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Perceptions of Infertility and *In Vitro* Fertilization Treatment among Married Couples in Anambra State, Nigeria

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Abstract

There is a high rate of infertility among couples in Nigeria. This challenge is perceived differently in each socio-cultural context in which it is experienced but solution to the problem is adversely affected by the people's perception of the phenomenon. This study thus explored the perceptions of infertility and *in vitro* fertilization (IVF) and how to enhance the use of IVF treatment among married couples. This was a cross-sectional survey in Anambra State, Nigeria involving household respondents (married couples) and hospital respondents (couples undergoing infertility evaluation). Structured questionnaire and key informant interview (KII) guide were used for data collection. Altogether 600 questionnaires were administered and 589 were validly completed and analysed. The main outcome measures included perceptions of infertility and IVF treatment, utilization of IVF treatment and association between some demographic variables and IVF utilization. The results showed that infertility was perceived majorly as - destiny/supernatural powers (17.1%), threat to men's procreativity/continuity of lineage (14.3%), women's problem only (15.6%). Solutions to the challenges were adversely affected by perception. The use of IVF treatment was low with misconceptions like it's too costly (15.4%) and unnatural (7.6%), giving rise to unmet need for assisted reproductive technology. Women (especially above 35 years) were more likely to accept IVF treatment than men. Reproductive health education and awareness creation should target the misconceptions about infertility/IVF and fertility treatment should be covered by national health insurance to reduce the cost of IVF treatment and improve its use in Anambra State. *(Afr J Reprod Health 2017; 21[4]:55-66).*

Keywords: Married couples, Infertility, *In vitro* fertilization, Perception, Anambra State, Nigeria

Résumé

Il y a un taux élevé de stértilité parmi les couples au Nigéria. Ce défi est perçu différemment dans chaque contexte socioculturel dans lequel il est vécu, mais la perception du phénomène par les gens nuit à la solution du problème. Cette étude a donc exploré les perceptions de la stérilité et de la fécondation in vitro (FIV) et comment améliorer l'utilisation de la FIV chez les couples mariés. Il s'agissait d'une enquête transversale menée dans l'État d'Anambra, au Nigéria, auprès de ménages interrogés (couples mariés) et d'hôpitaux (couples subissant une évaluation de la stérilité). Un questionnaire structuré et un guide d'entretiens avec des informateurs clés (EIC) ont été utilisés pour la collecte de données. Au total, 600 questionnaires ont été administrés et 589 ont été valablement complétés et analysés. Les principales mesures des résultats comprenaient la perception de l'infertilité et le traitement par FIV, l'utilisation du traitement par FIV et l'association entre certaines variables démographiques et l'utilisation de la FIV. Les résultats ont montré que la stérilité était perçue majoritairement comme - destinée / pouvoirs surnaturels (17,1%), menace pour la procréation chez des hommes / continuité de la lignée (14,3%), problème des femmes seulement (15,6%). Les solutions aux défis ont été négativement affectées par la perception. L'utilisation du traitement de FIV était faible avec des idées fausses telles que le coût excessif (15,4%) et non naturel (7,6%), ce qui donne lieu à un besoin non satisfait de technologie de reproduction assistée. Les femmes (surtout au-dessus de 35 ans) étaient plus susceptibles d'accepter un traitement de FIV que les hommes. L'éducation et la sensibilisation en matière de la santé de la reproduction devraient cibler les idées fausses sur la stérilité / FIV et le traitement de fertilité devrait être couvert par l'assurance maladie nationale pour réduire le coût du traitement FIV et améliorer son utilisation dans l'État d'Anambra. *(Afr J Reprod Health 2017; 21[4]: 55-66).*

Mots-clés: Couples mariés, Infertilité, Fécondation in vitro, Perception, État d'Anambra, Nigéria

Introduction

Nigeria has high rates of primary and secondary infertility[1]. The results of the Demographic and Health Survey of Nigeria[2], indicate that approximately 4% of women aged 30 years and above have never given birth to a child. Nigerian gynaecologists frequently report that infertility cases constitute between 50 and 70% of their consultations in tertiary health institutions[3-7]. Infertility is perceived

as a disease of the reproductive system that affects individuals and groups[8]. It is medically defined as the inability to achieve a pregnancy after a year or more of regular unprotected sexual intercourse[9]. In fact, "Infertility belts" has been described in sub-Saharan African countries (SSA) where about 20-35 million couples are affected by the inability to give birth to a child[10,11].

Medical advances have shown that most cases of infertility are treatable. All kinds of assisted reproductive technologies (ART) have been introduced to eliminate infertility problems. ART options include: *intrauterine insemination* (IUI), *in-vitro fertilization* (IVF), *gamete intra fallopian transfer* (GIFT), *intracytoplasmic sperm injection* (ICSI)[12]. These are advanced medical techniques that aid conception in women in order to fulfill the personal and societal ideal of having children[13]. IVF has been used safely and effectively for more than two decades for successful treatment of infertility[14]. Since the first IVF baby was born in 1978 in England, the number of cycles performed in many developed countries has grown by 5–10% per annum over the past decades[4,15-16]. It is estimated that approximately 3.5 to 5 million children have been born worldwide following ART treatment[17]. There are no accurate figures and proper documentation of success rates in many African countries[18], but in Nigeria, IVF has changed the prospect of thousands of married couples that were unable to have children.

Success rate varies from centre to centre, most importantly according to the patient's age. For women under 30 years of age, the success rate is approaching 60% while for those between 30 to 35 years, the success is about 50%, for those between 35 to 40 years, it is about 40% and over 40 years, it is about 33%[6,19]. According to available statistics based on the performance indicator from various centres across the country, it is estimated that over 40,000 babies have been born through IVF in Nigeria since 1989[4,5,20]. The first IVF birth in sub Saharan Africa was led by the Dapo Ashiru and Giwa-Osagie team on March 17, 1989, at the Lagos University Teaching Hospital (LUTH), Idi-Araba [4,21]. According to Ashiru[21], Nigeria has recorded 40% increase in IVF pregnancy success rate from 10% in the 70s to 50% in the 2010s. The first IVF birth in Anambra state was achieved by Joseph Ikechebelu's team on August 6th, 2011, at Life Specialist Hospital, Nnewi[23-25].
Since the birth of baby Joseph (Anambra state's first IVF birth) in 2011; more than 70 babies have been born through IVF in this centre[26].

Some couples view IVF as a good option, however, many others are hesitant about it because there are a lot of misconceptions about IVF in Nigeria and in Igbo land in particular. IVF is perceived as a new phenomenon shrouded in secrecy and stigma due to social and cultural encumbrances, norms and values about natural process of reproduction, ignorance, and religious sentiments. Also, failure of IVF treatment after paying so much money plays prominent roles in Nigeria, and these are potential factors that may influence the use of IVF in the state. Therefore, the aim of this study was to explore the perceptions of infertility and IVF treatment among married couples in Anambra state, Nigeria.

Theoretical framework

Herbert Blumer's Symbolic Interactionist (SI) Theory which is a variant of the functionalist perspective with emphasis on meaning is adopted for the study to explain human behavior as it relates to perceptions and their influence on the use of *in vitro* fertilization (IVF) amongst married couples in Anambra State. The theory asserts that people act toward things based on the meaning those things have for them; and these meanings are derived from social interaction and modified through interpretation[27]. The theory argues that the meaning of a thing resides in the action that it elicits as well as depends on the degree of consensual responses between two or more people[28]. For example, the meaning of the word infertility depends on the consensual responses of those who use it. If most of those who use it agree, the meaning of a symbol is clear; if consensus is low, the meaning is ambiguous, and communication is problematic[29]. The theory thus, considers children as important symbols in the family and that explains why those without children are often dissatisfied. In studying infertility for instance, SI theorists look at how people in everyday situations perceive infertility, which differs between cultures and settings[30]. Somebody being unable to perform his/her reproductive role can be seen as disease or ill-health, having no children, or having no sons[28]. In other words, reality does not give meaning to things, but rather people must make things meaningful in order to make them socially real. Thus, the meaning of infertility and its treatment modalities arises during the process of interaction.

Methods

This was a cross-sectional survey in Anambra State, Nigeria involving household respondents (married couples) and hospital respondents (patients undergoing infertility evaluation). The study sample included a total of 600 married couples aged 18 years and above who were resident in Anambra state at the time of this study and were selected using the multi-stage sampling technique made up of cluster, simple random sampling and systematic sampling techniques. First, Anambra State was clustered into three Senatorial Districts made up of seven LGAs each, then using the balloting method of simple random sampling technique, two clusters were selected namely Anambra Central and Anambra South. The LGAs in the selected two clusters were numbered and then with the application of the simple random sampling technique, two LGAs were selected namely Awka South from Anambra Central and Nnewi North from Anambra South. The population of Awka South and Nnewi North LGAs - **345,097** were employed as the target population[31]. Then, married couples aged 18 years and above who are resident in Awka South and Nnewi North LGAs with a total population of **190,370** representing 55% of the target population were used as the study participants[31]. The sample size was statistically estimated and generated using the population proportion formula as follows:

$$n=\frac{Z^2(PQ)}{e^2}$$

where:
n= sample size
Z= confidence level (95% or 1.96%)
P= population proportion (or its estimate 55%)
Q= compliment of P
e= level of precision (0.04^2)
Therefore, the sample size is calculated thus:

$$n=\frac{1.96^2\,(.55)(.45)}{0.04^2}$$

n= 594.18

This figure was rounded up to six hundred (600).

Ten participants were interviewed using Key Informant Interview (KII) guide. They were purposively selected and include 2 medical practitioners (involved in IVF treatment), 4 women who had IVF treatment in the past and 4 who have not used IVF treatment.

The 600 participants were selected from the household and hospital participants as follows. The communities in Awka South and Nnewi North, were numbered and by simple random sampling, one community was selected from each namely Awka town in Awka South LGA and Umudim in Nnewi North LGA. Then the villages/streets in the 2 selected communities were numbered and by simple random sampling one village was selected from each of the two communities namely: Obunagu in Awka and Umuele, in Umudim Nnewi. Finally, households in the selected village/street were numbered and the systematic sampling technique was employed to select every k^{th} household in the sampling frame from which a couple was selected as a respondent for the study. The sequence continued until a total of three hundred (300) respondents were drawn from the communities. Households without married couples aged 18years and above were skipped.

Specifically, in Nnewi North LGA, Life Specialist Hospital Ltd Nnewi was purposively chosen (the only hospital offering IVF treatment in Anambra state at the time of the study) to administer the questionnaires to three hundred (300) married couples seeking fertility treatment in the hospital using availability sampling technique.

Data were collected using the pre-tested questionnaire and the key informant interview (KII) guide. Informed consent was obtained from and questionnaires administered to sampled participants. The survey contained questions regarding demographic data, including sex, age, age at first marriage, duration of marriage, frequency of marriage, education, occupation, annual income and religion. Questions addressing views about infertility, causes of infertility, the experience of infertility, awareness of IVF treatment, sources of IVF treatment information, views about IVF treatments, as well as questions on utilization of IVF treatment were included in the questionnaire. Ethical approval was obtained from the ethical review board of Nnamdi Azikiwe University Teaching Hospital, Nnewi.

Quantitative data obtained were analyzed using Statistical Package for Social Sciences (SPSS) version 20, presented and interpreted using descriptive statistical analysis such as simple percentages, frequency distribution of the responses and graphical illustrations. Qualitative data gathered through the KII interviews were transcribed and analyzed using thematic content analysis. Multiple regression analysis was used to predict relationship

Table 1: Distribution of Respondents by Socio-demographic Characteristics

Group	Demographic	Frequency (n=589)	*Percentage (%)*
Gender	Male	199	33.8
	Female	390	66.2
Age	20-24	15	2.6
	25-29	93	15.8
	30-34	152	25.8
	35-39	119	20.2
	40-44	83	14.1
	45-49	69	11.7
	50-54	31	5.3
	55-59	15	2.5
	60+	12	2.0
Age at first	<20	37	6.3
Marriage	20-24	146	24.8.
	25-29	205	34.8
	30-34	138	23.4
	35-39	46	7.8
	40+	17	2.9
Marital Status	Married/Living together	533	90.5
	Married not living together	34	5.8
	Separated	6	1.7
	Divorced	10	1.7
	Widowed	6	1.0
Marriage Type	Monogamous	545	92.5
	Polygamous	44	7.5
Marriage Duration	0-5 years	257	43.6
	6-15 years	241	40.9
	16-25 years	53	9.0
	25+ years	38	6.5
Educational Qualification	None	2	0.3
	Completed Primary	22	3.7
	Completed Secondary	166	28.2
	Tertiary	399	67.7
Occupational	Professional	18	3.1
Status	Civil Service	237	40.2
	Business/Trading	165	28.0
	Apprentice	13	2.2
	Artisan	16	2.7
	Farming	6	1.0
	Clergy	15	2.5
	Self Employed	65	11.0
	Unemployed	52	8.8
	Retired	2	0.3
Occupation Recorded	Employed	255	43.3
	Unemployed	54	9.2
	Self employed	280	47.5
Annual Income	$0 - $ 500	181	30.7
	$501- $1000	129	21.9
	$1001- $2000	89	15.1
	$2001- $3000	62	10.5
	$3001- $4000	82	13.9
	$ 4001+	46	7.8
Religion/	Christianity-Catholic	297	50.4
Denomination	Christianity-Protestant	266	45.2
	Islam	11	1.9
	African Traditional Religion	15	2.5
	Total	**589**	**100.0**

between variables in the study. The differences were compared using chi-square (X^2) inferential statistics with a 95% confidence interval (CI), type 1 error rate set at 5% and P value <0.05 as significant.

Results

A total of six hundred (600) respondents from households and hospitals in Awka South and Nnewi North LGAs were approached out of which five hundred and eighty-nine (589) respondents validly completed the questionnaires. Majority of the respondents in the study were females 390(66.2%). The age range of the respondents was 20 to 65 years and the mean age was 37.59 years $\pm$ 9.2SD and a median age of 36.00 years. Majority of the respondents were in monogamous setting 545(92.5%) and living together with their spouse 533(90.5%). The duration of infertility ranged from 1 to 25 years. Majority of the respondents had attained higher (tertiary) education (399; 67.7%), were employed [255(43.3%) employed by others and 280(47.5%) self-employed], with annual income of ₦1,000,000 (equivalent of $4000 USD) and below (543; 92.2%). The majority were Christians 563(95.6%) [Catholics 297(50.4%) and Protestants 266(45.2%)] (Table 1)

Perceptions on infertility

Respondents' views about infertility show that most of the respondents perceive infertility in one of these four major ways: (a) a predestined supernatural problem, [101(17.1%) respondents; 44(22.1%) males and 57(14.6%) females]. (b) a threat to men's procreativity/continuity of lineage [84(14.3%) respondents; 33(16.6%) males and 51(13.1%) females]. (c) women only problem [71(12.1%) respondents; 31(15.6%) males and 40(10.3%) females]. (d) state of childlessness [66(11.2%) respondents; 13(6.5%) males and 53(13.6%) females] (Table 2). A respondent for the KII however did not agree with these major perceptions about infertility. According to him;

> *Infertility is basically a medical condition which equally requires a medical cure. However, because Igbo culture is particularly rooted in a lot of fetish or supernatural projections, it tends to influence people's perceptions of things or events in Anambra state. Most people believe that their inability to conceive is usually caused by evil spirits/people and that is the reason for incessant increase in spiritual or traditional treatments for infertility in Igbo culture. Some others erroneously may perceive infertility as a punishment from God even when God said that none shall be barren.* (Male medical practitioner, aged 50 years).

To further assess views of respondents on causes of infertility, their responses indicated that of all the couples who are experiencing infertility, 39(19.6%) male and 65(16.7%) female respondents said that it may be due to destiny or spiritual attacks/witchcraft; 35(17.6%) male and 41(10.5%) female respondents said sperm abnormalities; (Table 3). A KII respondent stated:

> *There are male factor causes like no sperm, low sperm, abnormal sperm, blocked spermatic passage/duct, erectile dysfunction, systemic diseases like neurological problem etc. Female factors include factors affecting the womb e.g. fibroid, uterine synechia, abnormal womb, absence of the womb; tubal factors e.g. blocked fallopian tube; ovulatory factors e.g. lack of or poor egg production; peritoneal factors e.g. adhesions from previous operation; endometriosis, hyper-prolactinemia, stress, etc. Unexplained or unknown factors are causes that available medical investigations to have not been able to ascertain the cause of the infertility* (Male medical practitioner, aged 55 years).

To assess awareness level of respondents by their experience of infertility and the nature of infertility, more than half of the respondents 323 (54.8%) had experienced some difficulty in getting pregnant or impregnating their spouse and 250 (42.4%) said they never did, while 16 (2.7%) respondents were uncertain in their response.

The study further reviewed the type of infertility they had experienced. The commonest form of infertility reported by the respondents was primary infertility (230; 39.0%). Secondary infertility was reported by 93 (15.8%) respondents, 250(42.4%) did not have any fertility challenge and 16(2.7%) were not aware of any fertility challenge. This result shows that married couples are aware of the nature of infertility they had. This is not surprising especially in South-Eastern Nigeria generally and Igbo culture where couples with recurrent pregnancy loss - *'ume omumu'* (that is those who often miscarry or are unable to carry pregnancy to term) are still respected and empathized with because there is hope of successful pregnancy outcome more than those affected by primary infertility, regarded as *'aga'*-

Table 2: Distribution of Respondents by Perception of Infertility

Response	Male	Female	*Total*
It is a medical condition	20(10.1%)	38(9.7%)	58(9.8%)
It is a public health problem	3(1.5%)	14(3.6%)	17(2.9%)
It is an individual/private problem	9(4.5%)	23(5.9%)	32(5.4%)
It is undesirable	14(7.0%)	34(8.7%)	48(8.1%)
It means that one is childless	13(6.5%)	53(13.6%)	66(11.2%)
It is Socio-culturally constructed	10(5.0%)	24(6.2%)	34(5.8%)
It is a problem of women only	31(15.6%)	40(10.3%)	71(12.1%)
It is a problem of men only	1(0.5%)	11(2.8%)	12(2.0%)
It is men and women problem	18(9.0%)	32(8.2%)	50(8.5%)
It is predestined by God/supernatural problem	44(22.1%)	57(14.6%)	101(17.1%)
It is a punishment for ungodly behaviours	3(1.5%)	13(3.3%)	16(2.7%)
It is a threat to procreativity/continuity of lineage	33(16.6%)	51(13.1%)	84(14.3%)
Other, specify	-	-	-
Total	**199(100%)**	**390(100%)**	**589(100%)**

Table 3: Distribution of Respondents' by Causes of Infertility

Response	Male	Female	Total
Blocked fallopian tube	32(16.1%)	41(10.5%)	73(12.4%)
Perforated fallopian tube	2(1.0%)	15(3.8%)	17(2.9%)
Sperm abnormalities	35(17.6%)	54(13.8%)	89(15.1%)
Infection /STDs/Abortion	21(10.6%)	49(12.6%)	70(11.9%)
Previous use of contraceptive device	9(4.5%)	41(10.5%)	50(8.5%)
Destiny/Spiritual attack/Witchcraft	39(19.6%)	65(16.7%)	104(17.7%)
Exposure to toxic waste	3(1.5%)	11(2.8%)	14(2.4%)
Nutritional deficiency	8(4.0%)	11(2.8%)	19(3.2%)
Life style	29(14.6%)	47(12.1%)	76(12.9%)
Early age of marriage & first conception/attendant problems	5(2.5%)	14(3.6%)	19(3.2%)
Unexplained/Unknown	16(8.0%)	42(10.8%)	58(9.8%)
Total	**199(100%)**	**390(100%)**	**589(100%)**

Table 4: Distribution of Respondents by Perception of *In Vitro* Fertilization (IVF)

Response	Male	Female	Total Frequency	Percentage %
IVF offers hope	7	23	30	5.1
IVF is too costly	30	61	91	15.4
IVF is affordable/accessible	0	5	5	0.8
IVF is not natural	23	22	45	7.6
IVF is too elitist	1	6	7	1.2
Children through IVF are not accepted	5	5	10	1.7
Don't truly know what IVF is all about	8	5	13	2.2
Not Applicable	125	263	388	65.9
Total	199	390	589	100.0

(that is those who have never experienced conception at all) who are viewed with disdain.

Perceptions of IVF

Two hundred and one (34.1%) of the respondents had heard about IVF before reading the information about it in the questionnaire, while two-third of the respondents 388(65.9%) had never heard about IVF. Views of respondent on source of IVF information showed that the commonest source was through family relations 86(14.6%) while the internet is the least source (18; 3.1%) The other sources were friends (58; 9.8%), health facility (20; 4.4%) and mass media (19; 3.2%). Respondents were also asked how they perceived IVF treatment and majority of the respondents 91(15.1%) regarded it as too costly and 45(7.6%) as unnatural, while 30(5.1%) indicated that IVF offers hope (Table 4). This finding was supported by a KII respondent who said that:

> *IVF offers hope; however, there is erroneous opinion in this part of the world that test-tube babies are abnormal or unnatural. Definitely*

> *not, they are as normal and natural as naturally conceived babies. A look at the pictures of the IVF babies shows that these babies are not abnormal. In fact, it is even better as a woman to have your own baby through IVF conception than to sleep around with different men (not your spouse) to get pregnant* (Male medical practitioner, aged 50 years).

Views of the respondents about utilization of IVF treatment shows that among respondents who were aware of IVF, majority of them 162(27.5%) had never used IVF while only 39(6.6%) had used IVF. This implies that awareness about the existence of IVF treatment is not the only likely reason why couples in Anambra state may not embrace or utilize IVF treatment. This finding was supported by a KII respondent who said that:

> *The problem with utilization of IVF treatment in Anambra state is that many people are not aware of this technology; even those who are aware cannot afford it because of the cost of the treatment. IVF helps but the cost scares away many people who need it. So, for me, creating the awareness is one thing but accessing it is another huge thing* (Male Engineer, aged 59 years).

To further ascertain respondents' views on cost of IVF, 135(22.9%) said that the cost of accessing IVF treatment is unaffordable while only 66(11.2%) of the respondents felt that IVF treatment procedure is affordable. This implies that the procedure is still too expensive. This result was corroborated by an IVF client who said that:

> *IVF is not affordable; if the money is not there you cannot use it. It is only those that live in the bracket of above average income that can afford it and that is why it is not a popular option for many infertile couples in the state* (Male Engineer, aged 59 years).

Furthermore, views of respondents on whether the awareness of IVF will significantly enhance its use shows that 78(38.8%) of the respondents strongly agree while 8(4.0%) strongly disagreed with the assertion. Others disagreed (27; 13.4%), Agreed (72; 35.8%) or were neutral (16; 8.0%). In the KII, lack of awareness of IVF is further captured thus:

> *I don't think people really understand the use of IVF because apart from the money that they need to spend, some still fear that the child might not survive. IVF might be of help to those seeking for the fruit of womb if they really understand its workability and if the child would survive* (Female health worker, aged 45 years).

The response captured in totality, lack of basic awareness of IVF. However, another KII respondent felt that this is not an issue of belief. For him:

> *The success rate of IVF is 30 – 40 percent just like the natural process. This is because if 10 sound couples met on a cycle, there is probability that only five of the women will get pregnant. But the successful children through IVF method grow normally like any child who was born through natural conception. However, the IVF service in this country is still evolving, we lack specialized personnel compared to other countries* (Male medical practitioner, aged 50 years).

Table 5 shows the correlation between some socio demographic variables and awareness/utilization of IVF. The age distribution of respondents (χ^2=7.503, N=589, df=5, P=0.186) and gender (χ^2=2.668, N=589, df=5, P=0.751) had no statistically significant difference in the level of awareness of IVF and subsequent utilization of the treatment. However, level of education (χ^2=19.560, N=589, df=5, P=0.002), religious affiliation (χ^2=16.887, N=589, df=5, P=0.0001) and duration of marriage/infertility (χ^2=47.666, N=589, df=25, P=.004) had a significant statistical difference in the level of awareness of IVF and subsequent utilization of IVF treatment.

Table 6 presents a multiple regression analysis to test the predictive power of each independent variable on the awareness/utilization of IVF treatment. The result indicates that four independent variables: age, education, religion and duration of marriage/infertility were statistically significant at (p<.004, p<.0001, p<.001 and p<.003 respectively). The R^2 which measures the explained variance is 6.8%. In other words, 6.8% of the variations in the level of awareness of the existence of IVF and its use by respondents are explained by the socio demographic variables in the model. The 'B' values showed that education and duration of marriage/infertility are positively associated; while

Table 5: Cross Tabulation of some Socio Demographic Variables and whether or not Awareness of IVF affects Utilization

Variables	Awareness and use of IVF						Total	χ^2
	SD	D	A	SA	N	NA		
Age (years)								
Younger Age (<35)	3(37.5)	10(37.0)	26(36.1)	29(37.2)	10(62.5)	182(46.9)	260(44.10)	χ^2=7.503,
Advanced Age (35+)	5(62.5)	17(63.0)	46(63.9)	49(62.8)	6(37.5)	206(53.1)	329(55.9)	N=589, df=5,
Total	8(100.0)	27(100.0)	72(100.0)	78(100.0)	16(100.0)	388(100.0)	589(100.0)	P=.186
Gender								
Male	3(37.5)	10(37.0)	25(34.7)	28(35.9)	8(50.0)	125(32.2)	199(33.8)	χ^2=2.668,
Female	5(62.5)	17(63.0)	47(65.3)	50(64.1)	8(50.0)	263(67.8)	360(66.2)	N=589,
Total	8(100.0)	27(100.0)	72(50.0)	78(100.0)	16(100.0)	388(50.0)	589(100.0)	df=5, P=.751
Education								
Lower education	3(37.5)	13(48.1)	34(47.2)	29(37.2)	8(50.0)	103(26.5)	190(32.3)	χ^2=19.56,
Higher education	5(62.5)	14(51.9)	38(52.8)	49(62.8)	8(50.0)	285(73.5)	399(67.7)	N=589,
Total	8(100.0)	27(100.0)	72(100.0)	78(100.0)	16(100.0)	388(100.0)	589(100.0)	df=5, P=.002
Religion								
Christians	4(50.0)	27(100.0)	62(86.1)	74(94.9)	16(100.0)	380(97.9)	563(95.6)	χ^2=16.88,
Non Christians	4(50.0)	0(.0)	10(13.9)	4(5.1)	0(.0)	8(2.1)	26(4.4)	N=589,
Total	8(100.0)	27(100.0	72(100.0)	78(100.0	16(100.0)	388(100.0)	589(100.0)	df=5, P=.0001
Duration of Marriage/infertility								
0-5	3(37.5)	7(25.9)	27(37.5)	37(47.4)	9(56.2)	174(44.8)	257(43.6)	χ^2=47.66,
6-10	1(25.5)	7(25.9)	23(31.9)	24(30.8)	6(37.5)	88(22.7)	149(25.3)	N=589,
11-15	3(37.5)	12(44.4)	10(13.9)	6(7.7)	1(6.2)	60(15.5)	92(15.6)	df=25,
16-20	0(.0)	1(3.7)	8(11.1)	9(11.5)	0(.0)	23(5.9)	41(7.0)	P=.004
21-25	0(.0)	0(.0)	1(1.4)	0(.0)	0(.0)	11(2.8)	12(2.0)	
25+	1(12.5)	0(.0)	3(4.2)	2(2.6)	0(.0)	32(8.2)	38(6.5)	
Total	**8(100.0)**	**27(100.0)**	**72(100.0)**	**78(100.0)**	**16(100.0)**	**388(100.0)**	**589(100.0)**	

Table 6: Multiple Regression Analysis on whether Awareness about IVF Treatment will affect its Use

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B(Mean)	Std. Error	Beta		
(Constant)	80.020	13.674		5.852	.0001
Age	-11.361	3.941	-.141	-2.883	.004
Gender	-3.909	3.631	-.046	-1.077	.282
Education	13.889	3.504	.163	3.963	.0001
Religion	-27.294	3.631	-.141	-3.415	.001
Duration	3.991	1.322	.143	3.018	.003

R=.260 R^2= .068 F-value=8.440 P= 0.0001

Dependent Variable: Whether awareness about IVF treatment will affect its use

age, sex and religion are negatively associated with the level of awareness of the existence of IVF and its use. It implies therefore that education and duration of marriage/infertility are good predictors of awareness of the existence of IVF and utilisation of IVF treatment. The strength of the 'T' values showed that education (3.963) was the most important influence on awareness of the existence of IVF treatment and its utilization. The multiple regression model showed a significant linear relationship between education, religion, duration of marriage/infertility and age at (p<.0001, p<.001, p<.003 and p<.004 respectively) and awareness of the existence of IVF and utilisation of IVF treatment.

Regarding age, majority of the respondents 570(96.8%) indicated that women aged 35 years and above are more likely to embrace IVF treatment than younger women aged below 34 years. In the words of

a KII respondent,

> *Majority of the IVF clients were already old both in age and in their marriages; those who were above 35years and are about six years and above in their marriages* (Male medical practitioner, aged 50 years).

On how many years couples who are infertile should wait before going for assisted conception, Table 7 presents a cross tabulation of marital status and duration of marriage showing that majority of those married/living together (318; 59.7%), separated (4; 66.7%), divorced (8; 80.0%), and widowed (4; 66.7%) indicated 1 year. While majority of those married/not living together (21; 61.8%) indicated above 5 years. The $\chi^2 = 78.503$, $N = 589$, $df = 12$, $P < 0.05$ (0.000) shows that the difference is significant. This was corroborated by the qualitative data:

> *Not many people want to go this way at all. But when the reproductive period is thinning out and no other alternative, we (the husband and wife) decided to give IVF a trial. We are exposed to a lot of ridicules; you cannot walk shoulder-high amid colleagues and friends. One is inadequate. The view is that they may want to ask who the father or the mother of the baby is* (Female IVF client aged 46 years).

However, a Gynaecologist interviewed added that in older couples, "between 3 to 6 months, is more than enough for a person to start looking for solution if there is no conception after regular unprotected sexual intercourse" (Male medical practitioner, aged 50 years). A KII respondent opined that:

> *Well, I cannot really say much but I think naturally it is only God who provides children for couples and not through the use of technologies. Culturally I disagree with the use of any form of assisted reproductive technology because as a cultured person, this idea about acting God counteract the totality of what we stand for* (Male Civil servant aged 52 years).

A medical practitioner, among the KII respondents said that:

> *Procreation is important and deeply rooted in Igbo land. Anybody without a child is viewed with contempt. More so, when the general society gets to know about the inability of a couple to have children and resorting to assisted methods (IVF) they may be stigmatized, call their children abnormal or not natural and therefore may not be accepted by members of the kinsmen as part of their family members. Therefore, IVF technology is still masked in secrecy, stigma, misconceptions, and religious sentiments in Nigeria.* (Male medical practitioner, aged 55 years).

In Table 8 respondents' views on how to enhance the treatment of infertility using IVF in Anambra state shows majority of the respondents indicated creation of awareness about IVF treatment using the mass and print media [368 (94.4%) female respondents and 168 (84.4%) male respondents] and reduction of cost of IVF treatment [347(89.0%) of the female respondents and 160(80.4%) of the male respondents] are the major ways of improving the use of IVF. The $\chi^2 = 15.889$, $p < 0.0001$ and $\chi^2 = 8.080$, $p < 0.004$ respectively showed that the differences are statistically significant. KII respondent interviewed also supported these findings.

> *IVF service is not well grounded. Aside Life Specialist Hospital, Nnewi, which is a private hospital, we do not have public fully fledged ART centre here in Anambra State. Therefore, IVF centers are not readily available to those who may want to access the services* (Female IVF client aged 40 years).

Another KII respondent corroborated the observation and emphasized that:

> *To prevent infertility, there should be a lot of crusade about the condition, the treatment and care centres. IVF services should be introduced in the tertiary public hospitals which will drastically reduce the cost. The rate is very low here. In the entire state only one or two centres have IVF unit. But there are centres in Lagos, Port-Harcourt and Abuja. Some people are not aware of it and those who know about it cannot afford the high cost. IVF is a very expensive treatment to embark on. Government should provide a lot of funds for research, training and treatment. They should subsidize the setting up, treatment and training of medical personnel* (Male medical practitioner, aged 55 years).

Table 7: Cross Tabulation on Marital Status and Duration of Marriage/Infertility

	How long do you think infertile couples should wait to achieve fertility before going to seek for further solution?				
	1 year	2-3 years	4-5 years	above 5 years	***Total***
Marital status	No (%)l	No (%)	No (%)	No (%)	No (%)
Married/living together	318(59.7)	121(22.7)	32(6.0)	62(11.6)	533(100.0)
Married/not living together	8 (23.5)	3(8.8)	2(5.9)	21(61.8)	34(100.0)
Separated	4(66.7)	0(.0)	0(.0)	2(33.3)	6(100.0)
Divorced	8(80.0)	0(.0)	2(20.0)	0(.0)	10(100.0)
Widowed	4(66.7)	0(.0)	0(.0)	2(33.3)	6(100.0)
Total	**342(58.1)**	**124(21.1)**	**36(6.1)**	**87(14.7)**	**589(100.0)**

χ^2= 78.503, N = 589, df = 12, P< 0.05 (0.000)

Table 8: Cross Tabulation between Gender and Measures to Improve Perception on the Use of IVF

		Gender		***Total***	***χ^2***
Responses		Male	Female		
Spouse co-operation and support	Yes	100(50.3)	249(63.8)	349(59.3)	χ^2=10.087, N=589,df=1, P=.001
	No	99(49.7)	141(36.2)	240(40.7)	
	Total	**199(100.0)**	**390(100.0)**	**589(100.0)**	
Reduction of cost of IVF treatment	Yes	160(80.4)	347(89.0)	507(86.1)	χ^2=8.080,N=589, df=1, P=.004
	No	39(19.6)	43(11.0)	82(13.9)	
	Total	**199(100.0)**	**390(100.0)**	**589(100.0)**	
Creation of awareness about IVF treatment using the mass and print media	Yes	168(84.4)	368(94.4)	536(91.0)	χ^2=15.889,N=589, df=1, P=.0001
	No	31(15.6)	22(5.6)	53(9.0)	
	Total	**199(100.0)**	**390(100.0)**	**589(100.0)**	
Improved reproductive health knowledge to reduce misconception and stigma attached to IVF practice	Yes	59(29.6)	162(41.5)	221(37.5)	χ^2=7.946,N=589, df=1, P=.005
	No	140(70.4)	228(58.5)	368(62.5)	
	Total	**199(100.0)**	**390(100.0)**	**589(100.0)**	

Discussion

Fertility and parenthood are highly cherished in Nigeria and indeed Anambra state to the extent that procreation is more often than not considered the most vital reason for marriage[12]. Results of this study have shown that outside the clinical perception of infertility, there are so many other meanings that are attached to the concept of infertility. Infertility or barrenness is predominantly perceived as a curse, a condition predestined by God/supernatural problem. Some see it as a natural occurrence and that with necessary prayers and patience the person can be fertile. This finding is consistent with Ali *et al*[32], who opined that beliefs in evil forces and supernatural powers as causes of infertility are still prevalent especially among people with lower level of education in Karachi, Pakistan. However, this is in contrast with the clinical findings of Ikechebelu *et al*[33], Umeora *et al*[34] and Okwelogu *et al*[3] in south eastern Nigeria which attributed the aetiology of infertility as a disease or a medical problem than a social problem. This disparity in findings may have been coloured by the researchers' hospital based data. Sociologically, the present population based survey found that in Igbo land, the predominant perception of infertility as a condition predestined by God/supernatural problem, or a threat to procreativity/continuity of lineage is not farfetched. This could be because Igbo people are predominantly religious and therefore, they attach a lot of religious connotations to many social situations and medical conditions.

Generally, the research participants demonstrated lack of knowledge about IVF and its use. Awareness of IVF treatment was low and some other ART practices were not favourably disposed to in Anambra state thereby constituting major obstacles to the use of the technologies. It was found that although IVF treatment has been in existence since 1989, it is relatively new in Anambra state. Correct perception about IVF treatment as a way out of infertility is limited among the study participants and a lot of misconceptions and myths are prevalent in the society. The study also found that IVF is perceived as very expensive, unnatural, and not cultural. Children

conceived through this method are equally regarded as abnormal or inferior to those conceived naturally. This concurs with Giwa-Osagie[20] and Ajayi[35] who stressed that IVF technology is still a new phenomenon in the developing countries where people are still going around with the wrong perceptions about IVF. The treatment is shrouded in secrecy and stigma in Nigeria due to misconceptions, ignorance and religious sentiments. Lack of awareness about IVF is a major issue affecting how it is perceived by the participants. This finding supports Jegede and Fayemiwo[36] who maintained that awareness in this respect is power, where this is lacking cultural beliefs and religious injunctions tend to fill the gap. These beliefs are still prevalent among people in the study area. Therefore, seeking care for infertility is often associated with supernatural forces and its cure may also be associated with supernatural method of treatment. Recourse to supernatural interpretation of infertility vitiates genuine attempts on IVF utilization. It is imperative to have adequate awareness of IVF before persons who are suffering from infertility can utilize it. Utilization is also a determinant of timely medical care and reactions or attitude to peoples' misconceptions or prejudice of such interventions. This finding is consistent with several reports which stress that utilisation of any assisted conception is a function of awareness, and perception of its existence.[3, 36-38] Basic understanding of IVF is lacking or poor in Nigeria and many other sub-Saharan African nations. This has posed a problem to its acceptability and utilization. It appears that the respondents accepted that IVF is the last resort to overcoming infertility.

The respondents lamented on the huge cost of procuring IVF treatment. Therefore, government should subsidize the cost of infertility treatment or include infertility and ART among the conditions covered by the National Health Insurance Scheme (NHIS). In addition, relevant NGOs and the private sector should be encouraged to subsidize the cost fertility treatment. The study further recommends that National Orientation Commission initiate value reorientation among members of the society to redress suffocating cultural norms and values attached to procreation. This will increase the use of IVF treatment in the state.

Conclusion

This study has shown that infertility has always existed, but its discussion in Anambra state is often culture-bound and supernatural beliefs are still prevalent among the people. The emergence of IVF in the treatment of infertility is a welcome development because it offers hope to infertile couples. However; there is low or lack of correct perceptions and awareness of IVF treatment in Anambra state. There is therefore an urgent need to vigorously create awareness about IVF treatment to dispel the misconceptions and enhance its utilization in Anambra state and Nigeria in general.

Conflict of Interest

None

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Contribution of Authors

NIO and JII conceived and designed the study. NIO and NNJ were involved in the data collection and analysis. All the authors were involved in the writing and review of the manuscript. All the authors approved the final version of this manuscript.

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