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

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Abstract

Background: Infertility affects one-fifth to one-sixth of couples of reproductive age. Gamete donation is one option for managing infertility, but it is relatively unknown in the developing world.

Objectives: To assess Nigerian undergraduate students' knowledge, attitude and willingness 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-stage sampling technique.

Results: The mean age of the respondents was 21.5±3.2 years, with a range of 18-32 years. The 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 an overall positive attitude towards gamete donation, while only 37.5% were willing to participate. The 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 a negative attitude. Age (p<0.001) was also significantly associated with poor willingness to participate.

Conclusion: The respondents' awareness of gamete donation was high, but their knowledge was poor, leading to a 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 cannot conceive again. [3] In developed countries, infertility has an average prevalence rate of 10-15%, in contrast to the high rates (20-46%) recorded in sub-Saharan African countries.[4]

Premature ovarian failure is 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* fertilisation (IVF) attempts and maternally inherited genetic abnormalities. [6, 7] The management of infertility ranges from counselling and medications to surgery. [5] Failure of medical and surgical management modalities may require using Assisted Reproductive Technology (ART). ART refers to infertility treatments that handle both eggs and sperm. It removes eggs from the ovaries, which 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 is 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 family's genetic lineage.

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 by most of the population. A study in Ohio, United States, revealed that the 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 survey conducted among Swedish women reported that 47% knew about oocyte donation. [12] However, a study 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 sperm, [15] while 40% feared that gamete donation might harm their current or future relationship. [15] A study of medical students in Enugu, southeast Nigeria, revealed that most (90%) 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 to treat 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 ART process. A study in France revealed that 71% of the respondents claimed they would inform the child about the method of conception. [17] Similarly, a study in Belgium showed that the majority (82%) of the respondents expressed their willingness to reveal non-identifying information about themselves to donor offspring. [15] However, the medical students in Enugu, southeast Nigeria showed that only 10% of the respondents were favourably disposed to gamete donation. [16]

Recently, 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 to advance learning and establish academic excellence. The university has a student population of over 35 000 and offers courses at undergraduate and postgraduate levels. There are six faculties on the main campus, comprising Arts, Social Sciences, Management Sciences, Law, Science and Education. [18]

Study Population
The study was conducted among 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 Fischer's formula for a cross-sectional study where $n = Z^2pd/d^2$:

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

At a 95% confidence level, 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 multi-stage 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. In 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 64 open- and close-ended questions, grouped into four sections: socio-demographic characteristics, knowledge, attitude and willingness to participate in gamete donation for artificial insemination.

Pre-test
Ten per cent of the total questionnaires were pre-tested among the University of Lagos, Akoka, Yaba, Lagos undergraduate students to address ambiguity and poorly structured questions.

Data analysis and management
The data was reviewed, cleaned, organised 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. The Chi-Squared test was used to determine the association between categorical variables, and the level of statistical significance was set at a 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 of less than 50% was considered poor knowledge, while a score of 50% and above was recorded as good knowledge.

A five-point Likert scale on twelve statements was used to assess attitudes 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 a minimum score of 12. The total score was converted to a percentage. Less than 50% was considered a negative attitude, while a score of 50% and above was recorded as a 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 score was awarded for an incorrect answer. The scores were converted to percentages. Less than 50% score was considered poor willingness, while 50% and above were recorded as having 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 adequately briefed on the nature of the study, the need for confidentiality, the importance to society and the 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 social media, followed by the classroom (23.4%). Only (18.2%) of respondents claimed to know anyone who had previously donated a 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 their gamete, while half (50.0%) strongly agreed to have information about the family the products of their donation would grow up with. Almost a third (32.5%) strongly agreed to prepare to meet the children conceived with their 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 a 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 the 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 survey 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 survey 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 women. This finding implies that there may be a 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 a lack of 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 a gamete for artificial insemination. This finding was similar to a study done among women in Turkey, where only 1.6% of the respondents had friends or relatives who had had gamete donations. [11] This finding implied that appropriate information on gamete donation for artificial insemination might not be in the public domain, resulting in 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 differed from a Turkish study, where only 3.6% of respondents knew 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 the future. The finding from the present study showed that only 38.7% of the respondents had 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.

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

Knowledge of 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		
No	23	14.9
	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)	89	
Self	65	57.8
Donor		42.2

A little more than a third of the respondents claimed they would like to know the number of children conceived with their gametes. This finding was similar to that of a systematic review of sperm donors 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 their gamete donation products would grow. 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] This finding implies that people are still not 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 of gamete donation for artificial insemination.

A little above half of the respondents in this study would like to donate their gametes anonymously. This is in contrast to a study conducted among medical students in Enugu State, Nigeria, where only one-tenth of the respondents would agree to donate

anonymously. [16] This observation implies that the principles of ART, particularly gamete donation for artificial insemination, are yet to be fully understood.

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 (%)
I 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)
I want 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)
I want 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)
I would be reluctant to donate to a single parent.	28 (17.5)	25 (15.6)	47 (29.3)	38 (23.8)	22 (13.8)
I would be prepared to give information about myself to the children born from my donation without giving my name	20 (12.5)	40 (25.0)	46 (28.7)	22 (13.8)	32 (20.0)
I 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)
I 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 had a fertility problem, I would be prepared to use a 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)

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 the study was significantly associated with poor knowledge of gamete donation, while age and gender are also associated with a negative attitude towards gamete donation. Similarly, age and class levels of study are related to poor willingness to participate in gamete donation for artificial insemination. The weakness of the survey includes the relatively small sample size; hence, the study findings may not apply 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 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 the child that they were 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
I would like to receive information about the recipient's 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 (%)	X²	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 (%)	X²	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)		

References

1. Zergers-Hochschild F, Adamson GD, Dyer S, Racowsky C, De-Mouzon J, Sokol R. *et al.* The International Glossary on Infertility and Fertility Care. Human Reprod 2017;32:1786-1801. https://doi.10.1093/humrep/dex234.

2. https://www.who.int/publications/i/item/9789240030787. WHO Laboratory Manual for the Examination and Processing of human semen. Sixth edition. July 2021. Accessed 19 September 2022.

3. Maseshwari A, Gurunath S, Farah F, Siladitya B. Adenomyosis and subfertility: a systematic review of prevalence, diagnosis, treatment and fertility outcomes. Hum Reprod Update 2012;18:374-392. https://doi.org/10:93/humupd/dms006

4. Ombelet. W. Global access to infertility care in developing countries: a case of human rights, equity and social justice. Facts Views Vis Obgyn 2011;3:257-266.

5. Bickerstaff H, Louise CK. Understanding the definitions and causes of subfertility. In: Stuart Larvey (Editors) Gynaecology by Ten Teachers. 20th edition. CRC Press/Taylor and Francis Group Publisher. 2017.pp 90-95. https://doi.org/10.1201/9781315382418

6. Harbottle S. Elective single embryo transfer: an update to UK best practice guidelines. J Human Fert 2015;18:165-183. https://doi.org/10.3109/14637273.2015.1083144

7. Masoudian P. Oocyte donation pregnancies and the risk of preeclampsia or gestational hypertension: a systematic review and metanalysis. Am J Obst Gynecol 2016;214:328-339. https://10.1016/j.ajog.2015.11.020

8. www.art.medlineplus.com. Accessed on 20 August 2022.

9. Kol S. Assisted Reproductive Technology. Encyclopaedia of Reproduction. Second edition, 2018. June 2018. Accessed 19 September 2022.

10. Bernsen SP. Exploring attitudes and awareness of college women toward egg donation. Ohio University Columbus work. A thesis presented in partial fulfilment of the requirements for the degree of Bachelor of Science in Social Work in the Honor's College of Social Work of The Ohio State University. 2011; 1: 21-35. Accessed 08 December 2022.

11. Uslu B, Ozekinci M, Sakinci M, Tunik S, Ozdogan G, Coskun N, *et al.* Knowledge and Perception about Oocyte Donation in a Semirural Region of Turkey. Clin Exp Health Sci 2016;6:101-106. https://doi.org/10.5152/clinexphealthsci.2018.52

12. Veerle P, Florence VR, Guido P. Non-donors' attitudes towards sperm donation and their willingness to donate. J Assisted Reprod Technol 2018;35:107–118. https://doi.org/10.1007/s10815-017-1036-x.

13. Omokanye LO, Olatinwo O, Durowade KA, Raji ST, Biliaminu SA, Salaudeen GA. Assisted Reproductive Technology: Perceptions among infertile couples in Ilorin, Nigeria. Saudi J Health Sci 2017;6;14-18. https://doi.org/10.4103/sjhs.sjhs_29_16.

14. www.psychologydiscussion.net Accessed on 14 April 2022.

15. Thijssen A, Provoost V, Vandormael E, Dhont N, Pennings G, Ombelet W. Motivations and attitudes of candidate sperm donors in Belgium. Fert Steril 2017;108: 539-547.

https://doi.org/10.1016/j.fertnstert2017.0 6.014.

16. Onah HE, Agbata TA, Obi SN. Attitude to sperm donation among medical students in Enugu, South-Eastern Nigeria. J Obstet Gynaecol 2010;28:96–99. https://doi.org/10.1080/014436107018119 28.

17. Kalampalikis N, Doumergue M, Zadeh S, French Federation of CECOS. Sperm donor regulation and disclosure intentions: Results from a nationwide multi-centre study in France. Reprod Biomed Soc Online 2018;5:38-45. https://doi.org/10.1016/j.rbms.2018.02.00 1

18. www.lasu.edu.ng/homepages//id. Accessed on 14 April 2022.

19. Adesiyun AG, Ameh N, Avidime S, Muazu A. Awareness and perception of assisted reproductive technology practice amongst women with infertility in Northern Nigeria. Open J Obst Gynecol 2011;1:144-148. https://doi.org/1042360j0g.2011.13027.