

# A study of some hormonal parameters in primary infertility

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## Abstract

The present study was conducted in the department of Biochemistry of Government Medical College, Nagpur for the duration of one and half years. The aim was to study the changes in the levels of serum Follicle Stimulating Hormone and Luteinizing Hormone levels in patients with primary infertility and to study if the change in the levels of these hormones is causative factor in primary infertility. In the present study 50 cases of primary infertility and 50 normal controls were selected. Serum levels of FSH and LH were estimated in both the groups by ELISA method. Serum LH level was decreased significantly in cases compared to controls. A non significant increase in serum FSH level was observed in cases. Increased LH level is suggestive of disruption of H-P-O axis which is indicative of ovarian dysfunction in infertility patients.

**Keywords:** Follicle Stimulating Hormone, Luteinizing Hormone, Hypothalamo-Pituitary-Ovarian axis, Enzyme Linked Immuno Sorbent Assay.

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## INTRODUCTION

The desire of a woman for a child is sometimes stronger than self interest in beauty or figure and may be stronger than dreams of career. Infertility is defined as inability of a couple to achieve conception after one year of unprotected coitus.<sup>1</sup> It can be Primary or Secondary. 10 to 15 % of marriages contracted by men and women prove to be childless. Childlessness may severely affect the couple's psychological harmony, sexual life and social function. As ovulatory dysfunction amounts for 30 to 45% of all causes of female infertility and these disorders are generally among the easily diagnosed and most treatable causes of infertility, they need to be investigated thoroughly.<sup>2</sup> Any defect in the hypothalamo-pituitary gonadal axis can affect ovulation. Changes in peripheral serum levels of FSH and LH are indicative of any such

defect in the axis. Gonadotropins such as FSH and LH are two hormones needed for follicles to grow. Hence inadequate amounts of FSH and LH in the beginning of menstrual cycle can be the cause of ovulatory dysfunction. FSH is a glycoprotein secreted by basophilic cells of anterior pituitary. It is responsible for proliferation of follicular cell and for the maturation of the ovum. LH is also secreted from the anterior pituitary cells and it triggers ovulation in females and the development of corpus luteum.

## MATERIALS AND METHODS

The present study was conducted in the department of Biochemistry of Govt. Medical College, Nagpur with support from department of OBGY, from January 2004 to March 2005. The study was approved by institutional ethics committee. Fifty women diagnosed with primary infertility, in the age group of 19 to 35 years, with h/o infertility of more than 1 year duration, were taken as cases and fifty normal healthy women were selected as controls. Exclusion criteria consisted of patients with h/o tubal blockage, gross cervicouterine anomaly, h/o tuberculosis or any other chronic illness and patients whose husbands were oligospermic or azospermic. Serum follicle stimulating hormone and luteinizing hormone levels were estimated by UBI MAGIWEL™ quantitative ELISA kit by sandwich ELISA method.

## RESULTS

**Table 1:** Distribution of study subjects according to age

Age in years	Number of study subjects			
	Controls(50)	Percentage (%)	Patients (50)	Percentage (%)
≤ 20	2	4	7	14
21 to 25	31	62	23	46
26 to 30	14	28	12	24
31 to ≤ 35	3	6	8	16

**Table 2:** Showing distribution of patients depending upon type of menstrual abnormality

Type of menstrual abnormality	Number of patients	Percentage (%)
Normal	16	32
Oligomenorrhea	18	36
Menorrhagia	7	14
Amenorrhea	9	18

**Table 3:** Showing values of serum LH and FSH in study subjects (Values are expressed in mIU/ml)

Study Subjects	Serum LH	Serum FSH
Controls	12.02 ± 2.64	9.76 ± 1.32
Patients	25.69 ± 2.59	9.87 ± 4.39
P value	0.001	0.8661

p<0.05- Statistically significant; p>0.05-Statistically non significant

**Table 4:** Showing values of serum LH level in study subjects (LH values are expressed in mIU/ml, mean ± SD)

	Controls(n=50)	Infertile women 50					
		Normal LH (n=33)		Increased LH level (n=17)		Total no of Patients(n=50)	
	Mean ± SD	Mean ± SD	%	Mean ± SD	%	Mean ± SD	%
LH level	12.02 ± 2.64	11.83 ± 3.33 (p=0.7763)	66	52.59 ± 22.75 (p 0.000)	34	25.69 ± 23.59 (p 0.001)	100

p<0.05- Statistically significant; p>0.05-Statistically non significant

**Table 5:** Studies showing FSH values in the infertile women (Values of FSH are expressed as mIU/ml; mean ± SD)

	Controls (n=50)	Infertile women 50					
		Normal FSH (n=44)		Increased FSH level (n=3)		Decreased FSH level (n=3)	
	Mean ± SD	Mean ± SD	%	Mean ± SD	%	Mean ± SD	%
FSH level	9.76 ± 1.32	9.43 ± 3.04 (p=0.4891)	88	22 ± 1.0** (p 0.000)	6	4.2 ± 0.17** (p 0.000)	6

\*\* - Statistically highly significant

## DISCUSSION

Ovulatory dysfunction leading to anovulation amounts for 30-45% of all causes of female infertility. For diagnosing this disorder it is desirable to establish the functional state of hypothalamic pituitary ovarian (H-P-O) axis. It is best done by direct measurement of serum gonadotropins. Hence the present study was designed to estimate the serum gonadotropins level in 50 infertile women and 50 controls. The prime decade of child bearing age in Indian society is 21-30 years and in this study 90% of the total cases studied fall in this category. Oligomenorrhea was the commonest menstrual abnormality found in 36% in the infertile women studied in the present study, menorrhagia in 14%, amenorrhea in 8% while almost 32% patients were found to have history of normal menstruation. Peripheral serum levels of FSH and LH are indicative for hypothalamic pituitary interaction. Central nervous system, hypothalamus, pituitary and ovary have

to be regarded as a dynamic functional unit. Any disruption in these well coordinated and synchronized interactions will result in ovarian dysfunction.<sup>3</sup> The mean serum levels of LH in control, patients with normal LH and patients with increased LH level are **12.02 ± 2.64**, **11.83 ± 3.33** and **52.59 ± 22.75** respectively. While LH level in total number of patients was **25.69 ± 23.69**. A significant increase in LH level (p=0.000) was found in 34% patients as compared with controls. Similar study was done by **Kuku SF et. al.**<sup>4</sup> who found increase in LH level in 28.7%cases. **Dmowski P et. al.**<sup>5</sup> found persistently higher LH level in 4 out of 6 infertile women, i.e. in 66% of infertile women. The mean values of FSH in control, patients with normal FSH level, patients with increased FSH level and patients with decreased FSH level are **9.76 ± 1.32**, **9.43 ± 3.04**, **22 ± 1.0** and **4.2 ± 0.17** respectively. It was found that a highly significant increase in serum FSH values was observed in 6% of

patients with increased FSH level as compared with the control ( $p=0.000$ ). Coincidentally, decreased FSH level was seen in about 6% patients which is also highly significant as compared to control. But there was no significant change in FSH level in total infertile patients as compared to control. It was found that there was normal FSH level in 88% infertile women. In the study conducted by **Kuku SF et. al.**<sup>4</sup>, there is increased FSH level in 15% patients and decreased FSH level in 7% patients. **Curchod A et. al.**<sup>6</sup> studied 9 cases of infertility in whom they found high FSH level in some patients and low levels in some patients. **Buyalos RP et. al.**<sup>7</sup> observed elevated FSH in 29.8% of infertile women. This indicates that there is a definite role of changes in serum LH and FSH levels in deregulating the H-P-O axis leading to ovarian dysfunction and the development of infertility.

### CONCLUSION

During the present study, serum LH level was found to be significantly increased in infertile women as compared to controls. No significant change was observed in FSH level in total infertile women as compared to control though some patients showed increased and some patients showed decreased FSH levels. As LH and FSH levels are indicative for hypothalamic pituitary ovarian (H-P-O) interaction, the increased levels in LH are suggestive of disruption of the H-P-O interaction, suggestive of ovarian dysfunction leading to primary infertility. Thus changes in FSH level depends on the type of the disease patient is suffering from. Increased levels of the gonadotropins is seen in premature ovarian failure while decreased levels are suggestive of hypothalamic defect, but these patients need further investigations for the definitive diagnosis.

We can conclude from this study that treatable endocrine abnormalities identifiable by direct hormonal assay may occur in a high proportion of female partners of infertile relationship. Considering this medical and social implications of infertility in the society and limited reproductive health resources in the developing country like India, direct hormonal evaluation should be an important part of work up of infertile females.

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