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Knowledge Level and Perception of Oocyte Donation among Undergraduate Female Students of Public Universities in Rivers State, Nigeria

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Abstract: *Infertility is a major reproductive health issue with social, economic, and other dire consequences. Despite the progress made in reducing the rate of infertility using assisted reproductive technologies such as invitro-fertilization with the use of donor oocytes to achieve conception, this problem is still prevalent among women of reproductive age. The aim of this study was to assess the knowledge level and perception of female undergraduate students in public universities in Rivers State towards oocytes donation. The study method adopted was a cross-sectional descriptive study and structured questionnaire was used for data collection. The sample size used was 1081 female undergraduate students across the three (3) public universities in Rivers State. Findings from the study revealed that majority of the respondents had moderate knowledge of egg donation and positive perception regarding egg donation. In conclusion, these findings show that education is an important determinant as education impacts a level of knowledge that can help individuals make informed decisions and can also change individuals' perceptions of oocyte donation regardless of their culture, religious affiliation, and age.*

Keywords: **Infertility; women; oocytes; egg; donation; knowledge ; perception**

1. INTRODUCTION

Infertility is a major reproductive health issue with social, economic and other dire consequences. The problem of infertility could result in divorce, depression, isolation, physical violence, stigmatization, and economic hardship among others [1]. This condition affects millions of people globally. According to [2] infertility is estimated to affect between 48 million couples and 186 million individuals globally. However, the rate is higher in Sub-Saharan Africa where it is estimated that about 30-40% of women are infertile, meanwhile, in Nigeria, the incidence varies between 20-30 % and constitutes about 50% of gynecological visits [3,4]. Despite the progress made in reducing the rate of infertility using assisted reproductive technologies such as invitro-fertilization with the use of donor oocytes to achieve conception, this problem is still prevalent among older women of reproductive age as advanced age affects the number and quality of oocytes produced [5].

Oocyte donation also known as egg donation is the process in which a fertile woman donates egg to another woman to help the other woman conceive through in vitro fertilization [6]. There has been increased access to the use of third-party assisted reproductive technologies and that has led to a greater demand for donor oocytes, in countries such as New Zealand where donor oocytes are used for about 10% of fertility treatment cycles. Despite the percentage already in use, shortages of oocytes donors have been reported globally including in Nigeria [6,7]. In vitro fertilization with the use of donor oocytes (IVF-OD) has become a vital part of infertility treatment today, despite its association with ethical, cultural and psychosocial issues [8].

This form of assisted reproductive technology was pioneered by Robert Edwards and Patrick Steptoe in the 1970s, while these pioneers sought to use IVF to treat women with blocked fallopian tubes; it became a major technological breakthrough in embryo research and the treatment of many conditions including infertility with the use of donor oocytes [9]. Invitro fertilization-oocytes donation has presented many women with the possibility of becoming pregnant, and subsequent advances have dramatically increased their chances.

Furthermore, in explaining the process of egg retrieval during egg donation, [10] revealed that the process is in three phases: The first phase involves the inducement of multiple ovulations in the woman using ovarian stimulation and hormone treatment. This will usually involve the administration of fertility drugs for several days from day three to seven of a woman's menstrual cycle. As a result of the drug treatment, one or more follicles containing eggs usually develop. Oocytes (immature eggs) or ova (mature eggs) are removed from ovarian follicles through a surgical technique known as laparoscopy. A laparoscope is a threadlike device, composed of quartz fibers, capable of transmitting light and images. Alongside a hollow needle, the laparoscope is inserted into the donor's abdomen. The ovarian follicles are located and aspirated to obtain the eggs. After which the eggs are then retrieved via the needle attached to the laparoscope. This surgical procedure is carried out with the donor being under anesthetic. Increasingly, egg

retrieval is now being undertaken through transvaginal aspiration under a local anesthetic. Immediately after removal, oocytes are first placed in a specially prepared culture and incubated to develop into mature eggs [11-13].

However, regardless of the problems surrounding invitro fertilization-oocytes donation, in most societies infertile couples still opt to use donor oocytes to avoid transmission of severe genetic disease [14]. The primary use of donated oocytes in the invitro fertilization process is to achieve pregnancy in women with Turner's syndrome, recurrent implantation failure due to poor oocyte quality, recurrent abortions, premature and age-related ovarian failure, and poor ovarian reserve [15-17. While pregnancies and live births have been reported in women in their late 50s and early 60s through egg and embryo donation, American Society for Reproductive Medicine (ASRM) ethical committee guidelines recommended 55 years old as an upper age limit for this procedure due to the high-risk nature of the pregnancy and the limited longevity of the individual [18]. Through invitro fertilization, women can donate eggs to other women who cannot produce viable eggs or women seeking a particular sex [19]. The process is invasive and involves the retrieval of donor eggs and fertilization of these donor eggs with male sperm. After fertilizing, the eggs can then be gestated in the uterus of the actual mother, or in a surrogate mother who is willing to undergo conception on behalf of the couple in need [19]. Interestingly, globally, several thousand children are born by conception through oocyte donation every year [20]. Although the process is an advancement in reproductive health technologies, oocyte donation has, however, sparked worldwide discussion involving the issues associated with the process [21].

Nonetheless, assisted conception using donor oocytes is not widely known or accepted in Nigeria, so recruiting undergraduate female students as potential donors can be quite challenging, thereby making oocyte supply limited. Therefore, it was imperative to assess the knowledge level and perception of oocytes donation among female students as it will enhance ones knowledge of egg donation and help increase the availability of oocytes for assisted conception.

1.1 Objectives of the Study

1. To assess the level of knowledge of undergraduate female students in public universities as it relates to oocyte donation in Rivers State
2. To ascertain the perception of undergraduate female students in public universities towards the donation of oocytes in Rivers State

1.2 Research Questions

1. What is the knowledge level of undergraduate female students of public universities as it relates to oocyte donation in Rivers State?
2. What is the perception of oocytes donation among undergraduate female students in public universities in Rivers State?

2. LITERATURE REVIEW

2.1 Concept of Oocyte Donation

The concept of "oocyte donation" deals with the process in which a fertile woman donates an egg also known as oocyte, to another woman to help her conceive [22]. It is a part of assisted reproductive technology (ART). The procedure typically involves the removal of egg or eggs from the donor, fertilizing the eggs in a laboratory, and then transferring the resulting embryos into the recipient's uterus [17]. This procedure has proven to be a successful option for women with fertility issues, especially for couples who cannot conceive with their oocytes, due to advanced age, diminished ovarian reserve and for some who want a particular sex [23]. Interestingly, some couples also opt to use donated oocytes to avoid the transmission of severe genetic diseases [16]. Despite the risk associated with the process, for married couple, oocyte donation creates the opportunity for the woman to carry and deliver a pregnancy with the use of her husband's sperm or donor sperm. This process is made possible with the use of assisted reproductive technology.

Evidence suggests that cocyte (egg) donation is an integral part of modern assisted reproduction and couples that opt for it stand the chance of having a high pregnancy success rate [24,25]. The procedure was originally offered to women with primary premature ovarian failure or women with genetic diseases who did not want to transmit the gene defect to their offspring [26,27]. However, it is offered currently to peri-menopausal and menopausal women and women who have failed traditional approaches to fertility [26]. Arguably, healthy individuals between the ages of 18 to 36 are the ones qualified to donate oocytes and these women are made to undergo rigorous hormonal treatment processes.

According to [14] the process involves the synchronization of an infertile woman's menstrual cycle with an ovarian-stimulated cycle of a donor. During this process, the donor's ovaries are stimulated with gonadotropins followed by monitoring of the follicular response. Monitoring of follicular response is usually accomplished by serial measurements of serum estradiol and frequent transvaginal ultrasonography of the ovaries. The exact stimulation protocol may vary from center to center. After which matured oocytes are recovered through trans-vaginal, ultrasound-guided needle aspiration [28]. Oocytes are then fertilized in vitro by sperm

provided by the recipient (i.e., husband, partner, or sperm bank). The retrieved oocyte fertilized with sperm can then be transferred into an infertile woman with the aim of the woman achieving pregnancy. There are basically three types of egg donors namely commercial egg donors, known egg donors and shared egg donors [29]. Notably, in the case of women who want to share their eggs, retrieved oocytes are usually divided equally among the women in order to produce enough embryos for transfer to each of the recipients.

2.2 Perceptions of Oocyte Donation

Perception is a concept that explains how an individual selects, organizes, and interprets information to create meaning [30]. It does not only depend on external stimuli but also stimuli associated with one's condition or surroundings. Perception is a process by which individuals organize and interpret their sensory perceptions to give meaning to their environment. The way individual creates meaning to things to a large extent is influenced by their characteristics including but not limited to personality, attitude, interest, past experiences, and other personal characteristics. According to [4] , the way an individual views and understands the act of oocyte donation will determine the extent to which these individuals are willing or unwilling to donate oocyte for women in need of oocyte for childbearing.

Furthermore, perception is the complex sensory control of behavior that causes one to act in a particular way [31]. For example, a student's personal attitude largely consists of what the student believes to be the outcome of performing the behavior and how useful the person considers the outcome of the behavior. This implies that a female undergraduate student can respond positively if the student considers the outcome of oocyte donation to be good and beneficial to the recipient and society. Previous studies have found that women who show a positive attitude towards egg donation are more willing to donate as compared to those with a negative attitude [32,33].

Hence, female students' willingness to donate oocytes to a great extent is influenced by their perception of self and how other people in their social network perceive them [29]. Thus, a personal belief that donating an oocyte is for a good cause is more likely to motivate an individual to donate than believing otherwise. A behavior may be internally controllable when an individual perceives that he or she possesses control over personal resources, such as requisite skills, confidence, and ability to perform the behavior [34]. This suggests that female students are more likely to donate oocyte if the student perceives the process and act of donation is easy and it will be beneficial.

Moreover, studies repeatedly show that student perceptions are an important determinant of student behavior and an understanding of these perceptions can be more useful in explaining their behavior [30]. Thus, student perception concerning oocyte donation is very key to the success of any oocyte donation program. Their opinion or reaction could either result to supply or more shortage depending on whether these undergraduate students are willing or unwilling to participate in the process. According to [35], undergraduate students who perceive that they are being supported when they intend to take an action, develop a higher level of perceived competence and autonomy. In terms of oocyte donation, if these students perceive they are being supported, their perception will translate into higher intrinsic motivation to donate and a lower likelihood to opt out of a donation program.

3. METHODS

This study adopted a descriptive cross-sectional study design to assess the knowledge level and perception of oocyte donation among female undergraduate students in Rivers State. The sample size for this study was one thousand and eighty-one (1081). A descriptive cross-sectional design was adopted because, in this type of study design, the researcher cannot influence nor control the study variables [36]. This design was successfully utilized by earlier studies [4,7,8,37]. In lieu of the above-mentioned reason, this design is suitable for this study.

4. RESULTS AND DISCUSSION

4.1 Results

Table 1: Percentage Distribution of Knowledge of Oocyte donation among female undergraduate students in public universities in Rivers State

Knowledge Items	Yes (%)	No (%)
Do you know what egg donation means?	486(45)	595(55)
Can a woman give her egg to another woman to enable her to achieve conception?	581(53.7)	500(46.3)
Is there an age limit as to who can donate eggs?	658(60.9)	423(39.1)
Is testing for sexually transmitted diseases required before donation?	614(56.8)	467(43.2)

Are hormonal treatments required before egg donation?	472(43.7)	609(56.3)
Do you know any health facility where someone can donate egg?	109(10.1)	972(89.9)
Can eggs be retrieved by all trained health workers	548(50.7)	533(49.3)
Can a woman donate eggs immediately after her monthly period?	635(58.7)	446(41.3)
Can a woman partake in donation without undergoing ultrasound	551(51.0)	530(49.0)
Average Knowledge Level	517(47.9)	564(52.1)

Note:1-33% = Poor Knowledge; 34-66% = Moderate knowledge; 67-100% = Good knowledge

Based on the provided results from the study on Table 1, it reveals a moderate knowledge level (47.9%) among female undergraduate students in public universities in Rivers State. Overall female undergraduate students in public universities had moderate knowledge of egg donation.

Table 2: Perception of Respondents towards Egg Donation

Perception Items	SA (%)	A (%)	D (%)	SD (%)	Mean	SD	Decision
Egg donation is good practice	214(19.8)	183(16.9)	284(28.3)	400(37.0)	2.80	1.38	
Donating egg is a way of helping infertile woman conceive	154(14.2)	226(20.9)	291(26.9)	410(37.9)	2.89	1.071	
Family members do not promote egg donation	152(14.1)	230(21.3)	278(25.7)	421(38.9)	2.90	1.075	
Egg donors should be compensated	177(15.4)	234(21.5)	264(24.4)	406(37.6)	2.83	1.104	
Egg donation is against my tradition	194(17.9)	200(18.5)	382(35.3)	305(28.2)	2.74	1.057	
Egg donation can cause barrenness	404(37.9)	387(35.8)	192(17.8)	98 (9.1)	1.99	0.956	
Average					2.69		Positive perception

Note: SA- strongly agree,A- agree, D- disagree, SD- strongly disagree SD standard deviation; Mean score <2 -negative perception; >2.1- positive perception

The overall perception level with a means score of 2.69, suggests a positive perception of oocyte donation among the respondents. While there is a positive perception regarding oocyte donation, there are also concerns about its social acceptance, albeit to a lesser extent.

4.2 Discussion

4.2.1 Knowledge level of Ooctye Donation among Undergraduate Female Students

The results of the study in Table 1 revealed that majority of the female undergraduate university students in the study area had moderate/average knowledge of oocyte donation. 517(47.9%) of the respondents responded correctly that egg donation is when a woman gives her egg to another woman as a way of helping her achieve conception. The findings of this study are consistent with the findings of [38] Krishnan et al. (2017) who noted that 74.5% of the population in their study had average/ moderate knowledge of the meaning of egg donation, However, it is contrasting to the findings of [39] who reported a higher percentage 86.7% of the population under study had good knowledge of what egg donation is.

Similarly, [40-41] assessed the knowledge of women of reproductive age pertaining egg donation. Their results showed that these women had a good knowledge of what egg donation is and about the process involved. [7,42,43,44] observed some contradicting results as respondents from their study had very high knowledge. The results were expected. This shows that students are literate and are mostly expected to be knowledgeable to the extent that they can make informed decisions. The discrepancies reported in these results could have stem from differences in demographics, sample size, geographical location, and survey methodologies as in some of the contradictory studies the respondents were the general public consisting of both literate and illiterate population. The discrepancies in the outcomes suggest that assessing the knowledge levels of female undergraduates regarding

oocyte donation can be complex. This highlights the need for further research to better understand the factors contributing to the observed differences and to design targeted educational interventions accordingly.

Egg donation knowledge was also assessed among the study respondents based on their knowledge of the required age limit of individual who can donate. It was also consistent with the result found in the study of [33], whose study aim was to evaluate the perception of young undergraduate female students concerning oocyte donation. Part of the objective of [33] was to assess the knowledge of the students. The evidence that emerged from the study showed moderate level of knowledge as seen among the students sampled. From the result extrapolated it was shown that a majority of the respondents 658(60.9%) knew there was an age limit as to who could donate. The results align with the outcome of the [44] investigation. In their research published in the African Journal of Reproductive Health, [44] found a comparative knowledge rate. Similarly, [45] reported that the age of the donor is important, it is imperative that potential donors/actual donors understand the age range at which a woman's oocyte is viable and can be donated. The knowledge of the age limit would help them make informed decision. 35% of their study participants which were undergraduate students had moderate knowledge of the age limits required for donors. The consistency in these findings highlights the potential need for improved efforts targeting this demographic.

4.2.2 Perceptions of Oocytes Donation

In this study when respondents were asked the question" egg donation is good practice" 19% of respondents strongly agreed and 16.9% agreed with the notion that egg donation is beneficial while a significant proportion of the respondents 37.0% strongly disagreed with the statement. Similarly, respondents were asked about the influence their tradition has on oocyte donation. The results indicated that 17.9% strongly agreed, and 18.5% agreed that it was against their tradition. In contrast, a notable 35.3% of respondents disagreed while 28.2% strongly disagreed that oocyte donation was contrary to their tradition. In this study, the respondents' overall perception of oocyte donation was positive with a mean profile of 2.69. The evidence emerging from this study is in line with the results found by [15,46] who found a significant number of their study respondents had a positive perception towards oocyte donation as they agreed to donate oocytes if the need arises. In the same vein [47,48] also found that their study respondents had a positive perception towards oocytes as majority of the population surveyed perceived that oocyte donation was good and could be the solution to the global oocyte shortage.

The positive perception found in this present study which was in -line with that found in previous studies suggests that despite the potential cultural and traditional considerations a significant portion of female undergraduates view oocyte donation as a valuable and acceptable option for reproductive purposes. It further highlights the need for a balanced approach between cultural values and individual needs. The results obtained could also suggest that there is a level of open-mindedness and an understanding of the benefits of oocyte donation among these female students even within the context of culturally sensitive settings. It is important to note here that individual perceptions vary therefore respectful dialogue is essential to address cultural concerns that may arise. Ajzen's Theory of Planned Behavior postulated that an individual's intention to perform a behavior is mostly influenced by their beliefs about the expected result of the behavior including the worthiness of the expected outcome [49]. Thus, a potential explanation for the positive perception reported in the present study could be a higher level of education which might have influenced them to take a less conservative stance towards oocyte donation than might be expected from the general population.

5. CONCLUSIONS

Consequent upon the data analysis, outcome, and discussion, the study has assessed the knowledge level and perception of oocyte donation among female undergraduate students in public universities in Rivers State, it has shown that their level of knowledge is moderate. 517(47.9%) correctly demonstrated oocyte donation was good practice. Overall, the perception of the undergraduate female students was positive (2.69).

6. RECOMMENDATIONS

1. Health educators: to increase the level of knowledge, health educators should ensure they engage potential donors on campuses and communities. Engaging these females through campaigns would help to increase oocyte donation knowledge among young female.
2. Individuals; should educate themselves concerning oocyte donation by using educational materials and sources that explain its risks and benefits. The personal information they obtain would help to shape their perception.
3. School management should provide an effective guidance and counseling service or a youth-friendly walk-in center within the school environment. This center could help provide the necessary information on egg donation.

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