

Study of Thyroid Function in Infertile Women in Basrah

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Abstract

Infertility is a condition in which a woman's ability to conceive and bear children is impaired. Thyroid dysfunction can affect hormone and androgen metabolism, menstrual function, and fertility. The study aimed to evaluate thyroid hormones T3, T4, and TSH, in the serum of infertile women. The research was conducted at Ibn-Gzouan Hospital for Obstetrics and Gynecology in Basra, southern Iraq, between October 2021 and March 2022. In our research, 28 infertile women, and 30 fertile women aged 18 to 45 were studied. Our research found that infertile women had greater TSH and lower T3 and T4 levels in comparing to fertile women. In conclusion, hypothyroidism is closely related to infertility in Iraqi females and may cause an increase in body mass index and disturbance of the menstrual cycle.

Keywords: Female Infertility, Thyroid disease, T3, T4, TSH.

1. Introduction

(WHO) has established a set of criteria. People who are married, have a normal sexual relationship without the use of contraception and have lived with their partner for a year without having a child are considered unproductive [1]. Infertility is seen as a global issue that has an impact on the health and financial well-being of infertile couples as well as their families [2]

Based on the presence or absence of a previous pregnancy, there are two types of infertility: primary and secondary. Three major factors that influence the likelihood of a spontaneous pregnancy are the female partner's unfavorable non-conception time, as well as disease-related infertility. Infertility caused by the condition might affect both sexes or be particular to one of them [3]

The elements that have an impact on both men and women Hypogonadotropic Infertility can be caused by Lifestyle-related Pathogens, autoimmune disorders, and style of life thyroid disease just a few of the disorders that can affect men. Hyperprolactinemia, ciliary function irregularities, Anovulation insufficiency, polycystic ovarian syndrome, endometriosis, uterine fibroids, and endometrium polyps are some of the diseases that can cause female infertility [4].

Females are four to five times as likely as males to have thyroid problems. Hormone and androgen metabolism, menstrual function, and fertility are all affected by hyperthyroidism and hypothyroidism [5]. They can lead to puberty being delayed, menstrual irregularities, anovulatory cycles, miscarriages, and infertility [6]. A thyroid disorder, if left untreated, can result in both subfertility and infertility. Any female who had more than two abortions or is unable to conceive after a year of unprotected intercourse and has a family history of thyroid problems or an irregular menstrual cycle has undergone more than two abortions. An evaluation of her thyroid is necessary. Hypothyroidism affects 2% to 4% of women in their reproductive years [7] (TSH) levels in the blood can be used to quickly detect hypothyroidism.

Subclinical hypothyroidism is defined as low T3 and T4 levels with a minor increase in TSH levels, whereas clinical hypothyroidism is defined as high TSH levels with low T3 and T4. Increased (PRL) amount and delayed LH response to GnRH are frequently related to Hypothyroidism resulting in elevated levels of thyrotropin-releasing hormones [8]. Even if PRL levels are elevated, To determine the cause of elevated PRL levels, medication should be administered first to correct hypothyroidism [9].

Aim of the study

The study aimed to evaluate thyroid hormones T3, T4, and TSH, in the serum of infertile women.

Subjects and methods

3.1. Subjects

It is a case-control study of 58 women; 28 infertile women and 30 fertile women. The participants were aged 18 to 45 years old, and they visited the infertility and IVF center in Ibn-Gzouan Hospital for Obstetrics and Gynecology in Basra, southern Iraq, between October 2021 and December 2022.

3.2. Methods

Each participant (patients and controls) had five milliliters of human blood drawn, and transferred to sterilized test tubes, for 30 minutes at room temperature to allow it to coagulate. After centrifuging a blood sample for ten minutes at 3000 rpm, the serum was then isolated and kept at -20 degrees Celsius. The serum was then isolated into an Eppendorf tube and used for measuring the concentration of TSH, T3, and T4 levels by Cobas e 411 kits.

3.3 Ethical Consideration

The study protocol was approved by the ethical research committee of Health and Medical Techniques College/ Southern Technical University. In addition, verbal approval was taken from all participants and controls.

2. Statistical Analysis

Data are stated as means \pm standard deviation (SD).

Differences between groups' means were tested by t-test, and chi-square test. Correlations between variables were also determined. All statistical analyses were performed using SPSS for Windows (version 25, USA). For the normal distribution, use one-way ANOVA. A value of $P < 0.05$ was considered statistically significant and $P > 0.05$ non-significant.

3. Results

Our study included 28 infertile women and 30 fertile women. The results of our study revealed as follows:

Table (1) reveals there's a non-significant difference ($p > 0.05$) between the Fertile and the Infertile groups in terms of age. BMI measurement shows a highly significant increase ($P < 0.01$), in the infertile women compared to the fertile group.

Table (1) Statistical distribution of the study groups by their age and body mass index

Items	Fertile (N=30)		Infertile women (N=28)		P value*
	Mean	±SD	Mean	±SD	
Age (years)	30.87	6.129	28.61	6.344	0.173
BMI (Km/M2)	13.97	7.907	25.34	8.021	0.000

Table (2) shows the comparison of the thyroid hormone between infertile women compared to the fertile group. The results revealed that there is a highly significant increase in thyroid-stimulating hormone level (TSH) ($p < 0.01$), and a highly significant decrease in levels of triiodothyronine (T3) and thyroxine (T4) ($p < 0.01$) compared to the fertile group.

Table (2): A comparison between fertile and infertile women

Group parameters	Fertile		Infertile women		P value*
	Mean	± SD	Mean	± SD	
T3 (nmol/L)	1.767	0.399	0.776	0.241	0.0000
T4 (nmol/L)	102.5	30.42	47.30	12.27	0.0000
TSH (μU/L)	1.919	0.830	7.173	3.767	0.0000

4. Discussion

Hypothyroidism is associated with decreased thermogenesis, decreased metabolic rate, and has also been shown to correlate with a higher body mass index (BMI) and a higher prevalence of obesity. There is clinical evidence suggesting that even mild thyroid dysfunction in the form of subclinical hypothyroidism is linked to significant changes in body weight and represents a risk factor for overweight and obesity [10].

T3 and T4 levels were a highly significant decrease in the infertile women's group compared to the fertile group ($P < 0.00$), while TSH levels showed a highly significant increase ($P < 0.00$). The results of our study indicate the prevalence of hypothyroidism disorder among infertile women, and these results are in agreement with previously reported studies of several types of research as in the following:

A study by Sridevi et al. [11] was found when comparison of clinical hypothyroid cases with controls. Serum T3 and T4 levels were found to be significantly decreased and serum TSH levels were found to be significantly increased in clinical hypothyroid women compared to controls.

Thyroid dysfunction was present in 53% of infertile women. It is obvious from the observation that the fertility of the women's reproductive system is hampered by altered thyroid hormone levels [11]. Hypothyroidism was found in 24%-28% of women with primary and secondary infertility. In hypothyroidism, increased thyrotropin-releasing hormone (TRH) production stimulates both TSH and prolactin secretion and that leads to hyperprolactinemia and altered gonadotropin-releasing hormone (GnRH) secretion [12]. Hypothyroidism may occur as a result of primary gland failure or insufficient thyroid gland stimulation by the hypothalamus or pituitary gland. Autoimmune thyroid disease is the most common etiology of hypothyroidism in the United States [13]. Iodine deficiency is the most common cause of hypothyroidism worldwide [14].

Hypothyroidism is defined by a lack of T4 and T3 hormones, which prompt the pituitary gland to produce more (TSH). T4 is the main hormone generated with very little T3 by the thyroid gland. Only around twenty percent of the T3 found in peripheral tissue is generated by the thyroid gland and the other eighty percent is created through the enzymatic conversion of T4 to T3 in the tissues that are being targeted [15].

5. Conclusion

Thyroid disorder is closely related to infertility in Iraqi females and may cause an increase in body mass index and disturbance of the menstrual cycle.

Conflicts of interest

We, the authors, declare that we have no conflict of interest.

6. Acknowledgments

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