Original Article

Assisted Reproductive Techniques and Gamete Donation; Knowledge, Attitude and Willingness to Participate Among Students in a Nigerian Tertiary Institution

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ABSTRACT

Background: Infertility is a worldwide problem affecting about 10-15% of married couples and has social, economic and psychological implications[1]. A significant number of couples will require assisted reproduction following failure of common treatment options. Undergraduates form a rich source of potential gamete donors and it is imperative to assess their knowledge, attitude and willingness to participate in the expanding gamete donor programs in a developing country like Nigeria.

Objectives: This study aimed to assess the knowledge and attitude of participants about assisted reproduction and to further evaluate their willingness to donate gametes for assisted conception or act as surrogates.

Methodology: This was a cross-sectional descriptive study of 1150 participants consisting of 511 male students and 639 female students of the University of Ibadan. Participants were selected by simple random sampling technique. A semi-structured, self-administered questionnaire was used to obtain information on sociodemographic characteristics, knowledge, attitude and willingness to participate in gamete donor programs. Participation was voluntary and data obtained was treated with utmost confidentiality. Data was analyzed using the Statistical Package for Social Sciences (IBM SPSS, New York) version 22. Descriptive statistics were generated, and the results summarized with the aid of a bar chart and frequency tables.

Results: Eight seven percent of the respondents had good knowledge of Assisted Reproductive Techniques (ART) and the most common source of awareness was the media (63.3%). More respondents were aware of sperm donation (75.5%) compared to egg donation (61.9%). Ninety percent of the participants were correctly able to identify the places where ART could be practiced in Nigeria. Most of the respondents (81.5%) supported ART services and the most common reason for not supporting was due to ethical considerations (45.1%). Only about 54.9% were willing to participate in gamete donor programs. Nine (0.8%) female respondents had previously participated in egg (oocyte) donation while none of the male respondents had ever donated sperm. About three-quarters of the respondents demonstrated good knowledge about the practice of surrogacy.

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Conclusion: Despite good knowledge about ART, only about half of the respondents were willing to participate in gamete donor programs. Religious and health concerns were primarily responsible for their reluctance. Providing Information, Education and Communication (IEC) materials about the safety of ART will increase the level of awareness and confidence in ART thereby increasing participation by potential donors particularly undergraduates in a developing country like Nigeria.

INTRODUCTION

Infertility a global problem is known to affect about 10-15% of couples[1,2]. It has been described as the inability of a couple to achieve conception after one year of regular unprotected sexual intercourse. In certain circumstances, shorter or longer durations have been advocated before evaluation and treatment. In addition to the act of sexual intercourse, a well-functioning hypothalamus, pituitary and reproductive tract is essential for reproduction in both sexes[1]. Infertility constitutes about 50% of gynaecological consultations in developing countries and it is estimated that about 30-40% of women in Sub-Saharan Africa are infertile; in Nigeria however, the incidence varies between 20-30% [2]. A sharp decline in fecundity has been noted from about 37 years in women[2]. Historically, women bore most of the burden and stigma of infertility as they were solely blamed, however many studies indicate that both sexes are affected in equal proportion.[3,4] In clinical practice, no recognizable cause is detected in about 5-10% of cases and this has been termed unexplained infertility.

Evaluation of the infertile couple involves detailed history, physical examination and specific investigations. Treatment options vary with the aetiology of infertility and conventional treatment may not resolve all cases. For those unable to conceive following conventional treatment, there is a need to resort to advanced fertility care involving assisted reproduction.[4,5] Assisted reproduction includes techniques that bypasses some of the natural processes with the aim of achieving conception by allowing gamete manipulation outside the body and subsequent embryo transfer. The first human In-vitro fertilization (IVF) pregnancy was achieved in 1973, while the delivery of the first baby happened 5 years later in 1978[6,7].

Assisted conception involves superovulation, oocyte retrieval, fertilization with capacitated sperm or intracytoplasmic sperm injection (ICSI), embryo culture and transfer followed by luteal support. Success depends on the quality of the retrieved gametes amongst other factors. Some patients would invariably require donor sperms and eggs (oocytes) in order to conceive, especially those advanced in age. Indications for oocyte donation include diminished ovarian reserve from any cause, carriers of significant genetic defects, poor oocyte, and/or embryo quality and or multiple failures from prior In-vitro-fertilization attempts[8]. Evaluation of a potential donor is usually very detailed, and the donor may be Known to the Recipient or Anonymous (Unknown). Psychological counseling, Confidentiality and Legal documentation are important components of gamete donation and should be strictly adhered too.

There is an unmet need for donor gamete treatment in a developing country like Nigeria. This has been occasioned by the high cost of assisted conception which is not covered by insurance resulting in out of pocket payment. Consequently, late presentation is quite common and treatment at this stage invariably entails the use of donor gametes especially oocytes. The process of gamete donation remains somewhat challenging as various cultural and religious practices hinder the donation and acceptance of donated gamete. Unchecked donor compensation may result in the commodification of gametes and may be subject to exploitation especially if scarce.[9,10,11,12, 13] There are growing concerns over the safety of gamete donation and it has become imperative to evaluate the knowledge of potential gamete donors of which undergraduates constitute a

large proportion, about their willingness to participate in gamete donation.

METHODOLOGY

A descriptive cross-sectional study which involved 1150 participants: 511 males and 639 female participants. It was conducted among students of the University of Ibadan, which is the oldest Nigerian University located five miles from the city center in Ibadan, South-Western Nigeria. The University of Ibadan undertakes training of both undergraduate and postgraduate students from across all the geo-political regions of the country, making it an ideal site for the conduct of the study. Sample size determination was calculated using the Kish formula for cross sectional studies with a prevalence set at 0.5. A minimum sample size of 384 was calculated, however 1150 participants were recruited into the study.

Simple random sampling was employed in selecting participants from their various halls of residence. Only full-time students of the University of Ibadan participated in this study. The sampling frame was obtained from the halls of residence. Participants who were not available during the study were replaced by others in the sampling frame. A semi-structured, self-administered questionnaire was used to collect information on sociodemographic characteristics, knowledge, attitude, and willingness of tertiary students to participate in gamete donation for assisted reproduction.

Participation was voluntarily and data obtained was treated with confidentiality. Data was analyzed using the Statistical Package for Social Sciences (IBM SPSS, New York) version 22. Descriptive statistics were used to summarize the results which were presented with the aid of a bar chart and frequency tables.

RESULTS

Six hundred and thirty-nine (55.6%) respondents were females while five hundred and eleven were males (44.4%). The predominant age group were the 16-20yrs (720, 62.6%) and distantly followed by the 21-25 yrs. (374, 32.5%) age group. Only one (0.1%) respondent was below the age of 16yrs. Majority of the respondents were Christians (963, 83.7%) and of Yoruba extraction (896, 77.9%).

Table 1. Socio-demographic Characteristics of Study Group N=1150, Mean age 20.6 ± 3.1yrs

Category	Number (N)	Percentage (%)
Sex		
Male	511	44.4
Female	639	55.6
Age group		
<16 yrs.	1	0.1
16-20	720	62.6
21-25	374	32.5
26-30	45	3.9
>30yrs	10	0.9
Marital Status		
Single	1136	98.8
Married	12	1
Divorced	1	0.1
Separated	1	0.1
Religion		
Christianity	963	83.7
Islam	181	15.7
Others	6	0.5
Tribe		
Yoruba	896	77.9
Igbo	148	12.9
Hausa	10	0.9
Others	95	8.3

The faculties were relatively evenly represented. The Faculties of Arts and Science had 176(15.3%) and 175(15.2%) respondents respectively while over 150 respondents each participated from the

Faculties of Basic Medical Sciences, Law and Social Sciences. About fifty four percent of the respondents were in their first and second years of study. Majority of the respondents (1062, 92.3%) were sponsored by their parents for their study and 42.5% were given allowances less than ten thousand naira monthly (N10,000, 28USD).

Table 2. Education and School Financing of the Participants

Category	Number (N)	Percentage (%)
Faculty of Study		
Basic Medical Sciences	164	14.3
Law	152	13.2
Arts	176	15.3
Education	127	11
Social Science	150	13
Science	175	15.2
Law	79	6.9
Agriculture	74	6.4
Others	54	4.7
Year of Study		
100	338	29.4
200	279	24.3
300	177	15.4
400	256	22.3
500	76	6.6
600	24	2.1
Mode of financing education		
Parents	1062	92.3
Self	44	3.8
Spouse	6	0.5
Combined	38	3.3
Monthly allowance Naira (₦)		
<10000	489	42.5
10001-20000	431	37.5
20001-30000	135	11.7
30001-40000	35	3
>40,0000	61	5.3

Table 3. Knowledge and Awareness of ART

Category	Number (N)	Percentage (%)
Awareness of Assisted Conception		
Yes	1004	87.3
No	146	12.7
Sources		
Media	728	63.3
Internet	503	43.7
Health Talk /Seminar	462	40.2
Person who had it before	121	10.5
Place of worship	81	7.0
Awareness of ART Practice in Nigeria		
Yes	698	60.7
No	452	39.3
Awareness about ART locations in Nigeria		
Yes	845	73.5
No	305	26.5
Locations where it can be done		
Specialized Hospital Any Hospital	763	90.3
Any Hospital	60	7.1
Mission Homes	12	1.5
Chemist	10	1.2
Opinion on what can be donated		
Sperm	868	75,5
Egg	712	61.9
Knowledge/awareness of the various components		
AIH	891	77.5
AID	783	68.1
IVF	657	57.1
Surrogacy	607	52.8
Uterine Transplant	330	28.7

Table 3 depicts the knowledge and awareness of ART amongst the respondents. Most of the respondents (1004, 87.3%) were aware about assisted reproduction. However, only 698(60.7%) were aware that the practice was available in Nigeria and about 90.3% of this group were correctly able to identify the places where ART was practiced in Nigeria. The main sources of information were from the media (63.3%), health

talks (40.2%) and the internet (43.7%). The least source was from religious places of worship. More respondents were aware of sperm donation (75.5%) compared to egg donation (61.9%).

Table 4. Practice of ART

Category	Number (N)	Percentage (%)
Do you support ART		
Yes	937	81.5
No	213	18.5
Reasons for not supporting ART		
Ethically Concerns	96	45.1
Religious beliefs	77	36.2
Immorality	50	23.5
Against Tradition	47	22.1
Willingness to donate gametes		
Yes	632	54.9
No	518	45.1
Reasons for willing to donate		
Altruistic	219	39.5
Assist Family member Financial gain	210	37.9
Financial gain	99	17.9
Other reasons	26	4.7
Reasons for not willing to donate		
Health Risks	250	28.5
Moral Concerns	218	24.9
Inadequate Information	205	23.4
Religious Beliefs	121	13.8
Fear of exhaustion of eggs	83	9.5
Previous egg donation		
Yes	9	0.8
No	630	99.2
Previous Sperm donation		
Yes	0	0.0
No	511	100.0

Most (937, 81.5%) of the respondents' supported ART services and the most common reason for not supporting it was because of ethical considerations (45.1%). Six hundred and thirty-two (54.9%) respondents were willing to donate their gametes if approached. The common reasons for willingness to donate were to help others (39.5%) and to assist family members (37.9%). Health risks associated with ART (28.5%), ethical considerations (24.9%) and inadequate information about ART (23.4%) were the common reasons for being undecided. Only 9 (0.8%) female respondents had previously participated in egg donation while none of the males had ever donated sperms.

Eight hundred and thirty-six respondents (72.7%) were conversant with the practice of surrogacy, however, only 34.5% were aware of its practice in Nigeria.(Figure 1) Only 18.9% of the respondents were willing to participate in surrogacy with 77.2% of them willing to do so for a family member.

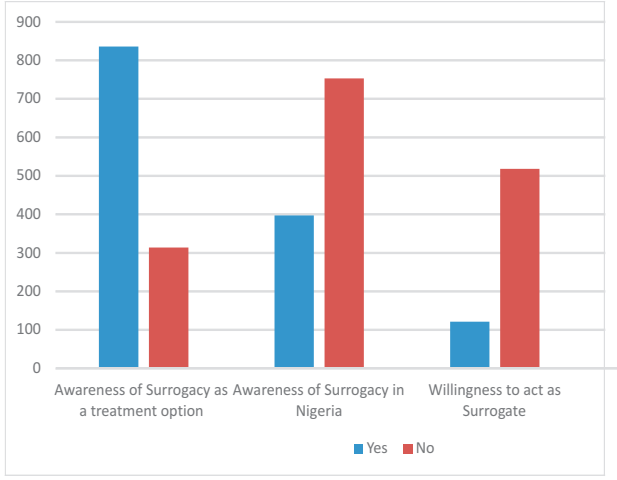

Figure 1. Practice of Surrogacy

DISCUSSION

This study conducted among undergraduates of the University of Ibadan revealed a relatively good knowledge and awareness about assisted conception and its practice in Nigeria. However, the attitude to assisted conception was not encouraging as willingness to participate in gamete donation and surrogacy did not match the level of awareness. Various reasons ranging from health considerations, ethical concerns and inadequate understanding of ART were adduced.

The mean age of the respondents was 20.6 $\pm$ 3.1yrs. Most were in the age bracket of 16-20 yrs. Which was not unexpected for a predominantly

undergraduate training and learning institution. The sociodemographic characteristics of the respondents was in conformity to the University's location in the South Western region of Nigeria with 77.9% of the respondents being of Yoruba extraction, the predominant tribe in the region. Additionally, most respondents were single (98.8%) and were sponsored by their parents (92.3%) with about 80% on less than twenty-thousand-naira monthly stipend (N20,000. 56 USD). This is the current reality in Nigeria where students are under the sponsorship of their parents/guardians even up till their postgraduate training. A reversal in this trend will entail an increased availability of educational grants and scholarships to lessen the financial burden experience in developing countries such as Nigeria.

The awareness about ART in this study was quite high (87.3%) and approaching the over 90% obtained in developed countries[14]. This figure is somewhat higher than previously reported rates of between 58.7-76.5% in Nigeria[15]. and may be attributable to the increased availability of ART clinics across the country and wider access to social media/internet. Previous studies involved mostly older women, infertile women and rarely included males. This study was amongst a much younger age bracket well abreast with social media thereby accounting for our finding of increased awareness via this source. The social media is increasingly becoming an avenue for promoting preventive and intervention strategies for public health and efforts must be made to enhance the utilization of modern communication media. Although, the hazards of social media regarding health has been documented in previous studies, helping young adults focus on the beneficial aspects should be the goal rather than discouraging it use. Health talks / Educative programs were also important sources of information about ART as observed in this study, with 40.2% of the respondents learning about ART through this medium.

This study revealed that 90.3% of the respondents were aware of ART. This was an improvement over the 73.2% and 54.5% previously reported in Ibadan and Ilorin respectively[16]. A study from Iran however, reported a lower rate of 41.7%[17]. Furthermore, there were variations in the knowledge about the different services/options offered by ART. Over 57% of the respondents had good knowledge about In-Vitro Fertilization (IVF) while lower knowledge rates were recorded for surrogacy (52.8%) and uterine transplantation (28.7%). The first successful uterine transplantation surgery was reported in 2016[18,19] and expectedly knowledge about it was poor. The acceptability of ART in this study was 81.5% which was quite similar to other studies with documented values between 74.8% and 85.6% [20]. Acceptability of ART for conception is about twice as likely in older couples[21,22].

With respect to gamete donation, our study found that 54.9% of the respondents were willing to donate sperm or egg. This was similar to the 50.7% obtained by Adesiyun in Nigeria[15] but lower than the range of 63-66% obtained from developed countries[23,24]. This study revealed that ethical (45.1%) and religious (36.2%) considerations were the two most common reasons why the respondents did not support gamete donation (Table 4). This was in contrast to a study from Turkey which suggested that religion had no influence on gamete donation [23]. Several respondents considered it strange to carry genetically unrelated foetuses while others counted it as a form of sexual immorality.

Altruistic donation of gametes was an important reason for supporting ART and in this study 39.5% of the respondents were willing to donate their gametes at no cost to the recipient. This was quite reassuring as less than 20% were influenced by financial benefits. The influence of rewards is particularly important in a low resource country like Nigeria where 69% of the population live below the global poverty line. Some studies have revealed that men were generally more likely to donate sperm

compared to women donating oocytes, as men were less concerned with the potential emotional problems of gamete donation, but more inclined towards the economic consequences or implications for inheritance[21,25]. Support for ART is not universal as 98.0% of women were opposed to oocyte donation in a study from Iran[17]. Concerns have also been expressed about intra-family donations which in effect has popularised the use of anonymous gametes by many ART clinics. This study revealed that health risks (28.5%) and inadequate information (23.4%) were the commonest reasons for not willing to donate gamete. This underscores the need for health information dissemination as a means to bridge the knowledge gap.

Nine (0.8%) female respondents had participated in a previous oocyte donation while none of the male respondents had ever donated sperm. There is a need to educate potential gamete donors about the benefits of participating in assisted conception programmes, with an emphasis on safety. Advocacy in this direction however must take into consideration religious and ethical considerations. Surrogacy on the other hand has been in existence for over 50 years and its awareness from our study was 72.7% (Figure 1), although, only 34.5% of the respondents were aware of its practice in Nigeria. This may be due to the strict confidentiality involved in surrogacy apart from the legal hurdles and documentation required. Furthermore, surrogacy is done in secrecy in many developing countries where a high premium is placed on childbearing unlike in most developed countries. Approval rating for surrogacy was 18.9% in this study which was quite low and similar to the 13% rate observed in Ilorin, Nigeria[26]. Surrogacy remains the only means of conception for a few infertile women with medical challenges and should be supported/encouraged when indicated. Surmounting the challenges posed by surrogacy would require not just reproductive health education but a conviction to participate in the programme.

CONCLUSION

The knowledge, attitude, and willingness to participate in gamete donation by undergraduates in a Nigerian tertiary institution was explored in this study and the outcome suggested a good level of knowledge and willingness to participate in gamete donor programmes. Insights into their argument against gamete donor programmes hinged on health risks, religious and ethical concerns. In view of the magnitude of infertility in Nigeria, with an increasing need to resort to assisted conception, it has become imperative to encourage gamete donation via reproductive health education of potential donors for which undergraduates constitute a large pool. There is an unmet need for gamete donation and providing the right ethical, moral and religious framework coupled with appropriate compensation for services rendered is a step in the right direction especially in a developing country, like Nigeria, where a high premium is placed on childbearing.

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