



# Correlation of Prolactin level and hypothyroidism in Primary and Secondary infertility in females of Andhra Pradesh

By

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## Abstract

**Background:** Infertility in females is a complex global health problem. It has multiple socio-cultural consequences which are usually associated with thyroid and prolactin hormone disorders. Hence it has become a clinical challenge to endocrinologist and gynaecologist.

**Method:** Out 300, 150 primary infertile and group A and 150 secondary infertile group B women were studied. Blood examination included complete haemogram ESR, hormonal assay. Radiologically USG perineum and abdomen; chest-x-ray was studied.

**Results:** Prolactin hormone levels 0-20 ng/ml was highest in secondary infertility (group-B) 98 (65.3%), 21-100 ng/ml was highest in group-A, >100 ng/ml was observed only in group-B i.e. 4 (2.6%), Regular Menses were highest in group-A 47 (31.3%), Oligomenorrhea was also highest in group-A 70 (46.6%), while Amenorrhea was highest in group-B 32 (21.3%), Menorrhagia was highest in group-A 12 (8%), Duration of marriage period was highest in group-B (secondary infertile).

**Conclusion:** Hyper prolactenemia with thyroid dysfunction are the major contributor of hormonal factors in primary and secondary infertility of women. Hence estimation of prolactin and TSH levels might be considered as essential assessment of patients with fertility disorders.

**Keywords:** Thyroid, Prolactin, TSH, Menses, Infertility

## Introduction

Infertility is defined as the failure of a couple to achieve conception (regardless of cause) after one year of unprotected and adequately timed intercourse <sup>(1)</sup>. It could be primary i.e. a couple has never conceived despite co-habitation and exposure to sexual activity over a period of years. Secondary infertility is when couples have achieved pregnancy previously but regular un-protected sexual intercourse has not resulted into second pregnancy <sup>(2)</sup>. Hence infertility is a complex problem, which has numerous consequences depending on society and cultural background, gender, life style, sexual history of the couple affects it. Infertility is a global health concern. This is partly due to complexity in aetiology and partly difficulty in diagnosing and treating it.

Hormonal disorders in female reproductive system comprised of number of problems resulting from aberrant hypothalamic – pituitary – ovarian axis <sup>(3)</sup>. Quantitative study of hormones like prolactin and thyroid hormones especially TSH has been considered as important factor for infertility in females <sup>(4)</sup>. Hence attempt was made evaluate the various causes of infertility so that it can be treated efficiently and permanently

## Material and Method

300 (three hundred) infertile women regularly visiting to obstetrics and gynaecology department of Nimra Institute of Medical Sciences Ibrahimpatnam – Vijawada-521456 (Andhra Pradesh) were studied.

**Inclusive Criteria:** Infertility confirmed clinically. The patients aged between 20 to 40 years and duration of marriage more than one year were selected for study.

**Exclusion Criteria:** Male factor infertility, tubal factor, congenital anomalies of uro-genital system. History of previous thyroid surgery patients or under medication for thyroid gland disease, Immune-compromised patients was excluded from study.

**Method:** 150 (one hundred and fifty) were classified as primary infertility and 150 as secondary infertility group-B. Blood examination included complete haemogram, ESR serum prolactin assay. Thyroid function test USG perineum and abdomen, chest-x-ray was studied in both groups.

The duration of study was July-2020 to July-2021

**Statistical analysis:** Various findings of both groups were classified with percentage and compared. The statistical analysis was carried out in SPSS software.

## Observation and Results

**Table-1:** Duration of marriage in both group of infertility 1 to 5 year of marriage 79 (52.6%) were in group-A, 43 (28.6%) were in group-B.

Duration of marriage was – 6 to 10 years – 45 (30%) in group-A, 61 (40.6%) in group-B. More than 10 years after marriage were – 26 (17.3%) in group-A, 46 (30.6%) in group-B.

**Table-2:** History of Menses was – 47 (31.3%) in group-A and 43 (28.6%) had regular menses, 70 (46.6%) in group-A, 65 (43.3%) in group-B had Oligomenorrhea 21 (14%) in group-A, 32 (21.3%) in group A -had amenorrhea, 12 (8%) in group-A, 10 (6.6%) in group-B had menorrhagea.

**Table-3:** Level of prolactin in both groups- Level – 0-20 ng/ml was in 65 (43.3%) in group-A, 98 (65.3%) in group-A, Level – 21-100 ng/ml was in 85 (56.6%) in group-A, 48 (32%) in group-B Level > 100 ng/ml was present only in group-B i.e. in 4 (2.6%) women.

**Table-4:** Study of TSH levels in both groups – TSH level - <0.4 mIU/L was observed 23 (15.3%) in group-A and 14 (9.3%) in group-B females. TSH level – 0.4 to 4.7mIU/L observed in 95 (63.3%) in group-A, 106 (70.6%) in group-B females, TSH level > 4.7 mIU/L Observed in 32 (21.3%) in group-A, 30 (20%) in group-B females.

## Discussion

Present correlative study of prolactin level in hypothyroidism, in primary and secondary infertility in females. Duration of marriage in both group was noted 1-5 years of marriage was 79 (52.6%) in group-A, 43 (28.3%) in group-B, 6 to 10 year of marriage duration was 45 (30%) in group-A, 61 (40.6%) in group-B. > 10 years of marriage duration was 26 (17.3%) in group-A, 46 (30.6%) in group-B (Table-1). 47 (31.3%) in group-A and 43 (28.6) in group-B had regular menses, 70 (40.6%) in group-A and 65 (43.3%) in group-B had Oligomenorrhea, 21 (14%) in group-A, 32 (21.3%) in group-B had Amenorrhea, 12 (8%) in group-A, 10 (6.6%) in group-B females had Menorrhagea (Table-2). Level of prolactin 0-20 ng/ml was 65 (43.3%) in group-A, 98 (65.3%) group-B. 21-100 ng/ml was 85 (56.6%) in group-A, 48 (32%) in group-B. >100 ng/ml was observed only in group-B. 4 (2.6%) Table-3, TSH level <0.4mIU/L was observed 23 (15.3%) in group-A, 14 (9.3%) in group-B, 0.4 - 4.7mIU/L was 95 (63.3%) in group-A, 106 (70.6%) in group-B. TSH level > 4.7mIU/L was in 32 (21.3%) in group-A, 30 (20%) in group-B (Table-4). These findings are more or less in agreement previous studies <sup>(5)(6)(7)</sup>.

Hyper prolactinemia is a common problem in infertility. It causes galactorrhea, amenorrhea and gonadal dysfunction which results into infertility. It is also reported that, hyperlactinemia adversely effects fertility potential by impairing GnRH pulsatility and thereby ovarian function <sup>(8)</sup>.

Thyroid hypofunction is characterized by low serum levels of T<sub>4</sub> because of this low level there is an increase secretion of thyrotrophic releasing hormone (TRH). In some individual TRH increase the levels of both prolactin and TSH by stimulating the thyrotrophs and lactotrophs <sup>(9)</sup>. In

hypothyroidism increased TRH production leads to hyper prolactinemia and altered GnRH pulsatile secretion. This leads to delay in LH response and inadequate corpus luteum leading to abnormal follicular development and ovulation. Thyroid hormone receptors are expressed on human oocytes and granulosa cells. At the cellular level, thyroid hormones synergize with FSH mediated LH/HCG receptor to exert direct stimulatory effects on granulosa cell function. i.e., progesterone production, altering the peripheral metabolism of estrogen and decreasing SHBG production is another pathway by which hypothyroidism may impact on fertility <sup>(10)</sup>. These pathways may result in abnormal feedback at the pituitary level and consequently infertility.

### Summary and Conclusion

There is higher prevalence of hypothyroidism and hyper-prolactinemia in the infertile women. Both hypothyroidism and hyper prolactinemia may result menstrual disorders and ovulatory dysfunctions. Hypothyroidism is commonly associated with hyper-prolactinemia and such women exhibit ovulatory failure. Hence measurement of serum prolactin and TSH levels is an important screening procedure in all infertile women particularly with abnormal menstrual patterns. But this demands further patho-physiological, genetic, embryological, nutritional and hormonal study because exact mechanism and quantum of hormone secretion is still unclear.

- This research paper was approved Ethical committee of Nimra Institute of Medical Sciences Ibrahimpatnum, Vijayawada – Andhra Pradesh-521456
- No Conflict of Interest
- No Funding

**Limitation of study:** Owing to limited number of patients and lack of modern instruments we have limited findings

**Table – 1**

**Study of duration of marriage in both groups of infertility females**

**(Group A = 150 and Group B = 150)**

(No. of Patients: 300)

Sl No	Duration of Marriage	Group-A (150)		Group-B (150)	
		No	%	No	%
1	1-5 year	79	52.6	43	28.6
2	6-10 year	45	30	61	40.6
3	> 10 year	26	17.3	46	30.6

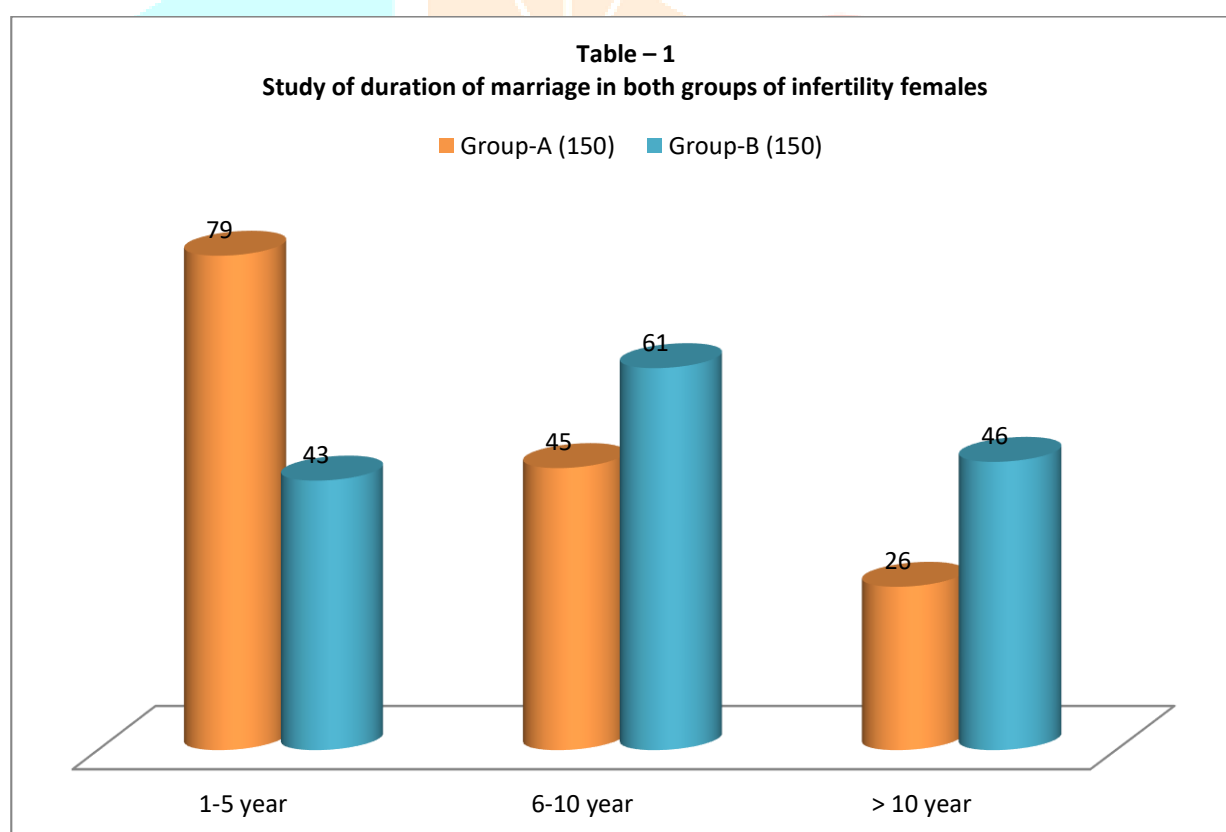


Table – 2

**History of Menses in both groups of infertility (Group A = 150, Group B = 150)**

Sl No	History of Menses	Group-A (150)		Group-B (150)	
		No	%	No	%
1	Regular Menses	47	31.3	43	28.6
2	Oligomenorrhea	70	46.6	65	43.3
3	Amenorrhea	21	14	32	21.3
4	Menorrhagea	12	8	10	6.6

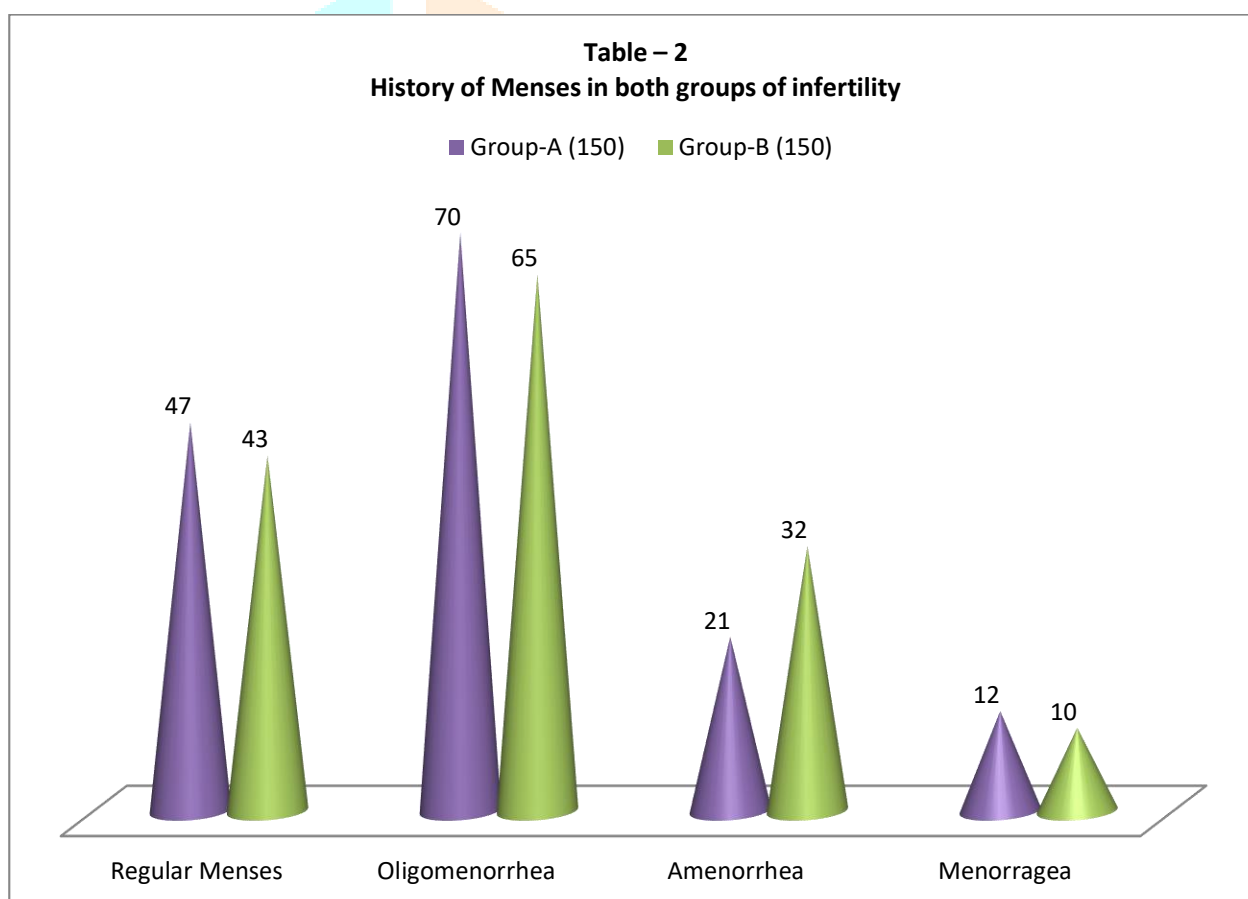


Table – 3

## Level of prolactin in both groups of infertility females

Sl No	Level of Prolactin	Group-A		Group-B	
		No	%	No	%
1	0-20 ng/ml	65	43.3	98	65.3
2	21-100 ng/ml	85	56.6	48	32
3	> 100 ng/ml	0	0	14	2.6

Normal value of serum prolactin = 2-25 ng/ml

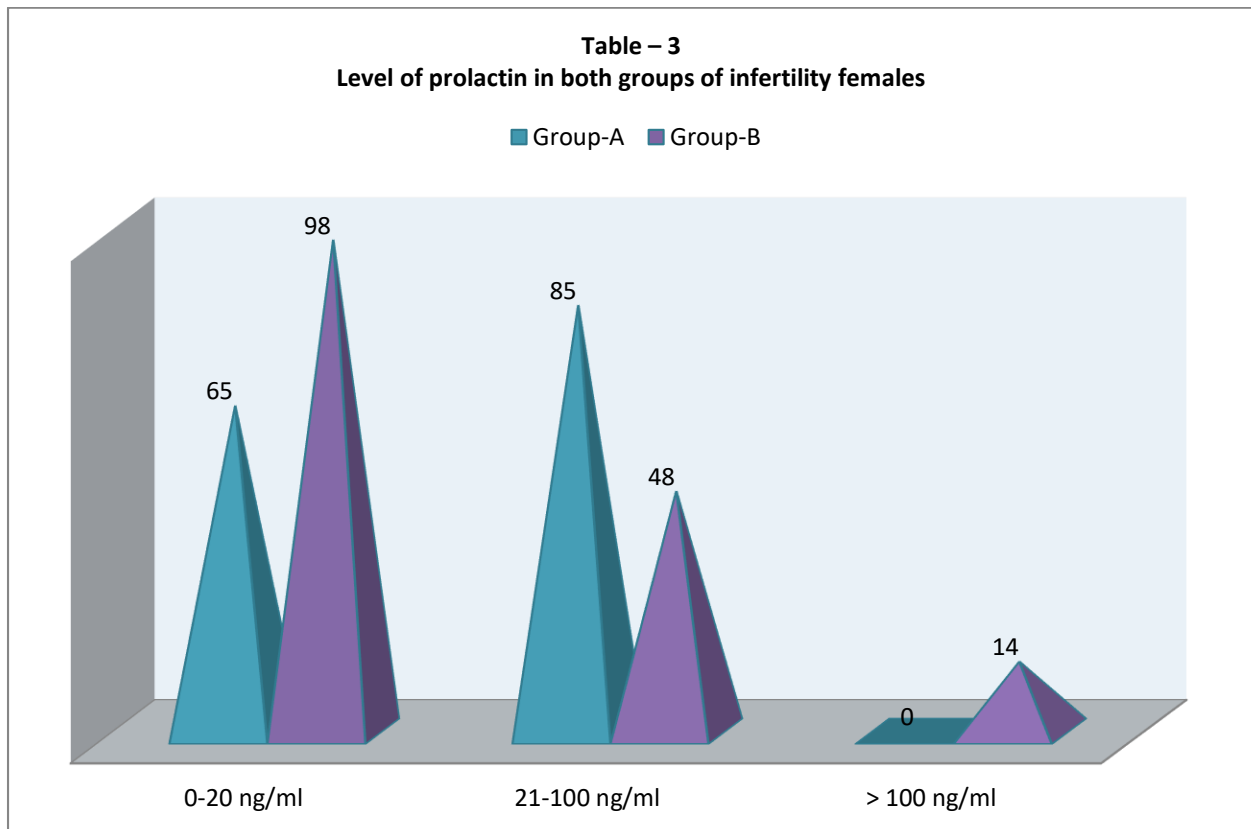


Table – 4

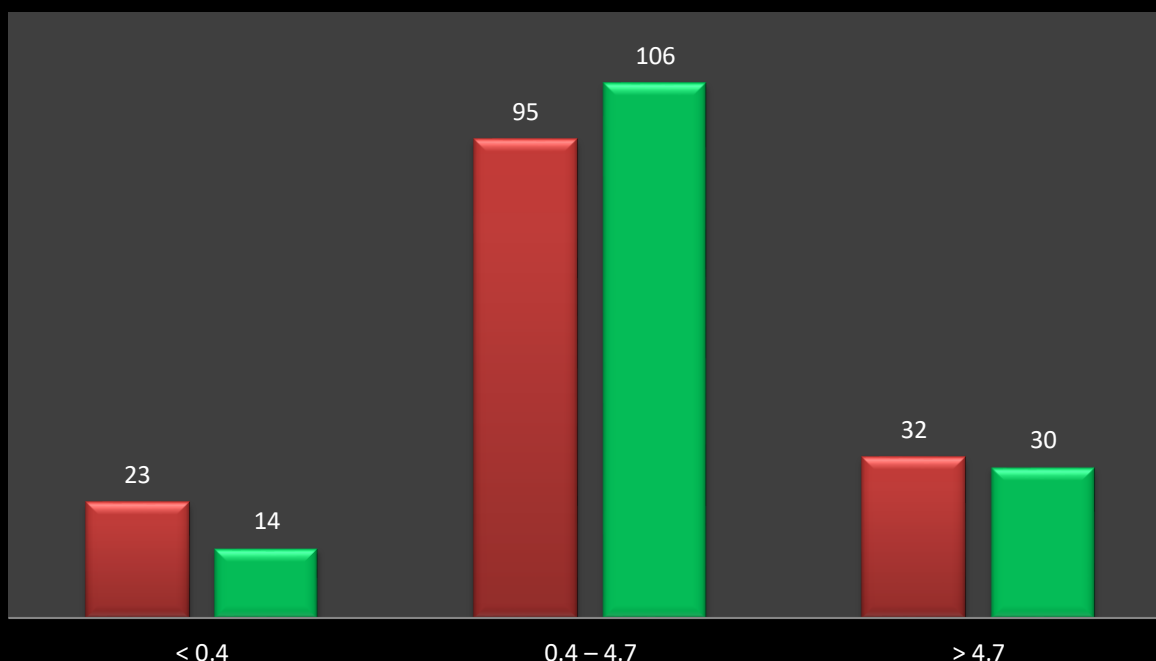
## Study of TSH level in both infertility groups of females

Sl No	TSH Levels	Group-A (150)		Group-B (150)	
		No	%	No	%
1	< 0.4mIU/L	23	15.3	14	9.3
2	0.4 – 4.7mIU/L	95	63.3	106	70.6
3	> 4.7mIU/L	32	21.3	30	20

Normal TSH level: 0.5 – 4.7 MIU/ml

**Table – 4**  
**Study of TSH level in both infertility groups of females**

■ Group-A (150) ■ Group-B (150)



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