

**Study on Correlation of Serum Prolactin and Thyroid Hormone in Female Infertility**Sayeeda Parveen<sup>1</sup>, Chanchal<sup>2</sup>, Swarnim Swati<sup>3</sup><sup>1,3</sup>Senior Resident, Department of Obstetrics and Gynaecology, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar<sup>2</sup>Associate Professor, Department of Obstetrics and Gynaecology, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar

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Corresponding Author: Dr. Chanchal

Conflict of interest: Nil

**Abstract:**

**Background:** Globally, infertility is becoming a more serious issue with detrimental medical, societal, and psychological effects. Infertility in women can result from a variety of factors, including hormone imbalances, thyroid issues, and hyperprolactinemia. Since both of these disorders are curable, normal fertility may return with appropriate care of the hormone imbalance. Aim of this to correlation of serum Prolactin and Thyroid hormone in female infertility.

**Methods:** From November 2021 to May 2022, a descriptive hospital-based study was carried out in the Department of Obstetrics and Gynecology, SKMCH, Muzaffarpur, Bihar. The study comprised 30 cases of primary and secondary infertility in female patients who visited the outpatient obstetrics and gynecology department of Sri Krishna Medical College and Hospital in Muzaffarpur, Bihar. Together with the assessment of the thyroid hormone profile and blood prolactin levels, a thorough history and clinical examination were conducted.

**Result:** 15 individuals, or 50% of the sample, had thyroid status, while 11 subjects (36.33%) had hypothyroidism and 4 subjects (13.33%) had hyperthyroidism. 13 (43%), having normal serum prolactin, and 17 (57%) having elevated levels. In female infertility, serum TSH and prolactin were found to have a strongly positive correlation ( $r=0.507$ ,  $p = 0.004$ ).

**Conclusion:** Thyroid dysfunction and hyperprolactinemia are highly prevalent in infertile females.

**Keywords:** Infertility, Prolactin, Subfertility, Thyroid.

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**Introduction**

Infertility is defined by the World Health Organization as The inability to become pregnant is known as infertility. If, after two years of consistent sexual activity without the use of contraception, neither woman has been pregnant and there is no alternative explanation such as nursing or postpartum amenorrhea the pair may be deemed infertile.

Similarly, In the UK, the NICE guideline defines infertility as failure to conceive after regular unprotected sexual intercourse for two year in the absence of known reproductive pathology[2]. Infertility is a growing problem virtually almost all over the world. The WHO estimates that 8-12 % of couples around the world experience difficulty conceiving a child[3]. The major cause of infertility among couples include ovulatory dysfunction (15%), tubal and peritoneal pathology (30-40%) and male factor (30- 40%) and rest is unexplained<sup>4</sup>. Apart from several cause of infertility hormonal

imbalance is one of the major causes of infertility. In a study conducted by O.S. Philippov et al with the aim to find out epidemiology and causes of infertility found that 32.8% of cases female infertility was due to endocrinal cause[5]. It has been seen that hypogonadism in hyperprolactinaemic women is due to high circulating level of prolactin interfering with the action of gonadotrophin at the ovarian level and impaired gonadal steroid secretion, which intern alters positive feedback effects at the hypothalamic and pituitary levels. This leads to lack of gonadotrophin cyclicity and to infertility[6]. Apart from role of prolactin, thyroid hormone has profound effects on reproduction and pregnancy. Thyroid abnormalities, among women with infertility, particularly in countries like India, considered as areas with endemic goiter are not uncommon[7].

In study conducted by B. Rijal et al, found that about 1/4<sup>th</sup> of women with infertility had some types of thyroid dysfunction[9].

Hypothyroidism can also be associated with an increased risk of polycystic ovaries, which is also associated with decrease fertility[8]. In our study hormonal assay was done with the aim to correlate the level of serum prolactin and thyroid hormone in infertile female and to determine relation of serum prolactin and thyroid hormone in female infertility.

### Materials and Method

This descriptive study was carried out in a hospital setting at Sri Krishna Medical College and Hospital in Muzaffarpur, Bihar, between November 2021 and May 2022. Included were thirty cases of primary and secondary infertility that were seen in the outpatient obstetrics and gynecology department at SKMCH in Muzaffarpur, Bihar. Following a thorough history and physical examination, a blood sample was drawn and sent for a laboratory test using an enzyme immune assay to measure thyroid hormone and serum prolactin levels. Prolactin, thyroid function test were assayed using standard and sensitive immune assay method using monobinInc. The data were analyzed using the SPSS.

**Inclusion Criteria:** Females of primary and secondary infertility.

### Exclusion Criteria:

1. Abnormal Semen Analysis
2. Participants under treatment of thyroid disorder and hyperprolactinemia.

3. History of drug intake which block dopamine receptors as phenothiazine, metoclopramide etc.

### Result

Total 30 cases of female infertility were included in our study.

Majority of participants i.e.; 17(56%) were from age group 20 – 24 yr followed by 11 (36.7%) from age group 25 – 29 yr and only 2(6.7%) participants were from age group 15 – 19 yr. Out of 30 participants majority i.e.; 19 (63.3%)found to seek medical help after 3-5 yr of their marriage followed by 5 (16.7%), 4 (13.3%), 1(3.3%) and 1(3.3%) participants came 6-8 yr and 9-11yr, 1-2yr and 12 – 15yr after their marriage. In our study 50% participants were Euthyroid whereas 11(36.33%) were hypothyroid and 4 (13.33%) were hyperthyroid. Among euthyroid group, the mean value of serum TSH, Ft4, Ft3 and Prolactin were 3.136±1.39 mIU/L, 1.142±0.214 ng/dl, 2.436±0.707 pg/ml, 16.79±10.11 ng/ml respectively. In hypothyroid group, the mean values of serum TSH, FT4, FT3 and Prolactin were 32.29±14.59 mIU/L, 0.59±0.17 ng/dl, 1.19±0.564pg/ml, 34.03±13.26 ng/ml respectively. In hyperthyroid group, the mean values of serum TSH, FT4, FT3 and prolactin were 0.105±0.026 mIU/L, 4.48= -1.36ng/dl, 8.85=-2.645 pg/ml, 23.27=-10.76 ng/ml respectively. Serum Prolactin was raised in 17 (57%) and normal in 13(43%) Both serum TSH and Prolactin were found to be significantly positively correlated ( $r = 0.507$ ,  $p = 0.004$ ).

**Table 1 : Age of marriage and duration of married life**

	Categories	Frequency (%)
Age of patients	15-19yrs	2(6.7%)
	20-24yrs	17(56.7%)
	25-29yrs	11(36.7%)
Duration of married life	1-2yrs	1(3.3%)
	3-5yrs	19(63.3%)
	6-8yrs	5(16.7%)
	9-11yrs	4(13.3%)
	12-15yrs	1(3.3%)

**Table 2 : Hormonal status in the whole study groups (values are expressed in Mean±SD)**

TSH (mIU/L)	Euthyroid (n=15)15%	Hypothyroid (n=11)36.33%	Hyperthyroid (n=4)13.33%
FT4(ng/dl)	3.136±1.39	32.29±14.59	0.105±0.026
FT3(pg/dl)	1.142±0.214	0.59±0.17	4.48±1.36
Prolactin(ng/ml)	2.436±0.707	1.19±0.564	8.85±2.645
	16.79±10.11	34.03±13.26	23.27±10.76

**Table 3 : Distribution of population according to serum prolactin levels (n=30)**

Serum prolactin (ng/ml)	Frequency	Percentage(%)
0-20	13	43%
20-40	14	47%
>40	3	10%

Data showed that majority of participants i.e; 17(57%) had Hyperprolactinaemia and 13(43%) had normal prolactin level.

**Table 4 : Correlation between serum TSH and prolactin levels**

Parameters	Pearson correlation value	P-value
Serum TSH (mIU/L)	0.507	0.004
Prolactin(ng/ml)		

Serum TSH levels were found to be significantly positively correlated with prolactin levels ( $r=0.507$ ,  $p=0.004$ ).

### Discussion

The result of the present study have revealed that the majority of participants i.e.; 17(56.7%) were from age group 20-24 yr followed by 11 (36.7%) age group 25-29 yr and around 2/3rd i.e.; 63.3% of participants came for treatment in between 3-5 yr of their marriage. similar age group was found in study by Shrewastwa et al in which the mean age was  $25.3\pm 3.5$  yr<sup>10</sup> and another study by B. Rijal et al in which mean age was  $26.3\pm 3.1$  yr [9]. Hormonal study of subjects in our study showed 15 i.e.; 50% participants were euthyroid, 11(36.33%) were hypothyroid and 4 (13.33%) were hyperthyroid. Almost similar finding were revealed in other study done by Shriwastwa,

M.K et al (2013) found that out of 635 infertile cases where 447 (70.39%) were euthyroid and 29.6% had different type of thyroid dysfunction ( $P<0.05$ )<sup>10</sup>. In other study by Rahman D et al found 33.3% of sub fertile female was suffering from thyroid dysfunction [17]. Our study also had a similar result done by Shevaleela M Biradar et al where 42% of infertile female had thyroid dysfunction [11] Significant proportion of population in our study i.e.; 17(57%) had hyperprolactinaemia and 13(43%) had normal prolactin level.

The finding is almost similar to M Poonam et al who found that incidence of hyperprolactinaemia in infertile women was 52% [12] overall hyperprolactinemia was noted in 41% by Pratibha D et al, 69.5% by Kalsum A et al and 46% by Awasthi et al [13,18]. Study done by A kumkum and B Goswami et al also revealed positive correlation between TSH and prolactin in infertile female [15,16].

### Conclusion

Globally, infertility is becoming an increasingly prevalent issue. If a woman has not been pregnant after two years of regular sexual relations without the use of contraception, the pair is deemed infertile. According to WHO estimates, 8–12% of couples worldwide have trouble becoming pregnant. Hormonal imbalance is one of the main causes of infertility in women, though there are other causes as well. Reproduction and pregnancy

are significantly impacted by thyroid and prolactin disorders. Thirty cases of primary and secondary infertility in females were included in our investigation. A hormonal analysis of the subjects revealed that 4 (13.33%) were hyperthyroid, 11 (36.33%) were hypothyroid, and 15 (50%) were euthyroid. Additionally, in 13 (43%) and 17 (57%) of the cases, serum prolactin was normal.

It was discovered that infertile females had significantly positive correlations between their serum prolactin and TSH P value ( $r=0.507$ ,  $P=0.004$ ) levels. Therefore, it is advised that all infertile women have their serum TSH and prolactin levels checked on a regular basis as part of their medical evaluation.

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