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Hormonal Profile of Some Infertile Women in Bida Nigeria

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Abstract

The desire for reproduction is a basic human instinct and it is well known that infertility is one of the psychosocial problems affecting many couples worldwide. The aim of this study is to evaluate the hormonal profile of infertile women in Bida metropolis. A total of 200 subjects comprising of 160 infertile and 40 fertile women as controls were recruited into this cross-sectional study in Bida metropolis. Serum luteinizing hormone (LH), follicle stimulating hormone (FSH), prolactin (PRL), progesterone and estradiol were determined using enzyme immunosorbent assay (ELISA). Infertile women had significantly higher LH and prolactin level ($P<0.05$) and statistically lower progesterone and estradiol level ($P<0.05$) when compared to fertile women. There was no significant difference in FSH level of infertile women ($P>0.05$) when compared to fertile women. Non-menstruating women had lower FSH and progesterone level ($P<0.05$) and significantly higher prolactin and estradiol level ($P<0.05$) when compared to menstruating women. There was no significant difference in LH level of non-menstruating women ($P>0.05$) when compared to menstruating women. Hormonal abnormalities were observed in 83.3% of the infertile women. This comprises of 30% secondary hypogonadism, 20% hyperprolactinemia/ hypogonadism, 13.3% primary hypogonadism, 13.3% hyperestrogenemia and 6.7% hyperprolactinemia. This study has shown that infertility remains a major problem affecting women of child bearing age. It is therefore recommended that couples should seek medical care on time as well as determine their hormonal status in order to correct any abnormality that might have arisen.

Keywords: Hormone; Infertile, Women; Estradiol; Prolactin; Progesterone

Introduction

In Africa, children are the fabric of any society, without which no meaningful social and economic progress is considered worthwhile. Infertility is defined as the inability to conceive after one or two years of unprotected coitus among couples of reproductive age [1]. The reproductive age for women is between 15 and 49 years. Demographically, one can be considered infertile after 5 years exposure of unprotected consistent sexual

intercourse and non-lactating [2]. Infertility is primary - if a pregnancy has never occurred, and secondary -if there has been a preceding pregnancy, irrespective of the outcome of the pregnancy. Okonofua reported infertility as the most common reason for gynecological consultation which has place huge burden on limited health care resources. The causes of infertility vary from country to country and within different social groups [3,4]. Reproduction is controlled by a range of hormone such as follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin, progesterone and estradiol which must be at the optimal level before reproduction can take place. The alteration of these hormones results in infertility among women of child bearing age [5]. Therefore, this study sets to determine the female reproductive hormone profile and by extension (if any) establish the possible cause of any alteration in these hormones.

Materials and Methods

Study Area

This study was carried out in Bida North central Nigeria, a traditional city of Nupes with an estimated population of about 60 ,000 people with inhabitants majorly farmers, traders and civil servants. The major ethnic groups are Nupe, Yoruba and Igbo while inter marriage between these tribes occurs quite frequently.

Study Population

A total of 200 female subjects within the age of 15-45 years within Bida metropolis were recruited for this study from the fertility clinic of Federal Medical Centre, Bida. This consisted of 160 infertile women and 40 apparently healthy fertile women of reproductive age as (control). Participants were informed of the study and their consent obtained. Ethical clearance was obtained from the institution ethical committee

Inclusion Criteria

Female subjects age 15 - 45yearsr with inability to conceive after one year of unprotected regular sexual intercourse were included in the study. Apparently healthy female subjects who were married and having children were included in the study as controls.

Exclusion Criteria

This includes female subjects whose ages were below 15years but not married and above 45years. All infertile women who were currently on hormonal therapy for the treatment of their infertility, all pregnant and lactating women; women who were using hormonal in jectable or oral contraceptives and women whose years of last child birth were more than five years.

Collection of Samples

About 10ml of blood specimen was aseptically collected from a peripheral vein (antecubital venipuncture) and dispensed into a plain container. This was allowed to clot and spun at 4000rpm for 10minutes to obtain a clear serum. The serum was separated into a plain container and kept frozen until analysis.

Biochemical Analysis

Hormones (LH, FSH, prolactin, progesterone and estradiol) were determined using competitive enzyme immunosorbent assay (ELISA) method according to manufacturer's instructions. All reagents were from DRG diagnostics, Germany.

Results

Table 1 shows the mean and standard deviation of infertile and fertile women. The infertile women have a mean age of 31±4 while the fertile women have a mean age of 34±3.

Characteristics	Infertile women (n=160)	Fertile women (n=40)	P values
Age (Years)	31.7±3.8	33.6±3.2	P>0.05
Menarche Age (Years)	14.2± 2.3	14.4±2.8	P>0.05
Menstrual Cycles (days)	60.5±7.4	25.8±2.9	P<0.05
Menstrual Flow (days)	4.3±0.4	4.6±0.6	P>0.05
FSH (miu/ml)	11.2±4.8	10.4±3.7	P>0.05
LH (miu/ml)	10.2±3.1	6.3±2.3	P<0.05
Estradiol (pg/ml)	80.0±10.6	176.6±15.8	P<0.05
Progesterone (ng/ml)	5.4±2.2	17.58±5.3	P<0.05
Prolactin (ng/ml)	29.6±10.3	16.2±9.2	P<0.05

Table 1: Mean and Standard deviation and Characteristics of infertile and fertile subjects.

Table 2 shows the comparison of hormonal profile of non-menstruating (NMW) and menstruating women (MW). Menstruating infertile women had significantly higher (P<0.05) FSH, progesterone and estradiol than non-menstruating infertile female. There was no significant difference (P>0.05) in the LH level of the non-menstruating and menstruating infertile women.

Parameters	MW (n=145)	NMW (n=5)	P values
LH (mIu/ml)	9.2±2.7	8.8±4.2	P>0.05
FSH (mIu/ml)	17.8±6.2	7.3±3.6	P<0.05
Prolactin (pg/ml)	30.9±3.6	49.4±5.1	P<0.05
Progesterone (ng/ml)	5.0±1.0	0.7±0.1	P<0.05
Estradiol (ng/ml)	100.8±62	290.3± 176	P<0.05

Table 2: Mean ± SD of hormonal profile in menstruating and non menstruating infertile women.
MW Menstruating women
NMW Non menstruating women

Table 3 shows hormonal abnormalities in infertile women. Out of the 150 infertile females, 125(83.3%) had abnormal hormonal levels. Hyperprolactinemia was found to be 6.7%, primary hypogonadism13.3%, secondary hypogonadism 30%, hyperestrogenemia 13.3% while combined hyperprolactinemia / hypogonadism 20%.

	n(%)	Age	PRL (1.2-19.5)	FSH (2.0-12)	LH (0.5-10.5)	E2 (44-196)	PROG (2.0-25)	Years
Hyperprolactinemia	10(6.7)	43.2±3.7	41.5±2.4	2.6±0.3	2.0±0.6	40.0±8.3	1.6±0.8	11.0±2.4
1ºhypogonadism	20(13.3)	28.0±2.2	7.3±2.8	33.3±6.2	18.5±3.8	43.5±10.6	0.8±0.2	4.2±1.2
2ºhypgonadism	45(30.0)	30.2±3.6	25.7±6.8	1.5±0.8	0.3±0.9	41.0±9.8	1.7±1.2	6.8±1.9
Hyperestrogenemia	20(13.3)	32.0±4.2	19.9±8.2	1.7±0.4	2.2±0.6	501±80.3	10.6±2.8	3.3±1.6
Hyperprolactinemia/ hypogonadism	30(20.0)	30.7±3.8	51.5±7.2	11.9±3.1	8.9±2.8	33.9±5.3	9.1±2.0	7.5±2.8
Normal	25(16.7)	31.6±3.2	13.8±4.6	6.5±2.8	4.0±1.2	88.4±23.2	6.4±2.3	7.4±2.2

Table 3: Mean age distribution of hormonal abnormalities among infertile women.
1º Primary
2º Secondary

Discussion

Our study revealed the mean age of infertile women as 32±4 years. This is in consonance with previous study of Cates, et al. who reported that majority of infertile women in an African setting are within age 30 to 36years [6]. It was also revealed that 3.3% of infertile women in this study were non-menstruating while 96.7% of them were menstruating and the mean duration of infertility among the infertile women in this study was observed to be 6.8 years. This is in contrast with Cates, et al. who reported 2 years as the mean duration of infertility among infertile couples in developing countries [6]. This difference may be attributed to the couple's effort in seeking fertility solution from traditional birth attendant, specialist healers and general medical practitioners so present late to clinics for infertility problems.

The study revealed significantly higher prolactin and LH in infertile women than fertile women. This is findings confirmed the earlier report of Ben-Chioma and Tamuno-Emine who reported similar results among infertile women [7]. However, the hyperprolactinemia observed may be attributed to interference with ovulation process leading to infertility as earlier reported by [8]. He further stated that the disruption of ovulation process may lead to decrease gonadotrophin releasing hormone (GnRH), inhibition of LH and FSH release as well as inhibition of both estradiol and progesterone secretion in the ovary. It was observed that 6.7% of the infertile women had hyperprolactinemia as the cause of their infertility. This is consistent with findings of Emokpae, et al. who reported 8.5% infertile women in Kano northwestern Nigeria [9]. These values were contrast with the findings of Kuku, et

al. who reported 48.9% in Lagos, southwestern and 50% in Zaria northwestern Nigeria respectively [10].

In this study, infertile women had significantly lower progesterone and estradiol than fertile women but there was no significant difference in their FSH level. This is in agreement with the previous studies of Daiter, Ben-Chioma and Tamuno-Emine who reported similar pattern of results which may have accounted for primary hypogonadism in these infertile subjects [11,7]. Our study also revealed 13.3 % of primary hypogonadism among the infertile subjects. This is in contrast with earlier report of Emoakpae, et al. who observed 4.7% of primary hypogonadism among infertile women in their study [9]. Primary hypogonadism is a diminished functional activity of the ovaries as a result of diminished sex hormone biosynthesis which may lead to failure to conceive. Primary hypogonadism may also be as a result of Turners syndrome, menopause and testicular feminisation.

Our study further revealed 30% secondary hypogonadism (low FSH, LH and Progesterone) in infertile women. This has been observed as the highest cause of female infertility in this study. This finding is in contrast with the earlier report of Emoakpe, et al. who reported 3.5% in Kano northwestern Nigeria [9]. The genetic causes of secondary hypogonadism include kallmans syndrome (anosmia and gonadotropic releasing hormones deficiency), cerebral tumor, head trauma, cerebral infection, cerebral radiation and malnutrition.

Other causes may include hyperprolactinemia, diabetes mellitus as well as marijuana. The study shows that 13.3% of the infertile women had hyperestrogenemia while 20.0% had both hyperprolactinemia and hypogonadism. This suggests that infertile women may have multiple endocrine disorders as causes of their infertility. The non-menstruating women had hyperprolactineamia as well as hyperestrogenemia which might be the cause of the cessation of their menstrual flow.

It is pertinent to conclude that, infertility is a common disorder among women which may be attributed to hormonal imbalances that need to be corrected. We therefore recommend that hormone assay should be one of the diagnostic tools in the management of infertility among women of child bearing age.

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