Journal of Advances in Medicine and Medical Research

33(3): 145-152, 2021; Article no.JAMMR.66213
ISSN: 2456-8899
(Past name: British Journal of Medicine and Medical Research, Past ISSN: 2231-0614, NLM ID: 101570965)

Infertility and Its Associated Factors among Women Attending Selected Health Facilities in Boripe Local Government Osun State

Abayomi Olarinmoye[1], Olayinka Ajao[2], Olanrewaju Davies Eniade[3*], Chinonso Esther Ekwonwa[1], Yusuff Akinkunmi Olasunkanmi[3] and Ugushida Ogenma[1]

[1]Department of Public Health, Adeleke University, Ede, Osun State, Nigeria.
[2]Department of Nursing, Osun State University, Osogbo, Osun State, Nigeria.
[3]Department of Epidemiology and Medical Statistics, University of Ibadan, Oyo State, Nigeria.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMMR/2021/v33i330827
Editor(s):
(1) Dr. Sevgul Donmez, Mugla Sitki Kocman University, Turkey.
Reviewers:
(1) Ali ihsan Anadolulu, Mehmet Akif İnan Research and Training Hospital, Turkey.
(2) Erhan Hüseyin Cömert, Ministry of Health, Turkey.
Complete Peer review History: http://www.sdiarticle4.com/review-history/66213

Original Research Article

Received 20 December 2020
Accepted 23 February 2021
Published 05 March 2021

ABSTRACT

The extent to which women of reproductive age (15-49 years) experience infertility have not been fully explored in developing countries including Nigeria. Assessing the factors associated with infertility among infertile women can inform interventions to support their needs. This study was conducted to investigate the risk-factors of infertility among women in Boripe local government area (BLGA) of Osun State.

A matched case-control study was conducted among infertile women attending the infertility clinic and fertile women attending ante-natal clinic in three health facilities namely: Ada health facility, Isale Oyo health facility and MDGs Oloti health facility in Boripe local government area in Osun state, Nigeria. Cases (n=135) were gotten from the infertility clinic across the three study facilities and controls (n=135) were the pregnant women attending the antenatal clinic in the three health facilities.

**Corresponding author: E-mail: eniadetreasure@gmail.com;*

Mean age was 29 ± 6.7 years, ranging from 16 to 47 years. Higher proportion of the infertile women (72.6%) had primary infertility, and a lot (35.9%) were not on treatment. Associated factors were partners' age (p=0.007), income (p=0.067), age at menstrual debut (p=0.049), mental wellbeing (p=0.006). Factors associated with the likelihood of infertility were age at menstrual debut (>=15 years) (OR: 2.69, 95%CI: 1.07-6.75) in relative to age at menstrual debut (< 15 years).
This study revealed a high prevalence of primary infertility, income, dietary habit and age at menstrual debut were associated with the likelihood of infertility. Much attention towards improving knowledge about factors influencing infertility such as dietary habit and early treatment for teenagers who have late menstrual debut will be helpful in reducing burden of infertility. Also, this study revealed that majority of the infertile women was not on treatments. This suggests that, it is likely that most of them were not seeing a pregnancy counselor. The role of pregnancy counseling on infertility should be appropriately explored in further studies.

Keywords: Infertility among women; pregnancy; menstrual debut; infertility treatments.

1. INTRODUCTION

Globally, infertility among women below 60 years of age has been identified as a serious public health problem. It was ranked as the 5th highest serious global disability as the prevalence ranges from about 6% to more than 16% across nations of the world [1].

Infertility is a common cause of psychological distress, divorce and social stigma in Nigeria [2,3]. Infertility was clinically defined as "a reproductive health disease and it is defined as the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse". Infertility could be regarded as primary infertility if a woman is unable to ever bear a child, either due to inability to become pregnant or the inability to carry a pregnancy to a live birth" this includes women who had miscarriage, whose pregnancy results in a still birth and have never given birth to a child, while secondary infertility referred to women who have had at least one pregnancy and live birth previously [1].

A systematic analysis of national health surveys showed that at least 50 million couples worldwide experienced infertility [4]. In developing countries, undesirable childlessness creates more weighty problem when compared with western societies and it has important implications for couples in the socio-cultural settings of every society, and it is therefore a problem of public health concern globally [5,1].

Levels of infertility (primary and secondary) has witnessed little change in most world region but remained unchanged in sub-Saharan Africa [6].

Nigeria has over 193 million people as at the beginning of 2018. Yet, the prevalence of infertility ranged from 20-25 percent among couples across Nigeria. Many of the women have tried achieving their dreams of child bearing with different fertility-boost methods but proved abortive. Several medical institutions have reported diverse statistics, spanning up to 45 percent of all female consultations at clinics are infertility issue but there are dearth of information on Osun state, Nigeria.

Osun state is an inland state in south-west region of Nigeria, that shares boundary with Kwara state in the north, Ekiti state in the east and partly Ondo state, Ogun in the south and Oyo state in the west with a population of over 3 million. The prevalence of infertility from studies conducted by scholars in health facilities was 25 percent [7].

In many cultures, childless women were object of ridicule and they suffer from stigmatization, discrimination and ostracism. Infertility has led to several divorces. It is also the root cause of polygamy. However, low attention has been given to reproductive health in developing countries, also unequal and unaffordable access to assisted reproductive techniques such as "In-vitro fertilization" remained defiance for low-income countries, especially in sub-Saharan Africa including Nigeria [4,8].

Scholars have conducted studies on infertility in several states of Nigeria but there are still paucity of information on pattern of infertility and its risk factors in Osun state, Nigeria.

2. METHODS

In this study, women within the child-bearing age (18-49 years) who were married/ cohabiting and exposed to sexual intercourse for at least one year and not using any form of contraceptive

were recruited as cases while pregnant women attending the antenatal clinic were recruited as controls.

Presented infertile women across the three health facilities were just 140 which lead to decision of sampling all. But only 135 infertile women gave consent to participate in the study. Total samples of 270 women were recruited for the study. Infertile women who gave consent to participate were 135 and a total sample of 135 pregnant women were randomly recruited from the antenatal clinic for the control arm in other to have equal samples for the cases and the controls. The inclusion criteria for the cases include exposure to unprotected sexual intercourse and inability to give birth. While the inclusion criteria for the controls were ability to give birth and current attendance of antenatal care in the three healthcare clinics.

A matched case-control study design was conducted among infertile women attending the infertility clinic and fertile women attending antenatal clinic in three health facilities namely: "Ada health facility", "Isale-oyo health facility" and "MDGs Oloti" health facility in Boripe local government area in Osun state, Nigeria.

Retrospective data was collected over a period of two weeks (June 2, 2020 to June 18, 2020). Cases (infertile participants) were gotten from the infertility clinics across the three study facilities and control were the pregnant women attending the antenatal clinic in the three health facilities. Infertile women presented at the facilities and gave consent at the three infertility clinics were included in the study. A random selection of women attending the antenatal clinic was done to select 135 participants for the control arm. A structured pre-tested questionnaire on Infertility was used. Demographic and socio-economic characteristics such as age, residential type, educational level, religion, ethnicity, occupation, income, partner's age and occupation were explored. Infertility treatments and mental well-being, participants were asked if they have; tested for ovulation, treated infertility before, the treatments taken, if husband has ever fathered a child, as well as stress and emotional problem they encountered as a result of infertility

2.1 Data Collection

Data was collected electronically using kobo tool-box [9]. Demographic information such as age, occupation, educational level, age at marriage and age at first menarche, Socio-economic, gynecological, family history of infertility, medical history including diabetes mellitus, hypertension and thyroid diseases, surgical history and others.

2.2 Data Analysis

Collected data were exported from Kobo toolbox into and excel work sheet after which was exported into Statistical package for social sciences (SPSS) version 25 [10] in a password protected computer to ensure confidentiality of the sensitive information.

To answer objective one (to determine the proportion of Primary and secondary infertility): Frequencies and percentage distribution were generated to present the pattern of infertility among the women.

To answer objective two (to describe the pattern of infertility across the age groups of women): Cross tabulation was done to unveil the pattern of infertility across age group.

To achieve the third objective, Chi-square test of independence was carried out on the outcome variable (infertility) and all other co-variates. Factors that were significant at 10% level of significance were included in the binary logistic regression [11] to examine the risk factors of female infertility. $P < 0.05$ was significant at 5% level of significance.

3. RESULTS

The mean age of respondents was 29 ± 6.7 years ranging from 16 to 47 years. Higher proportion of the infertile women (72.6%) had primary infertility. The frequency distribution of the socio-economic and demographic characteristics of the respondents was presented in Table 1. About 32% of the women were between the age group of 16 – 24 years and 46.7% were between the age group of 25 – 34years. Also partner's age distribution was 10.2% for age group 18 -24years, 28.6% for age group 25 – 34years and age group 35years and older had the highest proportion (51.2%). Among these respondents, 72% live in rural area, 17.8% had no formal education, 19.6% had primary education, and 40.4% had secondary education while 22.2% had higher education. Also, 50.4% of the women were Christians while others were Muslims. Majority (78.9%) were Yorubas. While Igbo and Hausa constituted 5.2% and 12.2% respectively. About 77.3% were into business, trading or farming, this proportion was similar

among their partners (77.9%) and 71.4% of these women earned monthly income less than the current Nigerian minimum wage (67 US dollars).

Concerning the gynecological and infertility history, the frequency and the percentage distributions of the gynecological and infertility history of the 270 eligible women was analyzed and presented in Table 2. About 3.7% of them have had abortion, 22.6% had first menses at age 15 or less, while 42.1% had sexual debut at age less than 18. The mean length of menstrual cycle was 27.7 ±1.8 days. Out of 16.7% who reported the use of contraceptive, 64.4% and 33.3% used hormonal and barrier respectively

Table 1. Demographic and socio-economic characteristics of the respondents

Variables	Frequency (n =270)	Percentage (%)
Infertility		
Case (infertile)	135	50.0
Control (fertile)	135	50.0
Type of Infertility		
Primary infertility	98	72.6
Secondary infertility	37	27.4
Age		
18 -24	85	31.5
25-34	126	46.7
>=35	59	21.9
Partner's age		
15 -24	25	10.2
25-34	95	38.6
>=35	126	51.2
Type of residence		
Rural	175	72.0
Urban	68	28.0
Educational level		
None	48	17.8
Primary	53	19.6
Secondary	109	40.4
Higher	60	22.2
Religion		
Christians	136	50.4
Islam	134	49.6
Ethnicity		
Yoruba	213	78.9
Igbo	14	5.2
Hausa	33	12.2
Others	10	3.7
Are you currently working?		
Yes	154	57.0
No	116	43.0
Occupation		
Civil/ public servant	31	20.1
Trading/Business/ Farming	119	77.3
Housewife /unemployed	4	2.6
Partner occupation		
Civil/ public servant	50	21.6
Trading/Business/ farming	180	77.9
Unemployed	1	0.4
Income		
< minimum wage (30,000)	165	71.4
> Minimum wage (>=30,000)	66	28.6

Table 2. Frequency and percentage distribution of gynecological and infertility history

Variables	Frequency (n)	Percentage (%)
Have you ever had abortion		
No	260	96.3
Yes	10	3.7
Age at first menses		
< =15	48	22.6
>15	164	77.4
Age at first sexual intercourse		
<18	90	42.1
>=18	124	57.9
Length of menstrual cycle Mean (sd)	27.69(1.80)	
contraceptive type		
LARC/Hormonal (hormonal, implant, IUD, pills)	29	64.4
Barrier (Condom, diaphragms)/	15	33.3
Both	1	2.2
If you've ever been on oral contraceptives (pills), were your periods regular after stopping the pills		
No	4	40.0
Yes	6	60.0
Number of sex per week		
1-2	109	42.7
3-4	66	25.9
5-7	80	31.4
Do you time intercourse around ovulation?		
No	149	55.2
Yes	121	44.8
Do you have bleeding during or after intercourse?		
No	259	95.9
Yes	10	3.7
Did your mother have any difficulty with conception or pregnancy?		
Yes	11	4.3
No	245	95.7
Did your mother take diethylstilbestrol (DES) when she was carrying you in the womb?		
Yes	10	3.8
No	250	96.2

while 2.2% had used both. Only 10 women reported uptake of oral contraceptive (pills). About 40% experienced irregular period after discontinuing the pills. Close to half of these women (42.4%) had sexual intercourse up to two times in a week, while 31.4% sexual intercourse more than five times per week. Of the study samples 44.8% timed their sexual intercourse around ovulation period and 3.7% reported bleeding during or after sexual intercourse. The proportion of women whose mother had difficulty with conception was 4.3% and 3.8% reported that their mother had used diethylstilbestrol when they were in the womb.

3.1 Factors Independently Associated with Infertility

About 60% who previously had abortion were infertile (p=0.749). Also, 62.5% of women who had their first menses at age 15 or less had infertility problem (p=0.049), 54.5% of those who timed their intercourse around ovulation were nulliparous (p=0.178). Majority (97.6%) of those who had mild/moderate stress (p=0.760) were infertile. Further, Anxiety/sadness was higher (95.7%) among infertile women (p=0.760). In furtherance, all women (100%) who had low wellbeing score were infertile (p=0.006).

3.2 Risk Factors of Infertility among Women in Boripe Local Government, Osun State, Nigeria

The adjusted Model from the binary logistic regression showed the factors independently associated with infertility while controlling for partner's age, income, dietary habit, age at menarche and mental wellbeing. Partner's age 25-34 years (OR: 3.53, 95%CI: 1.1 – 11.32)

relative to age less than 25 years, age at first menstruation >=15 years (OR: 2.69, 95%CI: 1.07-6.75) relative age at first menstruation < 15 years were associated with the likelihood of infertility. Also, mental wellbeing above average (OR: 7.76, 95%CI: 1.5- 4-.05) in relative to wellbeing below was associated with the likelihood of infertility. In furtherance, Income less than minimum wage (OR: 1.68, 95%CI: 0.62-4.6) compared to income >=minimum wage and dietary habit (OR: 7.37, 95%CI: 0.61-89.01) compared to no-dietary habit showed a likelihood of association with infertility.

4. DISCUSSION

In this study, we documented the socio-demographic characteristics, medical history, lifestyle, gynecological and treatment factors influencing infertility among women in Boripe Local government, Osun state, Nigeria. We found out that Primary infertility was obviously high among the infertile women. Most of them were married and exposed to unprotected sexual intercourse of not less than once in a week. Also, we discovered that majority of the infertile women had partners who were older than age 35 years. This shows that infertility was common among women who have older partner. Previous study conducted in south-west Nigeria on infertility revealed lower prevalence of primary infertility [12,13,14]. A deep look at the demographic and socio-economic characteristics of the infertile women showed that infertility was common among women living in the urban area, earning more than minimum wage, menarche at age >=15 and those below average well-being. This study unveiled some factors that were independently associated with infertility which includes Partner's age 25-34 years, age menstrual debut >=15, low mental wellbeing. These findings are in line with other studies in

Table 3. Pregnancy related characteristics by infertility

Variables	Infertility		Total	Test statistics	P value
	Yes	No			
Have you ever had abortion					
No	129(49.6)	131(50.4)	260(100)	0.415	0.749
Yes	6(60.0)	4(40.0)	10(100)		
age 1st sex					
<=18	41(45.6)	49(54.4)	90(100)	1.5	0.221
>18	67(54.0)	57(46.0)	124(100)		
Age at first menses					
<15	30(62.5)	18(37.5)	48(100)	3.88	0.049*
>=15	76(46.3)	88(53.7)	164(100)		
Contraceptive type					
LARC/Hormonal (hormonal, implant, IUD, pills)	13(44.8)	16(55.2)	29(100)	1.32	0.504
Barrier (Condom, diaphragms)/	6(40.0)	9(60.0)	15(100)		
Both	1(100)	0	1(100)		
Number of sex per week					
1-2	47(43.1)	62(56.9)	109(100)	3.24	0.191
3-4	31(47.0)	35(53.0)	66(100)		
5-7	45(56.3)	35(43.8)	80(100)		
Do you time intercourse around ovulation?					
Yes	66(54.5)	55(45.5)	121(100)	1.81	0.178
No	69(46.3)	80(53.7)	149(100)		
Do you have bleeding during or after intercourse?					
Yes	4(40.0)	6(60.0)	10(100)	0.4	0.527
No	130(50.2)	129(49.8)	259(100)		
Did your mother have any difficulty with conception or pregnancy?				0.22	0.64
Yes	6(54.5)	5(45.5)	11(100)		
No	116(47.3)	129(52.7)	245(100)		
Did your mother take diethylstilbestrol (DES) when she was carrying you in the womb?					
Yes	4(40.0)	6(60.0)	10(100)	0.52	0.472
No	129(51.6)	121(48.4)	250(100)		

Table 4. Risk factors of Infertility

	AOR	Test statistics	p value	95%CI	
Variables				**Lower**	**Upper**
Partner age					
15 -24	ref				
25-34	3.53	2.12	0.034**	1.1	11.32
>=35	1.52	0.66	0.509	0.44	5.21
Income					
< minimum wage (30,000)	1.68	1.01	0.311	0.62	4.6
> Minimum wage (>=30,000)	ref				
Any dietary habit?					
Yes	ref				
No	7.37	1.57	0.116*	0.61	89.01
Age at first menses					
<15					
>=15	2.69	1.26	0.035**	1.07	6.75
Wellbeing					
Low					
below average (32-38)	ref				
Average (40-58)	1.61	0.55	0.584	0.29	8.85
Above average (59-70)	7.76	2.45	0.014**	1.5	40.05

** (p<0.1); ** (p<0.05)*

Nigeria and countries beyond. The fact that late menarche was associated with infertility is not surprising as authors have revealed that age at menstrual debut is a risk for infertility [15]. Also, low mental wellbeing is not strange among infertile women, literatures have explained that women with infertility have higher rates of psychiatric disorders than the general population [16]. The low infertility treatments uptake revealed in this study suggests that it is likely that most of them were not seeing a pregnancy counselor. Studies have showed the importance of counseling in improving treatment uptake and combating infertility [17]. Other factors such as medical history, life style, age at first sex, contraceptive use, frequency of sexual intercourse, timing of sexual intercourse around ovulation family history of infertility were not statistically significant with infertility. Previous studies in southwest Nigeria revealed a contrary findings that alcohol use, history of sexually transmitted infections (STI), presence of fibroids, having had fibroid operation, previous abortion, and post abortion sepsis were associated with risk of infertility [13,14]. This statistical insignificance could be due to in adequate sample size for this analysis.

5. CONCLUSION

Infertility is a global problem that has serious effect on population structure and a common cause of psychological distress. It is the root cause of social stigma, discrimination, emotional imbalance, psychological disorder and ostracism, divorce and polygamy. Income, dietary habit, menstrual debut were associated with the likelihood of infertility. Unseemingly, age at first sex, previous use of contraceptive use were not found to be associated with infertility. Attention should be geared towards improving factors associated with infertility such as dietary habit and early treatment for teenagers who have late menstrual debut will be helpful in reducing burden of infertility. Also, this study revealed that majority of the infertile women was not on treatments. This suggests that, it is likely that most of them were not seeing a pregnancy counselor. The role of pregnancy counseling on infertility should be appropriately explored in further studies.

CONSENT AND ETHICAL APPROVAL

Ethical approval for this study was obtained from the Adeleke University review board (AURB). Participant gave informed consent to participate in the study; they were fully informed about their freedom to withdraw from the study at any point. Every tenet of Helsinki declaration and other ethical requirements were adhered with in this study. No personal identifying information was collected from the participants and study questionnaires were accessible to only investigators and authorized research staff. Hence, the confidentiality and anonymity of the

respondents are guaranteed. Informed consent was obtained from all the participants in both arms of the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Organization W.H. Infertility definitions and terminology. World Health Organization; 2016.
2. Naab F, Lawali Y, Donkor ES. "My mother in-law forced my husband to divorce me": Experiences of women with infertility in Zamfara State of Nigeria. PloS One; 2019;14(12):0225149.
3. Souter VL, Hopton JL, Penney G, Templeton A. Survey of psychological health in women with infertility. Journal of Psychosomatic Obstetrics & Gynecology. 2002;23(1):41-49.
4. Hodin S. The burden of infertility: Global prevalence and women's voices from around the world; 2017.
5. Ombelet W, Cooke I, Dyer S, Serour G, Devroey P. Infertility and the provision of infertility medical services in developing countries. Human reproduction update. 2008;14(6):605-621.
6. Mascarenhas M, Flaxman S, Boerma T, Vanderpoel S. National, regional, and global trends in infertility 1990: A systematic analysis of 277 prevalence since health surveys [Digital Source]. PLoS Med. 2012;9(12).
7. Erigbali P, Eruom L. Prevalence of infertility in women in a Southwestern Nigerian Community. African Journal of Biomedical Research. 2010;11.
   DOI: 10.4314/ajbr.v11i2.50716
8. Leke RJ, Goyaux N, Matsuda T, Thonneau PF. Ectopic pregnancy in Africa: A population-based study. Obstet Gynecol. 2004;103(4):692-697.
   DOI:10.1097/01.AOG.0000120146.48098.f2
9. Initiative HH. KoBoToolbox. Cambridge: Harvard Humanitarian Initiative; 2019.
10. SPSS I. IBM statistical package for social services (Version 25). Seattle, WA: IBM; 2018.
11. Pearce LD, Brauner-Otto SR, Ji Y. Explaining religious differentials in family-size preference: Evidence from Nepal in 1996. Population Studies. 2015;69(1): 23-37.
    DOI: 10.1080/00324728.2014.995695
12. Benksim A, Elkhoudri N, Addi RA, Baali A, Cherkaoui M. Difference between primary and secondary infertility in Morocco: Frequencies and associated factors. International Journal of Fertility & Sterility. 2018;12(2):142.
13. Emmanuel MO, Olamijulo JA, Ekanem EE. Risk factors associated with secondary infertility in women of childbearing age: A matched case–control study. Tropical Journal of Obstetrics and Gynaecology. 2018;35(3):249-255.
14. Irinyenikan T. Risk factors for female infertility at a tertiary health facility in Akure, South-West Nigeria. International Journal of Medicine and Medical Research. 2019;5(2): 61-68.
15. Kalima-Munalula M, Ahmed Y, Vwalika B. Factors associated with infertility among women attending the gynaecology clinic at University Teaching Hospital, Lusaka, Zambia. Medical Journal of Zambia. 2017;44(1):41-44.
16. Hanson B, Johnstone E, Dorais J, Silver B, Peterson CM, Hotaling J. Female infertility, infertility-associated diagnoses, and comorbidities: a review. Journal of Assisted Reproduction and Genetics. 2017;34(2):167-177.
17. Boivin J, Gameiro S. Evolution of psychology and counseling in infertility. Fertility and Sterility. 2015;104(2):251-259.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/66213