THE PREVALENCE AND CLINICAL PATTERN OF INFERTILITY IN BAUCHI, NORTHERN NIGERIA

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ABSTRACT

Context: Infertility is a common condition and is now viewed as a global reproductive health issue. The causes of infertility vary widely, both among and within countries.

Objectives: To describe the magnitude, pattern, aetiology, outcome of infertility and its associated factors in Bauchi, northern Nigeria.

Methods: This was a prospective study of a cohort of infertile women who were recruited at the gynaecological clinics of ATBUTH and FMC, Azare, all in Bauchi State between July 2013 and June 2014. They were followed up till December 2014. A structured form was used to collect relevant clinical information on each participant's clinical presentation and outcome of management. Data were analysed by descriptive and inferential statistics using SPSS version 20.

Results: There were a total of 1850 new gynaecological cases out of which 443 were infertility cases. This gives a prevalence of infertility of 23.9% in the clinics. Of the 406 enrolled infertile women, 155 (38.2%) had primary infertility while 251 (61.8%) had secondary infertility. Tubal factor was the predominant cause accounting for 167 (46.1%) of infertility cases among the women. Women with a history of vaginal discharge, puerperal sepsis, induced abortion and pelvic surgery were more likely to have tubal factor infertility.

Conclusion: Infertility is a common presentation in the clinics and the secondary type is predominant in this setting. The cause of infertility most commonly identified in the studied population was tubal factor and its best option of treatment is not available in the study area.

Keywords: Infertility, Prevalence, Women, Nigeria

INTRODUCTION

Infertility is a common condition and is now viewed as a global reproductive health issue[1]. In Nigeria, estimation from the demographic health surveys (DHS) data revealed a prevalence rate of 11% while epidemiologic and clinic-based studies suggested rates of between 14.5% and 30% [2,3,4,5].Hospital-based studies have shown that infertility was one of the commonest problems seen in gynaecological clinics [4]. The causes of infertility vary widely, both among and within countries. Nigeria is a country that is heterogeneous in terms of ethnicity, culture, access to

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modern education, religious beliefs and access to modern health facilities and personnel[6]. However, childbearing is a unique common factor among all groups and infertility is feared in all the cultures[7]. The burden of infertility, its trends, and geographical differences are important for stakeholders and policy makers to enable them to develop a comprehensive approach to the problem.

There is no study on this important reproductive morbidity in Bauchi, northern Nigeria. The aim of this study is to fill this data gap by exploring the magnitude and aetiology of infertility in Bauchi. This will provide baseline data on the local situation of infertility in Bauchi and a foundation for further research on this reproductive morbidity. Findings of the study may also aid the clinics in formulation of strategies for managing cases of infertility.

METHODS

The study sites were Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi and Federal Medical Centre (FMC), Azare, all in Bauchi state. Participants in this study included consecutive women who attended the infertility clinic from July 2013 to June 2014, with inability to achieve conception of at least 12 months duration that were followed up for at least six months. The evaluation protocol included menstrual, pregnancy, contraceptive and sexual history and physical examination. Weight and height were measured for calculating the body mass index (BMI). BMI was classified according to World Health Organisation classification.

All the participants had a pelvic ultrasound. They were then scheduled, based on their last menstrual period (LMP), for a hysterosalpingography (HSG) to test tubal patency and to assess the shape of the uterine cavity. All HSGs were performed in the radiology departments of ATBUTH and FMC using a soluble contrast medium between day 7 and 10 of the menstrual cycle. All women were given prophylactic doxycycline and metronidazole. They were asked to report to the clinic if they developed pain, fever and abdominal pain after the HSG. Women with amenorrhoea were further investigated with measurement of hormone levels.

The gynaecologists offered appropriate treatment when available and made referrals where indicated. Referrals were provided for artificial reproductive technology (ART) services (nearest available facility in Abuja).

We followed up all women enrolled in the study to determine the causes of their infertility and the outcome of their investigations and management.

A structured form was used to collect data from each study participant. Clinical case notes were also consulted to obtained more information. Personal identifiers were not used on the questionnaires. Data gathered during interviews and laboratory investigations results were coded, entered, verified, and cleaned in SPSS version 20 (IBM, USA).

RESULTS

During the study period, there was a total of 1850 new gynaecological cases out of which 443 were infertility cases. This gives a prevalence of infertility of 23.9% in the clinics. We enrolled 406 infertile women out of the total 427 (95%) that were approached to participate. Those that declined mentioned “personal reasons” and time constraints as reasons for their decision. Of the 406 infertile women, 155 (38.2%) had primary infertility while 251 (61.8%) had secondary infertility.

The ages of the respondents ranged from 19 to 42 years with a mean age of 30.5 years (SD ±5 years). Over 75% of the respondents were 35 years and below. Other demographic characteristics are shown in Table 1.

The commonest presenting symptoms include lower abdominal pain (65.5%), abnormal menstruation (46.6%), and vaginal discharge (42.6%).Three hundred and forty-one (77.3%) patients had previous consultations for infertility. The common examination findings were abnormal BMI (>25kg/m2) found in 161 (39.7%) and abnormal vaginal discharge in 110 (27.1%). Others include acne 66 (16.3%), galactorrhoea 55 (13.5%) and uterine enlargement 53 (13.1%).

Table 2 shows the results of investigations. The male factor investigation is for 249 male partners of the infertile women who agreed to do the investigations. Oligospermia was seen in 71(29%) of male partners investigated while 76 (32.1) had abnormalities in sperm motility. The findings of pelvic ultrasound scan show fibroids being the most common finding seen in 83 (20.4%). It also illustrates the HSG finding of 357 women. One hundred and sixty-three (46%) had a normal study in which the uterus and the fallopian tubes had normal calibre and a free peritoneal spill. The tubes were blocked bilaterally in about 25% of the cases.

Causes of infertility

Only 249 infertile women had their partners investigated with seminal fluid analysis. Based on this sample of couples, male factor infertility was found in 44 cases (17.7%), tubal factor in 68 (27.3%), Ovulatory dysfunction in 59 (23.7) cases and no identified cause in 31 (12.4%) of cases (Table 4). Combined female factors only accounted for 55% of the cases. When women whose infertility was due to male factor only (44) were excluded, in the remaining 362 infertile women, tubal factor was the predominant cause accounting for 167 (46.1%) of infertility cases among the women. Ovulatory factor was 24.6%, no identified cause in 13.5% and 10.8% had a combination of factors (Table 3).

Association of demographic factors with type of infertility

There were some significant differences in the distribution of socio-demographic factors and reproductive factors with the types of infertility. Women age less than 25 were more likely to have primary infertility compared to those in 25-30 years group (72.2% vs. 44.7%, p<0.001). Those in a monogamous union (43% vs. 29.4%) p=0.01) and those with a history of abnormal menstruation (48.1% vs. 29.5%, p=0.001) were also more likely to have primary infertility. Women who were housewives were more likely to have secondary infertility compared to those who were not (67.3% vs. 52.9%, p=0.004). Those with a history of vaginal discharge were more likely to have secondary infertility (69.4% vs. 56.2%, p=0.01). There was no significant difference between the types of infertility regarding respondents' history of lower abdominal pain (p= 0.07), Smoking (p=0.79), previous consultations (p=0.48) and BMI (p=0.3).

Association of demographic factors with tubal factor infertility

In terms of tubal factor infertility (TFI), there were significant differences in the distribution of the demographic and reproductive characteristics as shown in Table 4. Women over 25 years were more likely to have tubal factor infertility compared to those who were under 25 (p<0.001). In addition, those with a history of puerperal sepsis were also more likely to have tubal factor infertility compared to those without (88% vs. 29.1%, p<0.001). There were no significant differences in the distribution of respondents with respect to tubal factor infertility in terms of history of lower abdominal pain (p=0.07), smoking (p=0.17) and use of contraception (p=0.44). We did a logistic regression analysis to ascertain the effects of demographic and reproductive variables on the likelihood that participants have tubal factor infertility (TFI). The model was statistically significant (X2 =223.63 do=14 p<0.001). The model

explained 57.1% of the variation in TFI and predicted 81.8% of cases. Participants with a history of vaginal discharge, puerperal sepsis, induced abortion and pelvic surgery were more likely to have TFI. Also, women 25 years and older were more likely to have TFI but the wide confidence interval reveal uncertainty about the figures. As to the outcome of management of the patients, 8 (2.0%) achieved pregnancy, more than half 209 (51.5 %) were lost to follow-up and 189 (46.6) were still on treatment.

DISCUSSION

The prevalence of infertility in the gynaecology clinic population was 23.9%, and secondary infertility accounted for 61.8% of the cases. This prevalence figure is lower than the 48.1% from Oshogbo and the 26.8% from Lagos in southern Nigeria but higher than 15.7% reported from Sokoto in north-west Nigeria [4,5,8]. These differences could be due to the health-seeking behaviour of the studied populations and the spatial distribution of health professionals in parts of the country. As the poverty level is higher in the north than the south, it may also reflect the different economic power of the women as it is financially demanding to access care in health facilities. Several studies provide evidence of the fact that secondary infertility is the most common type in Africa [2,3,9]. Our 61.8% rate is lower than the 80% reported from Lagos but similar to 62.9% from Tanzania in East Africa [5,9].This is in sharp contrast to western societies where the rate of primary infertility is higher [10].The high prevalence of poorly treated STIs, unsafe abortions and puerperal sepsis from unskilled birth attendance are the major contributors to secondary infertility in Africa [11,12,13].The variations in the rates of primary and secondary infertility likely reflect the different underlying causes and differences in the incidence of post-partum infections[1].

In our study, the mean age of the infertile women at presentation was 30.5 ±5years with 75% of them being 35 years or less. The finding was less than the 33.8 years reported from a cohort of infertile women in Lagos, southern Nigeria[5] and may reflect the differences in age of marriage that is lower in the north. The population of infertile women differs remarkably from infertile population in western societies. The expectation there is for career first, and then childbearing in later years. Therefore, the age at first birth has risen in such societies and many infertile women are over 35 years of age[14.]

In our study, certain demographic and reproductive factors were found to be significantly associated with the type of infertility. Women older than 25 years were more likely to have secondary infertility compared to those younger. This may reflect their prolonged exposure to risk factors such as sexually transmissible infections (STI), pregnancies and post-partum infections. Those with secondary school education or higher were less likely to have secondary infertility; perhaps they were able to avoid childbearing because of being in school. In developing countries, women with no education are more likely to marry early and start childbearing [15]. There were significantly more women with a history of vaginal discharge and pelvic surgery in those with secondary infertility further lending credence to the role of the genital tract infections. There were no significant differences in the proportion of women with the history of lower abdominal pain, smoking or previous use of contraception between the types of infertility.

The median duration of infertility before presentation to the hospital was four years (IQR= 4 years). This is less than the 5 years reported from Sokoto in the north but similar to that reported from Lagos in the south of Nigeria[5,8]. This may represent the time the women used in attending other treatment facilities, which could be traditional, modern health

care providers or both. The history of previous consultations in 77.3% of the respondents lends support to their previous search for care.

The commonest presenting symptoms were lower abdominal pain, irregular menstruation and vaginal discharge, reported by more than 42% of the respondents. These symptoms warrant evaluation and prompt treatment to prevent injury to the reproductive system. More than a third of our participants (33.3%) reported inadequate sexual exposure, which may have been a contributing factor as coital exposure of at least thrice per week during the peri-ovulatory period is recommended. However, in our area where polygamy is common, it may not be practicable for all partners to have adequate sexual intercourse and this may account for the infertility for some of the women in the study.

Physical signs in women presenting for investigation of infertility were not common, but high BMI (39.7%) and vaginal discharges were the most often found. This is not an unexpected finding, as many infertile patients may have few or no demonstrable clinical signs [16].

Two hundred and forty-nine (61.3%) of the infertile women had their male partners investigated with seminal fluid analysis. In our study, four out of every 10 men (38.7%) did not participate in the management and in such cases only the women were evaluated. This rate is higher than 23.7% reported in Sokoto [8] and is a frequent finding in many countries in sub-Saharan Africa where infertility is seen as a woman's problem[17]. The claim of fathering children with other women is also often stated as a reason not to present for investigations, especially among polygamous men [17,18]. A study in South Africa, however, reveals a high level of participation of male partners in infertility evaluations [19]. The difference could be due to the level of development of that country, the method of recruitment and level of education of the participants.

In the evaluated couples in our study, female factor infertility accounted for 55% and male factor 17.7%. The predominance of female factor infertility in comparison to male factor is in agreement with previous studies in Nigeria and Rwanda [16, 18]. For the male partners investigated oligospermia (29%), asthenospermia (35.2%) and Azoospermia (4%) were the main abnormalities found. These were similar to findings in previous studies in Nigeria[8,20]. However, the comparison of laboratory findings should be done with caution due to lack of standardisation and regulation of laboratories in most sub-Saharan Africa [18]. In Nigeria, conventional treatment of the male factor infertility has not yielded good outcome in our hospitals. For this reason, a lot of male factor infertility may eventually require ART [3,21].

The commonest cause of infertility in our studied population was tubal factor infertility (TFT), it accounted for 46.1% of the women studied. In our study, HSG and laparoscopy were the procedures used to evaluate for tubal factors. Another method of evaluation is hystero-contrast-sonography (HyCoSy) which is less invasive and carries no hazard of radiation, but was not available at the facilities. The finding of tubal factor being predominant is similar to the findings from Rwanda and southern Nigeria [18,22, 23]. However, there are differences in percentage contribution of TFI. In our study, the rate is lower than the 69% in Rwanda and also less than the 54.4 % reported from southern Nigeria[18, 23]. The differences could be due to the characteristics of the populations studied, social norms, and prevalence of STIs, socio-economic status, health care seeking behaviour and availability of community-based health services.

A history of puerperal sepsis, induced abortion, pelvic surgery and vaginal discharge, in that order, were significant predictors of tubal factor infertility in our study. This further reinforces the place these

previous pregnancy morbidities have in causing infertility in sub-Saharan Africa. Similar findings were noted in previous studies [1, 23]. Puerperal sepsis is common as the hospital delivery rate is only 16.9% in the study area [24].

The fact that induced abortion was the second most significant predictor is an important finding as it indicates rising level of induced abortion and mirrors the low contraceptive prevalence rate in the area. Abortion law in Nigeria is restrictive, and it carries a higher penalty in northern Nigerian penal/sharia code compared to the criminal code of southern Nigeria [25]. This has largely driven the trade underground with attendant complications from procedures done by quacks. Prevention of these factors can have a significant effect on the burden of tubal factor infertility. Strategies such as provision of health education, prompt and effective treatment of STIs, provision of contraception to prevent unwanted pregnancy, better maternity services and provision of safe abortion services can reduce the burden of secondary infertility [1,26]. Application of these strategies thus has the potential of preventing the major cause of female infertility in the study area.

Treatment of tubal factor infertility in the study area has largely been surgical, and studies have reported poor outcome with the tuboplasty procedures[27]. At present ART provides the best result for tubal factor infertility as it is unresponsive to conventional treatment [1, 28]. In our study population, at least 5 out of every 10 infertile women may require ART procedures which are not available in the facilities. This group of women usually receive no intervention specific to their condition and only a few who can afford ART services get referred to the private facilities. Our study makes a case for the provision of ART in the area, as ART is the best treatment for the leading cause of infertility in the area.

Over the last decade, there has been an increasing interest in low-cost ART procedures for developing countries by professional organisations like European Society of Human Reproduction and Embryology (ESHRE) and International Society for Mild Approach in Assisted Reproduction (ISMAAR) [29]. The aim is to have simplified IVF system that is accessible, affordable and adaptable to conditions in low-resource settings. Cost of drugs and laboratory investigations are major contributing factors to the high cost of IVF. Initiatives to reduce costs such as the use of drugs like clomiphene, natural cycle IVF and ultrasound follicular monitoring instead of endocrine investigations have produced acceptable results [30]. A simplified IVF system (tWE Lab) that avoids medical gases, complex incubation equipment typical of high resource settings is undergoing field trial in some African countries [31]. The need for ART in the study area is not in doubt and these low-cost initiatives may offer hope to many women in the nearest future.

In our study, eight (2%) women became pregnant, 189 (46.6%) were still on treatment and 209 (51.5%) were lost to follow-up. Our result of 2% is lower than that reported from Benin in southern Nigeria and Rwanda [3, 18]. The findings should be interpreted in the context of the prevailing security challenges in the study area. Many families left the area as a result of the insecurity leading to high rate of lost to follow-up. Other factors that may have influenced the findings include the short period of the study, incessant industrial strikes by health workers at the two hospitals and lack of adequate medical resources. These factors affected the efficient management and follow-up of patients in the study area.

Limitations

The major limitation of the study is its hospital-based nature. There is the potential that the participants may have characteristics that make them distinct compared to other infertile women. While the use of the only hospitals in the area that offer services for infertility may have helped to capture most infertile

women in the area, it is still likely that those who did not seek hospital care may differ in certain ways and caution is required in extrapolating the data to all infertile women. Our short period of follow-up may have contributed to the poor outcome of management in the studied population. A further study with longer duration of follow-up could provide a greater understanding of the management outcome in this population.

CONCLUSION

Infertility is a common presentation in the gynaecological clinics of the study area. Two out of every ten new gynaecological patients present with infertility and secondary infertility is the predominant type. Male partner participation in evaluation of infertility was inadequate as four out of every ten couples had no male participation. The most common cause of infertility in the studied population was tubal factor. A history of puerperal sepsis and induced abortion, along with pelvic surgery or vaginal discharge were predictive of tubal factor infertility. There is a need for provision of ART in public hospitals as it is the effective option of treatment for the commonest cause of infertility in the study area.

Table1: Socio-demographic characteristics of 406 infertile women

Number (%)	Number (%)
Age	
<20	13(3.2)
21-25	59 (14.5)
26-30	153 (37.7)
31-35	116 (28.6)
36-40	61 (15.0)
41-45	4 (1.0)
Occupation	
Unemployed (Housewives)	251 (61.8)
Students	76 (18.7)
Skilled workers	48 (11.8)
Unskilled workers	31 (7.7)
Ethnicity	
Hausa	169 (41.6)
Fulani	67 (16.5)
Jarawa	55 (13.5)
Yoruba	39 (9.6)
Igbo	37 (9.1)
Others	39 (9.6)
Religion	
Christianity	112 (27.6)
Islam	294 (72.4)
Education	
None	15 (3.7)
Arabic/madrasah	94 (23.2)
Primary	87 (21.4)
Secondary	129 (31.8)
Tertiary	81 (20.0)
Place of residence	
Rural	102 (25.1)
Urban	304 (74.9)

Urban		304 (74.9)
Type of marital union		
Monogamy	263 (64.8)	
Polygamy	143 (35.2)	
Number of marriages		
Once	333(82.0)	
Twice	68 (16.8)	
Thrice	5 (1.2)	
Parity		
0	193 (47.5)	
1	121 (29.8)	
2	64 (15.8)	
3	17 (4.2)	
>4	11 (2.7)	

Table 2: Results of Investigations

Variable		number (%)
Seminal fluid analysis (N=249)		
Count (million/ml)		
=20 million/ml		
Oligospermia		167(67%)
Azoospermia		71 (29%)
Motility (n=237)		10 (4%)
=50%		
<50%		161 (67.9%)
Morphology (n=236)		76 (32.1%)
=15%		
<15%		
Pelvic ultrasound (n=406)		153 (64.8%)
Normal study	305 (75.1%)	83 (35.2%)
Fibroids	83 (20.4%)	
Polycystic ovaries	19 (4.7%)	
Adnexal mass	9 (2.2%)	
HSG (n= 357)		
Normal study	163 (45.7%)	
Unilateral tubal block	57 (16.0%)	
Bilateral tubal block	89 (24.9)	
Hydrosalpinges	35 (9.8%)	
Others	13 (3.6%)	

Table 3: Causes of infertility in 249 couples

Cause	number (%)
Male factor	44 (17.7)
Female factor	68 (55.0)
Combined male and female factors	37 (14.9)
No cause identified	31 (12.4%)
Causes among infertile women (n=406)	
Male factor	44 (10.8)
Tubal factor	167 (41.1)
Ovulatory factor	89 (21.9)
Uterine	18 (4.4)
Combined factors	39 (9.6)
No cause identified	49 (12.1)

Table 4: Association of demographic/reproductive characteristics with tubal factor infertility

Variable	Tubal factor infertility	Chi-square	value- p
Age			
19-24	2/44(4.5)	42.09	<0.001
25-30	67/179(37.4)		
31-35	56/118(47.5)		
=36	42/65(64.6)		
Education			
At least primary	98/196(50.0)	12.30	0.001
Secondary or higher	69/210(32.9)		
Occupation			
Housewife	116/251(46.2)	8.72	0.013
Student	21/76(27.6)		
Employed	30/79(38.0)		
Marital Union			
Monogamous	91/263(34.6)	13.16	<0.001
Polygamous	76/143(53.1)		
Parity			
Nulliparous	51/193(26.4)	32.87	<0.001
Para 1 and more	116/213(54.5)		
History of vaginal discharge			
Yes	98/173(56.6)	29.97	<0.001
No	69/233(29.6)		
Yes	118/266(44.4)	3.32	0.07
No	49/140(35.0)		
History of irregular menses			
Yes	50/189(26.5)	31.46	<0.001
No	117/217(53.9)		
History of Smoking			
Yes	6/22(27.3)	1.85	0.17
No	161/384(41.9)		
History of pelvic surgery			
Yes	88/110(80.0)	94.13	<0.001
No	79/296(26.7)		
History of induced abortion			
Yes	39/48(81.2)	36.18	<0.001
No	128/358(35.8)		
History of puerperal sepsis			
Yes	73/83(88.0)	94.45	<0.001
No	94/323(29.1)		
History of contraception use			
Yes	56/145(38.6)	0.59	0.44
No	111/261(42.5)		
BMI			
Normal	110/241(45.6)	5.14	0.08
Overweight	56/161(34.8)		
Underweight	1/4(25.0)		

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