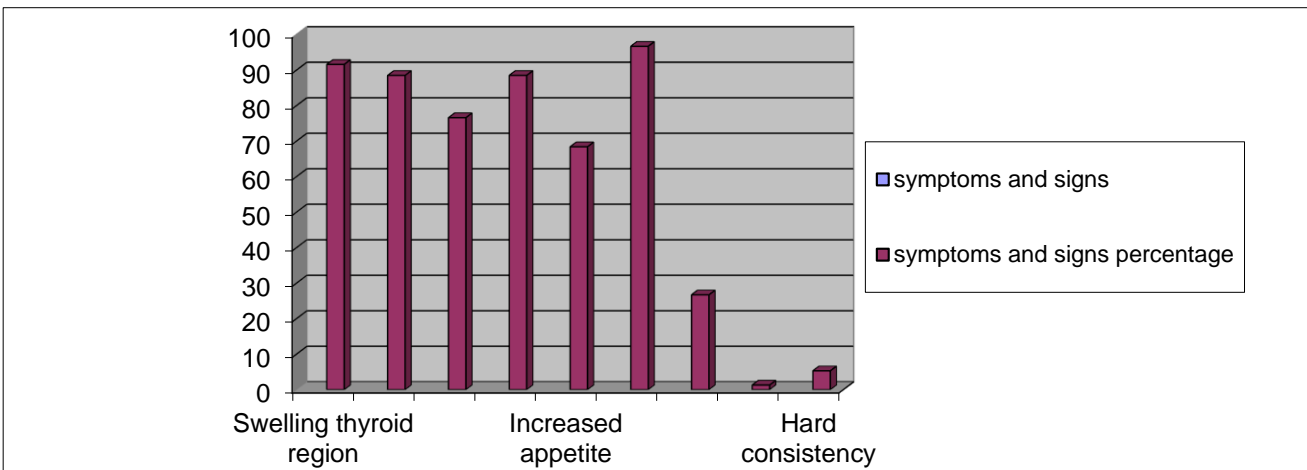


Figure 3: Symptoms and signs.

Table 2: Symptoms and signs of thyrotoxicosis.

Symptoms and signs	No. of patients	Percentage
Swelling thyroid region	55	91.6
Tremor	53	88.5
Heat intolerance	46	76.6
Loss of weight	53	88.5
Increased appetite	41	68.4
Palpitation	58	96.7
Menstrual Irregularity	16	26.7
Hoarseness of voice	1	1.3
Hard consistency	4	5.3

The different etiologies of hyperthyroidism were analyzed. Toxic multinodular goiter was the etiology in 66.8%. Graves' disease accounts for 21.4% and Toxic adenoma for 11.8% (Figure 4).

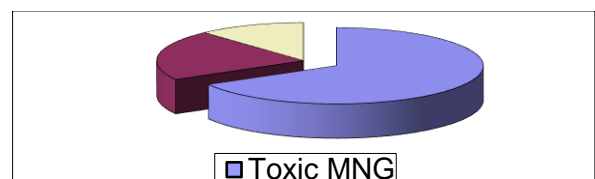


Figure 4: Etiology of thyrotoxicosis.

DISCUSSION

The prevalence of thyrotoxicosis among thyroid disorders in our study was 2.5%. In a similar study by Bose et al, the prevalence of hyperthyroidism is 1.79%, which is close to our study.¹⁴ The majority of the study population was in the twenties and forties. Female incidence was high in total admissions of thyroid swelling partly due to increased prevalence and partly due to increased cosmetic awareness among females. In another similar study by Abharam et al from Pondicherry, the prevalence was 1.8%.¹⁵ In a study by Hoogendoorn et al the prevalence of overt hyperthyroidism was 0.4% and subclinical hyperthyroidism was 0.8%.¹⁶

In a Madurai based study conducted by Velayutham et al, the prevalence of hyperthyroidism among the female population was 0.3%.¹⁷ Another study conducted by Bjuro et al, the prevalence of hyperthyroidism was 2.5% in females and 0.6% in males.¹⁸ In a meta-analysis by Madariaga et al in Europe the prevalence of hyperthyroidism was 0.8%.¹⁹ In the NHANES III survey by Hollowell et al in the USA, the prevalence of hyperthyroidism was 1.3%.²⁰ The main presenting symptoms were palpitation (96.7%), swelling thyroid region (91.6%), tremor (88.5%), heat intolerance (76.6%), loss of weight (88.5%), increased appetite (68.4%), menstrual irregularity (26.7%), hoarseness of voice (1.3%) which was almost similar in other studies done elsewhere. The different etiologies of hyperthyroidism were also accessed; the results of which came as follows: toxic multinodular goiter was 66.8%; Graves' disease 21.4%; toxic adenoma 11.8%

Taking into consideration the prevalence of thyrotoxicosis in different studies done in other parts of the world, our prevalence of thyrotoxicosis due to hyperthyroidism is higher when compared. This study is covering only a small cross-section of society. Further studies are needed to assess the prevalence better. Financial problems, access to the health care system, cultural aspects, and apprehensions of the people may be preventing them from getting examined and tested to diagnose the problem in a wider dimension.

CONCLUSION

The prevalence of thyrotoxicosis among thyroid disorders in our study is 2.5%. The majority of the study population was in the twenties and forties. In the total number of admission of any thyroid swelling, the female incidence is more partly because of increased prevalence and partly because of increased cosmetic awareness among young females.

Hyperthyroidism and other causes of thyrotoxicosis are a real burden to the health care system in terms of financial aspects as well as morbidity to the patients.

A study on the prevalence of thyrotoxicosis among thyroid disorders is crucial as it can give an idea about the present disease burden in the hospital. This gives an idea about the plan to assess prevalence in the community. This methodology and plan of work can later be used for conducting larger studies based on the prevalence, clinical presentation, and etiology of thyrotoxicosis.

One among the limitation of the study is that, the present study is conducted in only one institution and is inpatient based. This will give only a hospital based prevalence. To get community based prevalence, the study needs to be extended to outpatient department as well as to other institutions.

By conducting such multicentre studies in a larger extend by inter-institutional data collection and wider data analysis, the consensus in the management of thyrotoxicosis can be made and can be used for the betterment of patient care in the future.

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