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Secondary Infertility in Port Harcourt: Pattern and Socio-Dermographic Relationship

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Background: Secondary Infertility is viewed as a social stigma, especially in Nigeria, due to the high premium placed on procreation. Observation suggests that this condition is on the increase in our environment. Hence, the need to determine the pattern and the relationship between the socio-demographic factors with infective causes of this condition; which will subsequently allow the tailoring of the individual investigation and subsequent treatment.
Objective: To determine the prevalence and pattern as well as the relationship between the socio-demographic factors with infective causes of secondary infertility among women who attended the gynaecological clinic of the University of Port Harcourt Teaching Hospital (UPTH) between January 2012 and December 2016
Methods: This is a retrospective descriptive study design, based on findings from the folders, admission and outpatient registers, of infertile couples presenting at the gynaecology clinic of the University of Port Harcourt Teaching Hospital, over a five-year period (January 2012 – December 2016). Data were collected from all documented and laboratory findings. The data extracted from the case records were the socio-demographic characteristics of the patient, the duration of infertility as well as the causes. They were analyzed using SPSS version 20.
Results: The mean age of women was 33.14±4.93 years. The prevalence of secondary infertility was 12% of all outpatient gynaecological consultation. The mean duration of secondary infertility was 3 years.

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The infective causes of secondary infertility [recurrent pelvic inflammatory disease(PID), sexually transmitted infections(STI), post abortal sepsis, puerperal sepsis, HIV/AIDS, mumps orchitis were commoner among the 31-40 years' category, (45.8%), the infective causes were also commoner among women with primary level of education, (62.5%, p-value=0.001) as well as women who were self-employed (49%, p-value=0.041). Recurrent pelvic inflammatory disease was identified in majority of cases (37.1%). Abnormal semen analysis, hyper-prolactinaemia and uterine fibroid, also contributed significantly to infertility; 18.5%, 19.7% and 24.3% respectively.

Conclusion: Infective causes are at the root cause of secondary infertility; the more educated the couple, the higher their socioeconomic status, the lesser the impact of infection on secondary infertility.

Keywords: Secondary infertility; pattern; infection; level of education.

1. INTRODUCTION

Infertility is defined as the inability to conceive after one year of adequate intercourse[1,2]. Adequate intercourse is at least 3 to 4 times per week on different days [1–5]. In order to appreciate the fertility potential of humans the terms fecundability rate, fecundity and pregnancy rate per age needs to be understood. These are also important in predicting treatment outcomes for couples being managed for infertility. Fecundability rate is the chance of conception per cycle attempted [6]. It is about 0.2-20% in normally fertile couples [7]. Fecundity is the probability of achieving a live birth in one menstrual cycle and pregnancy rate per age for women under 30 years is in the range of 70-75%; for women 30-35 years it is 60% and for women over 35 years is 50% [6,8,9].

Infertility can be classified into primary infertility in which no previous pregnancies have occurred and secondary infertility in which conception have occurred irrespective of outcome, and this is the commoner type in developing countries [9–11]. In the unexplained subset, the couple and or individual have no discernible cause of the infertility after a comprehensive investigation of tubal assessment, ovulation assessment, seminal fluid analysis and post-coital test after 2 years of regular and unprotected sexual intercourse [6,11].

Worldwide infertility is quoted as occurring in 10-20% of couples of reproductive age [2–4,7].

However, the incidence varies from one region of the world to the other, being highest in the so called infertility belt of Africa that includes Nigeria[3]. In Nigeria, 1 in 5 of every couple have difficulty with conception. The distribution of infertility in couples are; 30-40% due to male factor, 30-40% due to female factor,10-20% due to both male and female factors,5-10% unexplained[2,5,6].

There is paucity of national vital statistics in Nigeria and hospital based studies constitute the main sources of information. It is not surprising, therefore, that existing studies suggest a range of life time prevalence of infertility extending from 6.6% to 32.6% [12].

While primary infertility is higher in other regions of the world, secondary infertility is more common in Africa [7,11,13]. This had been reported as sequel to poorly managed pelvic inflammatory disease, resulting in utero-tubal damage and pelvic adhesions also from complications of unsafe abortion and puerperal sepsis [14]. Infertility in Nigeria is largely secondary and mainly due to infections- sexually transmitted infections (STIs), post-abortal and puerperal sepsis [11]. Tubal damage accounts for more than half of all female causes of secondary infertility in Nigeria [6]. Age is another important variable that impacts on fertility and this is most certain in women and much less in men.Overall;10% of women under age 30 years will present with infertility,15%of women age 30-35 years, 30% of women between 35-40 years, and 60% of women over age 40 will present with infertility [6]. Infertile women are more likely to be less educated and not using barrier contraception, as it has been shown to confer protection on fertility, due to its dual protection against pregnancy and infection. The socioeconomic factors that have been implicated in the propagation of infertility are: poverty, smoking, alcohol intake and other risk behaviours such as substance abuse[4].

Apart from epidemiological definition,[15,16] demographically, infertility is defined as inability of a non contraception sexually active woman to achieve a live birth[17]. A community health

survey in Canada in 2012 showed a prevalence range for infertility between 11.5% and 15.7% the prevalence for secondary infertility was not specified. The study suggests that prevalence has increased since the last time it was measured, and it is due to the age of the female partner and parity. The three definition used in the study to define prevalence, were constructed variables and not clinical diagnosis, and it was not possible to identify couples where the male or female partner had been sterilized [18].

The prevalence of secondary infertility in Iran is 21.6% and Saudi Arabia is 18.98%. Europe has the lowest fertility rate in the world, instability of partnership, increasing participation of women in higher education and employment delayed child bearing, value changes and economic pressures are considered to have a major effect on fertility rate [19,20].

A systematic analysis of 277 health surveys, in 2010 among women 20-44 years, 10.5% had secondary infertility, the prevalence was highest in South-Asia, sub-Saharan Africa, north Africa/middle east, central/eastern Europe and central Asia [21]. In a convergent mixed-method correctional cross-sectional qualitative descriptive study done in Mali in 2013 and 2014, the prevalence of secondary infertility was 23.6%, socio-cultural pressure affected women physically, mentally and socially [22].

In the prevalence of secondary infertility that includes a wide range of countries in sub-Saharan Africa, Cameroon and Central African Republic rank among the countries with the highest prevalence of secondary infertility reaching 20% and 25% respectively. The lowest levels of secondary infertility were in Burundi, Rwanda and Togo, accounting for 5-7% of women age 20-44 years. It is worthy of note that comparative studies of infertility are hampered by the fact that different definition of infertility are being employed [17].

A prevalence of secondary infertility of 71.9% in Mkar-Gboko North central Nigeria, which was attributed to high cases of untreated and poorly treated pelvic inflammatory disease is similar to 61.8% in Bauchi [23–25]. These prevalence figures are higher than 48.1% from Oshogbo, 26.8% from Lagos and 15.7% from Sokoto north-west Nigeria [26].

In India, maximum proportion of infertility was found in females who were aged 25-35 years. Association between infertility and educational status of females was found statistically significant[27]. A Bangladeshi descriptive analysis showed 64.64% of majority of women with secondary infertility fell within 20-29years age group[28], and is in keeping with a Ghanaian cross sectional study[29].

There were significant differences in the distribution of demographics and reproductive characteristics, women in Bauchi over 25years were more likely to have tubal factor infertility compared to those who were under 25 years [30]. In a teaching hospital in Ikeja Lagos Nigeria, a retrospective study done from 2011 to 2014, where 88% of subjects had secondary infertility, 34.5% were in the 35-40 years' age group, 45.1% were overweight and the mean duration of infertility was 9.6 years [31]. It is important to note that in majority of the studies above, as well as those done in Port Harcourt Nigeria, there was none that showed the socio-demographic of secondary infertility specifically.

A study carried out in three French regions, identified the main causes of secondary infertility to be ovulation disorders in 32% of cases, tubal damage was 26%,male factor was 21%,and unexplained was 8% [32]. However, bilateral tubal blockage accounted for 32.8% of secondary infertility in western Siberia [33].

In Bauchi, tubal factor was the predominant cause in 46.1% [25]. Tubal factor remained a major contributor to secondary infertility in Enugu, as 43.5% had it [34]. In Calabar, it was noted that 34.5% had primary infertility, and 65.5% had secondary infertility, of which the cause of infertility was due to tubal factors in 45.1% of cases, uterine fibroids accounted for 7.4% of cases[35].

A study carried out in 2003, more than a decade ago, by Orazulike et al in Port Harcourt, showed that majority of women who had secondary infertility, had male factor accounting for (55%),tubal blockage(56%),and uterine fibroid(58%) [23].

This study is a periodic review into this worrisome condition in our health care delivery. It is intended to add to current body of knowledge that helps in shaping the management and prevention of the root causes of secondary infertility.

2. MATERIALS AND METHODS

This is a descriptive retrospective study of patients that presented with secondary infertility

at the University of Port Harcourt Teaching hospital, Port Harcourt, over a 5-year period, January 2012 to December 2016. Their folders were retrieved from the medical records department and searching through the outpatient and admission registers. Information on the ages, highest educational status, occupation, parity, duration of secondary infertility, history of recurrent pelvic inflammatory disease, sexually transmitted infection, post-abortal sepsis, puerperal sepsis, human immune deficiency virus infection/ acquired immunodeficiency syndrome, mumps orchitis and sexually transmitted infection in the male partner, considered as infective causes of secondary infertility, history of termination of pregnancy, Ashermann syndrome, uterine fibroid and congenital uterine anomaly, as well as history of premature ovarian syndrome, hypothyroidism, hyperthyroidism, hyperprolactinaemia, oligomenorrhea, amenorrhea, polycystic ovarian syndrome and primary post-partum haemorrhage. Histories of chronic systemic illness like diabetes mellitus, and determinants of male factor infertility like seminal fluid analysis, previous pelvic surgeries, were extracted and analyzed using SPSS version 20. Relevant descriptive statistics using frequency and percentage were computed for presentation of categorical variables while continuous variables were presented using mean and standard deviation. The Chi-square test was used to compare categorical variables with a p value of 0.05 or less taken as being significant.

3. RESULTS

Within the study period, a total of 5,275 women were seen at the gynaecology clinic of the University of Port Harcourt Teaching Hospital, 720 had secondary infertility, giving a prevalence of 12%.

The age of the women ranged from 21-50 years, with a mean age of 33.14± 4.93 years.

Majority (51%, n=367) had tertiary education and were self-employed (49.4%, n=356), and most (51.1%, n=368) were nulliparous. Table 1.

The mean duration of secondary infertility was 3 years. Table 2.

Infective causes (Recurrent pelvic inflammatory disease(PID), sexually transmitted infections(STI), post abortal sepsis, puerperal sepsis, HIV/AIDS, mumps orchitis) were commoner among the 21-30 years (44.3%, n=109) and 31-40 years (45.8%, n=197) category.

The infective causes were commoner among those with primary level of education (62.5%, n=15) with p-value =0.0001, which is statistically significant.

Persons who were self-employed had more (49%, n=176) infective causes of secondary infertility, with p-value = 0.041, which is statistically significant. Table 3.

Most women with secondary infertility (37.1%, n=267) had recurrent PID and STI respectively, and most (89%, n=641) had a history of termination of pregnancy.

One hundred and seventy-five, (24.3%) had uterine fibroid, 23.3%, n=168 presented with tubal blockage, 22.4%, n=161 had Asherman syndrome, 19.7%, n=142 had hyperprolactinaemia, while 18.5%, n=133 had abnormal seminal analysis. These were the commonest causes of secondary infertility in this study. Table 4.

Cervical stenosis was seen in 1.9%, n= 14, Premature ovarian syndrome occurred in 1.8%, n=13. None of the women with secondary infertility had hypothyroidism. Three women,0.4% had hyperthyroidism, 4.3%, n=31 had oligomenorrhea,3.2%, n=23 presented with amenorrhea,0.7%, n=5 had primary postpartum haemorrhage, none had congenital uterine anomaly, 1.5%, n=11 had diabetes mellitus, 0.3%, n=2 had spouses with a history of previous pelvic surgery,3.6%, n=26, had spouses with sexually transmitted disease and none of the women with secondary infertility had a spouse with a history of mumps orchitis.

4. DISCUSSION

The prevalence of secondary infertility in this study was 12%, this is comparable to a prevalence of 10-18% reported in some African countries,[17] 15.7% reported in Sokoto[26].

This prevalence is lower than 71.9% and 61.8% reported in Mkar-Gboko and Bauchi respectively. The lower prevalence in this study can be attributable to a high number of cases of untreated and poorly treated pelvic inflammatory disease in the areas with a higher prevalence [23-25,36].

Table 1. Socio-demographic characteristics of women with secondary infertility (N = 720)

Variables	Frequency	Percentage
Age category		
21 – 30 years	246	34.2
31 – 40 years	430	59.7
41 – 50 years	44	6.1
Mean age ± SD = 33.14±4.93years Range = 21 – 50 years		
Educational level		
Primary	24	3.3
Secondary	329	45.7
Tertiary	367	51.0
Occupational status		
Unemployed	145	20.2
Employee	219	30.4
Self-employed	356	49.4
Parity		
Nullipara	368	51.1
Primipara	224	31.1
Multipara	128	17.8

Table 2. Duration of secondary infertility among women

Duration of infertility	Frequency	Percentage
1 – 5 years	541	75.1
6 – 10 years	137	19.0
11 – 15 years	28	3.8
>15 years	15	2.1

Mean duration of infertility among study population ± SD = 4.22±3.49years; Median duration of infertility = 3 years; Range = 1 – 24 years

Table 3. Demographic factors associated with infective causes among women with secondary infertility

	Presence of infective causes		
	Yes (n=322)	No (n=398)	Total
Variables	**n (%)**	**n (%)**	**n (%)**
Age category			
21-30 years	109 (44.3)	137 (55.7)	246 (100.0)
31-40 years	197 (45.8)	10 (54.2)	430 (100.0)
41-50 years	16 (36.4)	28 (63.6)	44 (100.0)
	Chi square = 1.468; p-value = 0.480		
Educational level			
Primary	15 (62.5)	9 (37.5)	24 (100.0)
Secondary	170 (51.7)	159 (48.3)	329 (100.0)
Tertiary	137 (37.3)	230 (62.7)	367 (100.0)
	*Chi square = 17.609; p-value = 0.0001**		
Employment status			
Unemployed	57 (39.3)	88 (60.7)	145 (100.0)
Employee	89 (40.6)	130 (59.4)	219 (100.0)
Self-employed	176 (49.)	180 (50.6)	356 (100.0)
	*Chi square =6.397; p-value = 0.041**		
Parity			
Nulliparous	152 (41.3)	216 (58.7)	368 (100.0)
Primipara	105 (46.9)	119 (53.1)	224 (100.0)
Multipara	65 (50.8)	63 (49.2)	128 (100.0)
	Chi square = 4.060; p-value = 0.131		

**Statistically significant; Infective causes (Recurrent PID, STI, post abortal sepsis, puerperal sepsis, HIV/AIDS mumps orchitis)*

Table 4. Distribution of risk factors of secondary infertility among women

Variables	Frequency	Percentage
History of termination of pregnancy		
Yes	641	89.0
No	79	11.0
History of recurrent PID		
Yes	267	37.1
No	453	62.9
History of STI		
Yes	267	37.1
No	453	62.9
History of uterine fibroid		
Yes	175	24.3
No	545	75,7
History of tubal blockade		
Yes	168	23.3
No	552	76.7
History of Asherman syndrome		
Yes	161	22.4
No	559	77.6
History of hyperprolactinaemia		
Yes	142	19.7
No	578	80.3
Abnormal semen analysis in spouse		
Yes	133	18.5
No	587	81.5
History of puerperial sepsis		
Yes	44	6.1
No	676	93.9
History of post abortal sepsis		
Yes	9	1.3
No	711	98.8

The age range of women with secondary infertility in this study is comparable to that seen in other studies globally [28-31]. This phenomenon is not surprising in an industrial city like Port Harcourt where there is high premium on education. This finding can also be explained by the effect of aging that impact negatively on fertility, with fertility reducing with increasing maternal age[28].

Most of the women with secondary infertility were educated and employed, this had a negative impact on their fertility, as the pursuit of career and personal development increases the age at marriage and child bearing, thus the prevalence of 12% in this study is not surprising, as it is in keeping with findings in such cities globally[37-39].

The mean duration of secondary infertility among the study population, is also not surprising, as most couples after a live birth would not be bothered if pregnancy is not achieved two years after, following the child spacing encouraged by the world health organization, but subsequent delays in achieving conception would have the couple seek medical attention, hence, this explains the mean duration of 4.22±3.49 years seen in this study [37].

The duration of secondary infertility seen in this study is comparable to a multi- centre study in Iraq [38].

History of termination of pregnancy and recurrent pelvic inflammatory disease were the most common causes of secondary infertility in this study, this is slightly different from the findings found from studies conducted in Sub-Saharan Africa showing tubal blockage as the most common cause. This finding still conforms to the trend in Sub- Saharan Africa, as recurrent pelvic inflammatory disease leads to utero-tubal occlusion[14,36].

Abnormalseminal fluid analysis, hyperprolactinaemia, uterine fibroid, tubal

blockage and Asherman syndrome, contributed significantly to the cause of secondary infertility in this study, which is comparable to the trends in Bauchi, Calabar, and Port Harcourt[23,25, 35].

The findings recorded by Orazulike etal in Port Harcourt over a decade ago, is relatively similar to the findings in this study, as the leading causes of secondary infertility were comparable, except that the percentages were lower in this study. This may be due to the fact that most women are becoming educated and have better health seeking behavior like safer sexual exposures, in addition to having access to quality health care with the multiplicity of specialist facilities established in the city in the past decade; which makes specialist treatment for infective and other preventable causes of secondary infertility readily available and relatively affordable[39,40].

Infective causes of infertility such as recurrent pelvic inflammatory disease, sexually transmitted infection, post abortal sepsis, puerperal sepsis, human immune deficiency virus infection & acquired immunodeficiency syndrome and mumps orchitis, were commoner among women with primary level of education as well as women who were self –employed, interestingly, infective causes of secondary infertility increased with less education, which is comparable to a study conducted in Ghana[29]. Ignorance and poor health seeking behaviour among women in this lower socioeconomic group can account for this finding in this study[17,39].

5. CONCLUSION

Infective causes are at the root cause of secondary infertility; the more educated the couple, the lesser the impact of infection on secondary infertility. Hence, socioeconomic state plays important role in ethiopathogenesis of secondary infertility. High premium should be placed on primary prevention by general education the public and on the dangers inherent in high risk sexual behaviors, as well as the benefits of safer sexual practice.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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