

Assessment of Serum Gonadotrophins and Prolactin Hormone Levels in In Vitro Fertility (IVF) patients in selected fertility clinics in Port harcourt, Nigeria: A measure of Relevance in Assisted Reproduction Technology (ART)

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Abstract: The study was designed to determine the levels of gonadotrophins (luteinizing hormone (LH), follicle stimulating hormone (FSH)) and prolactin in women attending fertility clinics and were about to begin In vitro fertility treatment. Sixty (60) women who attended In vitro fertility clinic in various private fertility hospitals in Port Harcourt were used for the study. These hormonal tests were part of preliminary investigations carried out on the patients before the treatment. As a routine, the consent of the women was obtained for the investigations to be carried out on their samples. Fasting blood samples were collected on day two (2) of their menstrual cycle, and serum hormone (FSH, LH and Prolactin) concentrations analyzed by ELISA (Enzyme-linked immunosorbent assay) method with automated micro plate reader. The subjects were married for at least two years; and were within the child bearing age of 35-44years. Out of 60 patients examined for LH, FSH and prolactin concentrations, 29 (48.3%) had normal hormonal concentrations, 31(51.7%) had elevated hormone levels represented as follows:3(5%) had elevated levels of both LH,FSH and prolactin,1(1.7%) had elevated levels of LH and prolactin,6(10%) had elevated levels of FSH only with normal concentrations of LH and prolactin, 2(3.3%) had elevated levels of both FSH and LH with normal prolactin level, 23(38.3%) had elevated levels of prolactin(hyperprolactinaemia),19(31.7%) showed elevated levels of prolactin (hyperprolactinaemia) with normal levels of LH and FSH. The results obtained from the investigation were compared with standard values which are as follows: 0.5-15iu/l for LH, 0.2-10iu/l for FSH and 0-18.8ng/l for prolactin. The result showed a higher incidence (38.3%) of hyperprolactinaemia which has been identified by several other researchers as one of the major causes of female infertility .From this result, as corroborated by various other researchers, hormonal evaluation is important in the diagnosis and treatment of infertility as abnormalities in hormone concentrations may be the cause of infertility in some infertile women.

Keywords: infertility, hormones, hyperprolactinaemia, ovulation.

I. Introduction

Child bearing is important to all societies. The inability to have children has been a source of pain, anxiety and shame, to couples that are infertile. In Africa, couples who are unable to bear as many children as they wish may feel anguish or emotional panic hence several reports have focused on the causes, prevention and treatment of infertility in the continent (Brunham et al., 1992). The causes of infertility in women are many and approximately 40% of couples will have more than one cause for their infertility (Okonofua, 1999 and Ory, 1990). Recent advances in endocrinology points to the fact that the hypothalamus – pituitary –ovarian axis is essential for the smooth operation of the mechanism of the endocrine function which leads to ovulation (OnG and Rahman, 1985), and priming of the endometrium for implantation of the zygote which has to pass through a normal fallopian tube following fertilization (Iris et. al., 2003). Failure of any of these complex process leads to infertility. The world health organization (WHO), 1991 define infertility as the inability of couples of reproductive age to impregnate or conceive and carry a pregnancy to live birth within two years of exposure to the risk of pregnancy(i.e. unprotected coital exposure) and two types were identified; primary infertility, which is the inability of couples to impregnate/conceive despite cohabitation and exposure to pregnancy(not contracepting) for a period of two years, while secondary infertility, is the inability of couples to impregnate/conceive following previous pregnancy, irrespective of the outcome of the pregnancy, despite cohabitation and exposure to pregnancy (in the absence of contraception, breastfeeding, or postpartum amenorrhoea) for a period of two years. Although secondary infertility implies that there may be no natural barriers to conception, it nevertheless suggests the presence of a supervening pathology that may severely compromise fertility. Technically, secondary infertility is not present if there has been a change of partners (Bamigbowu and Adegoke, 2005). WHO in 1991 estimated that between 8 and 12% of couples experienced

some forms of infertility during their reproductive lives, thus affecting 50 to 80 million worldwide, out of which 20 – 35 million couples in Africa are expected to experience this problem. This can be extrapolated to 3 – 4 million Nigerian couples suffering from infertility (Thomas et. al., 1995). Available evidence from community based data suggests that up to 30 per cent of couples in some parts of Nigeria are infertile (Adetoro and Ebomoyi, 1991).

Another study also described an infertility belt in Africa. This stretches from West Africa, through Central to East Africa. Several countries with high rates of infertility that lie within this belt include: Nigeria, Cameroon, Gabon, Democratic Republic of Congo, Central African Republic, Chad, Burundi, Uganda and Kenya. In Gabon, it is estimated that more than 33% of women are childless at the end of their reproductive lives (Okonfua 2003). In some parts of Nigeria, community based studies have reported rates of infertility as high as 20% (Okonofua, 2003) and 45% (Adetoro, 1991). This study is mainly concerned with the levels of some reproductive hormones (Luteinizing hormone, follicle stimulating hormone and Prolactin) levels in infertile women who opt for in vitro fertility treatment in some selected fertility clinics in Port Harcourt Metropolis, Nigeria.

II. Materials And Methods

The investigation was carried out using sixty (60) women attending some fertility clinics in Port Harcourt city. These women were between reproductive ages of 35-44 years, and were married for at least two years. Written consent, as is the routine process for hormonal profile to be investigated on their samples, for medicals and documentation was given by them. Fasting blood samples were collected on day 2 of their menstrual cycles. The blood was centrifuged and the serum was used for analysis. FSH, LH and Prolactin levels were estimated by ELISA (Enzyme-linked immunosorbent assay) method with automated micro plate reader. The kits were obtained from Immunometrics (UK) Limited, London, and the investigation was carried as stipulated on the kit leaflet.

III. Results

Out of 60 infertile women examined for LH, FSH and prolactin concentrations, 29 (48.3%) had normal hormonal concentrations, 3(5%) had elevated levels of both LH, FSH and prolactin, 6(10%) had elevated levels of LH with normal concentrations of FSH and prolactin, 11(18.3%) had elevated levels of FSH, 2(3.3%) had elevated levels of both FSH and LH, 23(38.3%) had elevated levels of prolactin (hyperprolactinaemia), 19(31.7%) showed elevated levels of prolactin (hyperprolactinaemia) with normal levels of LH and FSH.

Figure 1 below illustrates the number of subjects that had luteinizing hormone concentrations within the normal (standard) level and the number which had elevated concentrations.

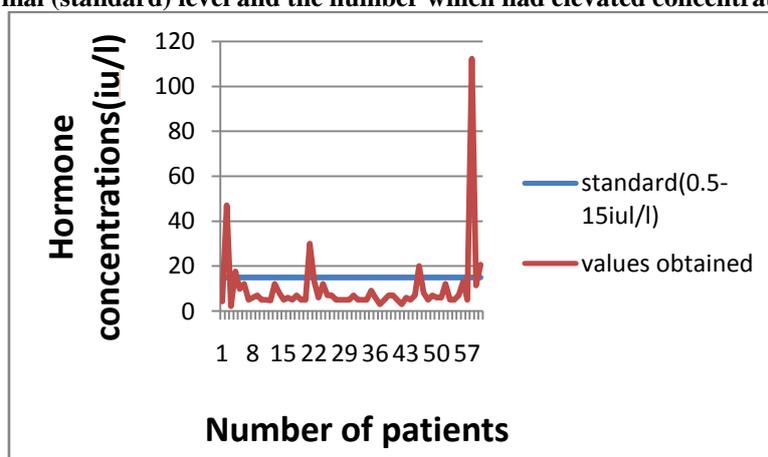


Figure 2 below shows the number of subjects within the normal (standard) levels of follicle stimulating hormone and those who had elevated levels.

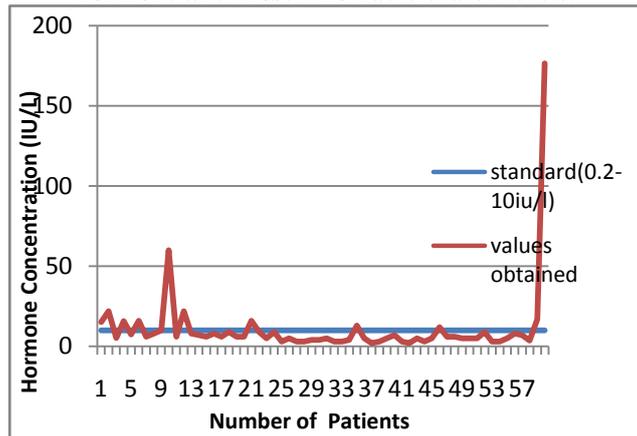


Figure 3: below, shows the number of subjects that had normal prolactin levels and those who showed elevated prolactin concentrations (hyperprolactinaemia).

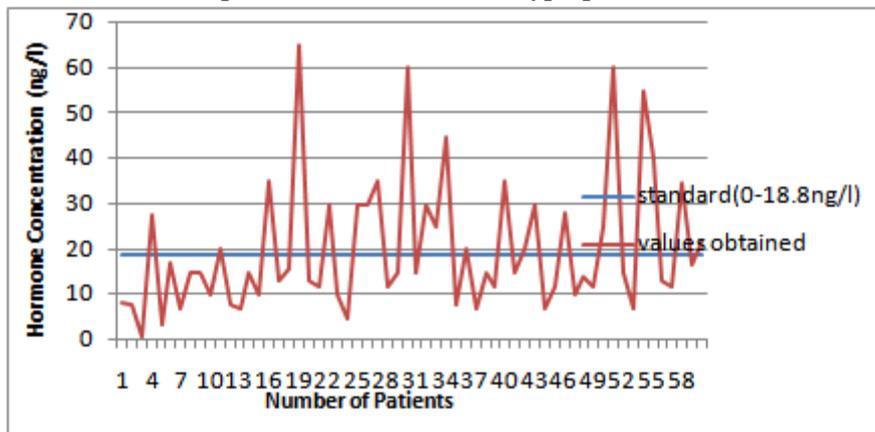
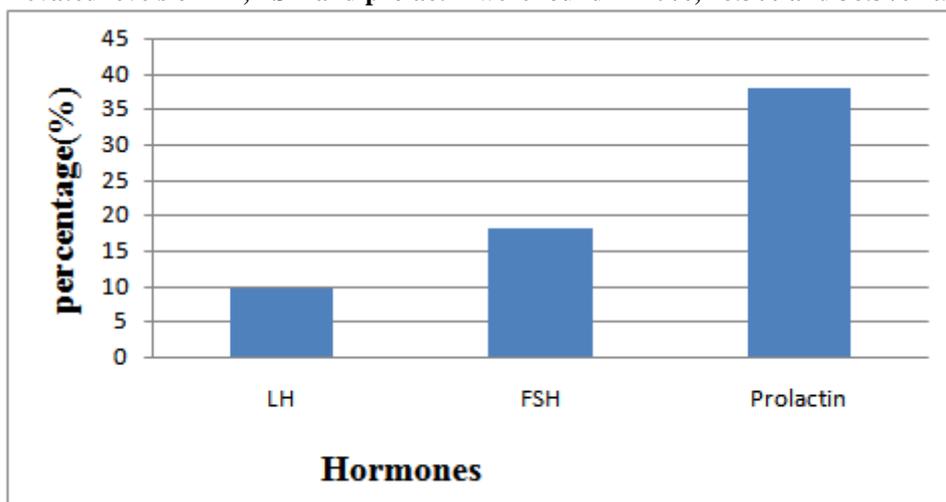


Figure 4; Distribution Of Hormone Levels In The Study

Figure 4: The bar chart below shows the percentage increase in the hormone levels among the patients studied. Elevated levels of LH, FSH and prolactin were found in 10%, 18.3% and 38.3% respectively.



IV. Discussion

Hormone levels in infertile women had been evaluated by many researchers. Higher level of FSH and LH is rarely found in infertile women. In this study high levels of gonadotrophins (LH and FSH) were observed in 10% and 18.3% of infertile women respectively. The incidence of high prolactin levels (hyperprolactinaemia)

as the cause of female infertility was reported to be 18% by Avasthi kumkum, (2006), 25% by Mishra et. al.,(2002). However, this present study, showed the prolactin level to be 38.3%.

Hyperprolactinaemia may occur primarily as a result of normal body changes during pregnancy, breastfeeding, mental stress, sleep, food, diseases affecting the hypothalamus and pituitary gland; disruption of the normal regulation of prolactin levels by drugs and heavy metals; or secondary due to disease of other organs such as the liver, kidneys, ovaries and thyroid (Mancini et. al., 2008).

Increase in concentrations of LH and FSH observed in some of the subjects in this study, is similar to report by Adegoke et. al., (2007) where infertile subjects showed elevated levels of LH and FSH. Gonadotrophins, especially single plasma FSH value has been found to diagnose the presence or absence of ovarian follicles (Goldenberg, et. al., 1973). Hyper secretion of LH is associated within menstrual disturbances and infertility, it is this endocrine feature that result in reduced conception rates and increased rate of miscarriages in both natural and assisted conception (Balen et. al., 1993).

This study also showed normal levels of LH, FSH and prolactin in 48.3% of the subjects. This could be indicative of other causes of infertility such as age, sexually transmitted diseases, body weight and tobacco smoking. Nicotine and other harmful chemicals in cigarettes interfere with the body's ability to produce estrogen, a hormone that regulates folliculogenesis and ovulation. Also, cigarette smoking interferes with folliculogenesis, embryo transport, endometrial receptivity, endometrial angiogenesis, uterine blood flow and the uterine myometrium (Dechanet et. al., 2011). Smokers are 60% more likely to be infertile than non-smokers (Department of health, UK, 2009).

V. Conclusion/Recommendation

A total of sixty (60) women attending infertility clinics in Portharcourt city were examined for the levels of luteinizing hormone, follicle stimulating hormone and prolactin. Of these, 29(48.3%) had normal hormonal concentrations and 31(51.7%) showed increased levels of any of the three hormones.

The result obtained here showed the importance of endocrinology in diagnosis and treatment of infertility, so subjects presenting cases of infertility should have their hormone levels determined so as to treat the imbalance. On the other hand, some patients showed normal levels of all three hormones, therefore their infertility may be due to several other factors such as age (it is known that fertility declines rapidly after age 35), inadequate exposure to sexual intercourse, smoking or exposure to cigarette smokers, sexually transmitted diseases, drugs e. t. c. Magnetic Resonance Imaging (MRI) scan should also be an integral part of diagnosis of infertility as this will rule out or detect pituitary tumor and determine its size.

Some of the causes of hyperprolactinaemia can be avoided by self discipline. Women of reproductive age and even female children should be made to understand and avoid practices such as nipple piercing, eating too much amino acid containing foods, excessive and rigorous exercises, excessive sleep, and excessive sexual intercourse and try to manage stress. Maintaining this kind of lifestyle will greatly reduce the risks of hyperprolactinaemia. Maintaining normal body weight (not being overweight or underweight) is also advised.

Regular clinical check-ups or examinations such as blood glucose levels examination is also advised so as to detect problems like Diabetes Mellitus which is also a cause of infertility.

The Government, through the federal and state ministries of health should create programs that will sensitize "the girl child" and women of reproductive age on the causes and prevention of infertility. Non-Governmental Organizations (NGOs) can also take up the responsibility of creating this awareness which can be done by organizing public lectures and campaigns. This kind of sensitization should begin from the secondary school levels.

The media (radio and television stations) could also be useful for the sensitization through advertisements and short films that will arouse the female child and the general public on the reality of the dangers, causes and prevention of infertility.

Finally, there is need for the formation of a centre for hormone profile research and awareness in Nigeria.

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