

ORIGINAL RESEARCH

Role of thyroid dysfunction in infertile women

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ABSTRACT

Introduction: In India, approximately 13-19 million couples are likely to be infertile as per data from Indian Council of Medical Research (ICMR). Thyroid disease is more common in women than in men. Because most thyroid disease is autoimmune in nature, an increased susceptibility to autoimmune diseases, perhaps secondary to the female endocrine environment, could be a contributing factor. Therefore this study was carried out to the prevalence of abnormal thyroid function in infertile women. **Materials and Methodology:** The sample size that has been calculated for this study was 350 which followed the inclusion criteria of those infertile married women aged between 20 – 35 years who had been married for more than 1 year attending the gynaecology department at PCMS and RC. Five millimetres of venous blood was collected in fasting state. Serum was prepared within one hour of blood collection and stored at -20°C till get analysed for thyroid function test. **Results:** 51.4% of the infertile women fall under the category of 26 – 30 years. Women in the age range of 21 – 25 years recorded the least number of cases that was recorded to be 16%. **Conclusion:** Thyroid dysfunction is one of the important aetiology for infertility which can be managed easily with appropriate management. Therefore screening the thyroid gland for dysfunction is mandatory in almost all the infertile women.

Keywords: thyroid dysfunction, hyperthyroidism, hypothyroidism, infertility, married women

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INTRODUCTION

Infertility affects approximately 10-15% of couples worldwide. Infertility means the apparent failure of a couple to conceive after one year of unprotected intercourse. Among the various causes for infertility, female cause of infertility accounts for about 35%, whereas male factors contribute to about 30%. A combination of both factors accounts for about 20% and 15% causes of infertility are idiopathic or Unexplained.¹ Ovulatory dysfunction, fallopian tube pathologies and endometriosis are mainly responsible for female infertility. In India, approximately 13-19 million couples are likely to be infertile as per data from Indian Council of Medical Research (ICMR).² National Family Health Survey in our country reports that 3.8% of women (between 40 & 44 years of age) were childless.³ Thyroid hormones have profound effects on reproduction and pregnancy. Normal thyroid function is important for fertility as well as for a healthy pregnancy.⁴ Thyroid disease is more common in women than in men. Because most thyroid disease is autoimmune in nature, an increased susceptibility to autoimmune diseases, perhaps

secondary to the female endocrine environment, could be a contributing factor.

Thyroid dysfunction is implicated in a broad spectrum of reproductive disorders. Both hypo as well as hyperthyroidism can affect female reproductive functions. Women may develop abnormal sexual development, menstrual irregularities and also infertility.^{5,6} Thyroid disease when undiagnosed & untreated can contribute to infertility as well as sub-fertility. It is better to detect and treat thyroid disease in early stages. Subtle thyroid disease can be easily diagnosed by the recently available sensitive laboratory assays. As a key to early diagnosis we should have a high index of suspicion as well as to screen for abnormal thyroid function, especially in women of childbearing age. Therefore this study was carried out to the prevalence of abnormal thyroid function in infertile women.

MATERIALS AND METHODOLOGY

This study was adopted as an observational study which included those women attending the outpatient gynaecology department in PCMS and RC. After

obtaining prior permission from the institutional ethical committee, the stipulated time period of this study set from January to June 2022. The sample size that has been calculated for this study was 350 which followed the inclusion criteria of those infertile married women aged between 20 – 35 years who had been married for more than 1 year attending the gynaecology department at PCMS and RC. There were certain exclusion criteria followed in this study that included those women reported with previous thyroid surgery or thyroid medications, those women who were receiving medications which has the potential to alter the thyroid profile and those with prompt male factor for infertility, those women with history of any congenital anomaly of urogenital tract or any obvious organic lesions were effectively excluded.

Five millimetres of venous blood was collected in fasting state. Serum was prepared within one hour of blood collection and stored at -20°C till get analysed for thyroid function test. All samples were analysed within 15 days from blood collection date. Serum free 3,5,3'- triiodothyronine (fT3), free 3,5,3',5'- tetraiodothyronine (fT4) and thyroid- stimulating hormone (TSH) were analysed using Vitros ECiTM

analyser (Ortho Clinical Diagnostics; OCD, Rochester, NY). Measurement of fT3 and fT4 was based on a direct, labelled antibody, competitive immunoassay, whereas immuno-metric immunoassay technique was used in measurement of TSH.

RESULTS

Table – 1 depicted the age distribution among the study population which showed that almost 51.4% of the infertile women fall under the category of 26 – 30 years. Women in the age range of 21 – 25 years recorded the least number of cases that was recorded to be 16%.

Table – 2 showcased that among the study population, women with irregular and regular menstruation cycle were categorically divided which showed that most of the women fell under the category of women with irregular periods.

Table – 3 evaluated the distribution of thyroid functions among the study population. Among them, 76% of the women fell under the category of normal thyroid function followed by 12.8% under sub-clinical hypothyroidism

Table – 1: Age distribution

Age range	Number	Frequency
21 – 25 years	56	16%
26 – 30 years	180	51.4%
31 – 35 years	114	32.5%
Total	350	100%

Table – 2: Menstrual history

Mensus history	Number	Frequency
Irregular periods	201	57.4%
Regular periods	149	42.5%
Total	350	100%

Table – 3: Distribution of thyroid dysfunction in study population

Diagnosis	Number	Frequency
Normal	266	76%
Overt hyperthyroidism	6	1.7%
Overt hypothyroidism	20	5.7%
Sub-clinical hyperthyroidism	13	3.7%
Sub-clinical hypothyroidism	45	12.8%
Total	350	100%

DISCUSSION

In this study, it had been observed that almost 51.4% of the infertile women fall under the category of 26 – 30 years. Mean age group in this study was identified to be 27.7%. This was in contradiction to the study conducted by *Shan Elahi* et al in the year 2007 where the mean age group was identified to be 26.9 years.⁷ Considering the menstrual history among the study population, there were 57.4% of the women comes under the category of irregular periods. The result obtained were in slight variation by the study conducted by *Goswami* et al which showed 62.5% of

the women were observed with menstrual abnormalities.⁸

Higher prevalence of hypothyroidism may be precipitated due to higher prevalence of iodine deficiency in this country, as it lies in iodine deficient range.⁹ Hypothyroidism that is occurring due to chronic autoimmune thyroiditis might also contribute significantly. Relatively higher prevalence rate of hypothyroidism in our study can be also due to special referral pattern of the patients who were referred to the hospital based on suspicion of thyroid abnormalities. High frequency of infertility in hypothyroidism maybe

due to altered peripheral estrogen metabolism, hyperprolactinemia, and disturbances in gonadotropin releasing hormone (GnRH) secretion that result in an abnormal pulsatile release of L.H.¹⁰ Moreover, thyroid hormones appear necessary to achieve maximum fertilization rates and have special role in oocyte physiology. Furthermore, serum TSH level can be a significant predictor of fertilization failure in women undergoing IVF.¹¹

Overall prevalence of hyperthyroidism in our study population is 5.4%, in which primary hyperthyroidism is most common. Another study conducted in India in similar setting also have similar prevalence of hyperthyroidism in infertile women.¹² Changes in sex hormone concentration including LH and FSH, result menstruation disturbance including oligomenorrhea, hypomenorrhea, and anovulation.^{13,14} menstrual disturbances, frequent in thyrotoxicosis are restored following treatment.

Additionally, the previously published deal with clinical cases only, while in this study we included all the clinical and subclinical hypo and hyperthyroidism cases. However, the majority of the tested infertile women in our study showed normal thyroid function (76%). These results were in agreement with *Goswami et al* who found that the majority of the infertile women were euthyroid. In infertile group, the prevalence of thyroid dysfunction was slightly higher than that of the general population.⁸

Thyroid dysfunction is reportedly identified as a common cause of infertility which can be easily managed by correcting the appropriate levels of thyroid hormones. The decision to initiate thyroid correction therapy in subclinical thyroid dysfunction at early stage is justified in infertile women. Our data also indicate that variations in TSH levels in the narrower range should not be ignored in infertile women who are otherwise asymptomatic for clinical hyperthyroidism. This group of infertile women, if only carefully diagnosed and treated for hyperthyroidism, can benefit a lot rather than going for unnecessary battery of hormone assays and costly invasive procedures. For better management of infertility case, we should plan further studies with the large sample size and investigate the beneficial effect of drug treatment by long-term follow-up, which are necessary to validate the variation in T3, T4 and TSH levels. In addition to thyroid profile other endocrine hormones like prolactin should be considered in infertility.

CONCLUSION

It is concluded from this study that the normal TSH levels are the prerequisite requirements for fertilization. The decision to initiate thyroid replacement therapy in subclinical hypothyroidism at early stage is justified. Measurement of TSH should be done at early stage of infertility check-up rather than straight away going for more costly tests or invasive procedures. Simple, oral hypothyroidism treatment can

be of great benefit to conceive in otherwise asymptomatic infertile women.

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