



In vitro fertilization: Perceptions and misperceptions among women of reproductive age group in Sokoto, Nigeria

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Abstract

Background: Infertility is a global issue causing a lot of psychological and social problems among couples. *In Vitro* Fertilization (IVF) is one of the options available for couples who want children but cannot have them. This study aims to assess the level of awareness, perceptions and misconceptions of IVF among women of reproductive age group (WRAG) in Sokoto metropolis in north-western Nigeria.

Methods: This was a cross sectional descriptive study involving 306 WRAG who were recruited using multistage sampling technique. Semi structured interviewer administered questionnaires was used and the data collected was analyzed using IBM SPSS version 20. level of statistical significance was set at $p=0.05$.

Results: The mean age of the respondents was a 26.7 ± 6.85 year with less than half of the respondents having no living children. Majority, (74.2%) of the respondents were aware of and had a positive perception (69%) towards IVF. About 54% (157) of those who did not accept IVF gave religion and the high cost of the procedure as reasons for rejecting it. Fifty one percent of the respondents were willing to use *In Vitro* Fertilization if the need arose. Religion ($\chi^2=4.726$; $df=1$; $p<0.04$) and awareness of the availability of IVF services ($\chi^2=5.393$; $df=1$; $p<0.023$) were factors associated with the willingness to utilize IVF.

Conclusion: The respondents had good level of awareness and positive perception about IVF, with few of them willing to utilize it. Awareness of the availability of IVF services and religious beliefs were factors that influenced respondents' willingness to utilize IVF services. Health care providers should try to explore ways to sensitize community, religious and traditional leaders in order to improve the attitude of the populace towards IVF service utilisation.

Keywords: *In Vitro* Fertilization, Women of reproductive age group, Perception, Misperception

Introduction

Infertility is the inability to conceive children after one year of unprotected intercourse [1]. Infertility is a global issue and its prevalence is on the increase worldwide, particularly in Africa as reported from several African societies it is mostly attributed to tubal occlusion. It accounts for over 50% of cases reported in gynaecology clinics in the developing countries [2]. In fact, "Infertility belt" has been described in sub-Saharan African countries (SSA) where about 20-35 million couples are affected by their inability to give birth to a child [3,4]. It affects

the social and psychological well-being of the couples with much more impact on the females compared to men, regardless of the cause of the Infertility [5,6]. It is a source of distress for couples as societal norms may equate infertility with a failure on a personal, interpersonal, emotional or social level [6]. In some societies, infertile women are excluded from certain social activities and traditional ceremonies, they are verbally or physically abused in their own homes, deprived of inheritance, sent back to their parents or even have their marriages dissolved or terminated [7].

Despite these psychosocial and health consequences very few infertility management programs exist in our environment thus limiting treatment options for those who seek medical interventions [5]. Several types of Assisted Reproductive Technologies (ARTs) have been introduced to reduce infertility problems, while accurate figures are difficult to obtain, there is little doubt that access to ART is extremely limited in all developing nations.

In Vitro Fertilization (IVF) is a method of assisted reproduction and may be the only option for couples who cannot have children through the natural biological means [7,8]. It is still considered to have an edge over adoption because in adoption, there is no genetic contribution by the couple but in IVF, couples contribute genetically or carry the baby [9]. In developing countries like Nigeria where fertility is valued to the extent that womanhood is defined as motherhood, IVF gives hope to the infertile even though only a few can afford it [10].

Unfortunately IVF is perceived as a new phenomenon shrouded in secrecy and stigma due to misconception, ignorance and socio-cultural factors [2]. It is perceived as abnormal, not natural, and worsened by the fact that IVF is seen as a costly treatment which is still beyond the reach of the teeming poor masses that are affected by the condition [11-13]. The high cost of IVF, misconception of what IVF is all about, religious belief/convictions cultural/traditional belief and failure of IVF treatment after paying so much money play prominent roles in Nigeria, and these are potential factors that may influence its utilization [12]. A crucial issue in the management of infertility, including ART, is that infertile couples need to have sufficient information so that they could make informed choices as to where and how they will be diagnosed and treated. In Nigeria, there has been a lot of researches on infertility but few on ARTs [5,13-19]. For the effective realization of various disease control measures instituted in any community, the knowledge/awareness of the populace of the cause, available treatment options and people's views on it, is of immense importance [9]. Determining the perceptions and misperceptions of IVF among women of reproductive age group would be useful in providing additional insights that will guide in the choice of appropriate intervention measures in infertility treatment. This study therefore, aims to assess the awareness, perceptions and misperceptions of IVF among women of reproductive age group in Sokoto metropolis.

Methods

This was a cross-sectional descriptive study carried out in Wamakko Local Government Area (LGA), one of the urban LGAs of Sokoto state, Nigeria with an estimated total population of 206,917. Using the formula for cross-sectional descriptive study and correcting for 10% non-response, a total of three hundred and six women of reproductive age group residing in the study area were enrolled using multistage sampling. Data was collected using a set of structured pretested interviewer

administered questionnaire, adapted and modified from previous studies [2,11,15]. The questionnaire consisted of 4 sections which included questions on the socio-demographic data of the respondents, their awareness, perception and misperceptions on IVF and willingness to utilize it. Data was cleaned, entered into and analyzed using IBM SPSS version 20. Chi-square test was used to compare categorical variables and multivariate analysis was done using the regression model to find out predictive variables for perception and willingness to utilize IVF. The level of statistical significance (alpha) for the test was set at $P \leq 0.05$.

Permission to conduct the study was obtained from the Ethical review committee of the Usmanu Danfodiyo University Teaching Hospital, Sokoto; permission was obtained from community leaders while informed consent of respondents was sought after assurance of confidentiality of all information given.

Results

In this study the mean age of the respondents was 26.7 ± 6.85 years with a higher proportion 131 (45%) of them being within 15-24 years (Table 1). Less than half had no children 139 (47.8%), and just about half of the respondents 150 (51.5%) were married (Table 1). A total (45.4%) of the respondents had secondary education, and 127 (43.6%) had tertiary education with only 16 (5.5%) having no formal education (Table 1). Majority 216 (74.2%) of the respondents have heard of IVF with 55 (25.5%) of them getting their information from the mass media, while 49 (22.7%) heard from friends (Figure 1).

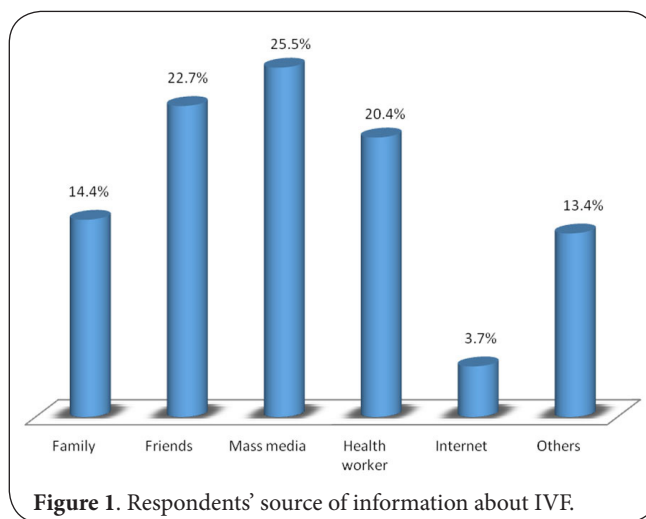


Figure 1. Respondents' source of information about IVF.

Majority of the respondents 153 (71.5%) were aware that IVF services are available in Nigeria. Over two thirds of them knew that people with blocked tubes may require IVF as treatment option for infertility and another 134 (62%) knew that IVF may be associated with failure (Table 2). Majority of the respondents 240 (82.5%) felt IVF offers hope to infertile

Table 1. Socio- demographic characteristics of the respondents.

Variable	Frequency n= 291	Percentage (%)
Age (years)		
15-24	131	45.0
25-34	115	39.5
35-44	40	13.7
≥45	5	1.7
Mean age = 26.7 ±6.85		
Number of living children		
0	139	47.8
1-2	58	19.9
3-4	53	18.2
≥5	41	14.1
Tribe		
Hausa	152	52.2
Fulani	58	19.9
Yoruba	32	11.0
Igbo	22	7.6
Others	27	9.3
Religion		
Islam	251	86.3
Christianity	40	13.7
Marital status		
Single	129	44.3
Married	150	51.5
Divorced	6	2.1
Widow	6	2.1
Educational status		
Informal	16	5.5
Primary	16	5.5
Secondary	132	45.4
Tertiary	127	43.6
Occupation		
Full-time house wife	63	21.6
Student	134	46
Business	50	17.2
Civil servant	44	15.1

Table 3. Respondents perception and misperceptions of IVF.

Variable	Frequency n=291	Percentage (%)
Do you think IVF offers hope for infertile couples?		
Yes	240	82.5
No	51	17.5
Do you think IVF is not a natural process?		
Yes	151	51.9
No	140	48.1
What do you think about IVF babies?		
Normal and natural	155	53.2
Normal but not natural	105	36.1
Not normal and not natural	31	10.7
Do you think IVF is too costly?		
Yes	236	81.1
No	55	18.9
Do you think IVF is not affordable/ accessible?		
Yes	198	68
No	93	32
Do you think IVF babies should be accepted by the society ?		
Yes	236	81.1
No	55	18.9
Do you think babies born via IVF are legitimate?		
Yes	208	71.5
No	83	28.5
Overall perception about IVF		
Positive	198	68
Negative	93	32

Table 2. Respondents' level of awareness of In Vitro Fertilization.

Variable	Yes n (%)	No n (%)	I don't know n (%)
Are IVF services available in Nigeria?	153 (71.5)	61 (28.7)	--
These are causes of infertility that may necessitate IVF			
Abnormal menses	136(63.3)	19(8.8)	60(27.9)
Blocked tubes	150(69.8)	13(6)	52(24.2)
History of infections in the reproductive tract in women	130(60.5)	23(10.7)	62(28.8)
History of infections in the reproductive tract in men	89(41.6)	43(20.1)	82(38.3)
Previous use of contraceptive methods	122(56.7)	33(15.3)	60(27.9)
Endocrine problems	108(50.5)	31(14.5)	75(35)
Marriage at an advanced age	96(44.7)	51(23.7)	68(31.6)
These are forms of IVF			
Use of donor oocyte	140(64)	22(10.2)	54(25.)
Use of donor sperm	141(65.3)	7(3.2)	68(31.5)
Use of donor zygote	70(32.4)	35(16.2)	111(51.4)
Preservation of gamete	72(33.5)	24(11.2)	119(55.3)
IVF procedure may be associated with these problems			
Failure	134(62.0)	82(38.0)	--
Genetic abnormalities in the baby	135(62.5)	81(37.5)	--
Death	96(44.4)	120(55.6)	--

couples, however barely half 151 (51.9%) believed it is not a natural process and about 36% thought the babies from IVF are normal but not natural. Most respondents 236 (81.1%) were opined that the procedure is too costly, not affordable and available (81.1% and 68% respectively (**Table 3**). Fifty one percent of the respondents would be willing to use IVF if the need arises among which 127 (84.7%) will only use husband's sperm. Among those not willing to utilize IVF services, desire to conceive naturally 63(44.7%), religion 52(36.9%) and the high cost of the procedure 3(2.1%) were some of the reasons they gave (**Table 4**). The number of living children the respondents had was statistically significantly associated with their perception towards IVF; those with no children formed a higher proportion (52.3%) of those with positive perception. Similarly most of the respondents that were aware of IVF 158 (79.4%) had a positive perception towards the procedure. ($p=0.004$) (**Table 5**). The respondents who were willing to utilize IVF were from the Islamic faith and this was found to be statistically significant ($p=0.04$). Seventy-six (50.7%) of the respondents who were willing to use IVF were within the age range of 15-24 years. There was a statistically significant association between awareness and perception ($p=0.023$ and $p=0.0001$ respectively) with willingness to utilize IVF services if the need arose (**Table 6-8**).

Discussion

Assisted Reproductive Technology (ART) has brought with it promising treatment modalities offering hope to infertile couples [20]. The findings in this study showed that about two thirds of the respondents were aware of IVF. This was similar to findings in Zaria and Ibadan, Nigeria where over 70% of the respondents were aware of IVF but studies from Kano, Bauchi, Akwa and Okija had less than 40% of the respondents being aware of IVF. Plausible reasons for the disparity may be due to the higher level of literacy among the respondents in the other studies who had better awareness [2,9,11,13,15,18].

Table 4. Respondents' willingness to utilize IVF.

Variable	Frequency n-291	Percentage (%)
Willing to use IVF if the need arises		
Yes	150	51.5
No	141	48.5
Method you would be willing to use		
Donor sperm	9	6.0
Only husband's sperm	127	84.7
Donor oocyte	13	8.7
Donor zygote	1	0.7
Reasons for not wanting to utilize IVF services		
Desire to conceive naturally	63	44.7
Religion	52	36.9
Culture	8	5.7
Will not be able to afford it	3	2.1
Others	15	10.6

Table 5. Respondents' background characteristics by their perception.

Variable	Overall perception n=291		Test statistic & p-value
	Positive, n (%)	Negative n (%)	
Age group			
15-24	95(47.7)	36(39.1)	--
25-34	76(38.2)	39(42.4)	$\chi^2 = 6.745$
35-44	27(13.6)	13(14.1)	$p= 0.076$
≥45	1(0.5)	4(4.3)	--
Number of living children			
0	104(52.3)	35(38.0)	--
1-2	37(18.6)	21(22.8)	--
3-4	37(18.6)	16(17.4)	$\chi^2 =8.866$
≥5	21(10.6)	20(21.7)	$p=0.031$
Religion			
Islam	168(84.4)	83(90.2)	$\chi^2 =1.782$
Christianity	31(15.6)	9(9.8)	$p=0.204$
Marital status			
Single	93(46.7)	36(39.1)	Fischer's exact $p=0.373$
Married	100(50.3)	50(54.3)	
Divorced	3(1.3)	3(3.3)	
Widow	3(1.5)	3(3.3)	
Educational status			
Informal	8(4)	8 (8.7)	$\chi^2 = 2.647$
Formal	191(96)	84 (91.3)	$p=0.163$
Occupation			
Unemployed	132(66.3)	65(70.7)	$\chi^2 =0.537$
Employed	67(33.7)	27(29.3)	$p=0.502$
Ever heard of IVF			
Yes	158 (79.4)	58 (63)	$\chi^2 =8.795$
No	41 (20.6)	34(37)	$p=0.004$

In this study the commonest source of information was the mass media and friends; this was similar to the findings in Zaria, Awka, and Ibadan; however in Tehran where there was also a high level of awareness, the commonest source of information was from health centres. The difference could be attributed to low practice of IVF in Nigeria where very few centres provide IVF services [2,11,18,21,22].

This study showed that majority of the respondents (68%) had a positive perception towards ART. A study in Benin City also had similar observation , where 70% of respondents had a positive perception of IVF [23]; however in Pakistan and Zaria a lower proportion of the study subjects felt it was acceptable as only 45% and 18.7% of the respondents respectively had a positive perception [6,18]. It is possible that the reasons for high acceptability of IVF among the women studied here could be because of their limited education on the entire IVF process thus not fully in grasp with the financial implications and issues surrounding the procedure which is in tandem with findings from a similar study [11]. The reasons for the lower perception in the other studies included cultural and religious beliefs with some people indicating that it is im-

Table 6. Respondents' background characteristics by their willingness to use IVF.

Variable	Willingness to utilize IVF n=291		Test statistics & p-value
	Yes n (%)	No n (%)	
Age group			
15-24	76(50.7)	55(39)	
25-34	52(34.7)	63(44.7)	
35-44	19(12.7)	21(14.9)	Fischer's exact p=0.211
≥45	3(2.0)	2(1.4)	
Number of living children			
0	81(54)	58(41.1)	
1-2	30(20)	28(19.9)	
3-4	22(14.7)	31(22)	$\chi^2 = 6.326$ p=0.097
≥5	17(11.3)	24(17)	
Religion			
Islam	123(82)	128(90.8)	$\chi^2 = 4.726$ p=0.04
Christianity	27(18)	13(9.2)	
Duration of marriage			
0-4	21(28.8)	23(27.7)	
5-9	26(35.6)	31(37.3)	$\chi^2 = 8.208$ p=0.084
10-14	11(15.1)	17(20.5)	
15-19	5(6.8)	10(12)	
≥20	10(13.7)	2(2.4)	
Educational status			
Informal	6(4)	10(7.1)	$\chi^2 = 1.337$ p=0.307
Formal	144(96)	131(92.9)	
Occupation			
Unemployed	108(72.0)	89(63.1)	$\chi^2 = 2.620$ p= 0.132
Employed	42(28.0)	52(36.9)	
Ever heard of IVF			
Yes	120(80)	96(68.1)	$\chi^2 = 5.393$ p=0.023
No	30(20)	45(31.9)	
Overall perception of IVF			
Positive	137(91.3)	62(44)	$\chi^2 = 75.408$ p=0.0001
Negative	13(8.7)	79(56)	

Table 7. Respondents' likelihood of having a positive overall perception about IVF.

Variable	AOR	95% CI for OR		p-value
		Lower	Upper	
Number of living children				
0	0.397	0.190	0.830	0.014
1-2	0.704	0.306	1.622	0.410
3-4	0.541	0.227	1.290	0.166
Have you ever heard of IVF?				
Yes	0.468	0.267	0.820	0.008

moral to spend time and resources on extraordinary means of promoting births with the children from such births not accepted in the society [9].

In this study majority of the respondents thought IVF offered hope to infertile couples, however about half of them believed it is not a natural process, with most of them also feeling it was too costly. The study from Anambra and Ibadan, in Nigeria had similar findings as the thought of not conceiv-

Table 8. Likelihood of respondents willing to utilize IVF.

Variable	AOR	95% CI for OR		p-value
		Lower	Upper	
Religion				
Islam	2.022	0.893	4.580	0.091
Have you ever heard of IVF?				
Yes	0.732	0.390	1.377	0.333
Overall perception?				
Positive	0.078	0.040	0.152	0.000

ing naturally and the high cost of the procedure were some of the factors that influenced the attitude and acceptability of IVF among those studied [2,11]. Factors that were statistically significantly associated with respondent's perception of In vitro Fertilization in this study were number of living children and awareness of IVF.

The study revealed that those without children formed the highest proportion (52%) of those with positive perception towards IVF and about 79.4% of those with positive perception were those that have heard of In Vitro Fertilization before the survey. These findings are similar to those from Saudi Arabia where awareness and number of living children affected the perception of respondents towards ARTs [22]. In the survey carried out in Oxford in the USA, participants' general attitudes towards ART became progressively more positive as their level of awareness of ART increased. It is possible that this observed outcome is a manifestation of the mere exposure effect; that merely being exposed to infertility treatments is enough to increase acceptance and augment positive attitudes towards these treatments [24].

This study showed that about 51.5% of respondents were willing to use IVF services if the need arose and this is similar to the study in Pakistan where 50% of the respondents were willing to use the procedure [6]. The finding is however lower than that of Ibadan and Saudi Arabia where 59.3 and 70.3% of the respondents respectively were willing to utilize the procedure [11,22]. The higher rates in these studies could probably be as a result of the fact that the studies were conducted among patients attending infertility clinic. The proportion of women willing to use IVF was however higher than was discovered in the studies from Okija and Kano where 37.2 and 7.6% of respondents respectively were willing to utilize ART [9,15]. Lower awareness rates and negative perception towards the procedure were the reasons for the lower proportion of women willing to use the IVF services in these studies. Among those willing to use IVF, majority preferred either their own gamete or that of their spouses; studies conducted in Okija, Ibadan and Zaria had similar observations and this could be attributed to the desire for genetic relationship with their offspring and also to avoid conflict within the marriage as to who the biological parent is [9,11,18]. In contrast to this finding, the study from Greece showed that up to half of their respondents preferred to use

donated gametes;25and in consonance with this, authors from developing countries found out that most respondents would accept donor gametes for their treatment only if it was kept private so that others can consider their offspring as biological [18,25].

The factors that affected willingness to utilize IVF were religion, awareness and perception. About 80% of those willing to utilize IVF were aware of it however about two thirds of those who were not willing to use it were still aware of the procedure and despite their awareness they still had a negative perception. A number of studies similar to this, also found religion to have a profound influence on the acceptance of IVF [8,15,20,22,26,27]. The strong influence of religion could be seen in the explanations offered for declining IVF as well as the interesting fact that most respondents listed religious interventions as part of the reasons for their previous refusal of treatment. It has been observed that people who practised some religions and people who attend churches are less likely to accept IVF. This implies that some people would decline IVF because they had faith that God would provide them with babies without having to resort to any assisted conception intervention [26,28]. Until all the misperceptions surrounding IVF are addressed, infertile couples will have

to bear the burden of infertility with the resultant effects of more psychological disorders among the couples which have public health implications for marital harmony.

Conclusion

Societal institutions may be slow to cope with the ideas and practice of In vitro fertilization especially in Africa where the technology is still relatively new. The study showed that the level of awareness is above average but not from the appropriate source, this probably explains the poor perception even among those who have the knowledge. The study also showed that the major reason why some of those aware of IVF didn't accept it was because of the perceived abnormal or unnatural procedure. In addition, factors such as religion, culture, fertility status, cost, availability among others have been seen to affect perception and willingness to utilize In vitro fertilization. We therefore recommend that the government work closely with health care providers to explore ways to make IVF facilities more available and affordable and religious and traditional leaders should be involved through media campaigns in a drive to clear the misconceptions of the public regarding the procedure so that those who require it and can afford it will utilize.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Authors' contributions	OMO	JTA	GJG	RAO	NCO	ASU	FAA	OJO	ZMG
Research concept and design	✓	--	--	--	--	✓	--	--	--
Collection and/or assembly of data	--	--	--	--	--	--	✓	✓	✓
Data analysis and interpretation	✓	✓	✓	✓	--	--	--	--	--
Writing the article	✓	✓	✓	--	✓	--	--	--	✓
Critical revision of the article	✓	✓	--	--	✓	✓	--	--	✓
Final approval of article	✓	✓	✓	✓	--	✓	✓	✓	✓
Statistical analysis	✓	--	✓	✓	--	✓	--	--	✓

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