

Determinants of Willingness to Donate Oocytes among Undergraduate Female Students in Rivers State, Nigeria

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Abstract: Infertility is the failure to achieve conception after 12 months or more of regular unprotected sexual intercourse. It affects millions of people of reproductive age worldwide with negative impact on them, families, and communities. The aim of this study was to assess the determinants of willingness to donate oocytes among undergraduate female students in Rivers State. Three objectives and three research questions were formulated to guide this study. The study adopted a cross-sectional descriptive study method and structured questionnaire was used for data collection. The sample size used was 1081 female undergraduate students across three (3) universities in Rivers State. Findings from the study revealed that the association between culture and willingness to donate was significant (OR=2.66, $p < 0.001$, 95% CI = 2.0056-3.438). The result further revealed there was no significant association between religious affiliation and willingness to donate oocytes (OR=0.444, Wald=3,726, $p = 0.139^*$, 95% CI=0.176-1.120). There was no association between willingness to donate oocytes and the age of respondents (OR=1.560, Wald =0.920, $p = 0.337$, 95% CI= 0.629-3.871). In conclusion, these findings highlight the need to formulate policies and guidelines that protects both donors and recipients to ensure that no party is exploited by service providers.

Keywords: Determinants, oocyte, donation; female; infertility

1. INTRODUCTION

Infertility is the failure to achieve conception after 12 months or more of having regular unprotected sexual intercourse [1]. Infertility affects millions of people of reproductive age worldwide with negative impact on their families and communities. In traditional societies like Nigeria children are considered to be one of the most important reasons for marriage and not being able to conceive and procreate is perceived as unusual. Just like in all societies, in Nigerian society, marriage brings together childbearing and problems arise in marriages where there is no child. Sadly, infertility causes distress, stigma and makes infertile women consider themselves to be less valuable [2]. This condition has biological, psychological, psychosocial, and cultural implications.

Today, there are a variety of treatment options for infertility, and new technologies are emerging that can be used to address this menace that affects millions of people worldwide. There are a number of assisted reproductive techniques used to help infertile couple bear children. Women with ovarian failure were considered irreversibly sterile until about years ago, but this view has changed when assisted reproductive techniques (ART) was developed. Today, women with premature ovarian failure or fast ovarian reserve have the opportunity to achieve pregnancy using oocyte from a donor [3].

Oocytes donation is one of the most controversial aspects of assisted reproductive technology. It is controversial because there are varying degrees of difficulty in making a decision about oocyte donation to couples for reproductive purposes. Recently there has been significant international interest in understanding donor motivation so as to aid donor recruitment [4]. For some potential donors, the reasons could possibly be arising from conflicts from social, emotional, and ethical factors [5], while for some it is physical, emotional, and financial [6]. According to [7], some other factors that serve as barriers to the willingness to donate oocyte include: perceptions, culture, religious belief, financial gains, self-esteem issues and risk involved in the process.

Female students' perception of whether the act of oocyte donation is good or bad and the extent to which they will agree or disagree to donate oocytes is largely influenced by their cultural or religious belief [8]. There have been religious, cultural and ethical issues as regards female students' perception and infertile couple acceptance of oocytes donation in some countries in Sub-Saharan Africa including Nigeria [9,10]. However, available evidence suggests that in more advanced countries such as the United Kingdom and in the United States, college students are becoming more open and willing to donate eggs [11,12].

This openness to donate does not negate the fact that some other females in these developed countries feel donation could put them at risk of not bearing children and consider the act of donation unpleasant [13]. According to [14], most of the participants in their study were not willing to donate oocyte to women in need as donating was considered to be against their religion and culture while others felt less confident about donating eggs. Interestingly, for some donors, the underlying reason for the decision to donate

to others was both the desire not to waste embryos and concerns about preservation of oocyte. [12] asserts that the increase in the number of willing donors in western countries is due to favorable government policies supporting oocytes donation and the use of the mass media to create awareness of the process.

Sequel to the above, more people are changing their negative perception and beliefs towards the act [15]. This have changed most female students perception towards oocytes donation as the students now belief that egg donation contributes to the significance of motherhood by assisting others that are denied the ability to procreate [12]. In more developed countries there are laws and regulation guiding the process of ARTs and egg donation, however, Nigeria is slow in taking this legal step as currently, there are no government-unified formulated policies or guidelines to inform the practice of invitro fertilization-oocytes donation [16]. Therefore, the need to formulate practice guidelines and ethical framework to guide the practice of oocyte donation in assisted conception in Nigeria has been highlighted severally [17,18].

1.2 Objectives of the Study

- 1) Ascertain the association between culture and the willingness to donate oocytes among undergraduate female students in Rivers State.
- 2) Determine the association between religious affiliation and willingness to donate oocytes among undergraduate female students in Rivers State.;
- 3) Determine the association between age and willingness to donate oocytes among undergraduate female students in Rivers State.

1.3 Research Questions

1. What is the association between culture and the willingness to donate oocytes among undergraduate female students in Rivers State?
2. What is the association between religious affiliation and willingness to donate oocytes among undergraduate female students in Rivers State?
3. What is the association between age and willingness to donate oocytes among undergraduate female students in Rivers State?

2. LITERATURE REVIEW

2.1 Demand for Egg Donors

In Nigeria, since Oladipo Ashiru pioneered the first *in vitro* fertilization (IVF) program in 1984, and his team successfully delivered the first IVF baby in 1989, there has been an increased demand for oocyte donors [19]. This increased demand together with non-existing uniformed body of regulations, has equipped oocyte recruitment agencies. Although there is shortage of donors, yet these agencies continue to promise potential recipients that they will find the perfect donor, even when available evidence suggest otherwise [20]. Similarly, [2] posits that as the demand for young women's egg increases, exceeding the supply, so does the competition to attract suitable donors. Thus, young women especially undergraduate students with low socioeconomic status remain the target population.

Invitro-fertilization came into existence when Warnock report was published. This led to human fertilization act of 1990 which includes assisted reproductive treatment (ART) [6,22]. ART involves processes such as intrauterine insemination, in vitro fertilization, intra-cytoplasmic sperm injection (ICSI), donor insemination and, egg donation. However, the Centre for Disease Control and Prevention (CDC) and Certification Act published a report in 1992, where ART was redefined to include all fertility treatments in which both eggs and sperms are handled outside the human body [23]. ART in general, involves surgically removing the egg from a woman's ovaries, combining them with a man's sperm in the laboratory, and returning the embryo back to the woman's body vis-à-vis or donating the oocytes to another woman [24].

Notably, artificial reproductive technology (ART) does not include treatments in which only sperm are handled outside the body, for example: intrauterine or artificial insemination or other procedure in which a woman takes medicines for the purpose of stimulating egg production without the intention of having the eggs retrieved [19]. ART-oocytes donation involves processes where eggs can be retrieved even from willing donors. As a result of the development of this technology, oocyte donation with the intention of helping an infertile woman achieve pregnancy became prominent.

2.2 Determinants of Egg Donation

2.2.1 Culture

Culture is an important factor in defining, meaning, and prompting reactions to infertility and the use of donor oocytes for assisted conception [25]. An individual's culture, their beliefs and how the individual was raised determine to an extent and contribute to their desire to donate and give back. Although some people want to give back as part of their contribution in building a better future, others give back because it aligns with their culture and belief system. In short, a complex mix of preferences, backgrounds, and personal principles influence giving.

According to [26], the cultural environment impacts on people's experience and their willingness to donate oocytes. For example, a student from a very traditional background where culture is the main bane may be unwilling to donate as compared to students who leave in a less traditional society. In Nigeria for example, students who resort to donating their eggs might do it secretly and continue to struggle personally and emotionally with their actions because of their beliefs, leading to unfavorable consequences that might have significant negative effects. Thus, culture can influence donation.

Cultural context is an important factor in defining, meaning, and prompting reactions to infertility and infertility treatments [27]. [26] on the emotional reactions of infertile couples in India stated that infertility affects all cultures, races, and ethical world-views. Furthermore, knowledge and beliefs about infertility will influence the types of treatment sought and are culturally variable. Infertile couple's decision to opt for egg donation will most likely be influenced by their cultural belief.

2.2.2 Religion

Religion is a significant factor in decision-making as regards oocytes. There have been various arguments concerning ethical issues surrounding oocyte donation since the advent of new IVF techniques and have opened the doors to new areas of debate [28]. Indeed, some religions take an interest in ARTs given the importance of the family and the institution of marriage [29]. [30] reported that some religious groups forbid the act of oocyte donation and even have stringent legislation against this form of reproduction. As a result, many developed countries have taken the necessary legal steps to ensure that the donation arrangement aligns with the country's values and beliefs and the right of the donor and recipient are protected [19]. For example, some Jewish law permits egg donation because according to these laws, the major factors that determine the acceptance of a child are gestation and delivery, which rely on the mother [29].

Conversely, Christians have different opinions regarding egg donation. [6] suggests three broad categories of Christian beliefs regarding egg donation: first, there is the group that reject egg donation on the premise that it is an act of adultery, the second group believes that a child that is given birth to through egg donation may have some challenges including, identity, stigma, and other socio-cultural issues; the third group, are those seeking a form of partnership between recipients and donors [19]. Similarly, there are various religious views regarding egg donation. For example, in Islam some clerics have issued laws regarding ARTs in which artificial insemination has only been accepted for an infertile married couple [31]. Although some sect accept using donated oocytes, other groups have stringent laws forbidding the act and would stigmatize both the donors and recipients considering them as adulterous. Furthermore, a child given birth to through egg donation is regarded as 'illegitimate' child [16].

2.2.3 Age

Age is an important determinant to consider when recruiting donors. Although there are no general guidelines in Nigeria for egg donors, however, the Practice Committee of the American Society for Reproductive Medicine, & Practice Committee of the Society for Assisted Reproductive Technology (2013), recommended that donors should be between the ages of 18 and 35 and be physically healthy. Donors should be non-smokers and have a BMI between the ranges of 19 and 29 [32]. Donors must have regular monthly menstrual cycles, and not be using specified methods of birth control. Additionally, donors must also have both ovaries, be psychologically stable and not use any psychoactive drugs and should not have a history of substance abuse or known family history of inheritable genetic disorders [33]. The donor must be willing to self-administer injections and commit to numerous appointments. This suggests that the set of women that are most likely recruited as donors are young women.

Available evidence shows that oocyte donation from young individuals especially female students has been prevalent and is an effective treatment for age-related infertility [34], because the pregnancy rates with younger females are significantly higher than those obtained from women of advanced reproductive age [35]. According to [35], live birth rates per embryo transfer are 50 percent greater in women that receive oocytes from a younger woman (18-24 years) donor. Though significant progress has been made in the use of donated oocytes in IVF process, arranging for donor eggs can be challenging this is because, even though the number of potential recipients is rising, report reveals that there is a shortage of donors available for a successful donor oocyte program [36]. Paramount among potential reasons for limited access to donor oocytes is the risk and life-threatening complications associated with the process [37].

3. METHODS

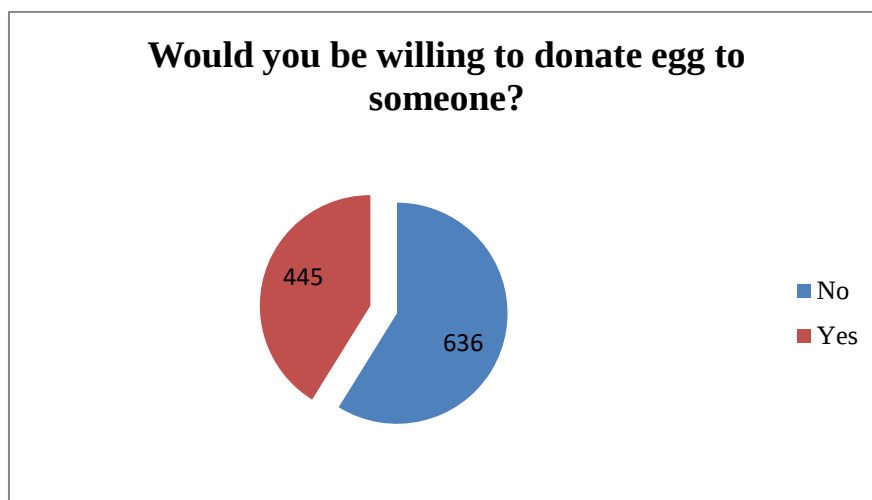
A descriptive cross-sectional study design was adopted to assess the determinants associated with willingness to donate oocytes among female undergraduate students in Rivers State. When study variables cannot be controlled or influenced, a descriptive cross-

sectional design is a perfect method for the study [38]. The population of the study consisted of all full-time female undergraduate students three (3) universities based on the 2021/2022 academic year in Rivers State. This population was 44,864 as at 2022 (Rivers State University, 2022; University of Port Harcourt, 2022; Ignatius Ajuru University of Education, 2022). The sample size includes one thousand and eighty one undergraduate female students in Rivers State. It was determined using Taro Yamane's formula. An adapted structured questionnaire was used for data collection titled "Determinants of Willingness to Donate Oocyte Among Undergraduate Female Students in Rivers State". The data for this study were collected through the administration of a pre-designed, re-tested structured questionnaire to respondents. The questionnaires consisted of closed-ended questions and Likert-type questions.

4. RESULTS AND DISCUSSION

4.1 Results

Figure 1: Proportion of respondents willing to donate egg



The fig.1 shows that a larger proportion which is a majority of the respondents 636 (58.8) percent of the respondents indicated that they were not willing to donate oocytes while 446(41.2) revealed their willingness to donate oocyte.

Question 1: What is the association between culture and the willingness to donate oocytes among undergraduate female students in Rivers State?

Table 1: Association between Respondents' Culture and Willingness to Donate Eggs

Influence of culture	Willingness to Donate		Df	p-value	OR	95% CI	
	No	Yes				Lower	Upper
No	305 (49.1)	331(72.0)	1	<0.001*	2.658	2.056	3.438
Yes	316 (50.9)	129(28.0)					
Total	621(100)	460(100)					

Note: *** $p < 0.05$.

Note: OR -Odd ratio

Table 1 showed a binary logistic regression analysis of the influence of culture on female undergraduate students willingness to donate oocytes. From the results obtained culture was 2.66 times more likely to influence female undergraduate students' willingness to donate oocytes. The study revealed that there was a statistically significant association between culture and willingness to donate (OR=2.66, $p < 0.001$, 95% CI= 2.056-3.438).

Question 2: What is the association between religious affiliation and willingness to donate oocytes among undergraduate female students in Rivers State?

Table 2: Association between respondents' religious affiliation and willingness to donate Eggs

Religious Affiliation	Willingness to Donate		Df	p-value	OR	95% CI	
	No	Yes				Lower	Upper
Islam	115 (58.1)	83(49.1)	2	0.155*	0.444	0.176	1.120
Christian	513(59.5)	349(40.5)					
Traditional Religion	8(38.1)	13(61.9)					
Total	636(58.8)	445(41.2)					

Note: ***p<0.05.

Table 2 shows a binary logistic regression analysis of religious affiliation of female undergraduate students' and willingness to donate oocytes. From the results, the odd ratio was 0.444 indicating that religious affiliations were 0.444 times less likely to influence female undergraduates' students willingness to donate oocytes. The study revealed there was no significant association between religious affiliation and willingness to donate (OR= 0.444, p= 0.155*, 95%CI=0.176-1.120).

Question 3: what is the association between age and willingness to donate oocytes among undergraduate female students in Rivers State?

Table 3: Association between respondents age and willingness to donate Eggs

Age	Willingness to donate		Df	p-value	OR	95% CI	
	No	Yes				Lower	Upper
18- 23	434(57.9)	316(42.1)	3	=0.539*	1.560	0.629	3.871
23-28	148(61.7)	92(38.3)					
28-33	39(56.5)	30(43.5)					
33-38	15(68.2)	7(31.8)					
Total	636(58.8)	445(41.2)					

Note: ***p<0.05.

Table 3 displays a binary logistic regression analysis of the age of undergraduate students' and willingness to donate oocytes. From the results age of the respondents was 1.560 times less likely to affect the respondents willingness to donate oocytes..The study revealed there was no significant association between age and willingness to donate (OR=1.560, p=.0.539, 95% CI= 0.629- 3.871).

4.2 Discussion

4.2.1 Culture as a Determinant for Egg Donation

Findings from the study revealed that there was significant association between culture and willingness to donate oocytes,. It shows that as cultural differences increase among the student population there was a slight tendency for their willingness to donate oocyte to decrease. This evidence obtained is similar to that from [39] that revealed that there was significant association between willingness to donate oocyte and cultural background of medical students. It further aligns with the research of [40]. Also, studies conducted by [41] among Asian populations have reported reduced rates of donation intention among students, health workers, and the general public. The similar results obtained suggest that culture is an important factor to consider as cultural differences play a very significant role in our decision-making process. The proportion of female undergraduate students willing 445(41.2%) to donate oocytes was less than that of those unwilling 636(58.8).

4.2.2 Religion as a Determinant for Egg Donation

The results from the study indicated that there was no significant association between religious affiliation and willingness to donate. It revealed that the association between religious affiliation and willingness to donate oocytes was not significant.58% of Muslims were against oocyte donation while 42% thought otherwise. A similar, pattern was seen across the Christian population 59.5% of Christians were against donation and 41.5% admitted they would donate oocytes. Conversely, 38% of the undergraduate female students that practice traditional religion opine that they would not donate as compared to a majority 61% who responded positively to the act of oocyte donation. However, the p-value coefficient showed no statistically significant association considering the likelihood of individuals being willing to donate their oocyte for reproductive purposes. This suggests that there is no strong evidence that religious affiliation is linked to female students' willingness to donate. In order words it was observed that in this set of female students sampled, religious affiliation does not seem to be a determining factor as to whether someone will be willing to donate their oocytes or not. The report obtained is consistent with the report from [8] these researchers hypothesized that religion

would be a barrier to oocytes donation, however, the evidence extrapolated from their research indicated that there was no significant association between religion and willingness to donate.

The outcome was surprising as this result is contrary to the findings of [3] and [42] who found a significant association between the two variables of interest. For instance, evidence from previous study [43] revealed that more religious people were more likely to be negative toward egg donation regardless of the circumstance at which the donation is done. In the same vein the outcome of the study by [44] also highlights the connection between religion and unwillingness to donate. [45] submitted that more Muslims in their study accepted donation as against Christians. In contrast, [45] and [46] had a result that does not align with the above submissions as the population in their own study reported that generally both Christians and Muslims were against egg donation; implying that participant's religious beliefs and affiliation impacts on their decision to give their oocytes to another. The possible reasons why religious affiliation may not be a likely determinant of students' willingness to donate may be due to a variety of reasons. Religious beliefs of students can vary greatly within a given affiliation and individuals may interpret their faith differently [47].

Additionally, personal values, cultural factors and educational background can play a more significant role in shaping someone's decision to donate than their religious affiliation. Another possible reason for the disparities seen maybe the sample sizes in the studies or methodologies might not have captured the distinctions in these associations accurately. Future research could take a deeper look at exploring additional variables that influence the result above, so as to gain a more comprehensive understanding of the determinants of oocyte donation decisions.

4.2.3 Age as a Determinant for Egg Donation

Amazingly, the findings between age and willingness to donate oocytes showed that there was no significant association between age and willingness to donate oocytes. Though the data suggest a trend of some degree of correlation between age of female undergraduate students and willingness to donate, this association was not supported with sufficient level of statistical confidence giving that from the data a majority of female undergraduate students sampled between the ages of 18-25 years which were within the age group with viable eggs were not willing to donate. This outcome is in contrast with the findings of [48] that found a significant association between age and willingness to donate.

Furthermore, the findings further contradict the findings of [3]; and [49]. In their research, the researchers documented that older adult disapproved of oocyte donation while the younger ones approved of it. However, younger adults between the age of 18-25 were undecided. This outcome aligns with the complicated nature of decisions concerning oocyte donation. The association shown implies that undergraduate students' age alone are not the major factor that reveals an individual's willingness to donate oocytes. This suggests that other factors including demographic variables, geographical location, personal beliefs and, cultural norms all contribute to the decision to donate or not to donate.

5. CONCLUSION

The findings of the study provides important information in response to our questions and objectives. The aim of this study was to assess determinants of willingness to donate oocyte among female undergraduate students in Rivers State. The association between culture and willingness to donate oocytes was significant ($OR=2.66, p<0.001, 95\% CI= 2.056-3.438$). The result revealed there was no significant association between religious affiliation and willingness to donate oocytes ($OR=0.444, p=0.139^*, 95\% CI=0.176-1.120$). There was no association between willingness to donate and the age of respondent ($OR=1.560, p=0.536, 95\% CI= 0.629-3.871$). It provides some similarities and dissimilarities between the determinants associated with donation and demographic profiles of egg donors from Nigeria and those from around the world.

6. RECOMMENDATIONS

1. Traditional leaders and health institutions: should partner in creating awareness concerning the need to donate oocytes. This could help provide holistic information and further reduce any cultural barriers to donation.
2. Religious Organization: service providers need to partner with religious organization to help create awareness for the need to donate oocytes and the use of donated oocytes to aid conception. This would help tackle the misinformation and myth surrounding oocyte donation.
3. Healthcare providers involved in fertility treatment and school administrators should partner to extend and intensify campaigns regarding oocyte donation, This will help to reduce stigma and improve self-esteem.

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