Characteristics of Infertile Clientele Attending a Public *in Vitro* Fertilization Clinic: Appraising Priorities in a Low-Income Country

Gbolahan O. Obajimi[1,2], Olugbenga O. Saanu[1,2], Ayodeji S. Adeyanju[2], Ademola S. Olutoye[2], Mofiyinfoluwa M. Adeyeye[3]

[1]Department of Obstetrics and Gynaecology, College of Medicine, University of Ibadan, Ibadan, Nigeria.
[2]Department of Obstetrics and Gynaecology, University College Hospital, Ibadan, Nigeria.
[3]College of Medicine, University of Ibadan, Ibadan, Nigeria.
Email: gbolahanobajimi@gmail.com

Abstract

Introduction: Infertilityaffects one in six couples, and it is an important public health issue largely due to thepervasive effects on the emotional and psychological wellbeing of affected couples. In many developing nations emphasis is placed on childbirth and inability to fulfill this role can be very distressing. There is an unmet need for assisted reproductive technology (ART) in many developing countries and where facilities exist, they are mostly privately owned, expensive and concentrated in urban areas. To bridge this gap, public fertility clinics have been established to provide subsidized care. Evaluating the characteristics and peculiarities of clientele presenting at these public facilities will aid planning and prioritization of care. **Methodology:** A descriptive retrospective study of 116 infertile patients presenting to the fertility clinic of the University College Hospital, Ibadan, Nigeria from inception on the 14th of February 2019 and 31st of December 2022.Data was analyzed using the Statical Package for Social Sciences (IBM, SPSS, New York) version 23. Descriptive statistics were used to summarize the results which were presented with the aid of bar charts and frequency tables. **Result:** The mean age of the patients was 40.70 ± 6.62 years. Post-menopausal patients accounted for about one-fifth of the study population while 80.2% (93 women) were older than 35 years. The mean duration of infertility was 9.39 ± 6.11years and nine patients (7.8%) had a duration greater than 2 decades. Secondary infertility occurred in 67.2% of the women. Twenty-nine women (25%) had undergone myomectomy prior to presentation. Hypertension (11.2%) was the most prevalent comorbidity. Nineteen patients (16.4%) had used contraceptives in the past with the male condom (36.8%)being the most preponderant.

Sixty-seven patients had experienced pregnancy losses before 28 weeks of gestation while just 16 patients (13.8%) had undergone ART, and none was successful. **Conclusion:** Secondary infertility was the prevalent type of infertility and may not be unconnected with the low contraceptive usage and high risk of sexually transmitted infection. Late presentation coupled with a large proportion of post-menopausal clientele suggests delayed health-seeking behavior most probably due to the prohibitive cost of ART. The need to streamline services offered in public fertility clinics is paramount in low-income countries grappling with scarce resources. A pragmatic approach will involve the provision of low-cost ART, while enhancing gamete donation programs through the implementation of gamete sharing policies. This will invariably bridge the unmet need and skewed access to ART in developing countries.

Keywords

1. Introduction

Much of what is known about the epidemiology of involuntary childlessness is based on information obtained from patients seeking care and traditionally has included the type and duration of infertility, sociodemographic characteristics, and co-morbid illnesses which are prognostic of successful treatment outcomes [1]. Infertility, defined as the inability of a couple to conceive after 1 year of regular, unprotected sexual intercourse, is estimated to affect over 180 million persons across the globe [2]. Involuntary childlessness, an important public health matter, is known to affect the emotional wellbeing of patients resulting in significant personal suffering [2] [3]. Infertility occurs in about one in six couples and global trends suggest an increase in the number of couples seeking infertility management [4]. Various factors have accounted for this increment, and these include the deliberate delay in conception for social reasons [4], increasing sperm dysfunction [5], lifestyle changes resulting in obesity and its associated problems [6] and infectious morbidities particularly significant in developing countries [7].

Management of infertility can be achieved using medical methods such as ovulation induction with timed intercourse or via intra-uterine insemination. In some patients, surgical management may be required ranging from tubal surgery to removal of uterine fibroids, excision of endometriotic deposits and adhesiolysis. The introduction of assisted reproductive technology (ART)over 4 decades ago opened a new vista of hope and opportunity for couples considered helpless. It is estimated that over 1.5 million cycles of in-vitro-fertilization (IVF) cycles are performed annually worldwide, the majority noted to occur in developed countries [8]. There is an unmet need for equitable access to ART and this is more profound in low-income countries where a high premium on childbirth exists [9]. Addressing this will involve prioritizing care in resource-constrained

countries where cost-effective and culturally acceptable fertility care is provided. Global estimates suggest that about 50% of women who suffer from infertility seek medical assistance [10] [11], this finding may, however, be much higher in developing countries.

There has been a gradual increase in the deployment of advanced fertility management in many developing countries. Most of these centers are privately owned and located in urban areas not readily available to those who cannot afford treatment [12]. Few public in-vitro-fertilization clinics exist in Nigeria, and in response to this shortage, the IVF clinic of the University College Hospital, Ibadan was established on the 14th of February 2019 to cater to the needs of patients unable to afford treatment at private fertility clinics across the country. An overview of the characteristics of infertile clientele presenting to a public in-vitro-fertilization clinic is important in evaluating both medical and socio-cultural factors influencing care which is necessary for the prioritization of limited resources. This overview inadvertently provides an opportunity to audit clinical presentations, peculiarities and associated comorbidities that may influence the preponderant management options in a resource constraint environment.

2. Methodology

A descriptive retrospective study of all infertile patients presenting to the in-vitro-fertilization clinic of the University College Hospital, Ibadan between 14th of February 2019 and 31st of December 2022. One hundred and sixteen patients (116) were registered at the fertility clinic and had undergone an initial consultation and assessment for assisted reproduction. Information extracted from the case records included sociodemographic, gynaecological, obstetric, and past medical histories alongside previous infertility management. Data was analyzed using the Statistical Package for Social Sciences (IBM, SPSS, New York) version 23. Descriptive statistics were used to summarize the results which were presented with the aid of bar charts and frequency tables.

3. Results

Sociodemographic details (Table 1)

One hundred and sixteen case files were available for review. The mean age was 40.70 ± 6.62 years with a range of 26 - 63 years. Seventy-eight patients (67.2%) had tertiary education, while 94 (81%) and 101 (87.1%) were Christians and of Yoruba ethnicity respectively. Polygamy was practiced by 6 patients (5.2%) with a maximum of 2 past relationships. Notably, thirty-three women (28.4%) were single and were never married.

Gynaecological history (Table 2)

The mean age of menarche amongst the study population was 13.58 ± 1.79 years. Post-menopausal patients accounted for about one-fifth of the study population (20.7%), while the mean duration of infertility was 9.39 ± 6.11 years. Nine patients (7.8%) had a duration of infertility greater than 2 decades. Majori-

ty (95.7%) of the patients had a current or past menstrual period lasting between 2 - 5 days. Thirteen women (11.2%) had experienced dysmenorrhea while only 5 women (4.3%) volunteered a history of menorrhagia. Just over a third of the patients (36.2%) had cycle lengths greater than 30 days. Nineteen patients (16.4%) had used contraceptives in the past and the male condom and combined oral contraceptive pills (COCP) were the most frequently used methods accounting for 36.8% and 21.1% respectively.

Obstetric history (Table 2)

Seventy-eight patients (67.2%) had been previously pregnant, and out of these patients, 23 (29.5%) volunteered to have been pregnant once while 13 (16.7%) had been pregnant more than three times. Sixty-seven patients, however, had experienced pregnancy losses before 28 weeks of gestation, while 3 patients had pregnancy losses after 28 weeks. Eight live births were reported amongst this cohort of infertile patients.

Past medical history (Figure 1)

Twenty-nine women (25%) had undergone surgery for the removal of uterine fibroids (myomectomy) and about a quarter of these women (24.1%) had undergone myomectomy more than once. Ten women (8.6%) had undergone a caesarean section in their previous pregnancy. Hypertension, peptic ulcer, diabetes mellitus and asthma were being managed by 11.2%, 5.2%, 1.7% and 0.9% respectively.

Previous assisted reproductive technology treatment (Figure 2)

Sixteen patients (13.8%) had attempted in-vitro-fertilization in the past while a vast majority (86.2%) had never attempted IVF. Most (68.8%) of those who had attempted IVF had just one attempt while one patient (6.3%) had attempted thrice. There was no successful IVF cycle amongst the study population.

Table 1. Sociodemographic characteristics of infertile clientele.

Variable	Frequency (116)	Percent (%)
Age (Years)		
26 - 30	7	6.0
31 - 35	16	13.8
36 - 40	38	32.8
>40	55	47.4
Mean ± SD	40.70 ± 6.62	
Educational status		
None/primary	12	10.4
Secondary	26	22.4
Tertiary	78	67.2
Religion		
Christianity	94	81.0
Islam	22	19.0
Tribe		
Yoruba	101	87.1
Igbo	13	11.2
Hausa	2	1.7
Others	0	0.0

Continued

Age at menarche (years)		
10 - 15	98	
>15	18	84.5
Mean ± SD	13.58 ± 1.79	15.5
Number of previous marital relationships		
0	33	28.4
1	77	66.4
2	5	4.3
3	1	0.9

Table 2. Obstetric &Gynaecological characteristics of infertile clientele.

Variable	Frequency (116)	Percent (%)
Duration of infertility(years)		
1 - 5	37	31.9
6 - 10	34	29.3
11 - 15	25	21.6
16 - 20	11	9.5
>20	9	7.8
Mean ± SD	9.39 ± 6.11	
Still menstruating?		
Yes	92	79.3
No	24	20.7
Period regular?		
Yes	68	58.6
No	48	41.4
Length of period flow		
2	4	3.4
3	42	36.2
4	27	23.3
5	38	32.8
>5	5	4.3
Length of menstrual cycle (days)		
20 - 24	12	10.3
25 - 29	62	53.4
≥30	42	36.2
Any Dysmenorrhea?		
Yes	13	11.2
No	103	88.8
Any Menorrhagia?		
Yes	5	4.3
No	111	95.7
History of contraceptive use		
Yes	19	16.4
No	97	83.6
Name of contraceptive		
Barrier	2	10.5
COCP	4	21.1
Male condom	7	36.8
Injectable	1	5.3

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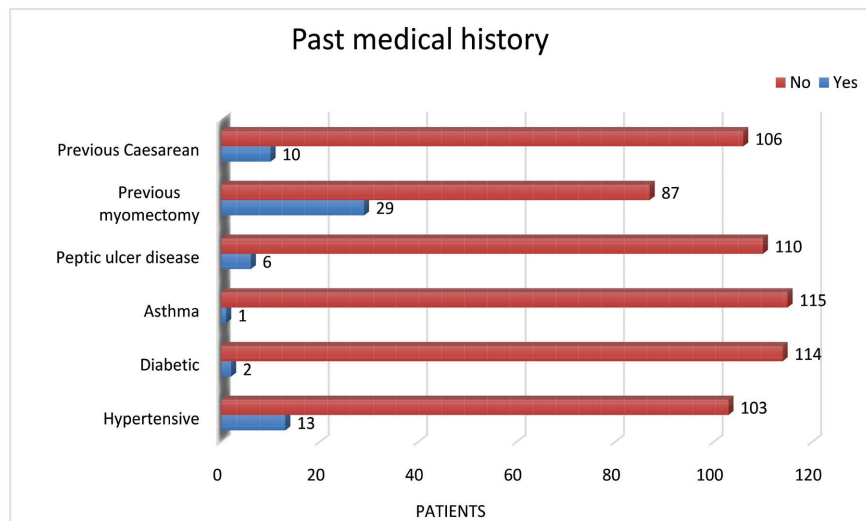|		
OCP	2	10.5
Emergency contraceptive	3	15.8
Ever been pregnant? (n = 116)		
Yes	78	67.2
No	38	32.8
Previous pregnancies (n = 78)		
Once	23	29.5
Twice	29	37.2
Thrice	13	16.7
>Thrice	13	16.7
Pregnancy Outcome (n = 78)		
Pregnancy losses before 28	67	85.9
Pregnancy losses after 28	3	3.8
Live birth	8	10.3

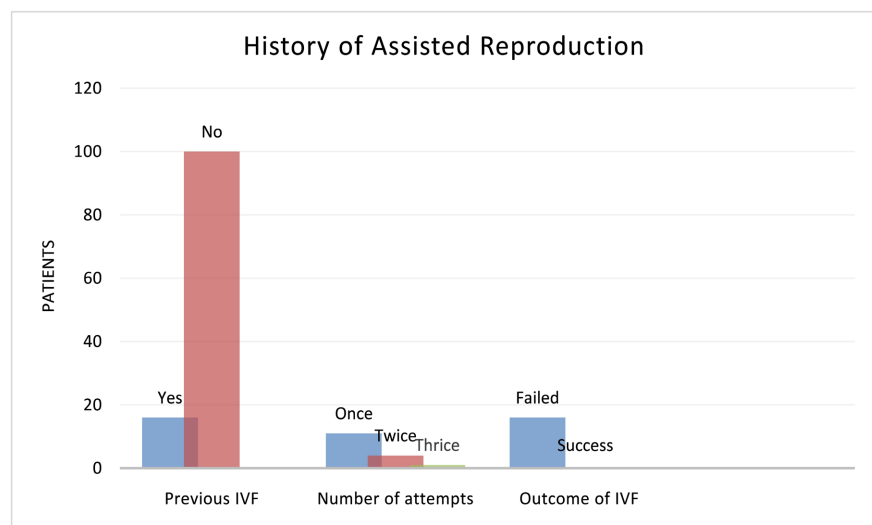**Figure 1.** Past medical history of infertile clientele.

Figure 2. History of assisted reproduction.

4. Discussion

Infertility, as defined by the World Health Organization, refers to the inability of a couple to achieve conception after 12 months of regular, unprotected sexual intercourse [13]. Involuntary childlessness is a multidimensional stressor often associated with anxiety, depression, and dysfunctional sexual relationships [14] [15]. Infertility is estimated to affect 10 - 15% of couples with a preponderance of the secondary type [15]. In this study, secondary infertility occurred in 67.2% of the clientele and can be attributed to the high prevalence of tubal diseases in low-income countries [16]. This finding may result from low contraceptive uptake coupled with high prevalence of poorly treated sexually transmitted infections (STI), a common occurrence in many developing countries. In this study, contraceptive uptake was low as only nineteen patients (16.4%) had ever used any form of contraception. Comorbidities were expectedly few as most women in this study were in the middle age. Hypertension (11.2%), however, was the most prevalent comorbidity.

One striking characteristic of this infertile clientele was delayed or late presentation. Four out of five clientele (80.2%) were older than 35 years. The mean duration of infertility amongst our clientele was9.39±6.11years and nine women (7.8%) had waited for over 2 decades before seeking advanced fertility care. The impact of ageing on the ovaries has long been documented and oocyte quality and number begin to decline rapidly at about the fourth decade of life [17] [18]. The pattern of oocyte depletion (quantity & quality) with respect to timing and mechanism is currently incompletely understood [18] and ongoing research suggests a multiplicity of factors, especially ovarian ageing. Fifty-five women (47.4%) in this study were older than forty years.

The implication of a preponderance of older infertile clientele attending a public fertility clinic in a low-income country is the need for a robust oocyte donation program that is affordable and cost-effective. Oocyte donation was initially introduced for the treatment of premature ovarian failure, however over the years, it has gained popularity in the management of age-related decline in ovarian reserve [19]. Donor oocyte IVF treatment (recipient cycle) is expensive because of the extra costs involved in third party recruitment, investigation, oocyte stimulation and donor compensation. In many developing countries where poverty is endemic, there exists the risk of commercialization of gametes and exploitation of donors due to ignorance, poverty, and ineffective regulations [20]. Furthermore, altruistic donors are a rarity in low-income countries and gamete donation programs are fueled by poverty and oftentimes greed.

A pragmatic approach is important in the delivery of effective fertility management in low-income countries. A hub-and-spoke model of service delivery has been suggested as a sustainable means in low-income countries [20]. This approach involves establishing ART hubs in major cities equipped with facilities for oocyte aspiration and embryo development. These hubs collaborate with spokes (peripheral centres) which essentially function as centres where patient

evaluation and oocyte stimulation take place during in-vitro-fertilization cycles. This system allows for synergy and sharing of responsibilities, thereby decreasing the financial burden across board [20]. A further suggestion aimed at enhancing gamete donation programs in low-income countries will entail the deployment of oocyte sharing protocols where more than one patient pays for the stimulation of a single oocyte donor and subsequent oocytes retrieved at aspiration are equally distributed amongst the recipients. This will inadvertently decrease the cost-per-head for treatment. The drawback here, especially in small populations, is the risk of consanguinity. Interestingly, sixteen patients (13.8%) had undergone IVF cycles in the past and none was successful. IVF success is premised on several factors including the age of the patient, quality of the embryos, uterine factors especially endometrial response and concomitant male factors [21] [22]. This study is limited by the relatively small study population and perhaps some of its findings may not be readily generalizable. However, it provides a window of opportunity to critically appraise service delivery in low-income countries with the aim of prioritizing limited resources in favour of the most exigent option of care.

5. Conclusion

A pragmatic and sustainable approach is needed in public fertility centres in low-income countries where much older clientele present for ART. The quest to ensure equity in access to advanced fertility management presents the challenge of funding for the majority who cannot afford care and are largely uninsured. The hub-and-spoke model of care is an important initial starting point, however, implementing a policy of oocyte sharing will decrease the cost-per-head for each recipient. Resource constraint is an important limitation to ART uptake in low-income countries and long-term interventions to bridge this unmet need will include a broader and more inclusive insurance policy coupled with the provision of low-cost ART services.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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