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'I will shed and waste it after all': Knowledge about egg donation among egg donors in selected health facilities in Southeast Nigeria

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Abstract
Research around the world has indicated that the demand for egg donation has grown considerably among young females. Egg donation involves using eggs from a fertile woman to create a pregnancy in an infertile woman by means of In-Vitro Fertilization (IVF). As a relatively novel and growing practice, it is important we learn what egg donors know about this procedure. Hence, this study was geared at examining the knowledge, and sources of information about egg donation among young egg donors at three selected health facilities in Southeast Nigeria. The convergent parallel mixed method comprising quantitative and qualitative data was adopted. The participants for the quantitative aspect were 53 respondents recruited through total population sampling approach, while purposive sampling technique was employed in the qualitative aspect and 10 participants were interviewed. Collected quantitative data were entered into the SPSS (version 27.0.1) for processing and results presented in tables, analyzed and interpreted using descriptive and inferential statistical methods while qualitative data were analyzed by means of thematic content analysis technique using OPEN-INFO version 4.2. Findings highlighted that most egg donors (34; 64.2%) had average knowledge about egg donation while 19 (35.8%) of them had high knowledge of egg donation. About two-third of the egg donors 35 (66.0%) would like to donate in the future, while the remaining one-third of them 18 (34.0%) would not like to donate in the future. It was therefore concluded that egg donors in Southeast Nigeria have average-to-high level of knowledge about egg donation. Given that the market for egg donation has become a common method of infertility management in Nigeria, our findings have important implications for practices, policy actions, and future research.
Keywords: Egg donation, egg donor, knowledge, Nigeria

Introduction
The dawn of assisted reproductive technology (ART) has been described as "among the greatest accomplishments of medical science in the 20th century" (Hodson & Bewley, 2019), as it has successfully restored hope/joy to numerous previously agonizing families. ART offers a range of managements ranging from diagnostic investigations to definitive treatments and has recorded much success in our time. In vitro fertilization (IVF) is the combination of eggs (ova or eggs in layman's term) and sperm cells outside the body in a petri dish and a body-temperature incubator in the embryology laboratory to form embryos. The embryo is then transferred back into a well-prepared uterus. The world's first IVF baby, Louise Joy Brown was born on 25th July, 1978 in the United Kingdom (UK) following an IVF-achieved conception of 10th November, 1977 (Kirkman-brown & Martins, 2020). In Nigeria, Oladapo Ashiru and his team pioneered IVF in Lagos University Teaching Hospital in 1984 and successfully delivered the first Nigerian IVF baby, (who also doubles as the first IVF baby in Sub-Saharan Africa) in 1989 (Omokanye, et al., 2018).

Since fertilization is done outside the human body (in vitro), IVF gives room for use of donor gametes (sperms and eggs) and embryos as well as gestational surrogacy giving answers to previously hopeless situations. Egg donation involves using eggs from a fertile woman to create a pregnancy in an infertile woman by means of IVF. The woman receiving the eggs will not be genetically related to the child but will be considered the birth mother (Dunne, 2020). In egg donation, sperm cells (from the intending father or a donor as the case may be) are used to inseminate the donor eggs to achieve fertilization, and the resulting embryo(s) is/are then transferred into the intending mother's (recipient's) uterus. Thus, egg donation provides sub fertile women with the unique opportunity to experience pregnancy and give birth to a child to whom they are not genetically related. The emergence of egg donation in 1983 (Martin, et al, 2019) saw the birth of yet another new type of family, challenging the long-standing Roman law principle, *mater certa semper est* (motherhood is always certain) (Klock & Lindheim, 2018).

Unlike artificial insemination with donor sperm, which has been practiced since 1884, though it gained popularity in both Britain and United States (US) in the 1940s, IVF with donor egg is a relatively novel technique (Ethics Committee of the American Society for Reproductive Medicine, 2019). The first birth from a donor egg was reported in 1984 (Dunne, 2020) in Australia, though the egg was fertilized in vivo. About four (4) decades after the first reported successful cases, the technique of egg donation has led to the birth of more than 200,000 children into previously infertile families (Woodriff, et al., 2014). According to Karki, (2019), egg donation accounts for about 18% of IVF births in US today.

Donor eggs are becoming an increasingly important component of ART for women of advanced reproductive age (ARA); its use has been steadily increasing due to sociological changes that resulted in a delayed age of motherhood in modern society which nowadays is often desired at ages where women are less fertile (Pellicer & Gomez, 2019). Another dimension is finance; unfortunately for most women in developing countries, infertility treatments are not widely available and IVF is not affordable to most families. While optimal utilization of IVF is estimated to be around 1500 cycles per one million population per year, provision of the service falls significantly short in developing countries, according to Calhaz-Jorge et al., (2017). As the cost of establishing advanced infertility centers is very high, only a limited number of centers are available in some developing countries and most remain in the private sector. This has made IVF relatively difficult to access by younger women as one has to save for years before she can afford a cycle. Hence, in practice, only a minority of women planning for IVF cycle can produce eggs for themselves and this makes egg donation an essential part of the process. No wonder, Haylett (2015), reported that the phenomenon of egg donation, has flourished in recent years.

This notwithstanding, the practice of egg donation has faced numerous challenges. While the benefits of egg donation in assisting reproduction for women who are unable to produce their own eggs are clear, many aspects of egg procurement and use remain controversial (Bracewell-milnes et al., 2016; Maleshina, 2020). Many have argued that donating eggs is difficult, tiring and not without risks for the donor herself (Shalev, et al., 2016; Carter-walshaw, 2018). Egg donors have to go through a series of medical treatments for a period of time. These involve hormonal stimulation to produce multiple eggs per cycle and mini-surgery to harvest the eggs, with the potential side effects of both and this is the reason egg donors are financially compensated. Donors are motivated to donate eggs both to help people in need and to receive compensation for their time and effort (Okafor, et al., 2023). Many questions have been raised

pertaining legality and morality of monetary compensation of egg donors. Although financial compensation to egg donors for their time and inconvenience in donating is established in the US as ethically and legally acceptable (Shalev et al., 2016), it is not so in many countries. The Nigerian law does not criminalize egg donation, and it is still silent on the trade. This can mean that egg donation is legal and the prospective donor has the right to decide to sell her eggs as far as she meets the selection requirements since the prospective donors are helping couples build a family (Okafor, et al., 2023). Thus, ovum trading is now a multi-millionnaira business in Nigeria (Okafor, et al., 2023), and depending on the facility, an egg donor gets between one hundred and twenty thousand naira (₦120,000 or $127USD) and one hundred and fifty thousand naira (₦150,000 or $420USD)(at exchange rate of ₦950 to $1 as at September 14, 2023) to have her eggs harvested. Other dimensions of the controversy include the cultural context surrounding motherhood and reproduction (who's the real mother to the resulting offspring, genetic mother (the donor) or the birth mother (recipient)?), anonymity of donors (anonymous or known donation arrangements), disclosure to resulting offspring or non-disclosure (if yes, at what age?), etc.

Furthermore, until very recently human eggs could not be cryo-preserved, such that a donor was needed each time a treatment required an IVF with donor egg. Klitzman and Sauer, (2015), identified scarcity of donors as the main problem of IVF with donor eggs. Human organs and cells,eggs inclusive are scarce not specifically because they are expensive to obtain, but due to the physical risks and ethical complications involved. Egg shortage for donation is a global problem (Human Fertilization and Embryology Authority (HFEA), 2013; in Bracewell-milnes et al., 2016). It is the main theme of all international expert debates on this issue. In most Nigerian fertility centers, many IVF cycles are being postponed because there are no donors available; abundant advertisements on egg donation targeting young women, which simultaneously promote giving the ultimate gift and receiving monetary reward (Okafor, et al., 2023), in popular media outlets notwithstanding. Some previous researchers reported that the waiting time for egg donations is approximately one year in the private clinic where they carried out their research (Mostowik, 2019). A survey of UK licensed centers reported that nearly all have experienced difficulty in obtaining a sufficient supply of donor eggs; seventy-five percent (75%) of potential donors changed their minds about donating after receiving information on the procedures involved (Sauer, 2016).

Amidst these challenges and controversies, since the twenty-first (21st) century medical and nursing practice focuses on the recipient of care, it is good this procedure is observed from the donors' perspective. Despite the rise in demand for human eggs, research focused on egg donors is lacking from current literature. There is limited information on this practice especially from the donors' perspective. Martin et al., (2019), asserted that relatively little is known about egg donation as a form of family building and as such, there is a lack of guidance for fertility counselling in this area. To date, there are only a few published studies of Nigerian background on knowledge about egg donation, or donors' thoughts about their donated egg to the best of our knowledge (e.g. Okafor, et al., 2023). As a relatively novel and growing practice, there is an obvious need for studies on donors' knowledge of the donation processes and beyond (Garibaldi, 2019). So, it is the importance of a synergy between research evidence and clinical practice along with the clients' values that inspired this study to learn what egg donors know about this procedure. This will expand available knowledge in this field and help researchers in establishing a framework for attracting more young females to donate their eggs and in long run curb the global problem of scarcity of egg donors. More so, the knowledge gained from this study will also help the healthcare providers (gynecologists, fertility nurses and

embryologists) to understand the process of egg donation from the donors' perspective and enable them to adapt their care to meet their needs, and in the end, improve the services provided to egg donors. Furthermore, this will develop the body of knowledge in the field and serve as baseline knowledge for further research.

Literature Review

The Concept of Egg Donation

Egg (egg, ova) refers to the female gamete produced by the ovaries of a mature adult female. It is the sex cell by which an adult female transfers her genetic properties to her offspring in the process of sexual reproduction. egg is synonymous to the spermatozoa in the male specie. Gamete donation was restricted to sperm donation until techniques of egg collection were developed for IVF. According to World Health Organization (WHO) in Mahajan, (2017), egg donation in the context of fertility treatment is the process by which a fertile woman allows several of her eggs to be aspirated, usually following ovarian stimulation, and used to enable another woman, who is infertile due to ovarian failure, to conceive with IVF. It is a process (in assisted reproductive technology (ART) in which a fertile woman donates eggs to another woman to help her conceive. IVF with the use of donor eggs has become an integral part of infertility treatment today. The procedure is used to achieve pregnancy in infertile couples, same sex couples, single parents and couples at risks of transmission of severe genetic diseases. As a matter of fact, egg donation has made childbearing possible in women with infertility previously thought to be untreatable. In these cases, donor eggs offer a chance at pregnancy when there is no other option (Dunne, 2020). Often, a woman's choice to use donor eggs comes after failed attempts at IVF with her own eggs, hence, Gleicher, et al., (2020) argued that third-party egg donation in clinical IVF should be considered a treatment failure, as it requires patients to choose a second rather than a first-choice treatment.

In the early 1980s, advances in assisted reproductive technology made laparoscopic retrieval of eggs possible (Omokanye et al., 2018). Today, eggs for IVF are retrieved via a transvaginal or transabdominal ultrasound guided needle aspiration, and the use of donor egg has become an increasingly common fertility treatment (Dunne, 2020). egg donation continues to grow in popularity and regarded as an established method to aid women in achieving their reproductive goals (Boutelle, 2014); commonly women of advanced reproductive age, younger women with diminished ovarian reserve/premature menopause, poor egg or embryo quality in prior attempts at IVF, and the possibility of passing on a significant genetic disorder. The process is regulated in the UK by the Human Fertilization and Embryology Authority (HFEA). However, Nigeria is yet to develop such regulations at the moment. Stringent screening is applied to gamete donors because success rates are related to the age and fertility status of the donor rather than the recipient.

Indications for use of Donor Egg

1. Premature ovarian failure: the major indication for use of donor eggs is premature ovarian failure, where the ovaries suddenly fail to produce ova within the reproductive age of a woman (Mahajan, 2017). Possible causes of premature ovarian failure include irreversible gonadal damage after certain regimens of chemotherapy or radiotherapy, Turner syndrome and other chromosomal disorders causing gonadal dysgenesis. Women with markedly diminished ovarian reserve should be counselled on their low chances of conception using their own gametes, even with assisted reproduction, and should be offered the options of donor eggs or adoption.

2. Advanced reproductive age: this is an increasingly prevalent cause of infertility (Dunne, 2020); as more women and couples find themselves delaying parenthood till later in life in order to pursue careers or education. And egg donation is the most successful technique for producing pregnancy in peri-menopausal women. Unlike sperm, which are constantly regenerated in billions in a 70-day cycle, eggs are not replenished (Dunne, 2020); women are born with all their eggs. A female attains her lifetime maximum number of eggs, 6 to 7 million, around 20-week gestational age in utero and by puberty she has about 400,000 eggs remaining, arrested in primordial follicles at the diplotene stage of meiosis. Early menopause due to the exhaustion of the ovarian follicles occurs in approximately 1% of women before the age of 40 years and, when there is little remaining follicular capacity, egg donation may represent the best chance of a successful pregnancy. Donor eggs are most often used by women over the age of 40 years, as their IVF success rates are greater when using donor eggs (49.4–50%) compared with their own (0.0–23.6%) (Woodriff, et al., 2014) and women diagnosed of spontaneous premature ovarian failure where ovarian reserve goes low at an early age. While egg donation for women with premature menopause has become widely accepted within the UK, the use of egg donation to achieve pregnancy after the start of natural menopause (typically between the ages of 45 years and 55 years) remains controversial (Mahajan, 2017).
3. Hypothalamic hypogonadism: spontaneous pregnancies among women with gonadal dysgenesis including Turner syndrome are associated with a high risk of miscarriage and an increased risk of trisomy in the offspring. egg donation offers women with ovarian failure due to Turner syndrome the chance of pregnancy and live birth. Pretreatment screening is essential to exclude phenotypic manifestations of the syndrome that might jeopardize successful pregnancy, including aortic dilation and cardiac lesions.
4. Ovarian failure following chemotherapy or radiotherapy: anticancer treatment can cause ovarian failure and women face limited options for fertility preservation. Cryopreservation of eggs has had very limited success (Mahajan, 2017); currently its use before chemotherapy is not a feasible option in many settings. However, cryopreservation of embryos is possible and another solution is egg donation followed by IVF. Success following egg donation has been reported in women who had previously received chemotherapy or radiotherapy. Two cases of normal live births with embryos from donated eggs have been reported in women (aged 36 years and 33 years) who have been treated with bone marrow transplantation following total body irradiation and cyclophosphamide for leukemia (National Collaborating Centre for Women and Children's Health (NCCWCH), 2013). A successful live birth was achieved with egg donation in one woman following radical surgery (with uterine conservation) and chemotherapy for ovarian cancer (National Collaborating Centre for Women and Children's Health (NCCWCH), 2013).
5. Poor egg or embryo quality in prior attempts at IVF: egg donation has also been advocated in certain cases of repeated failure of IVF, particularly those in which egg quality is compromised (Dunne, 2020), although unexplained failure of fertilization has also been treated using this method. An observational study (n = 32 couples, 119 cycles) reported a pregnancy rate of 24.5% per cycle following egg donation in women with previously failed IVF treatment (Mahajan, 2017). Variables found to have an effect on egg donation outcome included the number of previous natural conceptions and live births, and the IVF fertilization rate. However, increasing female age did not affect outcome. Pregnancy rates of 33.3% per started cycle and 38.4% per embryo transfer

were reported in another study (n = 15 couples, 15 cycles) in women following egg donation by ICSI in women with previous failed IVF (National Collaborating Centre for Women and Children's Health (NCCWCH), 2013).

6. Genetic disorders: heritable genetic diseases can be avoided with the use of donor eggs. A case series study used donor eggs from anonymous, matched, fertile donors in four women with heritable genetic disorders and found that use of donor eggs was a practical, successful, and currently available technique for the prevention of genetic disorders. A very common example in our setting is prevention of sickle cell disease in offspring from AS/AS couples. Other examples may include; hemophilia, Duchenne's muscular dystrophy and Huntington's chorea.
7. Bilateral oophorectomy: egg donation can also help women who have their ovaries removed as a treatment for cancer, pelvic infection or endometriosis.
8. Same-sex male couples and single men who lack the requisite gamete also use donor eggs to create embryos: these situations also require a uterus to gestate the pregnancy, which can take one of two forms. When the woman donating the egg is also the one to carry the pregnancy, it is referred to as traditional surrogacy. In contrast, a gestational carrier is a woman who carries a pregnancy derived from an egg that is not her own (i.e., she is not genetically related to the fetus).

In practice, the most common indication is age-related fertility decline.

Knowledge of egg donation among egg donor

A research study by Tober, et al., (2021) evaluated the retrospective perceptions of egg donors regarding information communicated about immediate and long-term risks during the process of becoming an egg donor, and the alignment of that perception with their experiences and expectations of egg donation. Data were collected from 375 current and former egg donors using an anonymous online survey and analyzed. The majority of the participants (81%) provided eggs in the USA, and 86.1% reported being compensated beyond direct reimbursement. 66% of egg donors surveyed reported feeling that their experiences matched their expectations based upon what they had been told during the informed consent process. While most participants (64.8%) felt well informed about potential short-term risks, 55.2% did not feel well informed about potential long-term risks. The findings indicate that while the majority of egg donors felt informed about immediate complications, there are gaps in knowledge about potential long-term risks (Tober et al., 2021).

Another study surveyed prospective egg donors at orientation to understand women's motivations to donate eggs, assess awareness and knowledge of egg donation prior to entry into the egg donation program, and explore attitudes toward egg donation in one fertility clinic in the Midwest of Ohio state, Columbus (Gezinski, et al., 2016). Ninety-two (92) women were used for the study and questionnaire was used for data collection. Findings revealed three (3) themes regarding participant motivations: altruistic, financial, and desire to pass on genetic material; the majority of participants indicated multiple sources of motivation rather than a singular motivator (Gezinski et al., 2016). The most common theme described was altruism, with 89% of participants mentioning their aspiration to help infertile couples. 67% of participants indicated that they were aware of physical risks; however, 65.48% of participants reported the perceived severity of said risks as somewhat minor to very minor.54% of all participants indicated that they were aware of potential psychological risks. Although potential donors felt recipients should receive some information about the donor, they tended to value privacy regarding information given to resultant offspring (Gezinski et al., 2016).

Also, another research study was also carried out in Spain to evaluate fertility knowledge and awareness in egg donors (Garcıa, et al., 2015). It was a cross-sectional study with 229 women who were interviewed by healthcare professionals. Results showed that majority of participants (95.6%) wanted to be mothers in future and 36.7% already had children; knowledge about assisted reproduction and egg donation was low; and 27.9% overestimated the age limits for ART (Garcıa et al., 2015). The researchers concluded that fertility knowledge is insufficient but, encouragingly, nearly 30% of interviewees were proactive in seeking information from the healthcare professionals.

Waldby and Carroll, (2012), reported a study undertaken with an Australian IVF clinic (tertiary metropolitan hospital in Sydney) to understand IVF patients' and reproductive donors' perceptions of egg donation for stem cell research. Two participant cohorts; 20 women who are ex IVF patients and five women who have donated eggs to other women and couples for the purpose of conceiving a baby were interviewed. Of the 20 IVF patient interviewees, 16 stated that they would not be prepared to donate mature eggs for research during infertility treatment, while four were unsure or unclear in their answers. Of the five donors, four would not donate to research during their donation cycles, as this was seen to detract from the more important task of assisting other women with their desire to have a child, although two said they would consider a separate donation process for stem cell research. Eight of the patient interviewees said they would be prepared to donate for reproduction during their own treatment, but only if the recipient were a sister or close friend. The reasons for not donating during treatment typically referred to the possibility that they would give away their best chance at pregnancy (Waldby & Carroll, 2012).

Reviewed literature shows that great success has been recorded in the use of egg donation in establishing pregnancies in otherwise sub-fertile and infertile couples. Literature showed low level of knowledge of egg donation among donors; a good number of researchers reported their participants (50-70%) not having adequate information about egg donation, especially the short and long term risks associated with the procedure. Thus, literature has several efforts that have been made to evaluate the efficacy of egg donation and the knowledge of the donors about egg donation. However, these studies are mostly foreign studies. Majority of them are of European and American background, with just one from South Africa; only one is from Nigerian setting. Hence, this study forms a good foundation for further research on this topic in Nigeria.

Methods

The study was hospital based study, conducted in the Southeast region of Nigeria among three leading ART facilities; Life International Hospital Awka (LIHA), Anambra State, Mbanefo Hospital Enugu, Enugu State and Vaden Specialist Clinic and Maternity Owerri, Imo State. Prior to data collection, ethical approval was obtained from the ethics committee of the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH/CMAC/ETH.C/VOL.1/FN:04/0113). Also, approval was sought and obtained from the heads of the various facilities used for the study. The study adopted a convergent parallel mixed method because it draws on potential strengths of both qualitative and quantitative research methods so as to gain deeper insights into egg donors' knowledge about egg donation in Nigeria and the data collected was for the purpose of this study alone. This approach was determined to be most appropriate given the goals of the study, and the lack of empirical research in this area. The participants for the quantitative aspect were 53 respondents recruited through total population sampling approach between September and December, 2021 in the three selected facilities. Inclusion criteria include; the young adult female who is an egg

donor; first-time or subsequent donation; the donor must have been recruited for donation cycle in one of the selected facilities and the donor must show interest to participate in the study. Exclusion criterion; donors who are younger than twenty (20) years of age were excluded from the study. In the qualitative aspect, interested participants were recruited through the purposive sampling technique till data saturation was attained at ten (10) participants. The purposive recruitment process was adopted to enable the research to reach only donors that are available and consent to participate in the study. Egg donation is a sensitive topic in Nigeria, as such; young females involved in donation program largely keep this a secret. This is because of their fear of identification, perceived stigmatization and being labelled an aberration to the generally accepted culture on procreation in the study area. To protect donors' privacy and confidentiality, the participants' names were not used, but rather some demographic profiles were used. Collected quantitative data were entered into the SPSS (version 27.0.1) for processing and results presented in tables, analyzed and interpreted using descriptive and inferential statistical methods while qualitative data were analyzed by means of thematic content analysis technique using OPEN-INFO version 4.2.

Results/Findings

Socio-Demographic Characteristics of Respondents

Out of the fifty-three (53) copies of questionnaire administered to the egg donors, all of them were returned and were properly filled and fitted for analysis giving response rate of 100%. The mean age and standard deviation of the egg donors is 23.0±3.4years.

Table 1: Socio-Demographic data of the egg donors

	N=53	
Demographic Data	**No of egg Donors**	**Percentage**
Age (years)		
21-25	16	30.2%
26-30	29	54.7%
31-35	8	15.1%
Marital Status		
Single	47	88.7%
Married	4	7.5%
Divorced	1	1.9%
Widow	1	1.9%
Level of Education		
Secondary	16	30.2%
Undergraduate	26	49.1%
Graduate	11	20.8%
Level of Income (₦)		
<10,000	12	22.6%
10,000-20,000	22	41.5%
20,000-50,000	16	30.2%
>50,000	3	5.7%
Religion		
Christianity	52	98.1%
African Traditional Religion	1	1.9%

Table 1 shows the demographic characteristics of the egg donors in the study. More than half of the donors 29(54.7%) were aged 26-30, while 16(30.2%) of them were aged 21-25 and 8(15.1%) of them were aged 31-35. About 47(88.7%) out of them were single, while very few of them 4(7.5%) were married. Also, above half of the donors 26(49.1%) were undergraduate, while 16(30.2%) of them were secondary school leavers and 11(20.8%) of them were graduate. Most of them 22(41.5%) had average monthly income of ₦10,000 - ₦20,000, while only three of them (5.7%) had average monthly income of over ₦50,000. Almost all of them were of Christian religion except one (1.9%) who was of African Traditional Religion.

This result was supported by the result from the qualitative data obtained through the In-depth interview (IDI) sessions. Socio-demographic characteristics of the participants from the IDI showed that the age range of the donors were 21-26years with mean and standard deviation of 23.0±1.7years. Five of them were first timer, while the remaining five had donated once before at the age range of 20-25years with mean and standard deviation of 23.0±2.2years. Also, four of them were from Anambra State, while others were from Delta, Edo, Enugu and Imo States. Two-third of them had secondary education, while the other one-third were undergraduates. All of them were Christians and singles but one of them is a single mother. Most of them were students, while some of them were tailors and caterers. Their average monthly income range was ₦15,000 – ₦20,000. In the same vein, the number of times donors donated egg can be gleaned from Table 2.

Table 2: Number of times eggs (oocytes, ova) were donated by the donors

	N=53	
	No. of Donors	**Percentage**
First time of donating eggs (oocytes, ova)		
Yes	22	41.5%
No	31	58.5%
No of times donated (n=31)		
Once	18	58.1%
Twice	10	32.2%
Thrice	3	9.7%

The number of times eggs were donated by the donors showed that most of them 31(58.5%) were not first timer, while 22(41.5%) of them were first timers. Out of the 31 egg donors, who were not first timer, 18(58.1%) of them had donated once, 10(32.2%) of them had donated twice, while 3(9.7%) of them had donated thrice.

Table 3: Knowledge about egg donation by the donors

	N=53	
	No. of Donors	**Percentage**
Source of information on egg donation**		
Friend(s)	44	83.0%
Social Media/ Internet	17	32.1%
Previous donor(s)	15	28.3%
Fertility Doctor/ Nurse	11	20.8%
Family member(s)	8	15.1%
Agent	7	13.2%
Meaning of egg donation to egg donors		

	No. of Donors	Percentage
A process (in ART) in which a fertile woman donates her eggs to another woman to help her get pregnant (conceive)	36	67.9%
A process in which a young woman sells her eggs to help older women get pregnant (conceive)	12	22.6%
A process in which a young girl gives out her eggs and gets some money in reward	4	7.5%
A process in which a young girl sells her eggs to hospitals	1	1.9%
Reasons people donate their eggs		
To help people in dire need of them	41	77.4%
To get monetary rewards	8	15.1%
To give out excess eggs they don't need	3	5.7%
To belong to the enviable group of donors	1	1.9%
It is a normal procedure (a must do) for every young girl	0	0.0%
Risks associated with egg donation		
Yes	29	54.7%
No	24	45.3%
If yes, the risks are:**		
Pain and discomfort of daily hormonal injections	25	86.2%
Ovarian hyper-stimulation syndrome (OHSS)	19	65.5%
Post-retrieval complications e.g. bleeding	12	41.4%
Headache	10	34.5%
Infection	9	31.0%
Injury to reproductive organs and surrounding structures e.g. nearby blood vessel	9	31.0%
Malaria	4	13.8%
Death	3	10.3%
Dizziness	1	3.4%

** Multiple responses allowed

The source of information on egg donation by the donors when multiple sources were allowed was mostly through friends 44(83.0%). Other sources included social media/internet 17(32.1%), previous donors 15(28.3%), fertility doctor/nurse 11(20.8%), family members 8(15.1%), and agent 7(13.2%). Majority of them 36(67.9%) correctly defined egg donation to be a process (in ART) in which a fertile woman donates her eggs to another woman to help her get pregnant (conceive). Also, more than three-quarter of them 41(77.4%) knew that the reason people donate their eggs is to help people in dire need of them. More than half of them 29(54.7%) knew that there are risks associated with egg donation. Out of these 29 egg donors that knew the risks associated with egg donation when multiple responses were allowed, majority of them 25(86.2%) knew about pain and discomfort of daily hormonal injections, 19(65.5%) of them knew about ovarian hyper-stimulation syndrome (OHSS), 12(41.4%) of them knew about post-retrieval complications e.g. bleeding, while 9(31.0%) of them knew about injury to reproductive organs and surrounding structures e.g. nearby blood vessel.

In collaboration with the quantitative result, on knowledge of egg donation, the following codes were identified from the interviews on knowledge of egg donation:

Helping	Friend	Desire
Giving	Compensation	Pleasurable

Conceive	Side effects	Finance
Person	Abdominal-pain	Excitement
Donation	Process	Cash
Money	Infertility	Pregnant
Eggs	Money	Pay
Pay	Explain	Fertility
Sister	Egg donation	Compensation

The above codes were categorized into sub themes and the sub themes grouped into the following emerging themes:

Giving Eggs to Help another Conceive

Most of the donors stated that egg donation is the giving out of their eggs to an infertile woman to help her have child(ren) either as rendering help to her or for financial compensation. According to some of the participants:

> 'It's giving out your eggs, then you get compensated for it… after all, I will shed and waste it if I don't give it out to help women who needs it to conceive' (…In depth Interviewee number 2 – IDI 2).
>
> 'Egg donation is the process of helping another woman who can't get pregnant on her own to conceive by donating eggs to her and to get some compensation in return.' (….IDI 3).
>
> 'It's a process whereby they retrieve your eggs and give it to a fellow woman like you who probably has some complications concerning her fertility to enable her bear a child.' (….IDI 4).
>
> 'Egg donation is helping people who can't get pregnant on their own to bear a child.' (… IDI 1).

Heard from friends/sister

The major source of information from the donors was through friend who had been a previous donor. However, one of the donors heard about it through her sister. According to participants;

> 'My friend told me about it and I decided to give it a trial.' (…IDI 2).
>
> 'I heard from friends and I browsed about it.' (…IDI 3).
>
> 'My sister told me about it, she donated here last month.' (…IDI 4).

Risks Associated with egg Donation

All the donors said there is no risk associated with egg donation, but some said continuous donation of egg could lead to complication in the future for the donor. According participants;

> 'No ooooo, I don't know of any risks involved in donating eggs' (…IDI 2)
>
> 'No risk is associated with egg donation, except you do it too much …more often than advised.' (…IDI 9)

To further assess views of respondents on level of knowledge about egg donation, respondent's responses were captured and summarised in Table 4.

Table 4: Level of knowledge about egg donation by donors

Knowledge of egg Donation	No of Donors	Percentage
Low (0-3)	0	0.0%
Average (4-7)	34	64.2%
High (8-11)	19	35.8%
Total	**53**	**100%**

Based on the results in Table 4, out of the 11 items on knowledge of egg donation, most of the donors 34(64.2%) had average knowledge on egg donation. However 19(35.8%) of them had high knowledge of egg donation, while none had low knowledge of egg donation. Additionally, a chi-square test was run to determine the relationship level of education and level of knowledge of egg donation among donors in Southeast Nigeria in table 5. The null hypothesis stated that there is no significant relationship between level of education and level of knowledge of egg donation among donors in Southeast Nigeria. The decision rule is to accept the hypothesis if $(P > 0.05)$, otherwise, it is rejected.

Table 5: Relationship between level of education and level of knowledge about egg donation

Level of Education	Level of Knowledge		$\chi 2$	P-value
	Average	High		
Secondary	11 (68.8%)	5 (31.2%)	4.741	0.093
Undergraduate	19 (73.1%)	7 (26.9%)		
Graduate	4 (36.4%)	7 (63.6%)		

Result in Table 5 clearly indicates that there is no significant relationship between level of education and level of knowledge of egg donation among donors in Southeast Nigeria at $(P > 0.05)$. Thus, the hypothesis was accepted.

Discussion

Fertility and parenthood are highly cherished in Nigeria and indeed Southeastern region thus, the primary objective of this research was to examine knowledge about egg donation among egg donors attending selected health facilities in Southeast, Nigeria. Results of this study have shown that more than half of the donors were aged 26-30, while 16 of them were aged 21-25 and 8 of them were aged 31-35. Almost all of them were single, while very few of them were married. Also, about half of the donors were undergraduate students, while the remaining minority were secondary school leavers and graduates. Most of them had average monthly income of ₦10,000 - ₦20,000, while only three of them had average monthly income of over ₦50,000. Almost all of them were of Christian religion but one who was of African Traditional Religion. This is in line with the findings of Okafor et al., (2022) and it is not surprising as South-easterners are predominantly Christians. Their average monthly income of ₦10,000 - ₦20,000 suggests that the donors are mostly low income earners (secondary school leavers and undergraduate students). Previous studies on egg donation have shown that the age range of the egg donors was from 20 to 37 years (Bracewell-Milnes, et al., 2016; Platts et al., 2019; Okafor et al., 2022). Like the findings of these previous studies on donors' demographic background, an enormous majority of participants in this study were currently young, single, and undergraduate students with an average age of 24 years and a mean income of ₦15,000. One may describe this given population as a vulnerable one.

Also, the findings of the study showed that most egg donors had average knowledge on egg donation. However, a significant number of them had high knowledge of egg donation, while nobody had low knowledge of egg donation. Majority of them correctly defined egg donation to be a process in assisted reproductive technology (ART) in which a fertile woman donates her eggs to another woman to help her conceive. Also, more than three-quarter of them knew that the reason people donate their eggs is to help people in dire need of them and more than half of them knew that there are risks associated with egg donation. Furthermore, the qualitative

study revealed that egg donation is the giving out of one's eggs to an infertile woman to help her have child(ren) either as rendering help to her or for financial compensation.

This agrees with the findings of Gezinski et al., (2016) and Tober et al., (2021) that majority of the participant donors were well informed about the physical risks and immediate complications of egg donation but disagrees with the findings of Garcıa, et al., (2015) that knowledge about assisted reproduction and egg donation was low. Interestingly, majority of the donors had the right information about egg donation. This may be because majority are students who have wide access to information and some of them had gone through the process repeatedly in the past. However, the fact that almost half of the donors who have gone through the process of egg donation (2-3 times for some) are yet to understand that there are possible risks associated with the process is a cause for concern. No wonder some of them may seem desperate to get recruited for egg donation cycles even at the expense of their health. Some pleaded for confidentiality while they confessed to have given the clinics' staff false information (most commonly on age and previous donation history) in a bid to get recruited into the donation program.

Conclusion

This study concluded that despite average-to-high level of knowledge of egg donation among egg donors in Southeast Nigeria, a significant number of the respondents were not aware of risks associated with egg donation. It therefore, becomes imperative to improve health education roles of health practitioners to ensure that these young donors get reliable first-hand information; understand and know every side of the process of egg donation before going in for it. Getting them well informed about egg donation will promote informed decision to donate and optimize the process of egg donation in our own setting.

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