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Research Article

A PROSPECTIVE STUDY TO DETERMINE THE PATHOPHYSIOLOGICAL MANIFESTATIONS AND PREVALENCE OF THYROTOXICOSIS

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Abstract:

Objective: To assess the Prevalence and Presentation of Thyrotoxicosis at Lahore. **Study Design:** Prospective Study. **Place and Duration of Study:** This study was conducted at the Mayo hospital, Lahore for the duration of one year from November, 2018 to October, 2019. **Materials and Methods:** We included in this prospective study 100 newly diagnosed patients of thyroid disorder. Patients were examined for their signs and symptoms as well as their clinical and family history. The blood samples of these patients were drawn and preserved at -80C. Patients were clinically diagnosed into hyperthyroidism by thyroid function test utilizing RIA. Patients having clinically visible enlarged swelling in front of neck were subjected to 99Tc Pertechnetate thyroid imaging. Patients in this study were of all ages and both genders. An informed consent was obtained from each individual participant. The data was recorded on designed performa. Initial screening included complete thyroid profile to identify thyrotoxicosis. **Results:** In this study the prevalence of the patients of Thyrotoxicosis was higher (31 %) n=31 at the age group of 41-50 years as compared to other age groups. Maximum (90%) n=90 patients were females as compared to male (10%) n=10. The patients of Thyrotoxicosis from rural population were (68%) n=68 & (32%) n=32 from urban population. Loose stools were present in (49%) n=49, (7%) in male and (42%) in female, anxiety was present in (85%)n=85 patients in male & (75%) in female, hair loss was present in (35%) n=35 patients, (05%) male & (30%) in female. Menstrual irregularities was present in (45%) n=45 of the female, heat intolerance was present in (64%) n=64 of the patients (4%) in male & (60%) in female, periorbital edema was present in (24%) n=24 of the patients, (01%) in male and (23%) in female, hoarseness was present in (38%) n=38 of the patients, (03%) in male and (35%) in female, sweating was present in (68%) n=68 of the patients, (05%) male & (63%) in female, exophthalmos was present in (49%) n=49 of the patients, (06%) in male & (43%) in female, tremors were present in (74%) n=74 of the patients, (10%) in male & (64%) in female, shortness of breath was present in (70%) n=70 of the patients, (05%) in male & (65%) in female, increased appetite was present in (53%) of the patients, (06%) in male & (47%) in female, polyuria was present in (40%)n=40 of the patients, (04%) in male & (36%) in female, goiter was present in (75%) n=75 of the patients, (09%) of male & (66%) in female of the Thyrotoxicosis. The mean age was 40±13SD. The mean ±SD of BMI was 23.65±3.70, 19.66±3.78 in male & 25.67±4.70 in female, free T3 was 7.25±1.9nmol/l as total 7.3±1.8 nmol/l in male & 6.85±2.4 nmol/l in female, total TSH(uU/ml) was 0.63±0.17(uU/ml), 0.63±0.15(uU/ml) in male & 0.59±0.29(uU/ml) in female. **Conclusion:** People awareness about the dietary iodine intake is necessary in our country to overcome the increased prevalence of the thyroidal dysfunction in our population. It is observed that hyperthyroid state is more common in our population.

Key Words: Goiter, RIA, Thyrotoxicosis, Prevalence.

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INTRODUCTION:

Changes in the hypothalamus-pituitary-thyroid axis (HPT) usually affects the whole-body mechanisms by disturbing thyroid function [1]. Thyroidal disease and diabetes mellitus are most common glandular disorders all around the world, irrespective of the gender and age [2]. Most thyroid hormone derangements may vary from subclinical which is asymptomatic with abnormal TSH level and normal free T3 and T4 levels to clinically symptomatic with abnormal T3 and T4 levels [3]. Besides this, common thyroid dysfunctions include subclinical phases, goiter, iodine deficiency disorders, Hashimoto's thyroiditis, Graves' disease and thyroid cancer. The thyroid disorders have been reported in over 110 countries of the world with 1.6 billion people at risk [4].

Iodine is essential for producing T3 and T4 [5,6,7]. Iodine deficiency usually prevails over one third part of the world. The prevalence of goiter in areas of severe iodine deficiency can be up to 80% [8]. Iodine deficiency is the basis of high prevalence of thyroid disorders in South Asian population as well [9]. In many cases mainly goiter is the sole reason for patient to screen for thyroid disorder by their physician. Prevalence as high as 12% and 23% of goiter has been reported in India in adults and children [10] respectively. In Pakistan, the prevalence of hyperthyroidism is reported to be 5.1%. It is also perceived that the prevalence of both

hyperthyroidism and hypothyroidism (subclinical or overt) is higher in females than males [11]. Hence, improved public awareness about thyroidal ailments is one of the important factors to cope with this disorder.

MATERIALS AND METHODS:

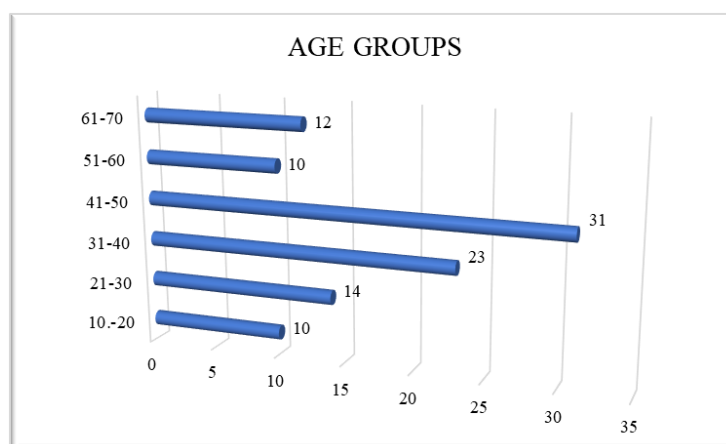
This prospective study was conducted at the Mayo hospital, Lahore for the duration of one year from November, 2018 to October, 2019. We included in this prospective study 100 newly diagnosed patients of thyroid disorder. Patients were examined for their signs and symptoms as well as their clinical and family history of thyroid disorders. The blood samples of these patients were drawn and preserved at -80C. Patients were clinically diagnosed into hyperthyroidism by thyroid function test utilizing RIA. Patients having clinically visible enlarged swelling in front of neck were subjected to ⁹⁹Tc Pertechnetate thyroid imaging. Patients in this study were of all ages and both genders. An informed consent was obtained from each individual participant. The data was recorded on designed performa. Initial screening included complete thyroid profile to identify thyrotoxicosis.

RESULTS:

In our study the prevalence of the patients of Thyrotoxicosis was higher (31 %) n=31 at the age of 41-50 years as compared to other age groups as shown in table number 01.

Table No 01: Age & Sex Distribution in Patients of Thyrotoxicosis

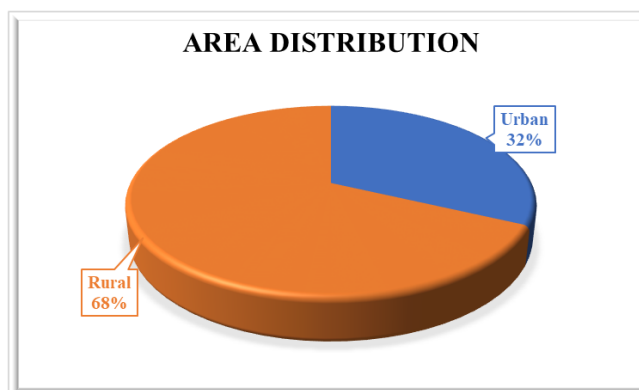
Age (Years)	No of Patients (%)	Male (%)	Female (%)
10-20	10 (10%)	1 (1%)	09 (9%)
21-30	14 (14%)	3 (3%)	11 (11%)
31-40	23 (23%)	1 (1%)	22 (22%)
41-50	31 (31%)	2 (2%)	29 (29%)
51-60	10 (10%)	1 (1%)	09 (9%)
61-70	12 (12%)	2 (2%)	10 (10%)
Total	100 (100 %)	10 (10 %)	90 (90%)



Prevalence was maximum (90%) n=90 female patients as compared to male (10%) n=10 as shown in table number 01. The patients of Thyrotoxicosis from rural area were (68%) n=68 & (32%) n=32 from urban population as shown in table number 02.

Table No 02: Area Distributions in Patients of Thyrotoxicosis

Area	No of Patients	Male %	Female %
Urban	32 (32%)	3 (3%)	29 (29%)
Rural	68 (68%)	7 (7%)	61 (61%)
Total	100 (100%)	10 (10%)	90 (90%)



Loose stools were present in (49%) n=49, (7%) in male and (42%) in female, anxiety was present in (85%)n=85 patients (10%) in male & (75%) in female, hair loss was present in (35%) n=35 patients ,(05%) male & (30%) in female. Menstrual irregularities was present in (45%) n=45 of the female, heat intolerance was present in (64%) n=64 of the patients (4%) in male & (60%) in female, periorbital edema was present in (24%) n=24 of the patients, (01%) in male and (23%) in female, hoarseness was present in (38%) n=38 of the patients, (03%) in male and (35%) in female, sweating was present in (68%) n=68 of the patients, (05%) male & (63%) in female, exophthalmos was present in (49%) n=49 of the patients, (06%) in male & (43%) in female, tremors were present in (74%) n=74 of the patients, (10%) in male & (64%) in female, shortness of breath was present in (70%) n=70 of the patients, (05%) in male & (65%) in female, increased appetite was present in (53%) of the patients, (06%) in male & (47%) in female, polyuria was present in (40%)n=40 of the patients, (04%) in male & (36%) in female, goiter was present in (75%) n=75 of the patients, (09%) of male & (66%) in female of the Thyrotoxicosis as shown in table number 03.

Table No 03: Distributions of Clinical Signs and Symptoms in Patients of Thyrotoxicosis

SIGNS AND SYMPTOMS	MALE %	FEMALE %	TOTAL %
LOOSE STOOLS	7 (7%)	42 (42%)	49 (49%)
ANXIETY	10 (10%)	75 (75%)	85 (85%)
HAIR LOSS	5 (5%)	30 (30%)	35 (35%)
MENSTRUAL IRREGULARITIES	-	45 (45%)	45 (45%)
HEAT INTOLERANCE	4 (4%)	60 (60%)	64 (64%)
HOARSENESS	3 (3%)	35 (35%)	38 (38%)
SWEATING	5 (5%)	63 (63%)	68 (68%)
EXOPHTHALMOS	6 (6%)	43 (43%)	49 (49%)
TREMORS	10 (10%)	64 (64%)	74 (74%)
INCREASED APPETITE	6 (6%)	47 (47%)	53 (53%)
POLYURIA	4 (4%)	36 (36%)	40 (40%)
GOITER	9 (9%)	66 (66%)	75 (75%)

The mean age was 40 ± 13 SD. The mean \pm SD of BMI was 23.65 ± 3.70 , 19.66 ± 3.78 in male & 25.67 ± 4.70 in female, free T3 was 7.25 ± 1.9 nmol/l as total 7.3 ± 1.8 nmol/l in male & 6.85 ± 2.4 nmol/l in female, total TSH(uU/ml) was 0.63 ± 0.17 (uU/ml), 0.63 ± 0.15 (uU/ml) in male & 0.59 ± 0.29 (uU/ml) in female as shown in table number 04.

Table No 04: Biochemical Parameters in patients of Thyrotoxicosis

Biochemical Parameters	Male Mean \pm SD	Female Mean \pm SD	Total Mean \pm SD
BMI (kg/m²)	19.66\pm3.78	25.67\pm4.70	23.65\pm3.70
FreeT3 (nmol/l)	7.3\pm1.8	6.85\pm2.4	7.25\pm1.9
FreeT4 (nmol/l)	202.0\pm19.2	199.1\pm23.6	201.7\pm19.5
TSH (uU/ml)	0.63\pm0.15	0.59\pm0.29	0.63\pm0.17

DISCUSSION:

Thyroid hormone is necessary for normal growth, development, metabolic regulation neuronal differentiation, in mammals and are required for metamorphosis in amphibians [12]. These actions are most apparent in conditions of thyroid hormone deficiency leading to hypothyroidism, or hyperthyroidism a condition arise due to excess of thyroid hormone production [13]. Thyroidal events are usually the result of different contributing factors like geographical distribution, food habits, dietary iodine consumption and genetic predisposition [14].

The present study was aimed to determine the pathophysiological manifestations and prevalence Thyrotoxicosis in Lahore. In our study, among 100 Thyrotoxicosis patients, 90% were females and 10% were males, which showed that females are more prone to have Thyrotoxicosis. Thyrotoxicosis is reported to be more common in women (2% to 5%) with female to male ratio up to 5:1 between the ages of 20-40 [15]. However, in our study this investigation female to male ratio is 9:1, there is increased prevalence of Thyrotoxicosis state especially in females. In our study peak age for Thyrotoxicosis is 31-40 years. Many studies have also reported the increase in the prevalence of thyroid disorders in middle age. High prevalence of hyperthyroidism in Pakistani population is reported by several studies. Being an iodine deficient region, the increased prevalence of hyperthyroidism might be due to autoimmune disorder or due to inconsiderate use of iodized salt in the diet due to which thyroid gland becomes hyper functional leading to the state of hyperthyroidism [16].

Most thyroid dysfunctions are autoimmune in nature; Graves's diseases accounts for the thyrotoxicosis and Hashimoto's thyroiditis for hypothyroidism. Goiter is one of the leading outcomes of the altered thyroid biology. In our data Thyrotoxicosis, 90% female and 10% male. The occurrence of goiter and thyroid disease is determined by complex interplay among gender, environmental and genetic factors, and the major environmental factor that determines the goiter

dominance is iodine intake status. In addition to this, higher prevalence of goiter among female is attributed to proliferative effect of estrogen on thyrocytes in the thyroid gland [17].

In our investigation, common symptoms observed in thyrotoxicosis state were heat intolerance (64%), anxiety (85%), menstrual irregularities (45%), and hoarseness (38%). Clinically profound symptoms of the hyperthyroidism are weight loss, increased hunger, weakness, and tremors of hands, elevated heartbeat, goiter, loose stools, anxiety, exophthalmos, increased sweating, and heat intolerance [18]. In this study, clinical symptoms of thyrotoxicosis were loose stools (49%), and heat intolerance (64%), tremors (74%), sweating (68%), anxiety (85%) and increased appetite (53%).

CONCLUSION

People awareness about the dietary iodine intake is necessary in our country to overcome the increased prevalence of the thyroidal dysfunction in our population. It is observed that hyperthyroid state is more common in our population.

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