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A STUDY ON SERUM FSH, LH AND PROLACTIN LEVELS AMONG INFERTILE WOMEN

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ABSTRACT

Background: Study of hormonal imbalance and its implications in female infertility are an interesting area that requires to be explored in recent time. Hormonal imbalance can associated with irregular menstrual cycle, Amenorrhea, obesity and infertility in women. Other medical conditions such as polycystic ovarian syndrome, Endometriosis, stress, sexually transmitted diseases and chromosomal anomalies may be responsible for infertility in females. **Objective:** The aim of the present study was to evaluate the serum levels of Follicle Stimulating hormone (FSH), Luteinizing hormone (LH) and Prolactin hormone in infertile women that were referred from different infertility clinics and centres. **Materials and Methods:** This study comprises total 176 female subjects with age ranging from 20 to 40 years and divided in two groups. The total number of 88 infertile women along with 88 fertile women as controls was included for the present study. Serum FSH, LH and Prolactin levels were estimated by enzyme-linked immunosorbent assay (ELISA) methods. **Results:** The results showed maximum infertile women were found between the age group of 30-40 years. The Serum FSH, LH and Prolactin levels among infertile women was 8.77±4.65, 7.64±5.16 and 18.59±7.50 respectively. Whereas, levels of FSH, LH and Prolactin in fertile women showed that 6.71±4.12, 5.66±3.17 and 13.44±5.82 respectively. **Conclusion:** In this study, we found that the hormone levels have statistically significant with female infertility. The elevated levels of FSH, LH and Prolactin may be one of the important causes for infertility in women.

INTRODUCTION

Infertility is described as failure to conceive after one year of unprotected intercourse.[1] The percent of infertility is reported to be 10-15% worldwide. It is estimated that infertility affects globally 50 to 80 million people and currently 8-10 million infertile couples are estimated to be in India.[2] The major causes of female infertility may include blockage of the Fallopian tubes, pelvic inflammatory disease, age factors, chromosomal anomalies, Amenorrhoea and endocrinological dysfunctions.[1,3] Infertility has been associated with various anthropometric parameters and socioeconomic conditions.[4,5] The association of age and infertility are reported in several studies. The aged women decline their fertility with time span.[5,6]

Hormonal imbalances have been associated with female infertility. The increased or decreased levels of FSH, LH and Prolactin hormones may cause infertility. FSH and LH hormones belong to glycoprotein family and play an important role in follicular development and production of oestrogen.[7-11] The study aimed to evaluate the serum levels of Follicle Stimulating hormone, Luteinizing hormone and Prolactin hormone in infertile women.

MATERIALS AND METHODS

Study design: Analytical cross sectional study
Study place and duration: All the subjects were enrolled during July 2009 to January 2011 from different infertility clinics and centres in Bhopal and Rewa district of Madhya Pradesh, India.
Ethical approval: This study was approved by the ethical committee of the Institute and obtained written consent from all the subjects.
Inclusion criteria: The inclusion criteria for the enrolled infertile subjects were diagnosis of infertility, age (range 20-40 years) and duration of marriage more than two years.
Exclusion criteria: The exclusion criteria were infertility due to male factor, tubal factor, anatomical anomaly of the urogenital tract and any organic lesion. The subjects with sexually transmitted diseases were also excluded from the study.
Sample size: One seventy six
Grouping: The present study included 176 women subjects and grouped them into infertile (n=88) and fertile as a control (n=88). 88 normal women with at least one child birth belonging to the same age group and socioeconomic status were selected as a control group.
Methodology: Five ml of whole blood was taken aseptically through antecubital vein from the subjects in the fasting state during mid cycle 14-16 day. The whole blood was allowed to clot, thereafter, serum was decanted and used for analysis. The serum was kept at -20^{0}C and assay were completed within three days.[8] FSH, LH and Prolactin hormone levels were evaluated by Immunoenzymetic assay by ELISA Reader with standard kits.[9]

Statistical analysis: The student t-test method was used for statistical analysis and the results were showed in the form of a table.

RESULTS

A total of 88 infertile women were involved in the present study. The maximum infertile women population was found between the age group of 30-40 years. The ratio of patients to control was 1:1. Table I depicts that detailed hormone levels in control and infertile group. We found that mean serum level of FSH of 8.77±4.65 mIU/ml in infertile women was higher than mean serum levels of FSH of 6.71±4.12 mIU/ml in fertile women that were statistically significant (p=0.0022). The mean serum level of LH was 7.64±5.16 mIU/ml in infertile women was higher than mean serum level of LH of 5.66±3.17 mIU/ml in fertile women which were statistically significant (p=0.0025). The mean serum level of Prolactin was 18.59±7.50 ng/ml in infertile women was higher than the mean serum level of Prolactin of 13.44±5.82 ng/ml in fertile women which was highly significant (p=0.0001).

There was statistically significant difference between levels of serum FSH, LH and Prolactin in infertile and fertile women as shown in Table I.

Table I: Hormone levels in Fertile and Infertile women.

Parameter	Control Group	Infertile Group	t-value	p-value
FSH (mIU/ml)	6.71±4.12	8.77±4.65	3.11	0.0022**
LH (mIU/ml)	5.66±3.17	7.64±5.16	3.06	0.0025**
Prolactin (ng/ml)	13.44±5.82	18.59±7.50	5.09	0.0001***

**Very Significant, ***extremely significant, Data expressed as Mean±SD.

DISCUSSION

Female infertility is multi factorial, but primarily it is due to ovulation problems, blockage of Fallopian tube, uterine problem, stress, obesity, infectious disease and hormonal imbalance etc.[10] Scott et al., (1989) and Ban et al., (2013) found a significant association between hormonal imbalance and female infertility.[11,12] Fertility has been associated with various anthropometric parameters and socioeconomic conditions.

This study was carried out to determine the levels of FSH, LH and Prolactin in infertile women. The increased levels of FSH, LH and Prolactin were found in infertile group when compared with the control group. These findings are in agreement with Ban et al., (2013) and Aroma et al., (2014).[12,13] Scott MG et al., (1989) and Choudhury et al., (1995) reported that the elevated levels of Prolactin hormone are very common in infertile women as compared with fertile women.[11,14]

In the present study FSH levels were significantly higher in infertile women compared with fertile women. FSH is the predominant circulating gonadotropin hormone in women. During the ovulation cycle, it is stimulating the development of ovarian follicles and a selection of the dominant follicle. The LH levels were significantly increased in infertile women compared with fertile women. Generally, increased LH levels are associated with ovarian dysfunction.[12,13] Aroma et al., (2014) emphasized that increased FSH, LH and Prolactin levels are significantly associated with infertile women.[13]

The serum Prolactin levels were increased in infertile women as compared to fertile women. The main function of Prolactin is the development and regulation of lactation in females. The increased levels of Prolactin results in amenorrhea, unexpected lactation, hypoestrogenism and lack of ovulation. The present study showed that the hyperprolactinemia as the cause for infertility in women. Similarly, increased levels of Prolactin have also been reported by Parijatham and Saikumar (2014), Goswami et al., (2009) and Kumkum et al., (2006).[15-17]

Follicle Stimulating hormone and Luteinizing hormone play a very important role in follicle development and oestrogen production. The hormonal imbalance is associated with infertility in women. The increased or decreased levels have an impact on ovulation and menstruation.[18,19] Many studies showed that the hormonal imbalance is in not only associated with chronic disease, but it also has the risk of infertility.[20,21] The results indicated elevated levels of FSH, LH and Prolactin in infertile women. The Prolactin levels are high in infertile women as compared to fertile women. These results are in agreements with Ban et al., (2013) and Aroma et al., (2014) who also found increased levels of FSH, LH and Prolactin in infertile women. [12,13]

CONCLUSION

The increased hormonal levels of FSH, LH and Prolactin were found in infertile women as compared to the control group. We should analyse the responsible factors for elevated levels of FSH, LH and Prolactin. The increased levels of hormone may be associated with infertility and other clinical manifestations. The elucidation of such studies helps us to achieve a more thorough understanding of female infertility. This study will be very useful in prevention and management of infertility. This can establish counseling strategies possible for those who are affected by the reproductive dysfunction. Endocrine tests should be undertaken to identify all infertile women.

Limitation of study: Large scale studies are required to confirm further results.

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Conflict of interest: We declare that we have no conflicts of interest.

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