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Prevalence of Hypothyroidism in Infertile Women and Evaluation of Response of Treatment for Hypothyroidism on Infertile

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ABSTRACT

Background: Thyroid disease, especially hypothyroidism, is frequently associated with infertility, which affects 8–10% of couples globally. Ovulation, pregnancy outcomes, and menstrual function are all impacted by thyroid problems. Early thyroid examination and therapy are necessary because infertility has been linked to both overt and subclinical hypothyroidism. **Objective:** The main objective of this study was to ascertain the incidence of hypothyroidism in infertile women and how it affects the results of reproduction. To evaluate the relationship between thyroid dysfunction and infertility, autoimmune markers and thyroid hormone levels were analyzed. **Methodology:** 130 infertile women who visited fertility clinics participated in a qualitative study. To evaluate thyroid status, participants performed thyroid function tests (TSH, T3, T4, and thyroid antibodies). Menstrual patterns, length of infertility, and medical histories were documented. To assess changes in ovulatory function and reproductive outcomes, responses to levothyroxine medication were tracked throughout time. **Results:** According to the study, hypothyroidism was present in 63.1% of infertile women, with subclinical hypothyroidism accounting for 40% and overt hypothyroidism for 23.1%. Treatment with levothyroxine improved pregnancy chances by restoring ovulation in 60% of overt hypothyroid cases and 73.1% of subclinical instances. **Conclusion:** Infertility outcomes are greatly impacted by hypothyroidism, which is very common in infertile women. Levothyroxine treatment enhances ovulation and conception, underscoring the importance of early thyroid screening in the treatment of infertility.

INTRODUCTION

A woman who fails to get pregnant during one year of unprotected sexual relationships defines her as infertile. Awareness of infertility as a worldwide health burden exists because it affects 8–10% of all couples throughout the globe according to Inhorn MC., (2003). Statistically women experience thyroid issues at rates that are four to five times greater than male individuals. Both hyperthyroidism and hypothyroidism strongly affect normal menstrual activity and fertility and estrogen androgen metabolism Talwar PP. (2012). Clinical symptoms of thyroid disorders include anovulatory cycles, delayed puberty, infertility, irregular menstruation and miscarriages according to Unisa S. (1999); Zargar AH et al., (1997). The lack of thyroid disorder treatment will result in both infertility and subfertility conditions. All women planning pregnancy should undergo thyroid evaluation when they present one of these characteristics: thyroid conditions in their family history along with irregular menstruation or two prior abortion experiences or when infertility persists after one year of unprotected sex.

Multiple studies confirm that hypothyroidism affects 2–4% of women in the childbearing age group leading to infertility along with abortion outcomes Lincoln R et al., (1999); Krassas GE. (2000). The transmission rate of the virus depends on both patient age group and their dietary iodine consumption level. Autoimmune thyroid disease diagnosed through thyroid peroxidase antibodies tests affects most of these patients particularly reproductive-aged women identified with hypothyroidism (Hollowell et al., 2002; M. P.J. Vanderpump et al., 1995). The condition of thyroiditis can trigger the development of drug-induced hypothyroidism. Multiple reproductive issues including irregular menstruation together with infertility and abnormal sexual development lead to hypothyroidism. Medical professionals should perform thyroid evaluation by combining TPO antibodies along with assessment of thyroglobin/antithyroglobin antibodies and thyroid stimulating immunoglobulin (TSI) and the examination of T3 and T4 levels and thyroid stimulating hormone (TSH).

American College of Obstetricians and Gynecologists consider thyroid antibodies as an important criterion during fertility workups by increasing the risk of recurrent miscarriage twice in women who display normal thyroid function Poppe K et al, (2008); Akhter N et al, (2009).

Blood TSH measurements can establish a fast diagnosis of hypothyroidism. The medical condition of subclinical hypothyroidism occurs when patients present low T3 and T4 levels along with modest elevation of TSH whereas the diagnosis of clinical hypothyroidism is established through high TSH levels combined with low T3 and T4 levels. People with hypothyroidism tend to display elevated thyrotropin releasing hormone levels that bring about delayed LH responses to GnRH together with increased PRL production (Akter et al., 2020). Hypothyroidism medication treatment should precede PRL level investigation because PRL elevation can still exist after hypothyroidism medication is administered (Stamatiades et al., 2019).

LITERATURE REVIEW

For years, studies have been conducted on the link between thyroid disease and the infertility of a woman to determine the effect it has on her reproductive health. All those, anovulation, irregular menstruation, successive miscarriages and infertility which can be explained by clinical and subclinical hypothyroidism (Krassas et al., 2000). While numerous studies proved that thyroid dysfunction, specifically hypothyroidism is conducive for a normal reproductive function and unfavorable for conception through the hypothalamic pituitary ovarian axis (Poppe & Velkeniers, 2003).

In a paper, Verma et al (2012) found infertile women are more predisposed to thyroid dysfunction than fertile women. The findings of this study suggest that there is subclinical rather than overt hypothyroidism in the infertile women, and that even very slight abnormality of thyroid function can affect fertility results. As were women with antibodies to thyroid peroxidase (TPO), even euthyroid, were more likely to have fertility and miscarriage much like Negro et al. (2005) similarly. Therefore, thyroid autoimmunity is important for reproduction even absent of apparent hypothyroidism.

Follicular growth and implantation are also known to have something to do with thyroid hormones. Prolactin levels increase and decrease the release of GnRH so not to allow ovulation (Stamatiades et al., 2019). In Akter et al., (2020) the increase in the subclinical hypothyroid women's thyroid stimulating hormone (TSH) was found to lead to a decrease in the ovarian reserve and change in the luteal phase function, thus causing them to not conceive.

Several such clinical research proved the great deal that levothyroxine therapy of hypothyroidism has on the reproductive outcome of treatment response. Levothyroxine treatment decreased the infertility rate in infertile women as was reported by Sinha et al (2013) that the menstrual regularity and performance of ovulatory cycle were improved significantly in infertile women who were hypothyroid. In addition, hypothyroid women can benefit from both decreased risk of miscarriage in the first trimester and increased rate of conception from thyroid hormone supplementation, their study could also demonstrate. Early evaluation and treatment of thyroid in infertile women were found to be important factors.

Yet recently, a study proved that any thyroid disease means lowered fertility numbers, like the meta-analysis by Thangaratinam et al. (2011), meta-analysis done by the use of assisted reproductive technologies (ART) proved to link the miscarriage and low conception rates to untreated subclinical hypothyroidism in women. This reinforces the necessity to include thyroid function in the routine infertility screening.

In addition, research has been conducted on the connection between dietary iodine and malfunction of the thyroid. One of the reasons behind hypothyroidism and inferring a defect on fertility is an iodine deficiency, which is found in research (Zimmermann & Boelaert, 2015). Thus, reproductive health could be optimized by having the right amount of iodine in food or supplement.

Finally, once the correlation with hypothyroidism and infertility has been said by all that is shown, it is imperative to undergo rapid analysis and treatment. These data suggest that the amount of data is an important factor in maximizing reproductive outcomes for women with hypothyroidism and levothyroxine medication initiated early. No data from population studies on infertility and subclinical hypothyroidism are available, and therefore further research is needed to decide on the long-term benefits of replacement of thyroid hormones in increasing conception rate and pregnancy outcome.

Research Objective

This research aims to ascertain how frequently hypothyroidism exists in the infertile women and how reproductive results are affected when hypothyroidism is treated. This study will go on to examine thyroid hormone levels and autoimmune markers in infertile women to determine association between thyroid dysfunction and infertility. The study also seeks to ascertain whether taking levothyroxine medication will increase the opportunity for conception, as well as restore normal thyroid function and improve ovulatory cycles. The central purpose of this study relates to the need for early screening and therapy for thyroid in order to improve reproductive health outcomes among women with hypothyroidism.

METHODOLOGY

This study investigated hypothyroidism frequency in infertile women with a qualitative research method and the effects of treatment on reproductive outcomes. In that view, a sample of 130 infertile women attending fertility clinics was selected using purposive sampling technique. The data has been gained from medical history reviews, thyroid function testing (TSH, T3, T4 and thyroid antibodies), and in-depth interviews. Through thematic analysis, themes regarding thyroid disease and infertility, both known associations with subfertility as well as subfertility itself were identified. Finally, participants were studied with regard to their response to levothyroxine treatment over a defined time frame. To investigate how hypothyroidism affects influencing ovulation, conception rates and menstruation, thyroid medication was given to them and examined to see what effect it had on that.

RESULTS

This study assessed the impact of thyroid treatment on reproductive outcomes and looked at the prevalence of hypothyroidism among infertile women. Thyroid function, infertility trends, and responsiveness to levothyroxine medication were the main topics of analysis of the data gathered from 130 infertile women.

Table 1

Prevalence of Hypothyroidism in Infertile Women

Thyroid Status	Number of Women (n=130)	Percentage (%)
Euthyroid (Normal)	**48**	36.9%
Subclinical Hypothyroidism	**52**	40.0%
Overt Hypothyroidism	**30**	23.1%

The findings of thyroid status of infertile women from the study are presented in Table 1. Nevertheless, 40 % suffered subclinical hypothyroidism and 23.1 % 'Overt' hypothyroidism, leaving a total of (63.1 %) individuals having been hypothyroid to some degree. So, many instances of a women's infertility could be the issue of thyroid.

Table 2

Menstrual Irregularities Among Women with Hypothyroidism

Menstrual Irregularities	Subclinical Hypothyroidism (n=52)	Overt Hypothyroidism (n=30)
Regular Cycles	14 (26.9%)	5 (16.7%)
Irregular Cycles	24 (46.2%)	12 (40.0%)
Oligomenorrhea (Infrequent periods)	10 (19.2%)	9 (30.0%)
Amenorrhea (Absent periods)	4 (7.7%)	4 (13.3%)

Table 2 presented the association between hypothyroidism and menstrual irregularities. 40–46% of women with hypothyroidism had irregular periods, and those with overt hypothyroidism were more likely to experience oligomenorrhea and amenorrhea. This demonstrates how irregular menstrual cycles caused by thyroid disease may affect fertility.

Table 3

Infertility Duration and Thyroid Dysfunction

Duration of Infertility	Euthyroid (n=48)	Subclinical Hypothyroidism (n=52)	Overt Hypothyroidism (n=30)
1–2 years	20 (41.7%)	12 (23.1%)	5 (16.7%)
3–5 years	18 (37.5%)	24 (46.2%)	12 (40.0%)
>5 years	10 (20.8%)	16 (30.8%)	13 (43.3%)

Table 3 showed the correlation between infertility duration and thyroid dysfunction. At the other end of the spectrum, overt hypothyroidism was associated with higher prevalence of prolonged infertility (defined as >5 years; 43.3%) among women with overt hypothyroidism which also suggests the possibility of further association of the prolonged infertility with untreated or undiagnosed hypothyroidism.

Table 4

Effect of Levothyroxine Treatment on Ovulatory Function

Ovulatory Status (After Treatment)	Subclinical Hypothyroidism (n=52)	Overt Hypothyroidism (n=30)
Restored Ovulation	38 (73.1%)	18 (60.0%)
No Ovulatory Improvement	14 (26.9%)	12 (40.0%)

Table 4 indicated the effect of levothyroxine treatment on ovulation. Compared to women with overt hypothyroidism, 73.1% of those with subclinical hypothyroidism reported restored ovulation, indicating the significance of thyroid hormone replacement therapy in enhancing ovulatory function.

Table 5

Pregnancy Outcomes After Levothyroxine Therapy

Pregnancy Outcome	Subclinical Hypothyroidism (n=52)	Overt Hypothyroidism (n=30)
Conceived Naturally	22 (42.3%)	8 (26.7%)
Conceived with ART	14 (26.9%)	7 (23.3%)
No Conception	16 (30.8%)	15 (50.0%)

Table 5 showed that this was evaluated in terms of pregnancy outcomes during levothyroxine therapy. Women with subclinical hypothyroidism had a greater natural conception rate (42.3%) compared with women with overt hypothyroidism (26.7%). The fact that half of the women with overt hypothyroidism (50%) were unable to conceive highlighted the importance of early thyroid assessment and treatment in cases of infertility.

DISCUSSION OF RESULTS

The aim of this study included the determination of hypothyroidism as a common condition in infertile women and how thyroid treatment influences the results of fertility. As expected, thyroid dysfunction and infertility significantly correlated, and most infertile women presented either overt or subclinical hypothyroidism. Treatment with thyroid hormone also increased the rate of ovulation and pregnancy. This discussion examines the meaning of these findings with regard to reproductive health treatment and in the light of literature.

Prevalence of Hypothyroidism in Infertile Women

According to the study, hypothyroidism was found in some capacity in 63.1 pct of infertile women, with overt in 23.1 pct and subclinical in 40.0 pct. Previous studies have shown how common thyroid dysfunction is in infertile women and these results are consistent with that. The infertile woman often has problems with the thyroid (Poppe & Velkeniers, 2003; Krassas et al., 2000). Subclinical hypothyroidism is common in this study as is the high prevalence of even slight thyroid hormone abnormalities having important and major impact on reproductive health as these can carry a high to normal burden of disease.

Fertility is affected in various ways by thyroid dysfunction, including interference in gonadotropin levels, altered endometrial receptivity, or disordered hypothalamic and ovarian axis. Women with hypothyroidism are usually fertile, but hormonal abnormalities frequently affect them, treating normal ovarian function, so that these women become

anovulatory and infertile. The results of this study are significant due to the high rate found of thyroid dysfunction in infertile women who should have routine thyroid screening. women.

Menstrual Irregularities and Hypothyroidism

The study found that strong correlation existed between menstrual abnormalities and hypothyroidism. Moreover, 30.0% of women with overt hypothyroidism experienced oligomenorrhea; 46.2% of women with subclinical hypothyroidism had irregular periods. In addition, amenorrhea was present in 13.3% of women with overt hypothyroidism. The results are in line with earlier work that demonstrates how thyroid hormones play a role in menstrual function.

In hypothyroidism, thyrotropin releasing hormone (TRH) level is elevated; therefore, prolactin output is high. Prolactin levels that are too high inhibit GnRH release and prevent follicular growth and ovulation. This mechanism is applied to explain menstrual irregularities in hypothyroid women. Early diagnosis and intervention may be possible through an evaluation of thyroid function in women with irregular cycles because irregular menstruation is a commonly used symptom of reproductive failure.

Duration of Infertility and Thyroid Dysfunction

The study found, 43.3% of women with overt hypothyroidism had infertility for more than 5 years, which is more than 5 years. In other words, long term infertility can be related to untreated or undetected hypothyroidism. Published results similar to this indicate that women with hypothyroidism are infertile for a much greater length of time than are women with euthyroidism.

Several reasons for hypothyroid women reproductive failure include luteal phase abnormalities, anovulation and poor endometrial receptivity. Additionally, untreated thyroid hypothyroidism may lead to raise the presence of the thyroid peroxidase (TPO) antibody, which has been associated with increased risk of implantation failure and pregnancy loss. The implication of these results is how crucial it is to assess thyroid function in women with chronic infertility early. infertility.

Effect of Levothyroxine Therapy on Ovulation

Levothyroxine According to the study she reported that treatment with levothyroxine massively improved the performances of ovulation in hypothyroid women. Treatment restored ovulation to 73.1% of sub clinically hypothyroid women and to 60.0% of overtly hypothyroid women. This conforms to other well-known facts that when thyroid hormones are replaced, both rates of ovulation as well as regularity in menstrual cycles are improved.

Levothyroxine is given to treat this, so that TSH levels return to normal to stabilize production of progesterone and estrogen. In people, normal ovulatory cycles and endometrial receptivity to implantation rely on this hormonal balance. As long as hormone tests do not demonstrate overt hypothyroidism, intervention can restore ovulation; however, when long term or severe thyroid dysfunction is present, impacts on ovarian function may be greater than hormone test results alone indicate such that longer treatment (spanning several months) or additional intervention may be needed to return function to normal; whereas only a small minority of patients require additional intervention beyond replacement hormone therapy to achieve successful recovery of ovulation. hypothyroidism.

Pregnancy Outcomes After Thyroid Treatment

According While the study suggests that only 26.7 percent of women with overt hypothyroidism conceived naturally using levothyroxine compared to 42.3 percent of women with subclinical hypothyroidism. In addition, women with overt hypothyroidism had a higher rate of unsuccessful conception (50.0%) than women with subclinical hypothyroidism (30.8%). As with other studies, these results support that thyroid hormone supplementation enhances fertility.

Under overt hypothyroidism, the reduced conception rates can be due to more serious hormonal abnormalities, protracted anovulation, or underlying autoimmune causes like increased thyroid antibodies. They found that thyroid autoimmunity in euthyroid women is associated with increased risk of miscarriage and implantation failure even in the presence of positive TPO antibodies. Therefore, these results suggest that the treatment of Hashimoto's thyroid autoimmunity may not only protect hormone replacement but also improve pregnancy outcomes.

Finally, among the overt hypothyroid women 23.3% and among the subclinical hypothyroid women 26.9% were thus supported in becoming pregnant by ART. This is in keeping with prior work showing that untreated subclinical hypothyroidism adversely affects ART success rates. The findings show that women who are IVF therapy should have thyroid monitoring and care medications.

CONCLUSION

This study emphasized the need to detect and treat the thyroid dysfunction in early life, as it informed the association of emotional embarrassment of hypothyroidism and female infertility. Hypothyroidism is very prevalent among infertile women (in all cases overt, and 63.1% of infertile with subclinical hypothyroidism). Subclinical hypothyroidism, as well as overt disease, had an effect on fertility because prevalence of subclinical was considerably higher than overt. The study also strongly associated thyroid illness with a defective, rare or missing period, as a large proportion of hypothyroid women have defective, rare or non-period. Thyroid hormones' healthful reproductive function and their control of the hypothalamic pituitary ovarian axis were shown in this. Women with overt hypothyroidism also tended to have longer infertility because thyroid condition may be linked to these cases.

This study demonstrated how well levothyroxine therapy both helps to improve reproductive outcomes and return ovulatory function. However, after treatment, a relatively large proportion of women with overt and even subclinical hypothyroidism regained ovulation, underlining the central importance of therapeutic hormone replacement therapy to menstrual cyclicity and also to ovarian function. Yet this study also showed that overt hypothyroid women had infertile persistence and natural conception rate compared with subclinical

hypothyroid women. Thus, the influence of the higher degree of thyroid malfunction on fertility will depend on a prolonged treatment or increased reproductive support.

The study also shows that thyroid treatment is associated with higher rates of conception (natural as well as in vitro fertilization), women with subclinical rather than overt hypothyroidism have better pregnancy outcomes, and that routine thyroid screening is important component of the assessment of the infertile patient who has irregular menses, prolonged infertility OR history of miscarriage. Since subclinical hypothyroidism is extremely common and undermines fertility, clinicians should actively test thyroxine function for therapeutic advantages in reproduction. More research is needed about the long-term consequences of thyroid hormone therapy in infertile women on ART to optimize therapy and to enhance pregnancy success rates.

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