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ORIGINAL RESEARCH

Knowledge, Attitude and Willingness to Participate in Gamete Donation for Artificial Insemination among Undergraduate Students in Lagos

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Abstract

Background: Infertility is a condition affecting one fifth to one sixth of couples in the reproductive age. Gamete donation is one of the options in the management of infertility, but it is relatively unknown in the developing world.

Objectives: To assess the knowledge, attitude and willingness of undergraduate students at a Nigerian university to participate in gamete donation for artificial insemination.

Methods: A descriptive cross-sectional study was conducted among 160 undergraduate students using a semi-structured self-administered questionnaire. The respondents were recruited using a multi-staged sampling technique.

Results: The mean age of the respondents was 21.5±3.2 years with a range of 18-32 years. Majority (89.4%) of the respondents were single and were in the first year of study (56.3%). Almost all the respondents (96.3%) had heard about the practice of gamete donation, but only (38.7%) had overall good knowledge about it. Almost half (46.9%) of respondents had overall positive attitude towards gamete donation while only 37.5% were willing to participate. Class level of the respondents ($p = 0.03$) was significantly associated with poor knowledge of gamete donation, while age ($p = 0.01$) and gender ($p < 0.001$) were associated with negative attitude. Age ($p<0.001$) was also significantly associated with poor willingness to participate.

Conclusion: Awareness of gamete donation was high among the respondents but the knowledge poor, leading to negative attitude and poor willingness to participate. Public enlightenment on gamete donation for artificial insemination should be intensified.

Keywords: Assisted Reproductive Techniques, Embryo transfer, Gamete donation, Infertility, In-Vitro Fertilization, Undergraduates.

Introduction

Infertility can be defined as the inability of a woman of reproductive age group to conceive or become pregnant after 12 months or more of unprotected vaginal sexual intercourse. [1] An estimated 34 million women, predominantly from developing countries, have infertility resulting from maternal sepsis and unsafe abortion. [2] Infertility is primary when the woman has never conceived or secondary, when the woman has previously achieved a pregnancy but unable to conceive again. [3] In developed countries, infertility has an average prevalence rate of 10-15%, which is in contrast to the high prevalence rates (20-

46%) recorded in the sub-Saharan Africa countries.[4]

Premature ovarian failure is known as a primary indication for gamete donation in infertility treatment in women.[5] However, more recently documented indications include advanced maternal age, diminished ovarian reserve, secondary infertility following treatment of childhood malignancies, multiple failed *in-vitro* fertilization (IVF) attempts and maternally inherited genetic abnormalities. [6, 7] The management of infertility ranges from counselling, medications to surgery. [5] Failure of medical and surgical management modalities may require the use of Assisted Reproductive Technology (ART). ART refers to infertility treatments that handle both eggs and sperm. It works by removing eggs from the ovaries and the eggs are mixed with sperm to make embryos. The embryos are then implanted in the woman's body. ART describes several different medical procedures required to facilitate conception. Such procedures include Intrauterine Insemination (IUI), *In-Vitro* Fertilization (IVF), Gamete Intrafallopian Transfer (GIFT), Intracytoplasmic sperm injection (ICSI) and Zygote Intrafallopian Transfer (ZIFT). [8] ART are based on the availability of gametes for insemination. [5] Donor sperm is required for IUI or ICI but less commonly, for other ART such as IVF and ICSI. [8] Therefore, gamete or embryo donation is a sensitive subject because it challenges the genetic lineage of the family.

In developed countries, many couples have benefitted from ART. [10] However, in the developing parts of the world, particularly Africa, where infertility is more prevalent, ART is less known and accepted to most of the populations. A study in Ohio, United States, revealed that majority (86.7%) of respondents knew about egg donation for infertility treatments compared to another Turkish study where only 33.1% of the respondents knew about gamete donation. [10, 11] Similarly, a study conducted among Swedish women reported that 47% had knowledge of oocyte donation. [12] However, a study done in Ilorin, Nigeria showed that only 18.8% of the respondents were aware of gamete donation for ART purposes. [13] Attitudes are moulded around an individual's belief about a phenomenon or circumstance. [14] Attitude towards gamete donation could be related to the level of its knowledge. A study of Belgian students revealed that only 34.3% of the respondents would consider donating their sperms [15] while 40% feared that gamete donation might have a negative impact on their current or future relationship. [15] A study of medical students in Enugu, southeast Nigeria, revealed that majority (90%) of the respondents indicated their preference for secrecy and anonymity in sperm donation. [16] However, only 15.2% of the male respondents reported their willingness to donate sperm for the treatment of infertile couples compared to 30% of the female respondents. [16]

Willingness to participate in gamete donation may be related to the level of knowledge and attitude to the entire processes of ART. A study done in France revealed that 71% of the respondents claimed that they would inform the child about the method of conception. [17] Similarly, a study in Belgium showed that majority (82%) of the respondents expressed their willingness to reveal non-identifying information about themselves to donor offspring. [15] However, the medical students studied in Enugu, southeast Nigeria revealed that only 10% of the respondents were favourably disposed to gamete donation. [16]

In recent times, infertile couples are increasingly embracing various treatment options for infertility, including gamete donation for artificial insemination. However, this option is still rather unpopular, especially among the younger generation. Therefore, the present study sought to assess the knowledge, attitude and willingness of a population of Nigerian undergraduates to participate in gamete donation for artificial insemination.

Methods

Study Area

The study was conducted at the Lagos State University (LASU) Ojo, a state-owned university, established in 1983 as a multi-campus, collegiate and non-residential institution for the advancement of learning and establishment of academic excellence. The university has a student population of over 35, 000 and offers courses at undergraduate and postgraduate levels. There are currently six faculties on the main campus, comprising of Arts, Social Sciences, Management Sciences, Law, Science and Education. [18]

Study Population

The study was conducted among the male and female undergraduate students of Lagos State University, Ojo, Lagos State.

Study Design

The study was a descriptive, cross-sectional survey.

Sample size calculation

The minimum sample size was calculated using the Fischer's formula for a cross-sectional study where $n = Z^2pd/d^{2:}$

"p" represents the proportion of population with good knowledge (90%) of gamete donation in a previous study. [16]

At 95% level of confidence, Z = 1.96, q = 1 - p and d = error margin of 5%. The calculated minimum sample size was 132. Using a 20% non-response rate, the sample size was increased to 158.4 and approximately, 160 to improve precision.

Sampling Technique

A multistage sampling technique was used to select the respondents. In stage one, two faculties (Sciences and Social Sciences) were randomly selected by balloting out of the six faculties in the institution. At the second stage, two departments were randomly selected by balloting within each faculty: Departments of Microbiology and Computer Science in the Faculty of Science and Departments of Psychology and Economics in the Faculty of Social Sciences. In stage three, 40 respondents were selected from each department across all the levels of study by simple random sampling method until the sample size was reached. Only respondents that consented to be interviewed were recruited into the study.

Survey Instrument

The survey instrument was a semi-structured and self-administered questionnaire, developed based on literature reviews of publications with similar objectives. [1, 16, 19] The questionnaire contained a total of 64 open- and close-ended questions, grouped into four sections as socio-demographic characteristics, knowledge, attitude and willingness to participate in gamete donation for artificial insemination.

Pre-test

Ten percent of the total questionnaires was pre-tested among the undergraduate students of University of Lagos, Akoka, Yaba, Lagos to address ambiguity and poorly structured questions.

Data analysis and management

The data was reviewed, cleaned, organized and analysed using the Statistical Package for the Social Sciences (SPSS) Software version 20. Descriptive and inferential statistics were conducted, and the results were presented in frequencies, means and standard deviations. Chi-Squared test was used to determine the association between categorical variables and level of statistical significance was set at p value ≤ 0.05.

Scoring System

The level of knowledge of gamete donation for artificial insemination had twelve questions. One mark was awarded for each correct answer and no mark for incorrect answers. Each respondent's total score was converted to a percentage. A score less than 50% was considered as poor knowledge while a score of

50% and above was recorded as good knowledge.

A five-point Likert scale on a set of twelve statements was used for the assessment of attitude towards gamete donation for artificial insemination. Respondents could strongly agree, agree, be neutral, disagree or strongly disagree with each of the statements. "Strongly agree" was scored 5 points, "agree" was 4 points, "neutral" was 3 points, "disagree" was 2 points and "strongly disagree" was scored 1 point, with a maximum score of 60 and minimum score of 12. The total score was converted to a percentage. Less than 50% was considered as negative attitude while a score of 50% and above was recorded as positive attitude.

Willingness to participate in gamete donation for artificial insemination was assessed using 13 questions. One mark was given for each correct answer and no mark was awarded for an incorrect answer. The scores were converted to percentages. Less than 50% score was considered as poor willingness while scores of 50% and above were recorded as good willingness.

Ethical considerations

Ethical approval was obtained from the Health and Research Ethics Committee of the Lagos State University Teaching Hospital, (LASUTH), Ikeja, Lagos (Reference Number: LREC/06/10/394). All the respondents were properly briefed on the nature of the study, the need for confidentiality, importance to the society and procedures for completing the questionnaire. Informed verbal consent was obtained in all cases.

Results

One hundred and sixty (160) questionnaires were administered and were fully completed, giving a response rate of 100%. The mean age of the respondents was 21.5±3.2 years with a range of 18-32 years. Over half (54.5%) of the respondents were males, 89.4% were single and 56.3% were in their first year of study (Table I). Almost all the respondents (96.3%) had heard of gamete donation for artificial insemination. Only 32.5% claimed to have learnt about gamete donation on the social media, followed by the classroom (23.4%). Only (18.2%) of respondents claimed to know anyone who had previously donated gamete for artificial insemination. However, a little more than a third (38.7%) of the respondents had an overall good knowledge of gamete donation for artificial insemination (Table II).

Over a third of the respondents (37.5% strongly agreed to know the number of children conceived from own gamete while half (50.0%) strongly agreed to have information about the family the products of their donation would grow up in. Almost a third (32.5%) strongly agreed to prepare to meet the children conceived with own gamete if they wanted it while 41.3% strongly agreed that the children should have the right to know their genetic origin. Both males (36.3%) and females (35.5%) were neutral about donating gamete for artificial insemination. However, less than half (46.9%) had a positive attitude towards gamete donation for artificial insemination (Table III).

A little above half (51.2%) claimed they would like to donate gamete anonymously. Overall, only (37.5%) of the respondents were willing to participate in gamete donation for artificial insemination (Table IV). Class level ($p = 0.03$) was significantly associated with the knowledge of gamete donation for artificial insemination (Table V). Age ($p = 0.01$) and gender ($p<0.001$) were also statistically significantly associated with the attitude of the respondents towards gamete donation (Table VI), while age ($p<0.001$) and class levels of study ($p<0.001$) were statistically associated with willingness to participate in gamete donation for artificial insemination (Table VII).

Table I: Socio-demographic characteristics of the respondents

Socio-demographic Characteristics	*Frequency (n=160)*	*Percentage*
Age group (Years)		
<20	51	31.9
20-24	83	51.9
≥25	26	16.2
Gender		
Male	84	52.5
Female	76	47.5
Marital status		
Single	143	89.4
Married	13	8.1
Others	4	2.5
Educational Level		
100	90	56.3
200	22	13.8
300	42	26.3
400	6	3.6

Discussion

The mean age of the respondents in the present study was 21.5 years and 89.4% were maritally single. These findings were comparable with a similar study conducted in Enugu, southeast Nigeria, where the mean age of the respondents was 24.0 years and 90% were single. [16] Such findings could be explained by the fact that both studies were conducted among undergraduate students. Almost all the respondents were aware of gamete donation compared to a study conducted among women in Northern Nigeria, where only 18.7% of the respondents knew about gamete donation. [19] The difference in the findings could be ascribed to the lower level of education in that section of the country, especially among the women. The implication of this finding is that there may be delay in recognising infertility and even, accepting alternative means of birthing children such as gamete donation for artificial insemination.

In the present study, just a little over a third (38.7%) of the respondents had good knowledge about gamete donation for artificial insemination. This low level of knowledge could be attributed to lack or inadequate information on gamete donation or even the secrecy associated with discussing infertility in the larger society.

The present study revealed that less than one-fifth (18.2%) of the respondents were aware of anyone who had previously donated gamete for artificial insemination. This finding was similar to the finding in a study done among women in Turkey, where only 1.6% of the respondents had friends or relatives who had had gamete donation. [11] This finding implied that appropriate information on gamete donation for artificial insemination might not be in the public domain resulting in the rather poor knowledge among the respondents. The present study revealed that less than half (43.7%) of the respondents were aware of their fertility status. This finding was different from the finding in a Turkish study, where only 3.6% of respondents had knowledge of their fertility status. [11] The implication of awareness of fertility status among undergraduates is the need to prevent actions and activities that might adversely affect fertility in future.

Table II: Knowledge of respondents on gamete donation for artificial insemination

Knowledge on gamete donation	*Frequency (n = 160)*	*Percentage*
Ever heard of about gamete donation		
Yes	154	96.3
No	6	3.8
Source of information (n=154)		
Television	21	13.6
Radio	7	4.5
Magazine	9	5.8
Social media	50	32.5
Friends	21	13.6
Family	3	1.9
Classroom	36	23.4
Others	7	4.5
Awareness about anyone that has previously donated a gamete (n=154)		
Yes	28	18.2
No	126	81.8
Knowledge of any gamete donation centre in Lagos (n=154)		
Yes	23	14.9
No	131	85.1
Will religion allow gamete donation for infertility treatment (n=154)		
Yes	77	50.0
No	77	50.0
Awareness of own fertility status		
Yes	61	38.1
No	90	56.3
Uncertain	9	5.6
Preference source of gamete donation (n=154)		
Self	89	57.8
Donor	65	42.2

The finding from the present study showed that only 38.7% of the respondents had overall poor knowledge of gamete donation for artificial insemination. This was in contrast to the finding in a study done in Ohio where only 21.1 of the respondents had poor knowledge about gamete donation. [10] The higher proportion of respondents with poor knowledge in the present study could be attributed to the lower socio-economic background of the environment.

A little more than a third of the respondents claimed they would like to know the number of children that would be conceived with their gametes. This finding was similar to that of a systematic review of sperm donors done in Belgium, in which 46.5% of the respondents would like to gather information about the children conceived with their sperm. [15] This study also revealed that half of the respondents would like to have information about the family where the products of their gamete donation would grow up. This contrasts a study done in Belgium where about a fifth of the respondents wanted information about the family where the child would grow up. [15] The implication of this finding is that people are still not totally receptive to gamete donation for artificial insemination, as this might influence the outcome of infertility management. Less than half of the respondents in the present study had a positive attitude towards gamete donation for artificial insemination. This observation could be linked to poor knowledge on gamete donation for artificial insemination.

Table III: Attitude towards gamete donation for artificial insemination

Attitude towards gamete donation	*Strongly Agreed Freq (%)*	*Agreed Freq (%)*	*Neutral Freq (%)*	*Disagreed Freq (%)*	*Strongly Disagreed Freq (%)*
Would like to know how many children were conceived with my gamete.	60 (37.5)	20 (12.5)	24 (15.0)	3 (19.4)	25 (15.6)
Would like information about the family in which the children will grow up.	80 (50.0)	19 (11.9)	9 (5.6)	27 (16.9)	25 (15.6)
Would like information about the child conceived with my gamete, without receiving their names.	22 (13.8)	34 (21.2)	47 (29.3)	22 (13.8)	35 (21.9)
Would be reluctant to donate to a single parent.	28 (17.5)	25 (15.6)	47 (29.3)	38 (23.8)	22 (13.8)
Would be prepared to give information about self to the children born from my donation, without giving name	20 (12.5)	40 (25.0)	46 (28.7)	22 (13.8)	32 (20.0)
Would be prepared to donate my gamete if my name would be revealed to the children resulting from my donation.	25 (15.6)	24 (15.0)	44 (27.5)	31 (19.4)	36 (22.5)
Would be prepared to meet the children conceived with my gamete, if they want that.	52 (32.5)	34 (21.3)	37 (23.1)	14 (8.7)	23 (14.4)
Children conceived with donated gamete should have the right to know their genetic origin.	66 (41.3)	45 (28.1)	24 (14.3)	2 (2.0)	23 (14.4)
Many men are prepared to donate sperm.	37 (23.1)	43 (26.9)	58 (36.2)	8 (5.0)	14 (8.8)
Many women are prepared to donate eggs.	15 (9.4)	19 (11.9)	57 (35.6)	40 (25.0)	29 (18.1)
If I would have fertility problem, I would be prepared to use donor gamete.	28 (17.5)	24 (15.0)	58 (36.3)	28 (17.5)	22 (13.7)
I would be prepared to donate even if my expenses would not be reimbursed.	33 (20.6)	43 (26.9)	45 (28.1)	14 (8.8)	25 (15.6)

A little above half of the respondents in this study would like to donate their gametes anonymously. This finding is in contrast to the finding in a study conducted among medical students in Enugu State, Nigeria, where only one-tenth of the respondents would agree to donate anonymously. [16] The implication of this observation is that the principles of ART, particularly, gamete donation for artificial insemination are yet to be fully understood.

The present study also revealed that a little above a third of the respondents were willing to participate in gamete donation for artificial insemination. This implies that more efforts should be put into engaging and convincing the public to embrace gamete donation for artificial insemination. Increasing class levels of study was significantly associated with poor knowledge of gamete donation while age and gender are also associated with negative attitude towards gamete donation. Similarly, age and class levels of study are associated with poor willingness to participate in gamete donation for artificial insemination. The weakness of the study includes the rather small sample size hence, the findings in the study may not be applicable to the general population.

Conclusion

Poor knowledge of gamete donation for artificial insemination cannot be divorced from negative attitude and poor willingness to participate in the gamete donation as an infertility treatment option. Extensive public enlightenment on fertility management options is recommended, especially on gamete donation for artificial insemination. Furthermore, concerned individuals should be adequately counselled to consider gamete donation for artificial insemination.

Table IV: Willingness to participate in gamete donation for artificial insemination.

Willingness to participate in gamete donation	*Frequency (n=160)*	*Percentage*
Would inform child that he/she was conceived by gamete donation		
Yes	68	42.5
No	92	57.5
Would use donor sperm/egg if the need arose		
Yes		
No	96	60.0
	64	40.0
Would like to receive information about the recipient family		
Yes	119	74.4
No	41	25.6
Would like to donate anonymously		
Yes	82	
No	78	51.2
		48.8
Preferred method of naming a donor		
Gamete donor		
Natural father	54	33.7
Real father	39	24.4
	67	41.9
Would reveal the identity of the donor to a donor conceived child		
Yes	77	48.1
No	83	51.9

Table V: Association between knowledge of gamete donation and socio-demographic characteristics

Characteristics	*Good n (%)*	*Poor n (%)*	*X^2*	*p-value*
Age group (Years)			4.091	0.129
<20 (n = 51)	14 (27.5)	37 (72.5)		
20-24 (n = 83)	36 (43.4)	47 (56.6)		
≥25 (n = 26)	12 (46.2)	14 (53.8)		
Gender			2.186	0.139
Male (n = 84)	28 (33.3)	56 (66.7)		
Female (n = 76)	34 (44.7)	42 (55.3)		
Marital status			3.077	0.215
Single (n = 143)	58 (40.6)	85 (59.4)		
Married (n = 13)	4 (30.8)	9 (69.2)		
Others (n = 4)	0 (0.0)	4 (100.0)		
Level				
100 (n = 90)	29 (32.2)	61 (67.8)	8.888	0.031
200 (n = 22)	8 (36.4)	14 (63.6)		
300 (n = 42)	24 (57.1)	18 (42.9)		
400 (n = 6)	1 (16.7)	5 (83.3)		
Faculty				
Social science (n = 80)	34 (42.5)	46 (57.5)	0.948	0.330
Science (n = 80)	28 (35.0)	52 (65.0)		
Department				
Psychology (n = 40)	17 (42.5)	23 (57.5)	1.159	0.769
Economics (n = 40)	17 (42.5)	23 (57.5)		
Microbiology (n = 40)	13 (32.5)	27 (67.5)		
Computer science (n = 40)	15 (37.5)	25 (62.5)		

Table VI: Association between attitude towards gamete donation and socio-demographic characteristics

Characteristics	*Positive n (%)*	*Negative n (%)*	X^2	*p-value*
Age group (Years)				
<20 (n = 51)	30 (58.8)	21 (41.2)	7.983	0.018*
20-24 (n = 83)	30 (36.1)	53 (63.9)		
≥25 (n = 26)	15 (57.7)	11 (42.3)		
Gender				
Male (n = 84)	34 (40.5)	50 (59.9)	2.908	0.008*
Female (n = 76)	41 (53.8)	35 (46.1)		
Marital status				
Single (n = 143)	67 (46.9)	76 (53.1)	1.002	0.600
Married (n = 13)	7 (53.8)	6 (46.2)		
Others (n = 4)	1 (25.0)	3 (75.0)		
Level				
100 (n = 90)	38 (42.2)	52 (57.8)	5.349	0.148
200 (n = 22)	9 (40.9)	13 (59.1)		
300 (n = 42)	23 (54.8)	19 (45.2)		
400 (n = 6)	5 (83.3)	1 (16.7)		
Faculty				
Social science (n = 80)	36 (45.0)	44 (55.0)	0.226	0.635
Science (n = 80)	39 (48.8)	41 (51.2)		
Department				
Psychology (n = 40)	18 (45.0)	22 (55.0)	0.678	0.878
Economics (n = 40)	18 (45.0)	22 (55.0)		
Microbiology (n = 40)	21 (52.5)	19 (47.5)		
Computer science (n = 40)	18 (45.0)	22 (55.0)		

Table VII: Association between willingness to participate in gamete donation and socio-demographic characteristics

Characteristics	*Good n (%)*	*Negative n (%)*	X^2	*p-value*
Age group (Years)				
<20 (n = 51)	17 (33.3)	34 (66.7)	10.354	0.006
20-24 (n = 83)	26 (31.3)	57 (68.7)		
≥25 (n = 26)	17 (65.4)	9 (34.6)		
Gender				
Male (n = 84)	26 (31.0)	58 (69.0)	3.325	0.072
Female (n = 76)	34 (44.7)	42 (55.3)		
Marital status				
Single (n = 143)	51 (35.7)	92 (64.3)	3.677	0.158
Married (n = 13)	8 (61.5)	5 (38.5)		
Others (n = 4)	1 (25.0)	3 (75.0)		
Level				
100 (n = 90)	26 (28.6)	64 (71.1)	12.496	0.006
200 (n = 22)	7 (31.8)	15 (68.2)		
300 (n = 42)	22 (52.4)	20 (47.8)		
400 (n = 6)	5 (83.3)	1 (16.7)		
Faculty				
Social science (n = 80)	32 (40.0)	48 (60.0)	0.437	0.514
Science (n = 80)	28 (35.0)	52 (65.0)		
Department				
Psychology (n = 40)	16 (40.0)	24 (60.0)	0.427	0.935
Economics (n = 40)	16 (40.0)	24 (60.0)		
Microbiology (n = 40)	14 (35.0)	26 (65.0)		
Computer science (n = 40)	14 (35.0)	26 (65.0)		

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