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Original Article

A 5-Year Retrospective Cross-Sectional Study of the Pattern of Infertility in Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

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Abstract

Background: Infertility is a major cause of marital disharmony in the word most especially in our environment because of the high value system placed on child bearing. Infertility is one of the commonest reason couples presents to a doctor especially the gynecologist. **Objectives:** This study is to determine the prevalence of infertility, causes, contributions of male and female factors in infertility, and to make recommendations on the management of infertility in NAUTH, Nnewi, Nigeria. **Materials and Methods:** This is a retrospective study that reviewed all the cases of infertility managed at Nnamdi AzikiweUniversity Teaching Hospital (NAUTH), Nnewi between 1st January 2017 and 31st Dec, 2021. The case notes of all the patients managed for infertility was obtained from the medical records department of the hospital. A structured proforma was used to collect the socio-demographic and clinical data of the subjects to be reviewed and analyzed. Ethical clearance and approval was sought for and obtained from the ethical committee of the teaching hospital. The data was analyzed using Statistical package for social sciences (SPSS) version 25. **Results:** The infertility prevalence rate of 26.8% was observed. Secondary infertility (55%) was the predominant type of infertility within the study population while the remaining (45%) had primary infertility. Tubal pathology (65%) was the most common cause of infertility identified during this study. Male factor alone contributed 100(11.7%) of the infertility cases, a combination of male and female factors were identified in 325(38%) of couples, female factor alone contributed 388(45.3%) of the cases. However, the cause of infertility was unexplained in 43(5%) of the couples that were studied during the period of this study. **Conclusion:** Infertility is a common presentation in the gynaecological clinics and the secondary type is predominant in this environment and has been linked to post-infectious causes. Thus, High premium should be placed on primary prevention of the various risk factors that predispose couples to this burden of infertility.

Keywords: Infertility; NAUTH

Introduction

One of the most frequent reasons for a woman to see a doctor is a delay in conception. The most widely accepted definition is when a couple is unable to get pregnant after a year of having regular, unprotected sexual contact [1]. Subfertility is a word used by some authorities. Since conception is frequently considered as the primary justification for marriage, infertility is a significant source of distress for couples [2]. While secondary infertility occurs when a couple has already conceived but is now unable to do so despite adequate unprotected sexual activity for at least 12 months, primary infertility is when a couple has never conceived despite having adequate unprotected sexual activity for 12 months or more [1, 3]. The incidence varies according to location throughout the world. Infertility is more prevalent in low and middle-income countries than in high-income countries [4]. The incidence of infertility is increasing in low and middle-income countries as a result of poor treatment of pelvic infections [5].

At some point during their reproductive life, an estimated 580 million people (or about 5-8%) of couples experience infertility [6]. In sub-Saharan Africa, the prevalence of infertility has been reported to range from 20 to 46% [6]. On the other hand, high-income nations have frequently cited an average rate of 10-15%. High rates of sexually transmitted diseases, complications from unsafe abortions, and puerperal pelvic infections have all been linked to this [5,6]. Women in high-income countries are more likely to experience primary infertility. Contrarily, higher rates of secondary infertility are observed in developing nations, which is a reflection of the high prevalence of tubal disease from sexually transmitted, post-abortive, and puerperal infections in these nations, with Chlamydia trachomatis and Neisseria gonorrhoeae being the most frequently implicated organisms [6, 7].

Some reasons of infertility, including azoospermia (no sperm in the ejaculate) or bilateral tubal blockage, are simple to diagnose. Most couples' circumstances, however, are less apparent; the woman may have a partial tubal occlusion, and the sperm may be diminished but not completely absent. Thus, while managing infertile couples, it can be challenging to prioritise these findings. Male factor (26%), ovulatory dysfunction (21%), tubal damage (14%), endometriosis (6%), coital issues (6%), cervical factor (3%), and unexplained (28%) were the causes of infertility cited in one population-based study [8]. According to a study, the most prevalent cause of infertility is a female factor, which accounts for about 41.7% of tubal blockages. The next most common cause is a mixed male and female factor, which accounts for around 22.2% of infertility cases, and rest of the couples, the aetiology could not be found [9].

Studies done in Nigeria have shown that secondary infertility is more common. There is evidence that there is a link between infertility in Nigeria to post-infectious conditions such sexually transmitted infections, puerperal sepsis, and post-abortion infections. Additionally, it was mentioned that infertility concerns can be treated surgically or medically. However, if one continues

to experience infertility despite receiving these treatments, one may choose to use assisted reproductive technologies (ARTs), which are more sophisticated techniques. Cost, however, posed the biggest obstacle to receiving therapy [10]. Therefore, prevention and improved infertility care should be the cornerstones of health policy in low and middle-income nations. Hence, this study is to determine the prevalence of infertility, the various causes of infertility, the contribution of male and female factors in infertility, and to make recommendations on the prevention and management of infertility in NAUTH, Nnewi, Nigeria.

Materials and Methods

Study Design

This is a retrospective cross-sectional analytical study.

Study Site and duration

Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria from 1st January 2017 to 31st December, 2021.

Study population

Patients with infertility registered in Gynaecology outpatient clinic at NAUTH, Nnewi, Nigeria.

Inclusion criteria:

Women with infertility registered in Gynaecology outpatient clinic or referred to us, during the study period.

Exclusion criteria:

We excluded women without infertility presentation. The cases of missing or incomplete data were also excluded from the study.

Sample size determination

The sample size was an all population based study.

Sample technique: Non-random sampling approach. All available case files were examined.

Study Outcome Measures

Prevalence rate, clinical presentations, maternal outcomes and fetal outcomes of eclampsia and maternal case fatality rate.

Procedure

A structured proforma was used to collect the socio-demographic and clinical data of the subjects which was reviewed and analyzed. The proforma contained clinical parameters like; patient's biodata, presenting complaints and examination findings, risk factors and type of infertility, and investigations of patients managed for infertility in NAUTH, Nnewi within the study period.

Data Analysis

The data obtained was analysed using Statistical Package for Social Sciences (SPSS) version 25 (IBM, Armonk, NY, USA). Mean, and standard deviation were employed where applicable and results were presented in tables and chart. Chi-square and Fischer exact test were used to perform statistical comparison. Level of significance was accepted when the *P*-value is less than 0.05.

Ethical Approval

Ethical approval was obtained from the research and ethical committee of Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, with reference number: NAUTH/CS/66/VPL.15/VER.3/124/2022/087.

Results

Sociodemographic analysis of patients managed for infertility in NAUTH

During the period of this study, there was a total of 3196 new gynaecological cases seen at the gynaecological clinic out of which 856 were cases of infertility giving an infertility prevalence rate of 26.8%. The ages of the participants ranged from to from 20 to 49 years with mean and standard deviation calculated as 35.50 ± 7.19 years. About 60% (514) of the women where between age group of 30-39 years. This is shown in Table 1. Out of the 856 cases that were studied, (443, 51.7%) of the women were nulliparous, while 214 (25%) of the women were primiparous and the remaining 199(23.3%) were multiparous women. It was observed that about 542(63.3%) and 23(2.7%) of the women had secondary and tertiary education respectively, about 7(0.8%) had no formal education. Most of the women were traders 343(40.1%), 184(21.5%) were artisans, others were civil servants 87(10.2%), students 28(3.3%) and the remaining 214(25%) were unemployed. This is shown in Table 1 Majority of their husbands were traders 413(48.3%), 199(23.3%) were civil servants, 186(21.7%) were artisans. 57(6.7%) had primary education, 473(55.3%) and 300(35.0%) had secondary and tertiary education respectively, while 26(3.0%) had no formal education. These sociodemographic characteristics are shown in Table 1.

Variable	Options	Frequency (n=856)	Percentage (%)
Age (years)	20-29 30-39 ≥40	128 514 214	15.0 60.0 25.0
Parity	Nullipara Primipara Multipara	443 214 199	51.7 25.0 23.3
Level of education	No formal Primary Secondary Tertiary	7 285 542 23	0.8 33.2 63.3 2.7
Occupation	Unemployed Trader Civil servant Artisan Student	214 343 87 184 28	25.0 40.1 10.2 21.5 3.3
Husband's Age	<20 20-29 30-39 ≥40	0 28 271 556	0 3.3 31.7 65.0
Husband's Occupation	Trader Civil servant Artisan Student Others	413 199 186 15 43	48.3 23.3 21.7 1.7 5.0
Husbands Education	No formal Primary Secondary Tertiary	26 57 473 300	3.0 6.7 55.3 35.0

Table 1: Sociodemographic Analysis of Patients Managed for Infertility in NAUTH

Analysis of some variables of patients managed for infertility in NAUTH

Secondary infertility was the predominant type of infertility noted with 471(55%) while the remaining 385(45%) had primary infertility. Fig 1 About 830(97%) of the male partners had seminalysis done. It was observed that 429(51.7%) of the men had abnormal seminalysis result while the remaining 401(48.3%) had a normal result. In terms of clinical evaluation, 710(83%) of the women had a hysterosalpingogram (HSG) during the period of the study, 616(72%) of the women had a hormonal assay, 368(43%) had a laparoscopy and dye test, while the remaining 385(45%) had a hysteroscopy. Table 2 shows the various analysis of some of these variables.

Variable	Options	Frequency (n=856)	Percentage (%)
Type of infertility	Primary Secondary	385 471	45.0 55.0
Investigations	Laparoscopy and dye test Hysteroscopy Hormonal assay HSG Semen analysis	368 385 616 710 830	43.0 45.0 72.0 83.0 97.0
Seminalysis	Normal Abnormal	401 429	48.3 51.7

Table 2: Analysis of Types/Investigations of Patients Managed for Infertility in NAUTH

Aetiological factors identified in patients managed for infertility in NAUTH

Tubal pathology (65%) was the most common cause of infertility identified during this study. However, uterine, ovulatory, endometriosis and coital problems were identified in infertile couples in 313(36.6%), 157(18.3%), 43(5.0%) and 57(6.7%) respectively. Male factor alone contributed 100(11.7%) of the infertility cases, a combination of male and female factors were identified in 325(38%) of couples, female factor alone contributed 388(45.3%) of the cases. However, the cause of infertility was unexplained in 43(5%) of the couples that were studied during the period of this study. This is shown in Table 3. The age of the studied population ranged from 20 to 49 years with mean and standard deviation calculated as 35.50 ± 7.19 years.

Variable	Options	Frequency (n=856)	Percentage (%)
Aetiology	Male factor only Female factor only Combined Unexplained	100 388 325 43	11.7 45.3 38.0 5.0
Risk factors for female	Tubal pathology Ovulatory pathology Uterine pathology Synechia Endometriosis Coital problems	556 157 313 15 43 57	65.0 18.3 36.6 1.7 5.0 6.7

Table 3: Aetiological/ Risk Factors Identified in Patients Managed for Infertility in NAUTH

Discussion

The study was enthused by the fact that infertility is becoming more commonplace in the world. Approximately 80 million people worldwide struggle with infertility. In high-income nations, the disease is prevalent in a range of 8–10% [11]. A 10% infertility rate has been recorded for low- and middle-income nations, with rates of 8% in India, 10% in Pakistan, 11% in Sri Lanka, 12% in Nepal, and 15% in Bangladesh [12]. This study found a prevalence rate of infertility of 26.8%, which was lower than a study conducted by Olusoji et al in a tertiary hospital in south west Nigeria that found a prevalence rate of infertility among gynaecological patients seen in the clinic to be 38.8% [13]; a related study by Odunvbun et al in South-South Nigeria revealed a prevalence rate of 32% [14]. Our results were consistent with a study conducted by Dattijo et al, which found a prevalence of 23.9% in the country's northern region [15]. This prevalence was consistent with a research by Chimbatata et al. who found that infertility afflicted 10–30% of couples in Nigeria, making sub-Saharan Africa the region with the highest prevalence [16]. The diverse sociocultural variances and health-seeking habits of couples around the world may be connected to the variations in prevalence rates.

The mean age of women with infertility at presentation in this study was 35.50 ± 7.19 years. The result was higher than the 30.5 years that a study in Bauchi, Northern Nigeria [15] revealed. This conclusion might be a result of the lower average marriage age in the north of the country. The majority of the infertile women in this study were between the ages of 30-39, it was reported. This age distribution found in our study could be explained by the fact that many women in our environment prefer alternative or non-medical care, such as visiting traditional birth attendants, prayer houses, maternity homes, and other non-orthodox locations, before presenting to a specialist for expert evaluation and care [17]. Secondary infertility was the most typical kind found in this study. This is consistent with data from numerous research on infertile women conducted in low- and middle-income nations like Nigeria [17-21]. The pattern of infertility in western and high-income countries, where the rate of primary infertility is higher, differs significantly. 81% of the women who sought treatment for infertility, according to Madgum et al., experienced primary infertility [20]. This high prevalence could possibly be due to poorly treated STIs, unsafe abortions, post-abortion sepsis and pelvic inflammatory diseases. However, Oriji et al noted that other plausible explanations for the high percentage of women with secondary infertility may include sexually transmitted infections, post-operative/procedure infections, and puerperal sepsis from previous deliveries supervised by unskilled/traditional birth attendants, which are all very common in our environment [17,21,22]. Secondary infertility in our environment has infectious origins at its core [22].

In our population under study, tubal factor infertility was the most prevalent cause of infertility. About 65% of the women in the study were infertile due to the tubal factor. In order to assess for tubal factor, hysterosalpingograms (HSG) were found to be the most frequently employed investigative method. This conclusion that the tubal component predominates in the aetiology of infertility is consistent with other research conducted throughout Nigeria. This was greater than the findings of Tukur et al, who found that 49.3% of Kano women had tubal factor infertility [23], Oriji et al, who found 49.2% in Bayelsa [17], and Makwe et al, who found 54.9% in Lagos [24].

This high incidence of tubal factor infertility may be largely attributable to the poor health-seeking behaviour of the women in our environment, which is leading to an increase in post-abortion sepsis, poorly treated pelvic inflammatory disease, sexually transmitted infections, and puerperal sepsis. This only serves to highlight the role that previous pregnancy morbidities have played in sub-Saharan Africa's high rate of infertility.

In this study, uterine factors were shown to account for 36.6% of infertility. The male partners of almost 830 (97%) of the women were subjected to seminal fluid analysis. This is greater than the findings of Harlow et al. [25], who found that male partners participated in 80.5% of marriages. This finding is consistent with the perception that infertility is primarily a woman's issue in many Sub-Saharan African nations [26]. The majority of the male partners (97%) participated in their evaluation procedure, thus this was not the case in our study sample. Infertility due to a male factor alone was responsible for 11.7%. This is less than Umar et al.'s findings of 34.4% in Sokoto [27] and Ogunlaja's findings of 36% in Ogbomosho [28]. The results of the seminal fluid examination on the male partners were abnormal in about 51.7% of the cases. Similar findings were made in a study by Garba-Alkali et al., which discovered that 53.2% of the male partners had abnormal seminalysis results [29].

The study found that the female factor (45.3%), the male and female factors combined (38%) and the unexplained accounted for around 5% of all cases of infertility. This is consistent with the findings of Abebe et al., who found that 54.01 percent of infertility was due to female factors, 22.26% were due to combination variables, 21.36% were due to male factors, and 10.4 percent were unaccounted for [30]. This was in contrast to the findings of Madziyire et al., who found that male factor accounted for 19% of the study population and that the most common reason of infertility was "unexplained" in 22% of the women. Sociocultural differences, exposure to environmental toxins, sexually transmitted infections, and differences in health-seeking behaviour in our environments may all contribute differently to the contribution of various aetiological factors to infertility. These factors may predispose a couple to infertility.

The tertiary hospital setting of this study is a drawback. The teaching hospital is the main hospital in the region that provides infertility services, so it may have helped to capture the majority of infertile couples in the area. However, it is still likely that those who visited the private owned hospitals or did not seek hospital care may differ in some ways, so caution is needed when comparing the data to all couples with infertility in this region.

Conclusion

A prevalent reason for a couple to visit the gynaecological clinics in the study area is infertility. In this study, secondary infertility was found to be the most common kind of infertility, with a prevalence rate of 26.8%. The majority of infertility cases were due to female-related factors, with tubal factor highlighted as the most frequent cause in the population under study, followed by pregnancy complications and infections with inadequate treatment. More over half of the male partners who had their seminal fluid analysed received abnormal results. Thus, high premium should be placed on primary prevention by general health education to enlighten the public on the benefits of safer sexual practice, adequate treatment of pelvic infections and sexually transmitted infections in addition to a standard obstetrics care aimed at reducing

pregnancy related complications. This strategy when combined together will help reduce the marital and societal unrest associated with the burden of secondary infertility in our environment. At the end of this study, it is recommended that adequate health education in the society to encourage both partners to present to hospital in cases of infertility. Secondary infertility is responsible for most cases of infertility in this environment, it is therefore important to reinforce the need for prevention of pelvic infection through safe sex practices, prevention and proper treatment of sexually transmitted diseases, provision of safe abortion care, health policies to help improve obstetric services including skilled manpower.

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