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# A Retrospective Study of Thyroid Disorders Among Women of Reproductive Age Group in Puducherry.

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**ABSTRACT**

Thyroid disorders are the most prevalent endocrine disorders in our country. Thyroid dysfunction is implicated in a broad spectrum of reproductive disorders, ranging from abnormal sexual development to menstrual irregularities and infertility. This retrospective study was conducted using data retrieved from the register maintained in the Department of Biochemistry of our Institution between January 2011 and April 2014. Thyroid function profile and the related reproductive disorders were analysed . Out of 1192 patients screened, 63.8% were euthyroid, 27.5% were hypothyroid, 2.09% hyperthyroid and 6.54% of them had a mildly suppressed TSH. Amongst the hypothyroid patients, 6.7% of them were clinically hypothyroid and 20.8% subclinical hypothyroid. Among the hyperthyroid, the distribution was 1.5% clinical hyperthyroid and 0.5% subclinical hyperthyroid. The study revealed that hypothyroidism, especially subclinical was considerably increasing with the advancement of age. The prevalence of hypothyroidism seemed to be on the higher side among patients with infertility, PCOD and menstrual distrubances. Screening for thyroid diseases should be considered during routine evaluation in this particular group of women.

**Keywords:** Euthyroid, Hypothyroid, Subclinical hypothyroid, Hyperthyroid, reproductive disorders.

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## INTRODUCTION

Thyroid disorders are the commonest endocrine disorders worldwide and public health problem. It has been estimated that in India about 42 million people are affected from thyroid diseases. Thyroid dysfunction are prevalent among women of reproductive age when compared with men[1]. Normal thyroid gland activity is essential for control of body metabolism, growth, development and maintenance of the internal environment. Thyroid gland elaborates two important metabolic hormones namely thyroxine (T4) and tri-iodo thyronine (T3). The later is biologically more active and is produced mainly by the conversion of prohormone T4 to T3 by enzyme 5-deiodonase in the peripheral tissues, liver and kidney[2]. Both T3 and T4 are under the control of thyroid stimulating hormone (TSH) of anterior pitutary gland which in turn is controlled by thyrotrophin releasing hormone (TRH) from hypothalamus. Thyroid dysfunction particularly hypothyroidism is associated with dyslipidemia which increase the risk of hypertension, endothelial dysfunction, and cardiovascular diseases. Prominent cardiovascular features such as tachycardia, arrhythmias, congestive cardiac failure, and systolic hypertension are well recognized manifestations of thyrotoxicosis[3]. Thyroid dysfunction in reproductive age group women are often associated with a variety of changes in reproductive function which includes delayed onset of puberty, anovulatory cycles, infertility and high foetal wastage [4,5]. Menstrual disturbances are frequent in hypothyroidism and thyrotoxicosis which can be reversed following treatment. Though study data are available on prevalance of thyroid dysfunctions among men and women, thyroid disorders associated with reproductive distrubances is not available in our area. The aim of our study was to provide the reference data of various thyroid disorders associated with reproductive distrubances and to evaluate TSH, FT4 and FT3 levels in reproductive age group women in our Puducherry region.

## MATERIALS AND METHODS

This retrospective study was carried out in the Department of Biochemistry, Sri Venkateshwara medical college and research institute, Puducherry between 1st January, 2011 and 31$^{st}$ April, 2014. A total of 1192 patients reports (both inpatient and outpatient) between the age group of 18 to 45 years, consulted obstetrics and gynaecology department for various clinical problems were analysed. The data collected were age, clinical diagnosis and thyroid function profile which included free T3, free T4 and Thyroid stimulating hormone (TSH). The study was approved by the Institutional Ethics committee.

The estimation of serum free T3, free T4 and TSH were analyzed using an enzyme immune assay kits (Accu – Bind ELISA Microwells) on the Awareness Technologies CPC- ELISA analyzer. The analytical sensitivity of free T3, free T4 and TSH were 0.835pg/ml, 0.314ng/dl and 0.078µIU/ml respectively. The laboratory reference values were fT3 (1.4 – 4.2pg/ml), fT4 (0.8 – 2ng/dl) and TSH (0.41- 4.5µIU/ml). Hypothyroidism was classified as clinical if TSH was ≥ 4.5 µIU/ml (4.5 µU/L) and FT4 was ≤ 0.620 ng/dL and subclinical if TSH was ≥ 4.5 µIU/ml and FT4 ≥ 0.620ng/dL. Hyperthyroidism was classified as clinical if TSH was ≤ 0.1 µIU/ml and FT4 ≥ 1.705 ng/dL and subclinical if TSH was ≤ 0.1µIU/ml and FT4 ≥ 1.705 ng/dL. A TSH concentration of 0.1 – 0.4 µIU/ml was considered as mildly suppressed [6].

### Statistical Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (Windows version 11.0; SPSS Inc, Chicago, US) and presented as percentage**.**

## RESULTS

Out of the 1192 patient reports studied, 28.6% belong to the age group of 18-25 years, 43.79% to 26-35 years and 27.6% to 36-45 years. 63.8% of the screened patients were euthyroid, 27.5% were hypothyroid, 2.09% hyperthyroid and 6.54% of them had a mildly suppressed TSH. (Figure 1& 2)

Amongst the hypothyroid patients, 6.7% of them were clinically hypothyroid and 20.8% were subclinical hypothyroid. Amongst the hyperthyroid, 1.5% were clinical hyperthyroid and 0.5% were subclinical hyperthyroid . Table 1 shows the distribution of thyroid disorders among the different age group.

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Table 2 shows the distribution of reproductive disorders among the thyroid disorders in the study group. 34.9% of the patients had a diagnosis of infertility including either primary or secondary, 31.7% of the women with polycystic ovarian disease and 33.3% with a diagnosis of menstrual irregularities like oligomennorhea, amennorhoea, polymennorhea, mennorhagia, hypomennorhoea due to various causes.

Table 3 shows the distribution of thyroid disorders among different reproductive problems.The prevalence of hypothyroidism seemed to be on the higher side among patients with infertility, PCOD and menstrual distrubances .

**Figure 1: Age distribution of study population**

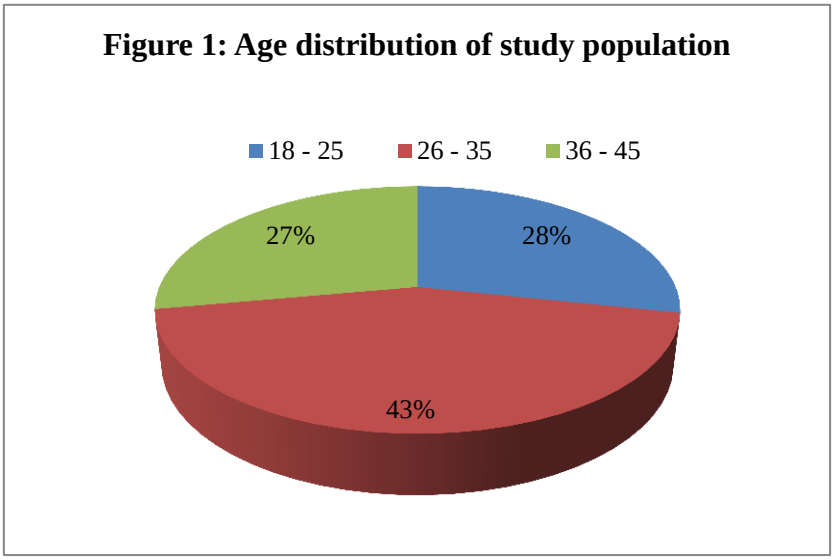


**Figure 2: Distribution of thyroid disorders among the study group**

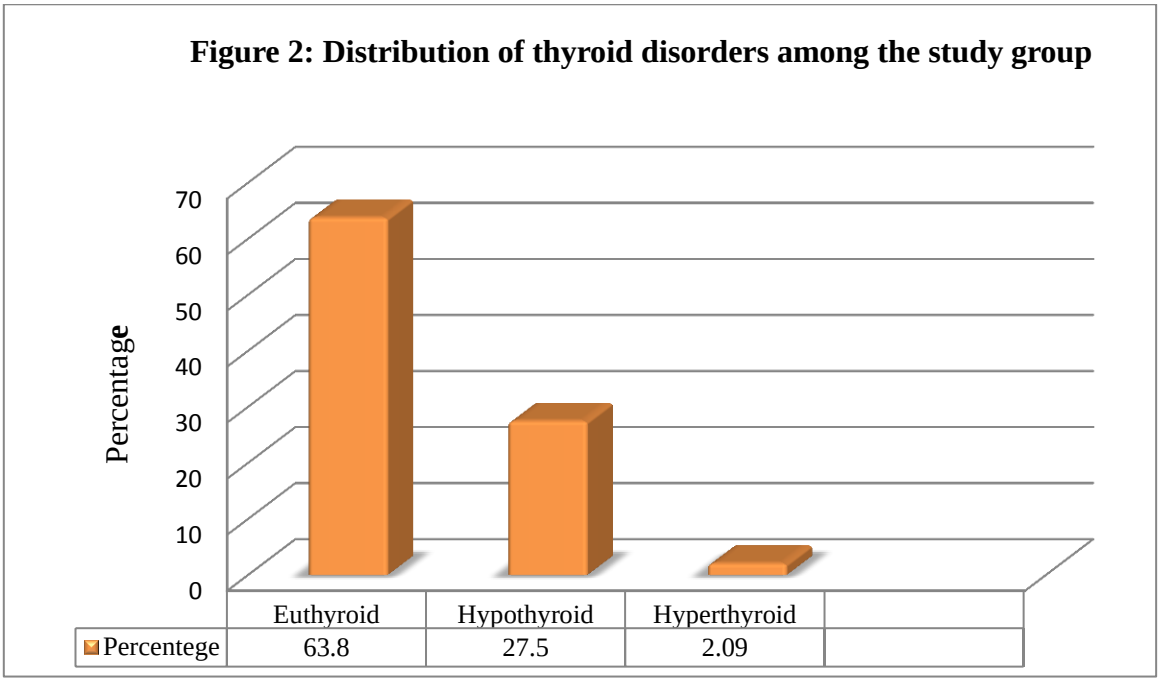

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**Table 1: Distribution of thyroid disorders among the different age groups**

| Age | Euthyroid | Hypothyroid | | Hyperthyroid | | Mildly suppressed TSH |
|---|---|---|---|---|---|---|
| | | Clinical | Subclinical | Clinical | Subclinical | |
| 18 – 25 | | | | | | |
| % (No) | 64.2(219) | 7.9(27) | 16.1(55) | 2 (7) | 1.1(4) | 8.5 (29) |
| 26 – 35 | | | | | | |
| % (No) | 61.8(323) | 4.9(26) | 22.4(117) | 0.9(5) | 0.2(1) | 9.5(50) |
| 36 – 45 | | | | | | |
| % (No) | 50.1(165) | 8.2(27) | 24(79) | 3(10) | 0 | 14.5(48) |

**Table 2:Distribution of menstrual disorders, Infertility and PCOD in the study group**

| | **No** | **%** |
|---|---|---|
| Infertility | 417 | 34.9 |
| PCOD | 378 | 31.7 |
| Menstrual irregularities | 397 | 33.3 |

**Table 3: Distribution of thyroid disorders among reproductive problems.**

| | **Euthyroid No(%)** | **Hypothyroid No(%)** | **Hyperthyroid No(%)** | **Mildly suppressed TSH No(%)** |
|---|---|---|---|---|
| Infertility | 242(58) | 135(32.3) | 13 (3.1) | 27(6.4) |
| PCOD | 259 (68.5) | 94(24.8) | 4 (1) | 22 (5.8) |
| Menstrual Irregularities | 260(65.4) | 99(24.9) | 5 (1.2) | 29(7.3) |

## DISCUSSION

Thyroid disorders are common endocrine problem with variable prevalence among the different population. The present study was conducted to assess thyroid disorders among the women of reproductive age group population attending a tertiary care hospital in Puducherry .

Approximately 64% of the subjects were euthyroid in our study. Hypothyroidism was observed in 27.5% of the patients. This was high when compared to a recent study, confirmed a prevalence of 11.5% hypothyroidism in the female patients of Pudducherry area in 2009[7]. Similar study conducted in Delhi showed the prevalence rate of 13% which was definitely less as compared to higher rate of our population[8].

A study from coastal areas of Japan, which has iodine rich seaweed, showed that the prevalence of hypothyroidism was 9.7% [9]. Pondicherry is also a coastal area and population residing in coastal areas consume sea food is believed to be rich in iodine which can prevent developing of hypothyroidism. However our study showed that there is increase in percentage of hypothyroidism in our area.

Subclinical hypothyroidism is defined as an elevated TSH concentration in the presence of normal thyroid hormones[10]. Our study showed 20.8% had subclinical hypothyroidismin contrast to yet another study conducted in Baster by sharia et al showed 12.6% hypothyroidism [11]. Subclinical hypothyroidism tend to increase with increase in age as observed in our study. Moreover this was higher when compared to previous study conducted in our costal area. Thyroid dysfunction is implicated in a broad spectrum of reproductive disorders, ranging from abnormal sexual development to menstrual irregularities and infertility[12,13].

Especially women of fertile age, hypothyroidism often results in menstrual irregularities like oligomenorrhea and amenorrhea, polymenorrhea and menorrhagia. Our study also showed menstrual irregularities and infertility associated with hypothyroidism and hyperthyroidism.

Proper evaluation of these disorders involves a multidimensional diagnostic approach, with a pivotal contribution from clinical laboratories[14]. Hypothyroidism can be easily and efficiently managed but may present with serious complications if untreated. Moreover possible advantages of treating subclinical hypothyroidism is preventing progression to overt hypothyroidism, thyroid hormone therapy may improve and restores normal menstrual pattern and reverses disturbed hormonal changes. Most importantly, treatment of hypothyroidism with thyroid drugs has been shown to normalize LH responses to LHRH which possibly reduce menstrual disturbances, and finally increase the chances of spontaneous fertility[15].

Our results of high percentage of hypothyroidism (32.3%) in infertile women is also compatible with other studies[16]. Similarly the prevalence of hypothyroidism(24.8%) was high among patients with PCOD, which is consistent with the findings of Hussain et al[17].

Overall percentage of hyperthyroidism in our study population was 2.09% which is similar to skaria et al. and this percentage was high among younger age than the higher age group people.

People of advanced ages were more vulnerable to thyroid dysfunction in the population. Subclinical hypothyroidism and hypothyroidism were preponderant, followed by clinical and subclinical hyperthyroidism. Our study indicates that thyroid disease should be considered during routine evaluation of this susceptible group and should be followed by appropriate detection and treatment. Therefore, the present survey study provides important data, to the Govt and other agencies so is to control this problem in future in India.

## CONCLUSION

Our study revealed that high percentage of hypothyroidism among the reproductive age group women which was considerably increasing with increase in age. The percentage of hypothyroidism, especially subclinical was high among the women of 36 – 45 age group. The percentage of hypothyroidism was high in most of the women suffering from various reproductive disorders. This indicates that thyroid disease should be considered during routine evaluation, especially in this group of women and should be followed by appropriate detection and treatment.

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