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 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<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.](Image)
### 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 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(25.5) |
| 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) | -- |

### 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 |
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 | 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 | Test statistic & p-value |
|-----------------------------------|--------------------|--------------------------|
| Age group                         |                    |                          |
| 15-24                             | 95 (47.7)          | 36 (39.1)                | --                        |
| 25-34                             | 76 (38.2)          | 39 (42.4)                | \( \chi^2 = 6.745 \) 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)                | \( \chi^2 = 8.866 \) p=0.031 |
| ≥5                                | 21 (10.6)          | 20 (21.7)                | --                        |
| Religion                          |                    |                          |
| Islam                             | 168 (84.4)         | 83 (90.2)                | \( \chi^2 = 1.782 \) p=0.204 |
| Christianity                      | 31 (15.6)          | 9 (9.8)                  | --                        |
| Marital status                    |                    |                          |
| Single                            | 93 (46.7)          | 36 (39.1)                | --                        |
| Married                           | 100 (50.3)         | 50 (54.3)                | Fischer’s exact test      |
| Divorced                          | 3 (1.3)            | 3 (3.3)                  | p=0.373                  |
| Widow                             | 3 (1.5)            | 3 (3.3)                  | --                        |
| Educational status                |                    |                          |
| Informal                          | 8 (4)              | 8 (8.7)                  | \( \chi^2 = 2.647 \) p=0.163 |
| Formal                            | 191 (96)           | 84 (91.3)                | --                        |
| Occupation                        |                    |                          |
| Unemployed                        | 132 (63.6)         | 65 (70.7)                | \( \chi^2 = 0.537 \) p=0.502 |
| Employed                          | 67 (33.7)          | 27 (29.3)                | --                        |
| Ever heard of IVF                 |                    |                          |
| Yes                               | 158 (79.4)         | 58 (63)                  | \( \chi^2 = 8.795 \) p=0.004 |
| No                                | 41 (20.6)          | 34 (37)                  | --                        |

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)                  |
| ≥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)                    |
| ≥5                  | 17(11.3)                         | 24(17)                    |
| Religion            |                                  |                           |
| Islam               | 123(82)                          | 128(90.8)                 |
| 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)                  |
| 10-14               | 11(15.1)                         | 17(20.5)                  |
| 15-19               | 9(6.8)                           | 10(12)                    |
| ≥20                 | 10(13.7)                         | 2(2.4)                    |
| Educational status  |                                  |                           |
| Informal            | 6(4)                             | 10(7.1)                   |
| Formal              | 14(96)                           | 131(92.9)                 |
| Occupation          |                                  |                           |
| Unemployed          | 108(72.0)                        | 89(63.1)                  |
| Employed            | 42(28.0)                         | 52(36.9)                  |
| Have you ever heard of IVF? |                          |                           |
| Yes                 | 120(80)                          | 96(68.1)                  |
| No                  | 30(20)                           | 45(31.9)                  |
| Religion            |                                  |                           |
| Islam               | 2.022                            | 0.732                     |
| Christianity        | 0.390                            | 0.040                     |
| Overall perception  |                                  |                           |
| Positive            | 0.732                            | 0.390                     |
| Negative            | 0.078                            | 0.040                     |
| Table 7. Respondents’ likelihood of having a positive overall perception about IVF.

| Variable            | AOR  | 95% CI for OR | p-value |
|---------------------|------|---------------|---------|
| 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? | 0.468 | 0.267         | 0.820   | 0.008 |

Table 8. Likelihood of respondents willing to utilize IVF.

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

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 conceiving 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
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5. Omoaregba JO, James BO, Lawani AO, Morakinyo O and Olotu OS. 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.

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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