

Original Research Article

Prevalence of hypothyroidism in subfertile women in a tertiary care centre in North India

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ABSTRACT

Background: Thyroid hormones are essential for normal growth, sexual development and reproductive function. The prevalence of hypothyroidism varies between 2-4% in women of reproductive age group. It can affect the fertility in various ways like sex hormone imbalance, anovulatory cycles, luteal phase defects, and hyperprolactinemia. **Objectives:** To study the prevalence of hypothyroidism in subfertile patients.

Methods: A total of 454 subfertile women visiting the Reproductive Biology department for subfertility were investigated for thyroid stimulating hormone (TSH) and prolactin (PRL). Hypothyroidism was considered at TSH levels of >4.5 µIU/ml and hyperprolactinemia at PRL levels of >25 ng/ml.

Results: Of 454 subfertile women 24% were hypothyroid (TSH >4.5 µIU/ml) and 12.8% patients had hyperprolactinemia.

Conclusions: TSH and PRL should be measured in all cases desirous of issue before proceeding for more costly tests or invasive procedures.

Keywords: Hypothyroidism, Infertility, Menstrual irregularity, Thyroxine

INTRODUCTION

Infertility is the inability of a couple to conceive after one year of regular unprotected intercourse. Its prevalence is estimated to be 10-15% in any community.¹ It is therefore a common condition with important medical, economic and psychological implications. Thyroid hormones are essential for normal growth, sexual development and reproductive function. Thyroid dysfunction can affect fertility in various ways resulting in anovulatory cycles, luteal phase defect, high prolactin (PRL) levels, and sex hormone imbalances. Therefore, normal thyroid function is necessary for fertility, pregnancy, and to sustain a healthy pregnancy, even in the earliest days after conception. The prevalence of hypothyroidism varies between 2 - 4 % in women of reproductive age group.^{2,3}

Thyroid evaluation should be done in any women who wants to get pregnant with family history of thyroid problem or irregular menstrual cycle or had more than two miscarriages or is unable to conceive after 1 year of unprotected intercourse.

Hypothyroidism can be easily detected by assessing serum thyroid stimulating hormone (TSH) levels. A slight increase in TSH levels with normal T3 and T4 indicates subclinical hypothyroidism whereas high TSH levels accompanied by low T3 and T4 levels indicate clinical hypothyroidism. Elevated thyrotropin-releasing hormone levels due to hypothyroidism are often associated with increased prolactin (PRL) levels.⁴ It has been recommended that even in the presence of raised PRL levels, the treatment should be first given to treat

hypothyroidism before evaluating other causes of raised PRL levels.

METHODS

This study was conducted on 454 women of reproductive age group (18 - 45 years) visiting to Reproductive Biology Unit of Obstetrics and Gynaecology Department of IGIMS, Bihar, a tertiary care hospital.

Inclusion criteria

All women with primary and secondary subfertility.

Exclusion criteria

- Women having any congenital anomaly of urogenital tract, or any obvious organic lesion, tubular blockage, pelvic inflammatory disease, endometriosis, genital TB, liver, renal or cardiac diseases.
- All women who were already on treatment for thyroid disorders or hyperprolactinemia.
- Male factor infertility
- Women unwilling to participate or sign the informed consent.

Informed consent was taken. Routine investigations such as hemogram, random blood sugar, renal functions tests,

urine routine, and ultrasound (if required) were done. Serum T3, T4, TSH and PRL were measured by the chemiluminescence method. Normal T3, T4, TSH and PRL levels were 0.8-1.90 ng/ml, 5-13 µg/dl, 0.25-4.5 µIU/ml and 1.9-25 ng/ml, respectively, as per kit supplier instruction. Therefore, hypothyroidism was considered at TSH levels of >4.5 µIU/ml and hyperprolactinemia at PRL levels of >25 ng/ml (WHO guidelines).⁵

RESULTS

Table 1 shows that most of the subfertile women were between 21 to 30 years with mean age of all women 28.07±5.89 years. Majority of them presented between 2-7 years of marriage. 67.62% women had primary subfertility and rest had secondary subfertility.

Table 2 depicts that total 109 (24.01%) women had hypothyroidism with mean TSH value 7.78 (7.08 - 8.48) µIU/ml and in euthyroid women mean TSH value was 2.56 (2.46 - 2.67) µIU/ml.

Table 3 shows that patients with primary subfertility 24.43% were hypothyroid and among women with secondary subfertility 23.13% were hypothyroid.

Table 4 demonstrates that 12.78% patients had hyperprolactinemia (prolactin >25 ng/ml) with mean prolactin level 27.83±1.99 ng/ml and 87% had normal serum prolactin level.

Table 1: Demographic distribution of cases.

Variables	N	Percentage %
Age (years) Mean age- 28.07±5.89	<20	4.85
	21-30	68.72
	31-40	23.35
	>40	3.08
Duration of marriage (years)	<2	16.08
	2-7	50.66
	8-12	20.93
	13-17	6.39
	>17	5.95
Parity	Primary subfertility	67.62
	Secondary infertility	32.38

Table 2: Serum TSH, T3, T4 level in hypothyroid and euthyroid patients.

Variables	Euthyroid TSH (≤4.5 µIU/ml) N= 345 (75.99%)	Hypothyroid TSH (>4.5 µIU/ml) N= 109 (24.01%)	Overall N= 454
TSH (µIU/ml)	2.56 (2.46-2.67)	7.78 (7.08 - 8.48)	3.83 (3.54 - 4.11)
T3	1.07 (1.00 - 1.16)	1.05 (1.00 - 1.09)	1.07 (1.01 - 1.13)
T4	8.74 (8.55 - 8.94)	8.47 (8.03 - 8.91)	8.68 (8.49 - 8.86)

Table 3: Prevalence of hypothyroidism in primary and secondary subfertility parity status.

Type of infertility	TSH (≤ 4.5)	TSH (> 4.5)	Total
Primary subfertility	232 (75.57%)	75 (24.43%)	307
Secondary subfertility	113 (76.87%)	34 (23.13%)	147
Total	345	109	454

Table 4: Serum prolactin level in subfertile patients.

Serum prolactin	N	Percentage	Mean value of prolactin (ng/ml)
≤ 25 ng/ml	396	87.22	5.57 \pm 1.66
> 25 ng/ml	58	12.78	27.83 \pm 1.99
Total	454	100	15.09 \pm 5.95

DISCUSSION

Thyroid hormones have various important effects on reproduction and pregnancy. It has a special role in oocyte physiology and appears necessary to achieve maximum fertilization rates. Hypothyroidism is one of the important endocrinological disorders causing ovulatory dysfunction, subfertility and adverse pregnancy outcome in reproductive age group women, due to altered peripheral estrogen metabolism, hyperprolactinemia, and disturbances in gonadotropin releasing hormone (GnRH) secretion that result in an abnormal pulsatile release of LH.

Most of the women in the study group belonged to 20 - 30 years of age and majority had primary infertility. In our study the prevalence of hypothyroidism in subfertile female was 24% and prevalence of hyperprolactinemia was 12.8%, which was similar to the result in the study by Rauf Abdul who found that prevalence of hypothyroidism was 24% (sub-clinical 62.5% and clinical 37.5%) and hyperprolactinemia was 18.5% in infertile patients.⁶ In a study by Verma I et al on 394 infertile women showed 23.9% (94 patients) prevalence of hypothyroidism in which SCH and overt hypothyroidism were 15% and 8.8% patients respectively.⁷

In a study by Pushpagiri N et al among 300 women with infertility, 73% of the patients were euthyroid and 27% (82 patients) were hypothyroid.⁸ In Priya M et al study on 95 infertile women, 53.7% were hypothyroid and after the treatment with thyroxine, 33.3% of subclinical hypothyroid women conceived within 6 weeks to 2-year period.⁹ Rijal B study revealed 25.6% prevalence of overall thyroid dysfunction in infertile patients. Majority of thyroid dysfunction was hypothyroidism comprising almost 20.1%, out of which subclinical hypothyroidism being most common (11.8%).¹⁰ Our result were also consistent with Raber's W et al, Rahman D et al and Bals-Pratsch M et al study.¹¹⁻¹³

CONCLUSION

In present study, we conclude that prevalence of hypothyroidism is 24% and that of hyperprolactinemia is 12.8% in subfertile women. Since undiagnosed and untreated thyroid disease is a cause for sub-fertility. So, screening and treatment of thyroid disorders is extremely important to achieve maximum conception rate. Evaluation of thyroid status in the infertile couple is not only important, also easy and its treatment is very simple and often has reversible or preventable effects on subfertility.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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