

## Correlation of Prolactin and Thyroid Hormone Levels in Infertile Women: A Cross-Sectional Study in Pakistan

Noor ul Ain<sup>1\*</sup>, Rehman HA<sup>1</sup> and Abdullah FE<sup>2</sup>

<sup>1</sup>Department of Serology, Dr. Essa Laboratory and Diagnostic Centre, Karachi, Pakistan

<sup>2</sup>Department of Microbiology, Dr. Essa Laboratory and Diagnostic Centre, Karachi, Pakistan

\*Corresponding author: Noor ul Ain, Department of Serology, Dr. Essa Laboratory and Diagnostic Centre, Karachi, Pakistan, Tel: 92-335-575-5577; E-mail: [dr.syedasadaf@essalab.com](mailto:dr.syedasadaf@essalab.com)

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### Abstract

**Introduction:** Thyroid and prolactin hormone levels are associated with fertility disorders among women. This study aims to find out the correlation between hyperprolactinemia and its correlates with hypothyroidism in female infertility.

**Methodology:** We conducted a cross-sectional study on 200 women who were experiencing from the condition of infertility and was referred to the department of biochemistry at Dr. Essa's laboratory institute at Karachi, Pakistan. The patients were enrolled for a period of 5 years, which is from 2011 to 2015. The inclusion criteria was cases with a diagnosis of primary infertility with over one year duration of marriage. Legitimate written informed consent was performed on patient recruitment. Moreover the collected data was interpreted by using SPSS version 20.0.

**Results:** The total of 200 recruited cases gathered in the study to evaluate the fertility status. Comparing the TSH value with the fertility status of the women the TSH hormone levels were abnormal in 36(100) of our patients who were infertile with none of the abnormal TSH hormone levels found in fertile women with a p-value of <0.001. The prolactin hormone levels similarly showed 79(89) of the patients having abnormal prolactin hormone level who were infertile while 103(86) patients have normal prolactin hormone levels and they were fertile with a p-value of <0.001.

**Conclusion:** There were a higher percentage of patients with abnormal prolactin levels who were infertile compared to abnormal thyroid levels. In conclusion estimation of prolactin and TSH levels might be considered essential in assessment of patient with fertility disorders.

**Keywords:** Thyroid; Prolactin; Fertility disorders; Thyroid stimulating hormone

### Introduction

Hormonal disturbance of reproductive system of the female results because of the variant malfunction of the hypothalamic-pituitary pivot. These generally normal and predominant issue frequently prompt to infertility constituting a noteworthy therapeutic, economical and physiological burden. Failure to consider following 1 year of general intercourse without the utilization of contraception is known as infertility that can be either primary or secondary [1,2]. Legitimate assessment of the aforementioned clutters includes a multidisciplinary approach with a vital commitment from the clinical research facilities [3].

Estimation of the prolactin and thyroid hormones particularly the thyroid-stimulatory hormone (TSH) has been viewed as an imperative segment of infertility workup in women [4]. Thyroid dysfunction interferes with different facets of multiplication and pregnancy. A few reviews uncover the relationship of hypo and hyperthyroidism with the menstrual aggravation, diminished fertility and increase risk of morbidity during pregnancy [5-7]. Hyperprolactinemia antagonistically influences the fertility potential by disabling the pulsatile secretion of the GnRH and consequently meddling with

ovulation [8]. The disorder has been initiated in the menstrual and ovulatory malfunctioning like anovulation, amenorrhea and galactorrhea [9,10].

Roughly two third of the women facing both galactorrhea and amenorrhea problems that will have hyperprolactinemia of that facet, while around 1/3 will have pituitary adenoma. Apart from this group the infertile women with consistent menses additionally have hyperprolactinemia. The point of the review was to discover the relationship of hyperprolactinemia that causes female infertility and it corresponds with hypothyroidism.

### Methods

The study focus a cross-sectional approach on 200 women who were experiencing the cause of infertility and was obtained and referred to the department of biochemistry of Dr. Essa research center establishment at Karachi, Pakistan. The patients were enrolled for a period of 5 years that is from 2011 to 2015. The inclusion criteria was cases with a diagnosis of primary infertility and span of marriage over 1 years. The patients were selected after the written informed consent. The exclusion criteria that was considered for our study was infertility aspect of male and among the tubal elements, any prominent organic lesion and any inborn abnormality of the urogenital tract were taken as the exclusion criteria for our study. Likewise, history of thyroid illness,

past thyroid surgery or on thyroid medicines was additionally added to exclusion for the study. We conducted a detailed history, clinical examination and the tests that were offered to them by their gynecologist in working for the infertility.

Five milliliters of fasting venous specimen was obtained in the morning of the third day of menstrual cycle as told by participants for the investigations of serum biochemical. Serum was isolated and stored at specified temperature conditions for further examination. The Hormones were then evaluated by the electrochemiluminescence method of TSH and Prolactin. The Measure of unwavering quality was assessed by the utilization of economically available control sera of high and low concentrations.

### Statistical investigations

Descriptive statistics were used to show the characteristics of the infertile women. Means were compared using the independent 't' test. Pearson/Spearman correlation coefficient, either of them applicable was used to see the correlation between infertility, TSH and PRL levels. The significant level was considered as P value of <0.05 at 95% confidence interval criteria. Collected data was analyzed using SPSS.

### Results

200 patients were enrolled in our study for the evaluation of the fertility status. Of the patients enrolled the majority were of the age between 25-29 years of age 34% followed by <24 years (30%) with a mean of 27.8±5.5 as shown (Table 1).

Age Group (Years)	N	%
Less than 24	60	30.5
25-29	68	34.5
30-34	45	21.8
35-49	27	13
Total	200	100

**Table 1:** Age group of patients enrolled for fertility status evaluation.

Regarding the fertility status of the women 104 of the women were fertile 52% and 96 (46%) as infertile as shown (Table 2). Majority of the patients have the marriage duration of <2 years 93 (46.5) followed by 74 (37) between 3-4 years and 33 (16.5) with >5 years marriage with a mean 3.2 ± 1.7.

Fertility status	N	%
Fertility	104	48
Infertility	96	52
Total	200	100

**Table 2:** Fertility status.

The TSH values in our study population when separated in to high, low and normal values 32 (16) of the participants has high TSH values followed by 4 (2) as low and 164 (82) as normal with a mean of 24.8 ± 19.8 Similarly when separating the prolactin values as high and normal 120 (60) of the patients have normal prolactin values followed by 80

(40) has high prolactin values with a mean of 3.4 ± 4.2. When comparing the patient population with the levels of the hormones and the fertility status majority of the population lies in the ages of less than 24 and 25-29 year in ages as shown (Table 3).

Age Group	Fertility	Infertility	N	p-value
Less than 24	34 (55)	28 (45)	62	0.076
25-29	41 (59)	28 (41)	69	
30-34	15 (35)	28 (65)	43	
35-49	15 (58)	11 (42)	26	
Total	105	95	200	

**Table 3:** Demographics and Fertility.

Majority of our patients who came for the fertility evaluation have a marriage duration of <2 years with 50 (53.8) as fertile and 43 (46) as infertile followed by 3-4 years 36 (49) in productive (fertile) group and 38 (51) in sterile (infertile) group with remainder of the patients having a marriage duration of >5years p-value 0.765.

When comparing the TSH value with the fertility status of the women the TSH hormone levels were abnormal in 36 (100) of our patients who were infertile with none of the abnormal TSH hormone levels found in our fertile women. On the other hand, majority 104 (63) of the patients have normal TSH hormone levels who were fertile followed by 60 (37) of the patient have normal levels who were infertile with a p-value of <0.001. The prolactin hormone levels similarly showed 79 (89) of the patients having abnormal prolactin hormone level who were infertile while 103 (86) of our patients have normal prolactin hormone levels and they were fertile with a p-value of <0.001 shown (Table 4).

TSH value	Fertility	Infertility	N	p-value
Abnormal	0 (0)	36 (100)	36	<0.001
Normal	104 (63.4)	60 (36.6)	164	
Total	104	96	200	
Prolactin value	Fertility	Infertility	N	p-value
Abnormal	1 (1.3)	79 (99)	80	<0.001
Normal	103 (86)	17 (14.2)	120	
Total	104	96	200	

**Table 4:** Comparison of TSH and Prolactin Hormone levels with the fertility and the infertility.

### Discussion

The Thyroid malfunction is a situation known to lessen the probability of pregnancy and to antagonistically influence pregnancy result. Information obtained on the relationship between thyroid issue and infertility stay rare and the relationship with a specific reason for infertility has not been analyzed vastly. It was therefore incumbent to do an assessment of the prolactin and thyroid hormone levels in the infertile women. Our study results are very much in accordance to the results that were published previously. Our study results showed

associations with the abnormality of the prolactin and TSH hormone levels and the fertility status. Another study uncovered that 62.5% of hypothyroid cases had some menstrual disorders cases (2009) [11-13]. One more study reported that 57.6% menstrual abnormality (like Oligomenorrhoea) was seen in (50%) cases [12]. The ubiquity of menstrual abnormalities (mostly Oligomenorrhoea) found to be 23% among 171 hypothyroid patients, while being just 8% in 214 controls have ( $p < 0.05$ ). The study authors had demonstrated a relationship between the elevated severity of menstrual malfunctions and higher serum TSH values.

The findings are in concordance to the results we have found in our study. The frequency of menstrual disturbance were also present in our study population who were infertile that was found in other studies also as reported previously. Menstrual issues may be resulted from hypothyroidism and hyperthyroidism. Hypothyroidism is generally connected with hyperprolactinemia and such patients display ovulatory collapse as published in the literature (drbintagoswani) [13]. Our study also showed that a significant proportion of our study population have normal prolactin levels and were infertile. A very high percentage of abnormal prolactin levels were appreciated compared to thyroid hormones the findings that is different with the results published in the past showing increased prevalence of hypothyroidism and increased association with infertility [12]. Although the study published in the past showed increased prevalence for hyperprolactinemia also. According to Kumkum et al. [14] the high rate of hyperprolactinemia is in relationship with the after effects of the study published which portrayed the predominance of 46% in his review, In our patient we found more prominent rate of infertile women with abnormal prolactin levels. Choudhary and Goswami [11]. There were hyperprolactinemia in 16.6% and 57% women with hypothyroidism according to Singh et al. Long standing hypothyroidism brings about hyperprolactinemia has been involved in ovulatory malfunctioning from deficient corpus luteal progesterone secretions, when slightly raised to oligomenorrhoea or amenorrhoea when the prolactin levels are immense [15-17]. Amenorrhoea has been associated with both hypothyroidism and hyperprolactinemia which is because of the deformity in the positive input of estrogen on leutinizing hormone, FSH and LH concealment.

Our findings uncovered a noteworthy significant relationship between aberrant menstrual arrangements and also anovulatory cycles, with hyperprolactinemia in the fertile facet thus, TSH and Prolactin are frequently requested clinical investigation in assessing infertility in women.

## Conclusion

There was a higher rate of patients with unusual prolactin levels who were infertile compared with abnormal thyroid levels.

Hypothyroidism is connected with hyperprolactinemia and such patients show ovulatory collapse resulting in infertility. In conclusion evaluation of TSH and Prolactin levels are viewed as essential in determination of patient with fertility disorders.

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