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Aetiology of Female Infertility in Gezira (Central of Sudan)

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Abstract: The aim of this study was to identify the aetiology of Sudanese female infertility. The study was supported by UNFPA in collaboration with The Population Center, University of Gezira, Sudan. It was a cohort study and it was held in Wad Medani City, Gezira State, Central of Sudan, from June 2001 to June 2002. There were no many studies done concerning the female infertility in Sudan. This study was conducted in Primary Health Care Centers (PHCC). To represent the whole city, out of 17 (PHCC) 4 PHCC were randomly selected. Depending on the prevalence of infertility in Sub-Sahara area, which is 10% of all couples, sample size was estimated from all married females patients presented to the health centers. The sample size was 200 infertile couples from whom demographic and medical information were collected using special questionnaire. Clinical examination and investigations which include; blood haemogram, urine analysis, hormonal assay, hystosalpingogram and ultra sound for all infertile females. All interventions were done within the health center by the investigator and health center staff. Outcome results were; 79.5% suffered from primary infertility and 20.5% had secondary infertility. Infertility due to husbands only was 20.5%, that due to wives alone was 37.5% and infertility due to both couple was 31% while those with unknown aetiology was 11%. The main aetiological factor for females, with primary infertility was due to unovulatory cycle (69.5%). The main cause of unovulatory cycle was high prolactin level which found in 47.5% (95 female). The main cause for secondary infertility was tubal problems which found in 15%. The rest were different causes like vaginal infection, ignorance about right time of ovulation and absence of the husbands (abroad for years).

Key words: Prolactin, unovulation, galactohroea, tubal problem, hysterosalpingography

INTRODUCTION

Infertility is a medical problem that affects more than 80 million people worldwide (Basely, 1976; Cates *et al.*, 1984). Infertility is one of the indicators of lacking of reproductive health. Although, it affects a vast proportion of the world's young population (10-15%), there is no agreement on a single definition. While the incapacity to conceive is serious concern from a clinical perspective, the incapacity to deliver live births is the problem for demographers (Zegers *et al.*, 2008). Irrespective of the definition considered inability to bear children seriously impacts the psychosocial and emotional lives of couples affected by this condition. A large proportion of the world's population has no access to medical treatment for infertility and even in developed countries with emerging economies there are great inequalities in access to proper diagnosis and treatment (Zegers *et al.*, 2008). Infertility is a threat to humans continued survival on earth (Cates *et al.*, 1984). Infertility is defined as inability to conceive after one year of unprotected adequately time intercourse (Berek, 1997). It has two types, primary infertility; it is used for a couple who have never achieved a pregnancy. Secondary infertility refer to a couple who have previously succeeded in achieving at least one pregnancy even if this ended in abortion (Stanley *et al.*, 1985). The prevalence and aetiology of infertility vary from place to another all over the world, it may depend on the influence of religion and region (Jejeebhoy and Sathar, 2001) and also it depends on type of studies and the place where, they were conducted, for example a study showed that two million American women of reproductive age were infertile in USA in 2002 and aetiology of infertility was also common among men (Almroth *et al.*, 2005). Other study in USA estimated the prevalence of infertility as one couple from 7 couples, while in Africa these studies related the main cause of infertility to tubal problem while in Western world ovulation disorder and male factors were the common causes (Gorkemli *et al.*, 2006). In general aetiology of female infertility include, ovulation disorders, tubal occlusion or adhesions, endometriosis, uterine and/or peritoneal factors and abnormality in cervical mucus-sperm interaction (Trantham, 1996). Infertility is often a multifactorial condition with more than one factor contribute to have the disease. For example, a woman may have both a tubal factor and endometriosis or a woman may have ovulatory dysfunction and her partner may have oligospermia. Couples whose fertility evaluation

identifies no abnormalities but who are unable to conceive are said to have idiopathic, or unexplained infertility (Wilkins *et al.*, 2010). Investigations and treatment of infertility are always time consuming, expensive and in developing countries raise moral problem to the female side, Sudan one of the largest countries in Africa most of its population live in rural areas. The county facing manifold problems including low socioeconomic status, transportation, education and health problems. One of these health problem is infertility. In literature, it is generally believed that the prevalence of infertility in sub share areas is 10% of all unions (Yao *et al.*, 2002; Sakar *et al.*, 2008). This figure seems to have built momentum as it is repeated frequently without very much documentation concerning its validity. This also applied to Sudan, where there is no actual study done recently to assess the magnitude of infertility. There are many perspective for the impact of infertility. These include psychological, economical and socio-cultural factors which affect the infertile woman and the hole community. In Sudan the traditional emphasis of a women's role is defined in terms of her fertility, her whole social personal security may depend on it. Therefore doctors should emphasize simple investigation which will bring out most of treatable cause of infertility and hence to avoid expensive, time consuming and usually inconclusive procedures, to make live easy for all infertility couples in Sudan. Objectives of this study was to identify the aetiology of Sudanese female infertility in Gezira area, central of Sudan.

MATERIALS AND METHODS

This study was conducted in Wad Medani City (Gezira State, Sudan), from June 2001 to June 2003. It is a community based cohort study. From the 17 primary health care centers in Wad Medani City four primary health care centers were randomly selected taking in consideration that they represent the whole city. They are, police, Banat, Eldibagha, Gezira health centers. Sample were selected by random selection, Depending on the prevalence of infertility of Sub-Saharan area found in literature (Yao *et al.*, 2002; Sakar *et al.*, 2008), sample size was calculated as 10% of the total number of married females patient coming to the health center during one month. The total number was 200 infertile couples.

First a consent was secured. A questionnaire was designed for interviewing the couples it includes: full history of both wife and husband, history of sexual intercourse (the frequency and timing), physical examination and investigations which include; Hemoglobin%, TWBC, ESR, urine analysis and seminal

analysis which done in the laboratories of the health centers. Other tests were performed in: National laboratory for microbiology for high vaginal swab for culture and sensitivity for wives. Institute of Nuclear Medicine and Molecular Biology (INMMB) for reproductive hormonal immune assay for all wives. Ultra Sound (U/S) and hysterosalpingography in X-ray department of Wad Medani Teaching Hospital.

Hyserosalpingography (HSG): In this test Urographin used as radio-opaque contrast medium. This procedure done from day 6 to 9 from the first day of the cycle and before having any sexual intercourse.

Hormonal assay: In this study, four reproductive hormones were estimated, Luteinizing Hormone (LH), Follicular Stimulating Hormone (FSH) and progesterone, they were done in day 21 from the first day of the cycle. A blood level of progesterone more than 20 nmol L^{-1} indicate ovulation. Prolactin hormone level done in day 3-5 from first day of the cycle, a blood level more than 600 nmol L^{-1} consider high level. It was done by the method of Immuno-Radiometric Assay (IRMA).

RESULTS

Age of females understudy range from 18 to 49 years. The 125 females (62.5%) their age between 30 to 39 years. Education level of the females ranged from illiteracy to higher education. Around 50% of them have secondary level of education while illiteracy presented in 10%. They were from different tribes from different parts of Sudan but 50% of the infertile women were from three tribes Jaaline, Shaygea and Danagla, those three tribes belong to the North of Sudan but this does not indicate that there is high rate of infertility among these tribes but it depends on percentage of their distribution inside the city. Concerning relationship between the couple, 57.5% of the couples have no relationship between the wife and her husband, the rest (42.5%) are found to be first or second kin's. only 5% of them were workers, the rest were house wives. The economic status of the infertile females, the mean monthly income is 405.90 Sudanese pounds (500$) that mean the majority of them lie in the moderate socioeconomic class, (Sudanese census 93) (Table 1). Duration of infertility vary from 1 to 28 years, the majority of them (48.5%) their complain continue for 3 to 8 years, this is normally happen between Sudanese women, they were worried to seek medical advice after the end of the first year of marriage. The main complain of 63% of wives was inability to conceive. Other complains irregular menstrual cycle, vaginal discharge and abdominal pain.

Table 1: Demographic data

Parameters	Frequency	Percentage
Age of female in years		
<20	1	0.5
20-29	62	31.0
30-39	125	62.5
>/= 40	12	6.0
Educational level		
Illiterate	23	11.5
Khalowa	1	0.5
Primary school	69	34.5
Secondary school	99	49.5
University and higher education	8	4.0
Monthly income $		
100-300	33	16.5
301-500	130	65.0
Above 500	37	18.5

Table 2: Clinical findings of infertile females

Clinical findings	Frequency	Percentage
Duration of infertility		
1-2	48	24.0
3-8	97	48.5
9-14	41	20.5
15 year and more	14	7.0
Physical finding		
Normal	147	73.5
Vaginal discharge	43	21.5
Abdominal mass	2	1.0
Diabetic	2	1.0
Hypertensive	2	1.0
Thyroid enlargement	4	2.0
Family history		
Diabetes	80	40.0
Hypertension	69	34.5
Infertility	33	16.5

Table 3: Classification of infertility among couples

Classification	Frequency	Percentage
Type of infertility		
Primary infertility	159	79.5
Secondary infertility	41	20.5
Causes of infertility		
Infertility due to wives	74	37.0
Infertility due to husbands	41	20.5
Infertility due to both couple	63	31.5
Idiopathic infertility	22	11.0

Those having irregular menstrual were 31.5% and those with amenorrhea were 2%. Around 75% of infertile women had family history of hypertension and diabetes and those with the same problem of infertility within their families were 45%. The result of physical examination shown in Table 2. Final results after full investigations was, 79.5% from all couples were suffer from primary infertility and 20.5% had secondary infertility. Infertility due to husbands only was 20%, that due to wives alone was 37.5% and infertility due to both partner was 31%. While those with unknown aetiology was 11% (Table 3). The main aetiological factor of female infertility as unovulatory cycle, which found in 69.5%. The main cause of unovulatory cycle is high level of prolactin 95 female (47.5%). Almost half of them complained from

Table 4: Type of infertility versus causes among females

Origin of the cause	Frequency	Percentage	No. of primary infertility	No. of secondary infertility
Unovulatory	139	69.5	119	20
Tubal factors	36	18.0	16	20
Uterine factors	11	5.5	6	5
Unknown etiology	22	11.0	10	1

galactohroea, 60% were found to have unovulatroy cycle (blood level of progesterone was less than 20 mg dL^{-1}) and 75 of them had primary infertility.

The second cause was tubal problems in 36 women (18%) inform of: Bilateral tubal blockage was found in 21 women (10.5%), those with unilateral tubal block were 6 women (3%) and those with hydrosalpinx were 9 females (4.5%). More than 50% of them (20 out of 36 females) have secondary infertility. Uterine fibroid was present in 11 women (5.5%) five of them had secondary infertility. Uterine congenital problems (bicornate uterus) was found in one woman (0.5%) (Table 4). Other diseases such as diabetes and hypertension were encountered in 2 women for each disease (1% for each), they were first time discovered and not under treatment. Half of the studied group suffered from vaginal infection mostly staph aurisin 34% Coliform in 4.5% and mixed infections in 12.5%.

DISCUSSION

Incidence of infertility worldwide related to both male and female factors continue to rise despite many advance in reproductive technology (Prasad and Dunbar 2000; Elussein *et al.*, 2008). Obviously infertility is a multifactorial and medicosocial problem. In some countries, it accounts for 40% outpatient gynecological consultations (Ilesanmi, 1995). In this study, Female infertility factors showed that, the age distribution of the study population was based on the international scale, 77 female (38.5%) their age in age group of 35-39 years old. From this age group there were 9 women represented with secondary infertility while 69 women have primary infertility. Hence, age played a significant role in female aetiology of infertility and average years in which the infertile woman consult a doctor was 2-4 years after marriage, this indicate delayed age of marriage, which might explained the etiology of their infertility. The (42.5%) are found to be first or second kin's. Sudanese people used to have consanguine marriage but it seems this habit began to decrease because more than half of couples were not. Around 90% of women were educated, so they can explain their problem clearly and follow the instruction of management (treatment and health education). The majority of our studied females were from middle socioeconomic class which may affect their efforts to seek medical advice for their problem. Around 90% of

the female received treatment for their problem. This usually happen were both invasive and non invasive investigations were applied more frequent to the female partner than male partner (Helmerhorst *et al.*, 1995).

As stated above that the main aetiology of female infertility was unovulation due to high level of prolactin, other investigations like X-ray and CAT scan which were essential for diagnosis of hyperprolactinemia were not done in this study. This indicates that the problem of hyperprolactinemia was the main aetiology of primary infertility but not of secondary infertility. Only three cases (1.5%) have thyroid hormones disturbance (hypothyroidism). Vaginal infections present in 34%, in Sudan there is genital mutation in childhood in the form of female genital mutilation FGM (also called Foronic Circumcision) may contribute in aetiology of vaginal infection and primary infertility A study of 99 infertile women examined, 48 had adnexal pathology indicative of previous inflammation. After controlling for covariates, these women had a significantly higher risk than controls of having undergone the most extensive form of FGM, involving the labia majora. Among women with primary infertility, both those with tubal pathology and those with normal laparoscopy findings were at a higher risk than controls of extensive FGM, The anatomical extent of FGM, rather than whether or not the vulva had been sutured or closed, was associated with primary infertility (Cundiff *et al.*, 1995; Sakar *et al.*, 2008). Tubal abnormal detected by hysterosalpingogram, which is a more economical and elementary method suitable for evaluation of endometrial and tubal pathologies (Stanley *et al.*, 1985; Trantham, 1996). It was presented in 36 women around 60% them had secondary infertility. Tubal occlusion usually result from chronic infections, in this study this was less than that cited in literature (Jackobson, 1993). WHO study in Africa stated that the main reason of infertility was due to tubal occlusion (70% of infertile studied women) perhaps the high incidence of tubal disease in previous studies due to high incidence of STDs (sexual transmitted diseases) and in our study no single case of STD was found. This might be explained by the cultural and religious background in central part of Sudan (Muslim religious). Uterine fibroid was present in 11 women, this also far less than what was written in literature which is 25%. Chronic diseases like diabetes and hypertension were encountered in only 2%. In general the main etiology of those with primary infertility was related to hormonal disturbance and those with secondary infertility related to tubal occlusion.

The outcome results depend on the results of all investigations done, simple investigation, seminal analysis, hormonal analysis and The final results showed that around 80% of the investigated infertile couples suffered from primary infertility and 20% had secondary infertility. After full examination and investigation of 200 infertile couples the responsibility of infertility due to wives was only present in 37.5% and that due to husbands was found in 20.5% that due to both partners was 31% and those of unknown etiology were 11%. This result seems to be similar to other studies (Elmusharaf *et al.*, 2006).

CONCLUSION

The main aetiology of primary infertility was unovulatory cycle due to high prolactin level and for secondary infertility was tubal problems. In comparison with the study done by The WHO in 33 infertile clinics in 25 developed and developing countries; infertility in both partners was found in 1/3 African couples and infertility due to females only was 30-40% and those of unknown etiology was 5%. The two studies outcomes are almost similar.

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