



## Knowledge and Attitude of Nurses towards In-vitro Fertilization: A Prospective Cohort Study

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### Abstract

**Background:** The use of In-Vitro Fertilization (IVF) is now becoming a popular experience in developing countries. Little or no research has been conducted to ascertain nurses' knowledge or practices regarding this emerging fertility technology in Nigeria.

**Objectives:** This study determined the knowledge and attitude of nurses regarding IVF.

**Material and methods:** A descriptive cross sectional study was conducted in Nnamdi Azikiwe University Teaching Hospital, Nnewi, south-east Nigeria. Nurses who worked in various wards and clinics, had at least one year of experience in practice were asked to complete the questionnaires. The wards and clinics in the hospital were contacted and the questionnaires were distributed and collected. Data was collected using pre-tested questionnaires with the 5-point Likert scale. Analysis was done using Epi info 2008 version 3.5.1.

**Results:** Of the 133 questionnaires distributed, 122 (92.4%) were completed and returned. The mean age of the respondents was 35.6 (5.1) years. Of the 122 respondents, 116 (95.1%) have heard of IVF while 6 (4.9%) have not heard of it. Of the 116 respondents who have heard of IVF, 100 (86.2%) correctly knew the definition of IVF. Sixty three (51.6%) nurses have been in practice for more than 5 years while twenty one (17.2%) nurses were single. Statistically significant difference exist between their knowledge of IVF and the marital status and age of nurses ( $p < 0.05$ ). Eighty nine (76.2%) of the 116 respondents believed that IVF gives an infertile couple an opportunity to have children, 20 (17.2%) believed that it could be used to determine the gender of a child, while 8 (9.6%) agreed that IVF could be used to treat genetic disorders. Analysis of their attitude revealed a grand mean score of 2.2 (negative).

**Conclusions:** Majority of the nurses had a good knowledge of IVF but with a strong negative attitude towards its use. IVF training would be a useful step in improving nurses' attitudes regarding IVF.

**Key messages:** Majority of the nurses had a good knowledge of IVF but with a negative attitude towards its use by single mothers and in sex selection. With the growing demand for IVF services in our environment, nurses should be adequately trained to enable them disseminate appropriate information on IVF to clients.

### Keywords

*In vitro* fertilization, Knowledge, Attitude, Infertility, Nurses

### Introduction

Knowledge and attitude of nurses can have a profound impact on the quality of healthcare received by patients undergoing in vitro fertilization (IVF) techniques [1]. Information on these factors are essential for future planning of in-house training programs and also for improving the quality of care a patient receives [2-4].

The first successful birth following IVF occurred in 1978 [5,6]. However, more than 250,000 babies have been born since then as a result of using the IVF technique [5-7]. IVF offers infertile couples a chance to have a child who is biologically related to them. Robert G. Edwards, the doctor who developed the treatment, was awarded the Nobel Prize in Physiology or Medicine in 2010 [6,7]. While some have recorded success, some have recorded adverse consequences of this treatment [8,9]. In Nigeria, health care workers, particularly nurses, are taking care of patients undergoing IVF procedures on a routine basis. This is particularly true of tertiary care hospital [10,11].

The IVF nurse plays a significant role in the care received by both recipient and donor, acting as the coordinator for IVF cycles and providing direct care to both patients [10,11]. According to one study, the nurse is the professional who spends the most time with donors as compared with physicians and mental health professionals [10]. They are also greatly involved in donor/recipient matching [10]. In another study, 73% of nurses practicing in infertility settings described their primary role as direct patient care [11]. The success of IVF is the birth of healthy baby (ies) and such condition can only be met with the role each health workers play in the procedure [11-13].

Over the years, there has been increasing number of facilities that offer IVF treatments in developing countries but only very few are in the public tertiary hospitals. The establishment of more IVF centers in the government owned hospitals in Nigeria is in progress. However, it has been observed that the fear arising from lack of knowledge led to discriminatory behaviour towards women embarking on IVF procedures [12]. Unless this gap in knowledge attached to the IVF practice is tackled effectively, the increased demand for the procedure cannot be met. Better knowledge and

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attitude of nurses can be expected to result in improved compliance with the standard procedures and universal precaution practices by them. Hence, knowledge and attitude of nurses regarding IVF can have profound impact on the quality of patient care and follow up practices undertaken by health care providers. Additionally, the nurses understanding and attitudes regarding IVF are yet to be studied in Nigeria. Thus, measuring nurses' knowledge and attitude may help in optimizing the health of couples before commencement of IVF cycle which ultimately will improve the chance of achieving success [14,15].

The authors therefore determined the level of knowledge and attitude of nurses in a teaching Hospital regarding IVF. It is believed that this study will form a useful guide to healthcare givers in developing country settings in educating them on the treatment of infertility and improved nurses'-patients' care.

## Material and Methods

This is a cross-sectional study descriptive research by which survey method was used which looked into the knowledge and attitude of nurses in Nnamdi Azikiwe University Teaching Hospital, Nnewi, south-east Nigeria. Nnamdi Azikiwe University Teaching Hospital, Nnewi is the only federal government tertiary hospital that serves as a referral centre to other hospitals in the state and environs. The study population comprised of all the registered nurses in the clinical area who were present at the time of study (March 2009) from the rank of Chief Nursing Officer to nursing officer class II. Different sections of the hospital were used and these include; out-patient department, surgical/medical units (ie medical, surgical, paediatrics, labour ward and lying-wards). These were used because all the nurses are registered midwives and have come in contact with women requiring a form of family planning.

Sample size was calculated using stata software (stata version 10). A medium effect size (.30) was required for this study. The power level was set on .80, and the conventional  $\alpha=.05$  was specified. On the basis of this, the minimum required sample size for this study was set to 135 nurses.

The target population of nurses in the various clinical areas of at least one year of experience was 167 as the time of the study. However, a total of 35 nurses were on leave and so were not present during the study period, with the result that only 132 nurses were used in the study.

One hundred percent samples were used because of the small number of the population. This was in line with what Shelley and Johnson [16] said in studies involving small population that all the elements can be and should be included in the samples, convert sampling was used, that is the questionnaires were given only to those nurses that were present and on duty. The study used a prospective design, where participants' knowledge and attitudes towards In vitro fertilization were assessed at baseline.

Permission was obtained from the Head of Nursing service of the hospital to use the nurses as study population. After receiving ethical approval from the institution's ethical committee, questionnaires were distributed to those on each shift in different sections of the hospital general out-patient clinic and the surgical/medical/paediatric/antenatal/gynaecology clinics. Only the nurses who gave informed consent were given questionnaires. Only permanent employees were recruited.

The questionnaire was pre-tested before final distribution. During the pre-test, the first questionnaire draft was checked for the content validity of it and ease of use. Feedback from the nurses ( $n=10$ ) was incorporated into a revised version of the questionnaire. The questionnaire consisted of two sections-A and B. Section A collected information on the personal profile of the respondents which was presented in a close-ended form, while section B was on the knowledge of IVF and attitude of nurses presented in open-ended form. They were also requested not to communicate with each other while filling out the questionnaire and not to compare answers after

filling out the questionnaire. They were also requested not to write their names on the questionnaire to maintain anonymity. Participants were given a concise written explanation of the study's background and purposes and were requested to answer all questions. They were informed that their replies would be kept confidential and that, if they did not desire to participate, they could submit a blank questionnaire. Completing the questionnaire was taken as consent to participate. Questions were easy to understand, and the questionnaire required 10 minutes or less to complete. Participation was voluntary, and no incentives were given for participation.

The data instrument was presented in a 5-point Likert scale requesting respondents to tick which item(s) apply to them. The self reported attitude of nurses was measured using a Likert scale and graded from 4= strongly agreed (SA); agreed (A)=3; undecided (U)=2, strongly disagree (SD)=1 to disagreed (D)=0 [17].

This contains a number of statements made about the IVF and for each statement the respondents are required to indicate her degree or level of agreement or disagreement with it using the above-mentioned response alternatives. After the questionnaires are completed, each item was analysed separately. Weights or scores were assigned to the various points on each scale. The higher the score, the more positive or favourable is the subjects' attitude. A respondent's score on the instrument was the sum of the weights assigned to all the scale points she checked.

All data were entered using the Epi info 2008 version 3.5.1 (v 3.5.1; Epi Info, Centers for Disease Control and Prevention, Atlanta, GA). Responses to all the items were converted to a percentage indicating the proportion of correct responses versus other responses. The qualitative data were presented as frequencies and percentages. The calculated scores were presented as mean and standard deviation (SD) after checking for normality in distribution. Analysis was also made by categories in order of importance from positive to negative statements.

$$\text{The weighted mean } (X) = \frac{\sum fx}{\sum}$$

was calculated.

Where F= Frequency of responses of particular category on the scale

X=Assumed weight

$\Sigma$ =Summation

Chi-square test was done where appropriate. The level of significance was accepted when p-value is <0.05 using Mantel-Haenszel

## Results

Of the 132 questionnaires distributed, only 122 (92.4%) were correctly filled and used for final analysis. Ten questionnaires had inadequate data. The mean age of the respondents was  $35.6 \pm 5.1$  years (range 21 to 55, median 31 and mode 32). The mean total years of service were 6.38 years (range 0.1 to 21.0, median 5 and mode 1). Amongst respondents who had worked in the infertility clinic, the mean period of service in infertility clinic was 1.1 years (range 0.1 to 6, median 0.5 and mode 0.1). The demographic characteristics of the subjects are shown in table 1.

Thirty two (26.2%) nurses were nulliparous, while 90 (73.8%) were parous. Sixty three (51.6%) nurses have been in practice for more than 5 years while 59 (48.4%) nurses have been in practice for at least 5 years. Twenty one (17.2%) nurses were single while 101 were married. There was a statistically significant difference between the knowledge of the nurses on IVF and the marital status and age of nurses ( $p<0.05$ ). This is shown in table 3. Majority of nurses who were married have correct knowledge of IVF.

Of the 122 respondents, 116 (95.1%) were aware of the term IVF

**Table 1:** Demographic characteristics of the study subjects (N=122).

Demographic Characteristics	n (%)
Parity	
Nulliparous	32 (26.2)
Multiparous	90 (73.8)
Age (Years)	
20-29	33 (27.0)
30-39	77 (63.1)
≥40	12 (9.9)
Marital Status	
Single	21(17.2)
Married	101 (82.8)
Total duration of Service (Years)	
≤5	59 (48.4)
6-10	45 (36.8)
11-15	11 (9.1)
16-20	5 (4.1)
≥21	2 (1.6)
Work experience in Infertility Clinic (years)	
Yes	91 (74.6)
No	31 (25.4)

**Table 2:** The Respondents' definition of IVF.

S/N Responses	n	%
1. A way of making infertile couples have children.	15	12.9
2. An assisted reproductive technique that involves the use of artificial methods to fertilize an ovum.	100	86.2
3. A new experiment on human beings.	0	0.0
4. Others	1	0.9
Total	116	100.0

while 6 (4.9%) have not heard of it. Of the 116 respondents who were aware of IVF, 100 (86.2%) correctly knew the definition of IVF while others did not know. This is shown in [table 2](#).

Further questions regarding the benefits of IVF were posed to the 116 respondents who were aware of IVF. Eighty nine (76.2%) of the 116 respondents believed that IVF gives an infertile couple an opportunity to have a child, 20 (17.2%) believed that it determines the gender of a child, 14 (12.1%) only believed that it involves the use of artificial methods to fertilize an ovum, while 8 (9.6%) agreed that IVF could be used to treat genetic disorders.

The attitude of the nurses was measured using the Likert scale [16]. Any score in attitude below the acceptance mean (2.5) is negative while a higher value is positive. This is shown in [table 4](#). As regards the attitude of nurses towards IVF, a grand mean score of 2.2 (negative) was gotten.

## Discussion

Hospital nurses could play an important role in IVF cycle, because they are close to the couple and have good knowledge of health criteria, worries, symptoms, drugs and pregnancy complications that could arise. Given their unique position in cycle control, treatment and recording the problems of pregnancy, nurses are well placed to monitor the patients' response to IVF treatments. They are often the source in alerting the responsible gynaecologist/physician about possible complications. There is thus a logical reason to involve nurses and encourage them to contribute in IVF practice. The most important finding in the present study was the nurses' high knowledge about IVF, while their attitude towards this subject was at a very low level. Thus, more than 80% of the respondents knew that IVF is an assisted reproductive technique that involves the use of artificial methods to fertilize an ovum. Similarly, a previous study by Macer [13] in Japan on the knowledge of nurses regarding IVF revealed a very high level of awareness of IVF and genetic engineering.

Unlike in a previous study by Mitchel et al. [7], graduate level education was not correlated with perceived level of expertise but did correlate with length of clinical experience in assisted reproductive nursing and with certification. However, in our study the duration

of nursing practice, work experience in infertility clinic and previous birth experience were not significantly associated with the correct knowledge of nurses on IVF. The short mean period of service in infertility clinic of 1.1 years may have been responsible for the lack of association. Also, prior to this study, the study hospital has not started doing IVF practice.

As regards the attitude of nurses towards IVF, a grand mean score of 2.2 (negative) shows that the nurses have a positive attitude towards IVF even though it is expensive. In our study, a high percentage of respondents (72.6%) believed that IVF gives an infertile couple an opportunity to have a child and 17.2% think it can also determine the gender of the child. These findings are worthy of note especially in our environment where greater premium is placed on the sex of a child especially among the infertile couples. Many couples may opt for IVF on the sole aim of pre-implantation sex determination. Similarly, despite the high level of awareness of IVF in Japan, however, up to 61% of the respondents were worried about research on IVF. The major reason cited for rejection of IVF research in Japan was that it was seen as interfering with nature, playing God or as unethical [12,13].

In the present study, the findings have implications for nurses generally and to the health authority. Although, majority (95%) of nurses have a good knowledge of IVF, there is still a negative attitude towards its use to select the sex of a child and singles opting for the procedure. The reasons for this negative attitude could not be ascertained in our study. This finding contrasts with a previous study by Khalili et al. [18] where the majority of participants in the study had a positive attitude towards IVF treatment for infertile couples. In IVF practice, the nurses give counseling in addition to routine nursing care services, including group education and individual interviews about treatment and coping strategies [18]. The nurses also provide support by accompanying the women during the invasive procedures [12,19].

Significant age and marital status difference were noted in levels of knowledge and awareness regarding IVF. In view of the fact that most nurses vary in different age groups, significant difference in the knowledge and attitudes among different age categories was noted. Similarly, in a study on nurses by Dillon et al. [20], it was found that the attitude of nurses toward IVFs was significantly affected by age ( $p = .05$ ), with older nurses attaining higher mean attitudinal scores. The reasons for this peculiar finding could be the status of the marital union. Age may be a function of their marital status as greater number of the respondents will have been married at higher age since their mean age was  $35.6 \pm 5.1$  years. This then calls for further study.

Despite the low level of attitude of the nurses regarding the use of IVF by single mothers and in sex selection, we expected better practice in terms of monitoring IVF procedures and patients. This indicates that IVF training would be a useful step in improving nurses' attitudes regarding IVF. Some effective measures to improve the situation could be inclusion of IVF practices/ procedures into pre- and postgraduate nursing continuing education programs and establishment of more regional IVF centers in the teaching hospital which could efficiently stimulate IVF Practice. Thus, with the growing demand for IVF services in developing countries, it is recommended that nurses in the clinical areas should gain more sufficient knowledge of IVF through seminars and workshops, while, the health authorities should strive to equip more health institutions with facilities appropriate for the treatment of infertile women at all levels of care. In our future studies, we plan to prepare a training program on IVF practices for the nurses who participated in this study to be able to evaluate the influence of the education on all the measured parameters.

Limitations of the present analysis also need to be addressed. A main weakness is that the majority of the variance in nurses' knowledge and attitudes could not be explained by our study. Moreover, the use of a nonrandom convenience sample may threaten the external validity of findings. The response rate for this study was 92.4%, so non responders may not necessarily affect any obtainable conclusion,

**Table 3:** Correct responses of nurses to definition of IVF with respect to their parity, marital status, duration of service and work experience (Total subject in the study: N=116\*).

Variable	Incorrect response n (%)	Correct Response n (%)	Chi-square	P-value
AGE				
< 30 (years)	10 (8.6)	21 (18.1)	12.0263	*0.0005
≥30 (years)	6 (5.2)	79 (68.1)		
Parity				
Nulliparous	5 (4.3)	24 (20.7)	0.3833	0.5358
Parous	11 (9.5)	76 (65.5)		
Duration of Service (years)				
≤5 years	7 (6.0)	52	0.3724	0.54170
>5 years	9 (7.8)	48 (41.4)		
Marital Status				
Single	10	11	24.4619	*0.0000
Married	6	89		
Work Experience in Infertility Clinic (years)				
Yes	13	77	0.1420	0.7063
No	3	23		

\*=Significance

#= Six (6) respondents have not heard of IVF.

**Table 4:** The Attitude of Nurses towards IVF.

S/N	Attitude Responses	SA	A	U	D	SD	*Mean	Acceptance Mean
1.	IVF should be encouraged	56	52	6	1	1	3.4	Positive
2.	Against any technique that experiments with human beings	1	12	52	48	1	1.7	Negative
3.	IVF should be used to select the sex of the child	20	36	14	40	6	2.2	Negative
4.	A child produced by IVF will not be healthy	0	10	48	54	1	1.6	Negative
5.	Single women should be given access to IVF	1	20	36	42	14	1.5	Negative
6.	We do not need IVF in Nigeria	1	0	56	60	1	1.5	Negative
7.	IVF is too expensive and so could not be recommended for any body	4	8	52	52	6	1.6	Negative
8.	Children produced via IVF behave abnormally	0	0	66	50	1	1.6	Negative

Acceptance mean  $(X) = \sum fx$

The \*grand mean Score (items 1-8) = 2.2

as we are unaware of their attitudes toward IVF. Furthermore, the current study excluded women less than one year student, who may have technology skills gained from their recent school education. However, including them was technically difficult, as they were taking basic science courses outside nursing. We agree that the statistical data resulted in the present study is actual for developing countries with their demographic specificity. According to our data, married women are more informed when questioned on IVF in comparison with the single even though the number of singles in this study was several times less. The three definition of IVF assessed in this report may be interpreted as not so accurate and as a whole, the statistical data represents certain interest and can be applied with guard at the organization of works in IVF clinics.

Finally, the selection of one research site in Nigeria may limit the generalizability of findings. Cultures that stress childlessness may appear positively related to higher nurses' attitude to IVF. Furthermore, psychosocial factors such as marital stress and self-esteem, or socioeconomic factors such as income and social class could have explained more variance in the knowledge and attitude which we did not evaluate in the present study. Another limitation is the cross sectional study design, which does not permit drawing conclusions between the influencing factors and nurses' knowledge and attitudes and bias could have been introduced in the open-ended questions assessing the respondent's attitudes. Another limitation

of the study may have been the fact that our study did not claim to represent all the nurses in the study hospital. However, considering the fact that NAUTH, Nnewi is only federal tertiary hospital in the state with the most qualified nurses, we can infer that most other cities in Nigeria have even less knowledge about the IVF.

In conclusion, the results of the present study demonstrated that nurses who participated in this study had sufficient knowledge about the definition, techniques, purposes and usefulness of IVF. Significant age and marital status difference were noted in levels of knowledge and awareness of IVF. Regarding the low level of attitude regarding its use by single mothers and in sex selection, we expected better practice in terms of monitoring IVF procedures and patients. This indicates that IVF training would be a useful step in improving nurses' attitudes regarding IVF. In our future studies, we plan to prepare a training program on IVF practices for the nurses who participated in this study to be able to evaluate the influence of the education on all the measured parameters. Moreover, as attitudes may change over time, a longitudinal approach should be conducted to identify differences in attitudes across time in future studies.

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