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Research Article

### FREQUENCY OF THYROID PATHOLOGIES AT TERTAIARY CARE UNIT

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**Abstract:**

*Objectives: Endocrine diseases are common, particularly those of the thyroid gland. The pathophysiology of many thyroid diseases relates to TSH, T3 and T4. The most important chemical marker of thyroid function is TSH. Hyperthyroidism is the result of low TSH profile, whereas high value leads to hypothyroidism. Thyrotoxicosis is the hyper-metabolic condition confirmed by estimation of free T4 (fT4), free T3 (fT3). Thyrotoxicosis or hyperthyroidism is an excess of thyroid hormone caused by an over active thyroid tissue or is the consequence of additional synthesis and liberation of thyroid hormone. Aim of the current study is to determine the frequency of thyroid pathologies among the patients visiting Jinnah Hospital Lahore.*

*Methods: It is an observational study done at main medical OPD of Jinnah Hospital Lahore. In this study we evaluated 300 patients from May 2019 to July 2019. This study was approved by the ethical committee of Jinnah hospital. The blood samples were collected, followed by their analysis for triiodothyronine (T3), tetraiodothyronine (T4) and thyroid stimulating hormone (TSH). All the patients were interrogated with the help of a preformed questionnaire. A brief history including sociodemographic details, family history of thyroid disease were also asked. All necessary laboratory investigations were performed including a lipid profile, complete blood count, LFTs, etc.*

*Results: among 300 patients, there were 180 female (60%) and 120 male (40%) with female to male ratio of 1.8:1.2. Majority of patients were in age group of 25-55. The results obtained revealed that female gender has categorically significantly high percentage of occurrence of thyroid abnormality as compared to male gender (76.4% vs. 23.6%). Results regarding locality distribution of the patients depicted that majority of those belonged to the local population of Lahore.*

*Conclusion: Thyroid diseases are more common in females as compared to males. The most probable causes could be lactation and pregnancy and hormone changes.*

**Keywords:** Thyroid dysfunction, euthyroid, hypothyroid, hyperthyroid.

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**INTRODUCTION:**

Endocrine diseases are common, particularly those of the thyroid gland. Some endocrine glands respond directly to metabolic glands; while most are controlled by hormones released from the pituitary gland [1]. Endocrine diseases are increasing globally but are growing more rapidly in Asia [2]. In Nepal, about 0.2% of deaths are because of endocrine disorders, the major cause of which is iodine deficiency [3]. The pathophysiology of many thyroid diseases relates to TSH, T3 and T4. The most important chemical marker of thyroid function is TSH. Hyperthyroidism is the result of low TSH profile, whereas high value leads to hypothyroidism [4]. Thyrotoxicosis is the hyper-metabolic condition confirmed by estimation of free T4 (fT4), free T3 (fT3) [5]. Thyrotoxicosis or hyperthyroidism is an excess of thyroid hormone caused by an over active thyroid tissue or is the consequence of additional synthesis and liberation of thyroid hormone. The incidence of hyperthyroidism is lower i.e., 2% as compared with hypothyroidism in general population of Pakistan [6]. In 90% cases, thyrotoxicosis or hyperthyroidism is caused by Graves's disease, toxic multinodular goiter and toxic adenoma. In some cases, sub-acute thyroiditis is also responsible for hyperthyroidism [7]. After Graves's disease, the major cause of thyrotoxicosis is toxic multinodular goiter, which has mostly been diagnosed in mature and aged patients. About 5% of patients with thyrotoxicosis have toxic thyroid adenoma caused by excessive release of thyroid hormones [8]. Hypothyroidism is a common metabolic disorder in the general population. It is characterized by diminished metabolism, retarded growth and development, impaired mental activity and swelling of certain parts of the skin. It is a disease caused by lack of iodine in drinking water [9]. Hypothyroidism is a clinical condition due to deficiency of thyroid hormone and increased level of TSH [10]. Hypofunction of the thyroid gland is also accompanied by changes throughout the organism.

Hypothyroidism was found in more than 2% of 2800 patients [11]. In case of sufficient iodine intake; autoimmune thyroid disease Hashimoto's thyroiditis appears to be the most common cause. In this situation, there is replacement of normal thyroid tissue with lymphocytic and rubbery tissue [12]. The presence of excess iodine in patient's body is also a cause of hypothyroidism including patients with a history of radioactive therapy, autoimmune thyroiditis and subtotal thyroidectomy. Other causes of hypothyroidism include certain medications like interferon alpha, amiodarone, thalidomide lithium and sta-vudine [13].

**METHODS:**

Blood samples and data were collected from patients attending Jinnah hospital Lahore, Pakistan. Patients visiting the hospital from different areas of Pakistan were also included in this study. The study subjects were divided into three groups: euthyroid, hypothyroid and hyperthyroid. Euthyroids serve as the control group; the number of cases included in this group is 109, whereas 97 and 94 patients are grouped as hyperthyroids and hypothyroids, respectively. Patients suffering from chronic diseases like hypertension, diabetes mellitus and cardiac disorders were excluded. Patients having thyroid surgery were also excluded. Patients who were taking thyroxin were also excluded. The selected cases were analyzed for serum levels of TSH, T4, T3, by using Gamma counter. TSH in the sample is estimated by using radioimmunoassay (RIA) [14]. The principle involved in the determination of fT4 and fT3 is based on the use of labeled antibody [15, 16].

**RESULTS:**

There were a total of 300 patients, out of which 80 (40%) were male and 120 (60%) female with male to female ratio of 1.8:1.2. Majority of the patients were in the age group of 25-55 years.

**Table 1: Social and demographic details of the patients. n=300.**

|                           | Frequency | Percentage |
|---------------------------|-----------|------------|
| <b>Age (years)</b>        |           |            |
| 30-39                     | 86        | 29         |
| 40-49                     | 120       | 40         |
| 50-59                     | 63        | 21         |
| 25-30                     | 31        | 10         |
| <b>Gender</b>             |           |            |
| Male                      | 120       | 40         |
| Female                    | 180       | 60         |
| <b>Educational status</b> |           |            |

|                       |     |    |
|-----------------------|-----|----|
| Illiterate            | 87  | 29 |
| Primary               | 99  | 33 |
| Secondary             | 54  | 18 |
| Higher secondary      | 30  | 10 |
| Graduation            | 21  | 7  |
| Post-graduation       | 9   | 3  |
| <b>Monthly income</b> |     |    |
| less than 10000       | 111 | 37 |
| 10000-20000           | 153 | 51 |
| More than 20000       | 36  | 12 |
| <b>Residence</b>      |     |    |
| Rural areas           | 123 | 41 |
| Urban areas           | 177 | 59 |

Table 2: Distribution of thyroid disease for age and gender. n=191

| Age (years)   | Frequency | Percentage |
|---------------|-----------|------------|
| 30-39         | 44        | 23         |
| 40-49         | 80        | 42         |
| 50-55         | 35        | 18         |
| 25-30         | 32        | 17         |
| <b>Gender</b> |           |            |
| Male          | 45        | 23.6       |
| Female        | 146       | 76.4       |

Table-3: Comparison of descriptive of thyroid function tests with clinical diagnosis.

| Laboratory Results N=300 |              | EU (N=107) |       |       |      | Hyper (N=97) |       |       |       | Hypo( N=94) |       |       |       |
|--------------------------|--------------|------------|-------|-------|------|--------------|-------|-------|-------|-------------|-------|-------|-------|
|                          |              | Min        | Max   | Mean  | SD   | Min          | Max   | Mean  | SD    | Min         | Max   | Mean  | SD    |
| Thyroid                  | T3 (pmol/L)  | 0.10       | 7.10  | 3.92  | 1.62 | 1.20         | 32.60 | 6.98  | 4.17  | 0.80        | 7.00  | 3.31  | 1.43  |
| Function                 | T4 (pmol/L)  | 2.90       | 24.00 | 17.10 | 3.70 | 5.90         | 77.00 | 34.75 | 18.63 | 0.00        | 54.00 | 10.71 | 7.14  |
| Tests                    | TSH (uIU/ml) | 0.20       | 10.40 | 1.77  | 1.44 | 0.00         | 0.13  | 0.25  | 0.36  | 0.06        | 51.00 | 31.47 | 18.27 |

On the basis of thyroid function tests, a statistically significant variation in the mean levels of T3 was observed for hypothyroid ( $3.31 \pm 0.128$  pmol/L) and hyperthyroid ( $6.98 \pm 0.367$  pmol/L) when compared to the mean levels in controls i.e. euthyroid ( $3.92 \pm 0.143$  pmol/L). Similarly, significant differences were observed in the mean levels of T4 for hypothyroid ( $10.71 \pm 0.637$  pmol/L) and hyperthyroid ( $34.75 \pm 1.640$  pmol/L) when compared to the mean levels in controls i.e. euthyroid ( $17.10 \pm 0.332$  pmol/L). The study also showed significant changes in TSH i.e. in hypothyroid ( $31.47 \pm 1.628$  uIU/mL).

#### Statistical Analysis:

Primary data ingress was processed on MS Database version 2007, which was cleaned in MS Excel with

sophisticated formulas for corrections. Data were checked in EPI-info Version 16.0 for scientific verifications. The data were finally imported in SPSS version 20.0 for analysis. The student's "t" test, is being used to find out the significance between two values, in various diseased groups. Frequencies, p-value, and other descriptive analysis was done to calculate the mean and standard deviation of different parameters. The latest versions of the said programs were used for graphical and tabular analysis. The valid frequencies were premeditated for desired results. To compare the significance of the difference between the two means, their values are given as (Mean  $\pm$  SD/SEM). There is a marked difference in the number of female subjects having thyroid dysfunction.

**DISCUSSION:****Table-4: Association between descriptive of thyroid function tests with EU & Hyper.**

| <b>Laboratory Results N=300</b> |              | <b>EU (N=107)</b> |            |                | <b>Hyper (N=97)</b> |            |                | <b>Association</b> |
|---------------------------------|--------------|-------------------|------------|----------------|---------------------|------------|----------------|--------------------|
|                                 |              | <i>Min</i>        | <i>Max</i> | <i>Mean SD</i> | <i>Min</i>          | <i>Max</i> | <i>Mean SD</i> | <i>P-Value</i>     |
| Thyroid                         | T3 (pmol/L)  | 0.10              | 7.10       | 3.92 1.62      | 1.20                | 32.60      | 6.98 4.17      | 0.999              |
| Function                        | T4 (pmol/L)  | 2.90              | 24.00      | 17.10 3.70     | 5.90                | 77.00      | 34.75 18.63    | 0.000              |
| Tests                           | TSH (uIU/ml) | 0.20              | 10.40      | 1.77 1.44      | 0.00                | 0.13       | 0.25 0.36      | 0.264              |

**Table-5: Association between descriptive of thyroid function tests with EU & Hypo.**

| <b>Laboratory Results N=300</b> |              | <b>EU (N=107)</b> |            |                | <b>Hypo (N=94)</b> |            |                | <b>Association</b> |
|---------------------------------|--------------|-------------------|------------|----------------|--------------------|------------|----------------|--------------------|
|                                 |              | <i>Min</i>        | <i>Max</i> | <i>Mean SD</i> | <i>Min</i>         | <i>Max</i> | <i>Mean SD</i> | <i>P-Value</i>     |
| Thyroid                         | T3 (pmol/L)  | 0.10              | 7.10       | 3.92 1.62      | 0.80               | 7.00       | 3.31 1.43      | 0.921              |
| Function                        | T4 (pmol/L)  | 2.90              | 24.00      | 17.10 3.70     | 0.00               | 54.00      | 7.14 10.71     | 1.000              |
| Tests                           | TSH (uIU/ml) | 0.20              | 10.40      | 1.77 1.44      | 0.06               | 51.00      | 18.27 31.47    | 0.666              |

The pair sample “t” test showed that the mean difference of hyperthyroid patients with T3 is nonsignificant when compared with the control group. The difference was statistically significant for TSH and T4 in the same group. These findings are in accordance with the study of Tayal D et al<sup>[17]</sup>. Thyroid dysfunction was diagnosed by the chemical analysis of thyroid function tests. The prevalence of diagnosis was 109 cases of Euthyroidism (35.7%), 97 Hyperthyroidism (32.5%) and 94 Hypothyroidism (31.8%), respectively out of a total 300 cases. As regards the nature of abnormality of thyroid disorder, it has been observed that patients of Euthyroidism-e., 109 were more than 97 and 94 for hyperthyroidism and hypothyroidism respectively. The prevalence of hypothyroidism is slightly higher than that of hyperthyroidism. The association of TFTs with hypothyroidism is statistically significant ( $p=0.005$ ) for T3. The difference is highly significant for TSH and T4 as ( $p=0.000$ ). Hypothyroidism is an observable fact. In the initial stage there is a minor decrease in T4 which leads to an elevated value of TSH whereas T3 are in the reference range. Due to the deficiency of thyroid hormone, a biochemical abnormality is present but is asymptomatic. Although in some severe cases the danger exists resulting in a life threatening illness<sup>[18]</sup>. The locality wise distribution and the frequencies of euthyroidism, hyperthyroidism and hypothyroidism of the selected cases was also noted: Patients visiting hospital from different areas of Pakistan were also included in the study. The majority of the patients were from the Lahore and its nearby districts. A total of 191 (64%) subjects included (32.5%) hyperthyroids and (31.8%) hypothyroid. The prevalence of thyroid dysfunction is greater in Lahore. According to the

above results the incidence of hyperthyroidism in Lahore is evident. The reason is being greater population in Lahore and availability of medical and laboratory facilities. Cardiovascular diseases must be monitored especially angina, Ischemic heart disease as coronary atherosclerosis is common in hypothyroidism. Hypothyroidism can increase blood cholesterol levels and that contributes to heart disease; however, if the hypothyroidism is being treated with a thyroid hormone, then the cholesterol returns to normal<sup>[19]</sup>. To prevent cardiovascular disease, myxedema coma, hypothyroidism must be treated with thyroxin immediately and thyroid function should be monitored frequently with treatment. This study shows the frequency of the patients having problems of thyroid disorders in their locality. Results regarding locality distribution of the patients depicted that majority of these belong to local population of Lahore.

The reason for frequency of thyroid disorders can be attributed to a variety of factors.

- Poor compliance with the treatment protocol and poor glycemic control.
- Low public health awareness.
- The attitude of the general public to “bear through the problem” for as long as possible.
- Ayurveda, Hakeem, and Quacks are falsely trying to relieve the earlier symptoms of thyroid disorder, thus delaying the actual diagnosis of thyroid pathology.

**CONCLUSION:**

Thyroid diseases are more common in females as compared to males. The most probable cause could be

lactation and pregnancy but we need to figure out. In lactation and pregnancy BMR is raised because the body requirement increases than the normal, leading to stimulation of thyroid gland to produce more hormones. Early diagnosis and treatment should be done as early as possible.

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