

PERCEPTION AND KNOWLEDGE OF INVITRO FERTILIZATION AS A TREATMENT OPTION AMONG INFERTILE WOMEN IN A TERTIARY HOSPITAL IN SOKOTO, NORTHERN NIGERIA

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ABSTRACT

Introduction: Infertility is defined as the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. 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. *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. **Methodology:** The study was conducted among infertile women attending the Gynaecological clinic of UDUTH SOKOTO. It was a descriptive cross sectional study in design where 203 participants were recruited using systematic sampling technique. Data was collected using interviewer-administered, pretested, semi-structured questionnaire and was analyzed using SPSS version 20. **Results:** The age of respondents ranged from 18 to 42years (mean age = 28.9; SD = 5.2). Majority of the respondents 166(81.8%) had positive perception on IVF. A large proportion of them 130(64%) demonstrated good knowledge on IVF. **Conclusion:** Majority of the respondents in this study had positive perception (81.8%) and good knowledge of IVF (64.0%) as a treatment option. Information on IVF was obtained from health personnel/facility and friends/siblings in 94 (62.7%) and 95 (63.3%) of them respectively.

KEYWORDS: Perception, Knowledge, Infertility, InVitro Fertilization.

INTRODUCTION

Infertility is a global health problem and a socially destabilizing condition for couples resulting in stigmatization and marital disharmony. It is defined as the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.^[1] In most developing countries, the joy of every married man and woman is to procreate and raise children of their own. However, this desire does not always find fulfilment among some couples because of primary or secondary infertility. The majority who experience this condition live in developing countries

where fertility services including Assisted Reproductive Technologies (ARTs) are not always available.^[2] The African traditional society places a high premium on the size of the family, be it nuclear or extended. In this society, a woman's childlessness may be viewed as a punishment for a social misdemeanor or attributed to other factors including witchcraft and the disaffection of one's ancestors. Childlessness is a dreaded outcome of any marriage in the traditional African society and often leads to polygamy and broken marriages but rarely child adoption. 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.^[3,4] 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. 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.^[1]

The prevalence of infertility is on the increase worldwide, particularly in Africa as reported from several African societies. It is mostly attributed to tubal occlusion. The condition impacts 10–15% of couples at their reproductive age.^[3] However, the incidence varies from one region of the world to the other, being highest in the so-called infertility belt of Africa that includes Nigeria. In contrast to an average prevalence rate of 10-15% in the developed countries, the prevalence of infertility has been notably highly variable in sub-Saharan Africa ranging from 20-46%. It accounts for over 50% of cases reported in gynaecology clinics in the developing countries. 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.^[4] This has been attributed to high rate of sexually transmitted diseases, complications of unsafe abortions, and puerperal pelvic infections. About 30% of infertility is due to female problems, 30% to male problems, and 30% to combined male/female problems, while in 10%, there is no recognizable cause.^[1]

Institutional-based incidence of infertility reported in some parts of Nigeria are 4.0%,15.4%,15.7%,23.9% and 48.1% from Ilorin (North central), Abakaliki (South east),Sokoto(North West), Bauchi (North East) and Oshogbo (South west), respectively.^[1,5,6]

The challenges associated with infertility have necessitated different health care-seeking behavior ranging from spiritual, traditional/alternative health care to orthodox medical types including biotechnological devices such as Assisted Reproductive Technology (ART)(7). Assisted reproductive technology (ART) has helped infertile couples to conceive, and to have children. Assisted reproductive technology is defined as all treatments or procedures that include the in - vitro handling of both human oocytes and sperm, or -embryos, for the purpose of establishing a pregnancy.^[8] This includes, but not limited to in - vitro fertilization and embryo transfer, gamete -intrafallopian transfer, zygote intrafallopian transfer, tubal embryo transfer, gamete and embryo cryopreservation, oocyte and embryo donation, and gestational surrogacy. Assisted Reproductive Technologies (ART) do not include assisted insemination (artificial insemination) using sperm from either a woman's partner or a sperm donor. The use of ART has been increasing steadily since its inception, and today more than 1% of infants are born using ART.^[9] Trends indicate that the use of ART will continue to grow for some time, especially because the incidence of infertility is rising in both developed and developing nations, coupled with the fact that first marriage and childbirth are delayed.

Since the development of assisted reproductive technologies (ART), also referred to as medically assisted reproduction, couples with reduced fertility or advanced age, single women, and same-sex couples now have options to experience parenthood. The pioneering work of Patrick Steptoe and Robert Edwards gave birth to “*In-vitro* fertilization” and

Louise Joy Brown, the first test tube baby, was born on the 25th of July, 1978.^[10] Since then, the science of IVF has taken the world by storm and this technology with its various processes are now being made available in almost every country though the developing countries still lag behind. According to the most recent available data published by the International Working Group for Registers on Assisted Reproduction and the International Committee for Monitoring Assisted Reproductive Technology, infants born annually via ART in countries reporting, increased approximately 40-fold from 11,323 in 1989 to 404,364 in 2010.^[11]

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. 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. In developing countries like Nigeria where fertility is valued to the extent that womanhood is defined as motherhood, IVF gives hope to the infertile.^[12] Modern IVF generally involves retrieving preovulatory oocytes from the ovary, subsequent fertilization with sperm in the laboratory and embryo transfer into the endometrial cavity. The procedure for IVF treatment comprises controlled ovarian stimulation with exogenous gonadotropins, oocytes collection through transvaginal ultrasonographic-guided aspiration, coculture of eggs and sperm in vitro (or intracytoplasmic injection of sperm into the oocyte), and placement of the resultant embryos (2–5 days later) directly into the uterus.^[13]

METHODOLOGY

The study population comprised of infertile women attending gynaecological clinics of Usmanu Danfodiyo University Teaching Hospital, Sokoto. All infertile women with confirmed case of infertility irrespective of the type and duration were considered eligible for the study. It was a descriptive cross-sectional study in design. The minimum sample size was determined using the formula for descriptive cross sectional study, the final sample size calculated was 203. Study subjects that met the inclusion criteria were enrolled using systematic sampling method.

Data was collected using interviewer-administered, pretested, semi-structured questionnaire, to obtain information on the socio-demographic characteristics of the study subjects, perception and knowledge of IVF as an option of treatment of infertility. The questionnaire was administered by oral interview of selected patients by the researcher and trained research assistants. Data was analysed using the statistical package for social sciences (SPSS) version 20 (SPSS Inc, USA). Frequency distribution tables were constructed and cross tabulations were done to examine relationship between categorical variables.

Specifically, knowledge on IVF was assessed by asking questions on definition and understanding, source of information, its availability in Nigeria and its relationship with tubal factor infertility. Each correct response was scored one mark, while an incorrect or I don't know response was scored zero. All correct responses were added up and divided by all possible correct responses and then multiplied by 100. A knowledge score of $\geq 60\%$ represents good knowledge on IVF, while 45-59% is considered fair and $\leq 44\%$ represents poor knowledge. Perception was assessed using Likert Scale comprising of five options agree, strongly agree, neutral, disagree and strongly disagree. Total score of each respondent for each question was divided by the total obtainable score and graded dichotomously as negative perception ($\leq 49\%$) and positive perception ($\geq 50\%$) respectively.

Ethical approval for the study was sought from the Health, Research, Ethics Committee of UDUTH Sokoto.

RESULTS**Socio-demographic characteristics of respondents**

A total of 203 patients were enrolled into the study, their ages ranged from 18 to 42years (mean age = 28.9; SD = 5.2). Most of the respondents 113(51.7%) were in the 20-29years age group. Majority of the respondents were Muslims 169(83.3%), Hausas 130(64.0%) and in monogamous union 131(64.5%) respectively. Some of the respondents 79(38.9%) and majority of their husbands 123(60.6%) have obtained tertiary level of education with 142(70.0%) in upper socio-economic class (Table 1).

Table 1: Socio-demographic characteristics of respondents.

Variable	Frequency (n = 203)	Percentage (%)
Age group(years)		
<20	3	1.5
20-29	113	55.7
30-39	78	38.4
40-49	9	4.4
Religion		
Islam	169	83.3
Christianity	34	16.7
Tribe		
Hausa	130	64.0
Fulani	33	16.3
Yoruba	14	6.9
Igbo	25	12.3
*Others	1	0.5
Marital Setting		
Monogamous	131	64.5
Polygamous	72	35.5
Marital Status		
Married	201	99.0
Divorced	2	1.0
Educational Status		
No formal education	2	1.0
Quranic	19	9.4
Primary	32	15.8
Secondary	71	35
Tertiary	79	38.9
Educational Status of Husband		
No formal education	1	0.5
Quranic	2	1.0
Primary	11	5.4
Secondary	66	32.5
Tertiary	123	60.6
Occupation		
Skilled	83	40.9
Semi-skilled	39	19.2
Unskilled	62	30.5
Unemployed	19	9.4
Occupation of Husband		
Skilled	171	84.2
Semi-skilled	18	8.9
Unskilled	8	3.9
Unemployed	6	3.0
Socio-economic status		
Upper class	142	70.0

Middle class	39	19.2
Lower Class	22	10.8
*Nupe		

Respondents' perception on IVF as a treatment option

Out of the 203 respondents, majority 166(81.8%) had positive perception towards IVF as a treatment option. About half 101(50%) believed that IVF babies are normal, but 70(34.5%) have the opinion that IVF babies are artificial, however, few of them 58 (28.6%) agreed that IVF is a natural process. Some of the respondents 88(43.3%) felt that they are accepted in the community and 87(42.9%) believed that they are accepted in their religion. A significant proportion of the respondents 117(57.6%) agreed that IVF use is likely going to increase over the years, therefore most of them 96(47.3%) want IVF to be publicly funded (Table 2).

Table 2: Respondents perception on IVF as a treatment option.

Variable	Frequency n=203	Percentage (%)
IVF babies are normal		
Agree	101	49.8
Strongly agree	71	35.0
Neutral	20	9.9
Disagree	11	5.4
Strongly disagree	0	0
IVF babies are artificial		
Agree	70	34.5
Strongly agree	52	25.6
Neutral	45	22.2
Disagree	30	14.8
Strongly disagree	6	3.0
IVF is a natural process		
Agree	58	28.6
Strongly agree	22	10.8
Neutral	80	39.4
Disagree	39	19.2
Strongly disagree	4	2.0
IVF babies are accepted in the community		
Agree	88	43.3
Strongly agree	53	26.1
Neutral	54	26.6
Disagree	8	3.9
Strongly disagree	0	0
IVF encourages people to delay conception		
Agree	42	20.7
Strongly agree	23	11.3
Neutral	116	57.1
Disagree	18	8.9
Strongly disagree	4	2.0
IVF should be publicly funded		
Agree	96	47.3
Strongly agree	58	28.6
Neutral	32	15.8
Disagree	15	7.4
Strongly disagree	2	1.0
IVF is accepted in my religion		
Agree	87	42.9
Strongly agree	36	17.7
Neutral	62	30.5

Disagree	11	5.4
Strongly disagree	7	3.4
It is allowed to use donor egg or sperm in my religion		
Agree	85	41.9
Strongly agree	36	17.7
Neutral	54	26.6
Disagree	14	6.9
Strongly disagree	14	6.9
IVF use is likely going to increase over the years		
Agree	117	57.6
Strongly agree	53	26.1
Neutral	28	13.8
Disagree	5	2.5
Strongly disagree	0	0
IVF is associated with ethical issues		
Agree	88	43.3
Strongly agree	37	18.2
Neutral	69	34.0
Disagree	9	4.4
Strongly disagree	0	0
Perception grading		
Positive perception	166	81.8
Negative perception	37	18.2

Respondents' knowledge on IVF as a treatment option

Majority of the respondents 130(64%) had good knowledge on IVF as a treatment option. Most of them knew that in IVF, the husband's sperm and wife's egg are put together 180(88.7%), that IVF babies grow in the mother's womb 161(79.3%) and 126(62.1%) knew that IVF babies do not grow in the test tube. About half of the respondents 112(55.2%) did not know that female egg is retrieved through transvaginal scan and male sperm collected by masturbation 124(61.1%). A large proportion of the respondents 152(74.9%) knew that the success rate of IVF depends on the mother's age and IVF can be associated with failure 125(61.6%). Majority of the respondents knew that in IVF multiple embryos can be transferred, however only a few of them 95(46.8%) knew that the egg or sperm can be preserved 161(79.3%). A significant number of the respondents 53.7% and 68.5% did not know that women have to receive gonadotrophin injection and didn't know anyone who had IVF respectively (Table 3a and 3b).

Table 3a: Respondents' knowledge on IVF as a treatment option.

Variable	Frequency n=203	Percentage (%)
Have you ever heard of IVF		
Yes	151	74.4
No	51	25.1
I don't know	1	0.5
IVF babies are formed artificially		
Yes	136	67.0
No	65	32.0
I don't know	2	1.0
Husband's sperm and wife's egg are put together		
Yes	180	88.7
No	21	10.3
I don't know	2	1
In IVF babies grow in mother's womb		
Yes	161	79.3
No	40	19.7
I don't know	2	1.0

In IVF babies grow in test tube		
Yes	72	35.5
No	126	62.1
I don't know	5	2.4
Women receive Gonadotrophin injection		
Yes	62	30.5
No	109	53.7
I don't know	32	15.8
Procedure is started on day 2 or 3		
Yes	91	44.8
No	87	42.9
I don't know	25	12.3
Female egg is retrieved through Transvaginal scan		
Yes	83	43.3
No	112	55.2
I don't know	3	1.5
Sperm is collected by masturbation		
Yes	76	37.4
No	124	61.1
I don't know	3	1.5
Male has to abstain from sex for at least 2 days		
Yes	118	58.1
No	65	32.0
I don't know	20	9.9

Table 3b: Respondents' knowledge on IVF as a treatment option.

Variable	Frequency n=203	Percentage (%)
Success rate depends on the age of the mother		
Yes	152	74.9
No	41	20.2
I don't know	10	4.9
IVF services are available in Nigeria		
Yes	140	69.0
No	52	25.6
I don't know	11	5.4
IVF can be associated with failure		
Yes	183	90.1
No	17	8.4
I don't know	3	1.5
IVF may have to be repeated after failure		
Yes	125	61.6
No	72	35.5
I don't know	6	3.0
Donor egg or sperm can be used		
Yes	188	92.6
No	15	7.4
I don't know	0	0
Egg or sperm can be preserved		
Yes	95	46.8
No	99	48.8
I don't know	9	4.4
In IVF multiple embryos can be transferred		
Yes	161	79.3
No	40	19.7
I don't know	2	1.0
Women with blocked tubes can benefit from IVF		
Yes	166	81.8

No	36	17.7
I don't know	1	0.5
IVF offers help to infertile couples		
Yes	191	94.1
No	12	5.9
I don't know	0	0
Do you know anyone who had IVF		
Yes	64	31.5
No	139	68.5
I don't know	0	0
Knowledge grading		
Poor knowledge	36	17.7
Fair knowledge	37	18.3
Good knowledge	130	64.0

Sources of information

Majority of the respondents 94 (62.7%) and 95 (63.3%) obtained information on IVF from health personnel/facility and friends/siblings respectively (Table 4).

Table 4: Respondents sources of information.

Variable	Frequency	Percentage
Friends/siblings	95	63.3
Health personnel/facility	94	62.7
Electronic media	54	36.0
School	23	15.3
Not specified	15	10.0
*Multiple responses allowed		

Factors affecting knowledge of IVF

On bivariate analysis, there was a significant association between respondents' religion, socio-economic status, perception and duration of infertility with their knowledge on IVF. The proportion of muslims with good knowledge was higher 127(75.1%) than the Christians 31(91.2%) and this association was statistically significant($p < 0.040$). The proportion of respondents from upper socio-economic class 125(88.0%) with good knowledge was higher than those from the middle 26(66.7%) and lower 7(4.4%) socio-economic class and the association was statistically significant ($p < 0.001$). There was a statistically significant association ($p < 0.001$) between respondents with positive perception 148(82.9) and good knowledge than with respondents with negative perception 10(27%). The proportion of respondents with infertility for 1-7 years with good knowledge was higher 150(79.8%) than those with infertility for 8-15 years and this relationship was found to be significant ($p = 0.026$) (Table 5).

Table 5: Relationship between knowledge of IVF and some variable.

Variables	Knowledge of IVF		Test statistics	P-value
	Good n (%)	Poor n (%)		
Age (years)				
< 30	88 (75.9)	28 (24.1)	$X^2 = 0.609$	0.435
≥ 30	70 (80.5)	17 (19.5)		
Religion				
Islam	127(75.1)	42(24.9)	$X^2 = 4.215$	0.040
Christianity	31(91.2)	3(8.8)		
Tribe				
Hausafulani	123(75.5)	40(24.5)	$X^2 = 2.698$	0.100

Others	35(87.5)	5(12.5)		
Marital status				
Married	156(78.0)	44(22.0)	F =NA	0.530
Unmarried	2(66.7)	1(33.3)		
Marital setting				
Monogamous	104(79.4)	27(20.6)	$X^2 = 0.519$	0.471
Polygamous	54(75.0)	18(25.0)		
Socio-economic status				
Upper	125(88.0)	17(12.0)	$X^2 = 38.372$	0.000
Middle	26(66.7)	13(33.3)		
Lower	7(4.4)	15(68.2)		
Perception				
Positive	148(82.9)	18(10.8)	$X^2 = 67.691$	0.000
Negative	10(27.0)	27(73.0)		
Type of infertility				
Primary	76(81.7)	17(18.3)	$X^2 = 1.504$	0.220
Secondary	82(74.5)	28(25.5)		
No of living children				
0-2	151(77.0)	45(23.0)	F =NA	0.352
>2	7(100.0)	0(0.0)		
Duration of infertility				
1-7 years	150(79.8)	38(20.2)	F = NA	0.026
8-15 years	8(53.3)	7(46.7)		

Determinants of knowledge of IVF

On logistic regression analysis, socio-economic status and perception were found to be independent predictors of knowledge of IVF ($p = 0.008$, OR 3.240, 95% CI 1.355 -7.747 and $p < 0.001$, OR=17.119, 95% CI 6.752-43.400). Thus, respondents from upper socio-economic class are 3 times more likely to have good knowledge of IVF compared to those from lower social class. Similarly, respondents with positive perception are 17 times more likely to have good knowledge of IVF compared to those with negative perception (Table 6).

Table 6: Determinants of knowledge of IVF.

Variables	aOR	Knowledge of IVF 95% Confidence interval		p-value
		Lower	Upper	
Religion (Islam vs Christianity*)	0.307	0.073	1.3000	0.109
Social class (Upper vs *lower)	3.240	1.355	7.747	0.008
Perception (Positive vs Negative*)	17.119	6.752	43.400	< 0.001
Duration of infertility (≤ 7 vs > 7 *)	2.128	0.535	8.458	0.283

aOR = adjusted odds ratio, * reference group, p value = 0.005, IVF – In vitro fertilization

DISCUSSION

The study was carried out to assess the perception and knowledge on invitro fertilization as a treatment option among infertile women in a tertiary hospital in Sokoto, Northern Nigeria.

The mean age of the respondents was 28.9 ± 5.2 years with majority of them being within 20-29 years age group. This is similar to the findings in previous studies in Sokoto^[3,14] where the mean age was 26.7 ± 6.8 and 28.5 ± 6.6 years respectively. It is however lower than 36.6 ± 6.6 , 34.6 ± 4.4 and 38.0 ± 6.5 years reported from Ilorin, Ibadan and Canada respectively.^[7,15,16] The similarity in above studies may be as a result of the fact the studies were carried out in the same region with similar sociocultural practices.

Most of the respondents (99%) were married, this is in conformity with previous studies in Ilorin^[2] and Sokoto^[14] where 98.5% and 98.9% were married. Majority of them were in a monogamous marital setting (64.5%). More than half of the respondents (54.2%) had secondary infertility. This is consistent with the findings in Zaria (82.0%) where more than half of the respondents had secondary infertility.^[17]

In this study, it was found that majority of the respondents (81.8%) had positive perception towards IVF as a treatment option. This is in agreement with the findings in Egypt^[9] and a study in Sokoto (Northern Nigeria),^[3] where 85% and 69% of the respondents had positive perception respectively. A study in Pakistan^[18] reported much lower figure of 45%. A large proportion of respondents believed that IVF babies are normal and accepted in the community (84.8%, 70%), however, they are considered to be artificial (60.1%). IVF procedure is also considered to be accepted in religion by 60.6% of respondents. Studies by Oche and Umar reported that 36% and 56.5% believed that IVF babies are normal.^[3,14] The findings in the current study were much higher than what was observed in Zaria where 18.7% believed that IVF babies are normal and natural while 14% believed that they are normal but not natural.^[17] In Ibadan, 29.4% believed that IVF babies will be deformed, whereas in Anambra 79.7% believed that IVF babies are abnormal.^[2,19] The high level of positive perception among the study respondents may not be unrelated to the fact that the study was carried out in a tertiary hospital located in an urban setting where most of the patients have high literacy level and good information on IVF. The reason for low perception may be attributed to cultural and religious beliefs, IVF is considered unacceptable and not allowed in Islam which constitutes the religion of majority of the respondents in the reported studies.

The current study revealed that more than 60% of the respondents had good knowledge of IVF. This is consistent with the findings from other studies^[20,21] where 57% and 56% were reported to have good knowledge respectively. Ali et al.^[18] and Mohammed et al.^[9] reported much lower findings as 78% and 93% of respondents were unfamiliar and had no information on IVF respectively. A significant proportion of the respondents heard of IVF (74%) and knew that IVF services are available in Nigeria. This corresponds to the findings in Sokoto, Zaria and South Western Nigeria where more than 70% of the respondents heard of IVF and knew that the services are available in Nigeria.^[3,14,17,22] However, only about 40% of respondents knew about its availability within Nigeria as reported by Bello.^[15] Majority of the respondents (90%) knew that husband's sperm and wife's egg are put together to form a baby. Similar findings were reported in South Western Nigeria.^[22] This is not surprising as the study was conducted among final year medical students who obtained information during lectures and clinical experience. The high level of knowledge in this study may be attributed to the high literacy level of the respondents as majority of them have attained secondary and tertiary level of education.

The commonest source of information was through friends and health personnel. Studies by Oche, Umar, Adesiyun and Okwelogu reported mass media as an additional common source of information.^[3,14,17,19] The disparity may be because in the older studies the practice of IVF was not common in most health facilities so even the health personnel were not conversant with the procedure. IVF is perceived to be unaccepted in religion by a reasonable proportion of respondents (40%) so therefore may not be discussed freely in the mass media to avoid disenchantment amongst religious adherents.

In this study, some of the factors that influenced knowledge of IVF include among others religion, perception, type of infertility, duration of infertility and number of living children. It was observed that majority of those with positive

perception (82.9) and primary infertility (81.7%) had good knowledge of IVF. Likewise, most of those with no or less than two living children (77%) and short duration of infertility (79.8%) also had good knowledge of IVF. Studies by Oche and Omokanye had similar results.^[3,8] Factors that were found to be statistically significantly associated with respondents' knowledge of IVF were religion, socio-economic status, perception and duration of infertility. However, only socio-economic status and perception were found to be independent predictors of knowledge of IVF. 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 knowledge towards treatments.

CONCLUSION

This study showed that majority of the respondents (81.8%) had positive perception on IVF. Most of them agreed that IVF babies are normal. A large proportion of the respondents (64%) demonstrated good knowledge on IVF, the information was obtained mainly from friends/siblings and health personnel. There was a significant association between respondents' religion, socio-economic status, perception and duration of infertility with their knowledge on IVF. However, only socio-economic status and positive perception were found to be independent predictors of knowledge of IVF.

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REFERENCES

1. Panti AA and Sununu YT, "The profile of infertility in a teaching Hospital in North West Nigeria". *Sahel Med J*, 2014; 17: 7-11.
2. Akande SO, Dipeolu IO, Ajuwon AJ, "Attitude And Willingness Of Infertile Persons Towards The Uptake Of Assisted Reproductive Technologies In Ibadan, Nigeria". *Ann Ib Postgrad Med.*, 2019; 17(1): 51-58.
3. Oche OM, Ango JT, Gana GJ, Oladigbolu RA, Okafoagu NC, Umar AS, Adam FA, Oluwatobi OJ, Gatawa AM. "In vitro fertilization: Perceptions and misperceptions among women of reproductive age group in Sokoto, Nigeria". *Journal of Reproductive Biology and Health*, 2018; 6(1).
4. Hocaoglu C (2018). "The Psychosocial Aspect of Infertility". *Dhastagir Sultan Sheriff, IntechOpen.*
5. Abubakar IS, Ayyuba R, Garba I. "Awareness of fertility period among women attending immunization clinic at Aminu Kano Teaching Hospital, Northern Nigeria". *Arch Int Surg*, 2015; 5(3): 156-160.
6. Dattijo LM, Andreadis N, Aminu BM, Umar NI, Black KI, "Knowledge of Infertility among Infertile women in Bauchi, Northern Nigeria". *International Journal of Women's Health and Reproduction Sciences*, 2016; 4(3): 103-109.
7. Omokanye LO, Olatinwo AO, Durowade KA, Raji HO, Raji ST, Biliaminu SA, Ganiyu SA, "Determinants of utilization of assisted reproductive technology services in Ilorin, ". *Nigeria. J Med Soc.*, 2017; 31: 109-113.
8. Omokanye LO, Olatinwo AO, Salaudeen GA, Durowade KA, Panti AA, Balogun RO. "Assisted reproduction technology in Nigeria: Challenges and the way forward". *Afr J Infertil Assist Concept*, 2018; 3: 2-5.
9. Mohamed SM, Younes EM, El-Deen HA, Abd-Elaliam AA., "Assessment of Knowledge and Attitude of Infertile Couples About Assisted Reproductive Technology". *Assiut Scientific Nursing Journal*, 2017; 5(12): 126-135.

10. Fauser BC, Boivin J, Barri PN, Tarlatzis BC, Schmidt L, Levy-Toledano R, "Beliefs, attitudes and funding of assisted reproductive technology: Public perception of over 6,000 respondents from 6 European countries". Research Article PLOS, 2019.
11. Dyer S, Chambers GM, de Mouzon J, Nygren KG, Zegers-Hochschild F, Mansour R, Ishirara O, Banker M, Adamson GD, "International Committee for Monitoring Assisted Reproductive Technologies world report: Assisted Reproductive Technology 2008, 2009 and 2010". Hum Reprod, 2016; 31(7): 1588-1609.
12. Iliyasu Z, Galadanci HS, Abubakar IS, Bashir FM, Salihu HM, Aliyu MH, "Perception of infertility and acceptability of assisted reproduction technology in northern Nigeria". Niger J Med, 2013; 22(4): 341-347.
13. Iketubosin F., " In vitro fertilization embryo transfer processes and pathway: A review from practice perspective". Trop J Obstet Gynaecol, 2018; 35: 227-232.
14. Umar AG, Nasir S, Ukwu AE, Burodo AT, Garba JA, Nwobodo EI, "Awareness and Perception of Assisted Reproductive Techniques among Women Attending Infertility Clinic in Sokoto, North-Western Nigeria". Asian Research Journal of Gynaecology and Obstetrics, 2020; 3(4): 26-31.
15. Bello FA, Akinajo OR, Olayemi O., "In-vitro Fertilization, Gamete Donation and Surrogacy: Perceptions of Women Attending an Infertility Clinic in Ibadan, Nigeria". Afr J Reprod Health, 2014; 18(2): 127-133.
16. Zhang Y, Margolese S, Yudin MH, Raboud MJ, Diong C, Hart TA, Shapiro HM, Librach C, Gysler M, Loutfy MR. "Desires, Need, Perceptions, and Knowledge of Assisted Reproductive Technologies of HIV-Positive Women of Reproductive Age in Ontario, Canada". International Scholarly Research Notices, 2012; 11.
17. Adesiyun AG, Ameh N, Avidime S, Muazu A, "Awareness and perception of assisted reproductive technology practice amongst women with infertility in Northern Nigeria". Open Journal of Obstetrics and Gynecology, 2011; 1: 144-148.
18. Ali S, Raafay Sophie R, Imam AM, Khan FI., "Knowledge, perceptions and myths regarding infertility among selected adult population in Pakistan: A cross-sectional study". BMC Public Health, 2011; 11(1).
19. Okwelogu IS, Azuike EC, Ikechebelu JI, Nnebue CK, "In-Vitro fertilisation practice: Awareness and perceptions among women attending fertility clinics in Okija, Anambra State, Nigeria". Afrimed Journal, 2012; 3(2): 5-10.
20. Bunting L, Tsibulsky I, Boivin J., " Fertility knowledge and beliefs about fertility treatment: findings from the International Fertility Decision-making Study". Human Reproduction, 2013; 28(2): 385-397.
21. Sabarre K, Khan Z, Whitten AN, Remes O, Phillips KP, "A qualitative study of Ottawa university students' awareness, knowledge and perceptions of infertility, infertility risk factors and assisted reproductive technologies (ART)". Reprod Health, 2013; 10(41).
22. Ajayi RA and Dibosa-Osadolor OJ., "Stakeholders' Views on Ethical Issues in the Practice of In-Vitro Fertilisation and Embryo Transfer in Nigeria". African Journal of Reproductive Health, 2011; 15(3): 73-80.