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Original Research Article

ASSOCIATION BETWEEN HYPOTHYROIDISM, MENSTRUAL IRREGULARITIES AND FEMALE INFERTILITY: A PREVALENCE STUDY

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ABSTRACT

Background: The connection between thyroid dysfunction and menstrual irregularities in women of reproductive age is a topic of significant clinical relevance. Thyroid hormones are essential for metabolic regulation and maintaining homeostasis, exerting a substantial influence on the female reproductive system. They play a key role in various reproductive processes, from menarche to menopause, affecting menstrual cycle regulation, fertility, and pregnancy outcomes.

Materials and Methods: This study involved two groups: • Group I: Patients with hypothyroidism (n = 232). • Group II: Patients with euthyroidism (n = 178). The study was conducted in the Department of Biochemistry at Career Institute of Medical Sciences, Lucknow, over a period of two years.

Results: A total of 410 cases were analyzed, comprising 232 cases of hypothyroidism and 178 cases of euthyroidism. Among these, 352 women did not experience subfertility, while 58 were affected, demonstrating a clear association between thyroid dysfunction and an increased risk of subfertility.

Conclusion: These findings highlight the critical role of thyroid function in reproductive health and stress the importance of thyroid screening for women experiencing menstrual irregularities and infertility.

Keywords: Hypothyroidism, Oligomenorrhea, Polymenorrhea, Menorrhagia.

INTRODUCTION

The link between thyroid dysfunction and menstrual irregularities in women of reproductive age is of significant clinical concern.[1] Thyroid hormones play a crucial role in metabolic regulation and homeostasis, profoundly influencing the female reproductive system.[2] They are essential for various reproductive processes, from menarche to menopause, contributing to menstrual cycle regulation, fertility, and pregnancy outcomes.[3] Both hypothyroidism and hyperthyroidism have been linked to menstrual disorders, including oligomenorrhea, polymenorrhea, menorrhagia, and amenorrhea.[4] These associations highlight the importance of understanding the thyroid-reproductive axis and its impact on women's health.

The prevalence of hypothyroidism in women of reproductive age is estimated to be 2–4% and has been recognized as a contributing factor to infertility and recurrent miscarriage.[5,6] Hypothyroidism is commonly diagnosed by measuring TSH levels in the blood. A mild increase in TSH with normal T3 and T4 levels indicates subclinical hypothyroidism, whereas elevated TSH along with low T3 and T4 levels signifies clinical hypothyroidism.[7] Subclinical hypothyroidism, which is more prevalent, can lead to anovulation either directly or through elevated prolactin (PRL) levels. Diagnosing and managing subclinical hypothyroidism is essential for conception and maintaining pregnancy, provided there are no other independent risk factors. Many women with hypothyroidism-related infertility also experience hyperprolactinemia due to increased thyrotropin-releasing hormone (TRH)

production, which disrupts ovulatory function.[8,9] In cases of elevated PRL, treating hypothyroidism should be the first step before exploring other potential causes of increased PRL levels. Therefore, routine TSH measurement should be an integral part of infertility evaluations.

MATERIALS AND METHODS

Study Population

This study included two groups:

- **Group I:** Cases of hypothyroidism (n = 232)
- **Group II:** Cases of euthyroidism (n = 178)

Study Area

The study was conducted in the Department of Biochemistry at Career Institute of Medical Sciences, Lucknow.

Study Duration

The study spanned a period of two years.

Data Collection

- **Group 1:** A total of 232 subjects diagnosed with hypothyroidism were included.
- **Group 2:** A total of 178 subjects with euthyroidism were enrolled.

Euthyroidism refers to the normal production and serum levels of thyroid hormones, defined by the following reference values:

- **TSH:** 0.5 to 5.5 mIU/L
- **Free T3:** 1.7 to 4.2 pg/mL
- **Free T4:** 0.3 to 5.5 µIU/mL

Hypothyroidism is characterized by insufficient thyroid hormone levels, except for TSH, which rises in response to the deficiency. In this study, two types of hypothyroidism were identified:

- **Subclinical hypothyroidism:** A mild form where only TSH is elevated, while T3 and T4 levels remain within the normal range.
- **Overt hypothyroidism:** A more severe form marked by elevated TSH and decreased T3 and T4 levels.

Study Procedure

Eligible patients were selected, and a detailed menstrual history was obtained, focusing on abnormalities such as scanty, absent, or excessive menstruation lasting for more than three months. Additionally, symptoms of thyroid dysfunction, including fatigue, weight gain, and palpitations persisting for over three months, were documented. Menstrual irregularities were classified as follows:

- **Polymenorrhea:** Menstrual cycles shorter than 21 days.
- **Oligomenorrhea:** Menstrual cycles longer than 35 days.
- **Amenorrhea:** Complete absence of menstruation.[10]

The impact of hypothyroidism on menstrual patterns and fertility was assessed through blood tests measuring thyroid hormone levels, FSH, LH, and prolactin, along with ultrasonographic evaluation to identify pelvic pathology or intrauterine abnormalities.

Subfertility

Subfertility refers to reduced fertility leading to prolonged unsuccessful attempts to conceive. It is categorized into:

- **Primary subfertility:** Difficulty conceiving in couples who have never had a live birth.
- **Secondary subfertility:** Difficulty conceiving in couples who have previously had a live birth but are unable to conceive again.[11]

Data Analysis

Data were analyzed using Microsoft Excel.

RESULTS

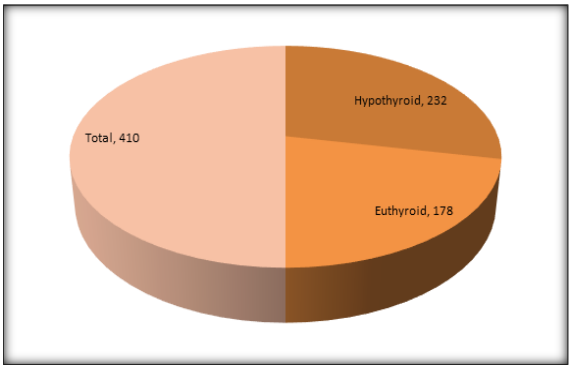

Figure 1: Distribution of cases according to Hypothyroid & Euthyroid cases

Table 1: Group distribution among the all cases

		No.	Percentage
Group I	Hypothyroid cases	232	56.5%
Group II	Euthyroid cases	178	43.4%
Total		410	100%

Table 2: Distribution of cases according to Menstruation

Menstruation	Group I (n=232)	Group II(n=178)
Normal	144	152
Abnormal	88	26
Total	232	178

Table 3: Distribution of cases according to Abnormal Menstruation

	Group I (n=232)	Group II(n=178)
Polymenorrhea	24	10
Oligomenorrhea	46	12
Amenorrhea	18	4

Total	88	26

Table 4: Distribution of cases according to Subfertility

Subfertility	Group I (n=232)	Group II(n=178)	Total
No Subfertility	188	164	352
Primary Subfertility	26	4	30
Secondary Subfertility	18	10	28
Total	232	178	410

Table 5: Subfertility status among the thyroid cases

	Thyroid status			
	Normal (178)	Overt (140)	Subclinical (92)	Total
No subfertility	164	120	68	352
Subfertility	14	20	24	58
Total	178	140	92	410

DISCUSSIONS

This study emphasizes the strong association between hypothyroidism and reproductive disorders, particularly menstrual irregularities and subfertility. Among 232 hypothyroid patients, 44 (18.9%) experienced subfertility, compared to 14 (7.9%) out of 178 euthyroid patients, indicating a higher prevalence of subfertility among hypothyroid women. Additionally, the occurrence of primary subfertility (26 cases) and secondary subfertility (18 cases) was significantly greater in hypothyroid individuals than in those with normal thyroid function. These findings align with research conducted by Joshi JV et al,[12] Krassas GE et al,[13] and Kaur T et al,[14] which also reported an increased prevalence of menstrual disturbances and subfertility in hypothyroid women.

Menstrual irregularities, including oligomenorrhea, polymenorrhea, and amenorrhea, were more frequently observed in hypothyroid patients. In this study, 88 hypothyroid women exhibited menstrual abnormalities, whereas 26 euthyroid women with goiter experienced similar irregularities. Among hypothyroid cases, 46 had oligomenorrhea, 24 had polymenorrhea, and 18 had amenorrhea. In contrast, among euthyroid cases, 12 had oligomenorrhea, 10 had polymenorrhea, and 4 had amenorrhea.

These findings are consistent with previous research. Krassas GE et al,[13] reported that menstrual irregularities affected 23.4% of hypothyroid women compared to only 8% of normal controls. Similarly, Joshi JV et al,[12] found that 68.2% of hypothyroid women experienced menstrual abnormalities, whereas the prevalence in healthy controls was 12.2%. Furthermore, Sharma N and Sharma A,[15] identified hypothyroidism in 22% of cases of Dysfunctional Uterine Bleeding (DUB), while studies by Pahwa S et al,[16] and Padmaleela K et al,[17] reported thyroid disorders in 22% and 26.5% of DUB cases, respectively.

The relationship between subclinical hypothyroidism (SCH) and infertility remains a subject of debate, primarily due to inconsistencies in TSH cut-off values across studies. Bohnet HG et al,[18] attributed 11% of infertility cases to thyroid dysfunction. Similarly, Abalovich M et al,[19] identified a 13.9% prevalence of SCH in 244 infertile women, while Lincoln SR et al,[20] found elevated TSH levels in 16 out of 704 infertile women.

CONCLUSION

These results highlight the essential role of thyroid function in reproductive health and emphasize the need for routine thyroid screening in women with menstrual irregularities and infertility.

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