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# Assessment of the Socio-Demographic Characteristics of Ovum Donors Attending Invitro-Fertilization Clin ics at Abakaliki

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## Abstract

**Background:** Egg donation has become an integral part of invitro fertilization (IVF) necessary for its success. This study is aimed at assessing the socio-demographic characteristics of ovum donors attending IVF clinics at Abakaliki.

**Method:** This study was a descriptive cross-sectional study that used a census sampling technique and a structured self-administered questionnaire proforma for data collection. Questionnaires from 423 first-time female ovum donors, who properly filled their proforma questionnaires were selected out of 444 female participants and analyzed using Statistical Package for the Social Sciences IBM, SPSS version 26 and presented in tables. P values of ≤0.005 were considered statistically significant.

**Result:** Majority of the ovum donors, 91(21.5%) were 23 years of age. The mean age was 22.35 ± 3.435 (2 S.D). Majority of the ovum donors, 392 (92.7%) were nullipara and unmarried, 390 (92.2%). Greater percentage, 87.9% (372) of the donors were undergraduate students. Donors who were non-smokers were more in number, 402 (95%). Majority of the oocyte donors, 407 (96.2%) confessed they were not under any form of stress, while 411 (97.2%) of the donors did not engage in at least three times per week non-strenuous sporting activities. Majority of the oocyte donors, 319 (75.4%) had normal BMI, and 314 (74.2%) ovum donors, attained menarche at age 13. Financial gratification was the main reason for ovum donation accounting for 421 (99.5%) of the oocyte donors. The main source of recruitment of donors in this study was friends, accounting for about 385 (91.0%) of donors. This is statistically significant, p-value 0.000.

**Conclusion:** M A 23-year-old, single, undergraduate, nulliparous, female with normal BMI, who is not under stress, non-exercise-friendly and who attained menarche at age 13, is likely to present at IVF Clinics for egg donation in Abakliki.

**Keywords:** Assessment, Socio-Demographic Characteristics, Ovum Donors, , Invitro Fertilization Clinics and Abakaliki

## Introduction

Infertility, which is the inability of a couple to achieve pregnancy after 12 months of regular unprotected sexual intercourse of at least 2-3 times a week is increasingly becoming global public health concern [1,2]. It is suggested that about one in six individuals may experience infertility at some point in their lives [2].

In Africa, childbearing is regarded as a major reason for marriage and when this does not occur naturally, there is anxiety and threats to the marriag [3,4].

Fertility treatment available to infertile couples varies depending on the aetiology, the availability of fertility services and the socio-economic capabilities of the couples among others.

Since the birth of Loiuse Joy Brown, the world's first IVF baby,in the UK on July 25th, 1978, Assisted Reproductive Technology (ART) has successfully restored hope to many hitherto hopeless homes [5]. Invitro fertilization is therefore a scientific breakthrough technology that has helped many infertile couples to have their own children [2,6].

The birth of first IVF baby in Nigeria in 1989 was pioneered by Oladapo Ashiru and his team7.

The principle of ovum donation began in 1983 [6,8]. This principle involves the young fertile woman willingly giving out her eggs to another woman who is not capable of producing her own eggs, for fertilization and creation of embryos that will be transferred to the recipient to enable her become pregnant with the opportunity of having her own children [2,5].

Since the reported case of first birth from a donor ovum in 1984, thousands of births have resulted from donor ova to bless previously hopeless families [5,9]. Ovum donation accounts for about 18% of IVF births in the USA [5,10].

The demand for ovum donation has grown tremendously world over [5]. Reports suggest that most donors often turn out to be students11. This may be due to the financial demand of their academics [11]. Increasingly, egg donation has become a common method of treating infertility in Nigeria especially among older females who can no longer produce their own eggs. There is paucity of data on the socio-demographic characteristics of ovum donors in Abakaliki. This study is therefore set to fill this gap.

## Methods

### Study Area

Ebonyi state is one of the smallest states of Nigeria. In terms of land mass and population respectively, it is the 33rd largest, sitting on 6, 400km2 and the 29th most populous state in Nigeria with an estimated population of 3,490,383 (2016 estimated population by National population Commission [12].

Geographically, Ebonyi State is located in the South-East geopolitical zone and shared boundaries with Benue State in the North, Cross-River State in the South East, Enugu State in the West and Abia State in the South West. It was created out of the former Abia and Enugu States on October 1, 1996 with Abakaliki as its capital. It derives its name from the famous Ebonyi River which traverses the greater parts of the state.

Economically, the occupation of people of Ebonyi State is mainly agriculture (yam, cassava, rice, oil palm crops). Mining is also going on in some pockets of the state as the state is blessed with deposits of lead, zinc and rich in limestones. The gross domestic product (GDP) of Ebonyi State is estimated at $12.2 billion and $3,634 per capita. Ebonyi State has the 20th highest Human Development Index (HDI 2018) in the country [13].

Ebonyi state has three senatorial zones of North, Central and South with 13 local government areas. Abakaliki is located in Northern Senatorial zone of the state and houses two major federal tertiary health care institutions: the Alex Ekwueme Federal University Teaching Hospital and National Obstetric Fistula Centre (NOFIC) as well as many private health care facilities including Smile Specialist Hospital.

NOFIC Abakaliki is a federal tertiary institution that focuses its care mainly on female reproductive needs. It is situated in the State capital.

It started as Mother and Child Care Initiative (MCCI) in 2008 as a pet project of the wife of the second Governor of Ebonyi, Chief Mrs Josephine Elechi which cared for the women with obstetric fistula. It later transformed to South East Vesico-Vagina Fistula Centre. It was taken over and renamed National Obstetric Fistula Centre in 2011 by the Federal Government of Nigeria with six Mandates namely: Free treatment of obstetric Fistula, Research, Training, Prevention and Rehabilitation of fistula patients as well as cancer screening/treatment with respect to cervical, breast and prostate cancers. The IVF unit of the Centre was established and became operational in 2015.

Smile Specialist Hospital is a private healthcare facility located in Abakaliki that focuses mainly on women's reproductive health needs. It was established in 2012. The IVF unit of the hospital became operational in 2014, hence, it became the first IVF Centre in the State.

The two Invitro Fertilization (IVF) clinics in Abakaliki, one private (Smile Specialist Hospital) and one Government (National Obstetric Fistula Centre) which started in 2014 and 2015 respectively were selected for the study.

The choice of Smile Specialist Hospital's IVF Centre is predicated on the premise that apart from the fact that the hospital hosts the first and oldest IVF unit in the state, its proximity to NOFIC makes data collection easy. The choice of NOFIC IVF unit is predicated on the fact that it was the second IVF Centre in Abakaliki as well as its proximity to Smile Specialist Hospital.

### Study Population

The study population comprised of all first-time ovum donors who willingly presented to these two Centres for egg donation and willingly gave consent to participate in the study within the study period.

### Study Design

This is descriptive, cross-sectional study.

### Sampling Technique/Selection Criteria

Census of all eligible first-time ovum donors within the study period who presented at the selected clinics and consented to participate in the study were used.

### Sampling Size

Sample Size was determined by statistical formula for descriptive studies, and was derived from the formula:

$N=Z^2pq/d^2$ (Kadam and Bhalerao, 2010)

Where:

N= minimum sample size

z= 1.96 (95% CI)

P= Expected proportion= 0.5 (since there is no available study to pick the prevalence)

q =1-p

d =desired precision (acceptable margin of error) =0.05

$N=(1.96)^2 \times 0.5 (1-0.5)/(0.05)^2$

N=3.8416 x0.25/0.0025=384.16

Plus 10% attrition=38.4

Sample size- 38.4+384.16=422.58

Approximately 423

### Inclusion Criteria

Willing and consenting, non-recipient first-time ovum donors who willingly gave out their socio-demographic data and who willingly subjected themselves to ovarian stimulation protocols. Ovum donors who met above criteria and completed the procedure with oocyte retrieval (or did not complete the procedure because they were dropped early due to poor performances) within the study period were selected and included.

## Exclusion Criteria

**Excluded from the study were:**

1. Ovum donors who refused to consent to the study, or refused to willingly give out their socio-demographic data
2. Ovum donors who withdrew from the stimulation protocol before oocyte retrieval
3. Ovum donors who have donated eggs in the past
4. Egg-sharers, and
5. Recipient donors.

## Instrument of Data Collection

The information was collected using a well-designed data collection proforma. The proforma has two sections: A and B. Section A comprised of instrument for collecting the socio-demographic characteristics of the donors. Information on the anthropometric data of ovum donors were found in section B.

## Validity of Data Collection Instrument

To ensure validity of the collection instrument, the proforma was reviewed and modified by the co-authors to ensure compliance with objectives of the study.

## Reliability of The Instrument

To ensure reliability of the proforma instrument, it was pre-tested on 10 selected ovum donors. This exercise helped to identify some ambiguities with the proforma which were corrected before proceeding with data collection.

## Data Collection

Six (6) Research Assistants (2 doctors and 4 nurses) who understood the three major languages of Nigeria-Hausa, Igbo and Yoruba, and the major dialects in Ebonyi State-Izzi, Ezza, Ohaozara and Afikpo, as well as the IVF terminologies and also worked routinely in IVF clinics received further training for a day and were equipped with the contents of the proforma.

The Research Assistants counseled each donor and collected information on their socio-demographic and anthropometric characteristics.

## Data Analysis

Data was analyzed using Statistical Package for the Social Sciences IBM, SPSS version 26. The assistance of a Statistician conversant with this was sort to help in the analysis.

Frequencies, percentages, mean and standard deviation were used to present the results.

## Ethical Considerations

Ethical clearance was obtained from Research and Ethics Committee of Ebonyi State University Abakaliki (EBSU REC). Formal administrative permission was secured from the heads of the IVF Clinics used.

Confidentiality was observed and data was extracted and analyzed anonymously. All donor's information that will expose her identity were not entered into the proforma and were excluded from the data set.

All participating ovum donors gave consent in writing and were made to know that they could withdraw at any stage of the research without untoward effects.

## Results

Table 1 shows that majority of the donors were 23 years old (21.5%) while age 33 formed the least (0.9%). The mean age was 22.35years ±3.435 (2 S D).

**Table 1: The Age Characteristics of Respondents.**

| Age(yrs) | Frequency | Percentage(%) |
|---|---|---|
| 18 | 52 | 12.3 |
| 19 | 54 | 12.8 |
| 20 | 51 | 12.1 |
| 21 | 34 | 8.0 |
| 22 | 16 | 3.8 |
| 23 | 91 | 21.5 |
| 24 | 30 | 7.1 |
| 25 | 37 | 8.7 |
| 26 | 8 | 1.9 |
| 27 | 14 | 3.3 |
| 28 | 8 | 1.9 |
| 29 | 8 | 1.9 |
| 30 | 6 | 1.4 |
| 31 | 5 | 1.2 |
| 32 | 5 | 1.2 |
| 33 | 4 | 0.9 |
| TOTAL | 423 | 100.0 |
| Mean age | 22.35 | |
| Median age | 23.0 | |
| Std. Deviation | 3.435 | |

**Table 2: Parity of Respondents.**

| | Frequency | Percent |
|---|---|---|
| Nullipara | 392 | 92.7 |
| 1-2 | 29 | 6.9 |
| >=5 | 2 | .5 |
| Total | 423 | 100.0 |

Table 2 showed that majority of the donors were nullipara, 392 (92.7%). This is statistically significant, Chi-square = 51.541, P value¬= 0.000

**Table 3: Marital/Educational and Occupational characteristics of Respondents.**

| Marital status | Frequency | Percentage (%) |
|---|---|---|
| Single | 390 | 92.2 |
| Married | 33 | 7.8 |
| Total | 423 | 100.0 |
| **Highest Educational status attained** | **Frequency** | **Percentage (%)** |
| Secondary | 11 | 2.6 |
| Tertiary | 412 | 97.4 |
| Total | 423 | 100.0 |
| **Occupation** | **Frequency** | **Percentage (%)** |
| Undergraduate Students | 372 | 87.9 |
| Teachers | 4 | 0.9 |

| | | |
|---|---|---|
| Civil Servants | 30 | 7.1 |
| Artisans | 11 | 2.6 |
| Bankers | 2 | 0.5 |
| Business | 4 | 0.9 |
| TOTAL | 423 | 100.0 |

Table 3: shows that majority of the donors, 390 (92.2%) were single. Donors had tertiary education as their highest educational attainment were 412 (97.4%) while 372 (87.9%) were students.

**Table 4: Social lives (smoking, sporting and stress) of Respondents.**

| Smoking status | Frequency | Percentage (%) |
|---|---|---|
| Yes | 21 | 5.0 |
| No | 402 | 95.0 |
| Total | 423 | 100.0 |
| **Types of smoking** | | |
| None | 402 | 95.0 |
| Cigarette | 21 | 5.0 |
| Total | 423 | 100.0 |
| **Sporting of at least X3 a week** | | |
| Yes | 12 | 2.8 |
| No | 411 | 97.2 |
| Total | 423 | 100.0 |
| **Under Stress** | | |
| Yes | 16 | 3.8 |
| No | 407 | 96.2 |
| TOTAL | 423 | 100.0 |

Table 4: shows that majority of the donors were non-cigarette smokers, 402 (95.0%). Majority of the donors were not engaged in sporting activities up to at least three (3) times a week, 411(97.2%), while majority of the donors,407 (96.2%) confessed they were not under any form of stress.

**Table 5: Source of Motivation.**

| Source | Frequency | Percentage (%) |
|---|---|---|
| Helping hands to Recipients | 2 | 0.5 |
| Finance | 421 | 99.5 |
| **TOTAL** | **423** | **100.0** |

Table 5: shows that the main reason for egg donation in this study was financial gratification. Majority, 421 (99.5%) of donors donated for the single reason of financial gains.

**Table 6: Source of Recruitment.**

| Source | Frequency | Percentage |
|---|---|---|
| Came on my own | 2 | 0.5 |
| Friends | 385 | 91.0 |
| Online | 28 | 6.6 |
| Classmates | 9 | 1.9 |
| TOTAL | 423 | 100.0 |

Table 6: shows that the main source of recruitment of donors in this study was friends, accounting for about 385 (91.0%) of donors.

**Table 7: The Body Mass Index (BMI) characteristics of Respondents.**

| BMI(kg/m²) | | Frequency | Percentage (%) |
|---|---|---|---|
| Valid | 16.00 | 4 | .9 |
| | 16.50 | 2 | .5 |
| | 16.70 | 2 | .5 |
| | 17.00 | 2 | .5 |
| | 17.10 | 2 | .5 |
| | 17.30 | 6 | 1.4 |
| | 17.40 | 6 | 1.4 |
| | 17.50 | 7 | 1.7 |
| | 17.60 | 6 | 1.4 |
| | 17.70 | 2 | .5 |
| | 17.80 | 4 | .9 |
| | 17.90 | 2 | .5 |
| | 17.99 | 4 | .9 |
| | 18.00 | 8 | 1.9 |
| | 18.08 | 2 | .5 |
| | 18.10 | 12 | 2.8 |
| | 18.20 | 4 | .9 |
| | 18.30 | 12 | 2.8 |
| | 18.40 | 13 | 3.1 |
| | 18.50 | 6 | 1.4 |
| | 18.60 | 11 | 2.6 |
| | 18.65 | 2 | .5 |
| | 18.70 | 11 | 2.6 |
| | 18.75 | 2 | .5 |
| | 18.80 | 10 | 2.4 |
| | 18.90 | 10 | 2.4 |
| | 19.00 | 4 | .9 |
| | 19.10 | 20 | 4.7 |
| | 19.30 | 12 | 2.8 |
| | 19.40 | 16 | 3.8 |
| | 19.50 | 6 | 1.4 |
| | 19.60 | 2 | .5 |
| | 19.70 | 10 | 2.4 |
| | 19.80 | 2 | .5 |
| | 19.90 | 4 | .9 |
| | 20.00 | 6 | 1.4 |
| | 20.10 | 2 | .5 |
| | 20.11 | 2 | .5 |
| | 20.20 | 2 | .5 |
| | 20.30 | 4 | .9 |
| | 20.60 | 2 | .5 |
| | 20.70 | 4 | .9 |
| | 20.80 | 6 | 1.4 |
| | 20.90 | 2 | .5 |

| | | | |
|---|---|---|---|
| | 21.00 | 2 | .5 |
| | 21.10 | 2 | .5 |
| | 21.25 | 4 | .9 |
| | 21.30 | 5 | 1.2 |
| | 21.50 | 2 | .5 |
| | 21.60 | 4 | .9 |
| | 21.70 | 3 | .7 |
| | 21.80 | 7 | 1.7 |
| | 21.90 | 2 | .5 |
| | 22.00 | 2 | .5 |
| | 22.10 | 5 | 1.2 |
| | 22.40 | 8 | 1.9 |
| | 22.60 | 2 | .5 |
| | 22.70 | 2 | .5 |
| | 23.00 | 6 | 1.4 |
| | 23.20 | 10 | 2.4 |
| | 23.50 | 2 | .5 |
| | 23.60 | 3 | .7 |
| | 23.90 | 4 | .9 |
| | 24.00 | 6 | 1.4 |
| | 24.20 | 4 | .9 |
| | 24.30 | 5 | 1.2 |
| | 24.40 | 4 | .9 |
| | 24.60 | 4 | .9 |
| | 25.10 | 4 | .9 |
| | 25.20 | 2 | .5 |
| | 25.30 | 6 | 1.4 |
| | 25.80 | 3 | .7 |
| | 26.10 | 3 | .7 |
| | 26.30 | 4 | .9 |
| | 26.50 | 3 | .7 |
| | 26.60 | 7 | 1.7 |
| | 26.90 | 4 | .9 |
| | 27.40 | 4 | .9 |
| | 27.70 | 2 | .5 |
| | 27.90 | 3 | .7 |
| | 28.40 | 3 | .7 |
| | 28.60 | 4 | .9 |
| | 29.70 | 2 | .5 |
| | 31.10 | 3 | .7 |
| | 31.25 | 4 | .9 |
| | 31.30 | 4 | .9 |
| | 31.60 | 2 | .5 |
| | Total | 423 | 100.0 |

P-value = 0.000; Chi-Square = 4493.329

Table 7: shows that majority of the donors (4.7%) had BMI of 19.0kg/m2 while 319 donors (75.4%) of donors had normal BMI of 18 to 25.5kg/m².

**Table 8: Age of Menarche of Respondents.**

| Age (yrs) | Frequency | Percentage (%) |
|---|---|---|
| 11 | 10 | 2.4 |
| 12 | 27 | 6.4 |
| 13 | 314 | 74.2 |
| 14 | 72 | 17.0 |
| **Total** | **423** | **100.0** |

Table 8: shows that majority of the donors, 314 (74.2%) attained menarche at age 13 followed by age 14.

## Discussion

This study showed that majority of the donors were aged 23 years. This is not unexpected because this is the age bracket when most of them are in the university. Age is a critical factor in ovum donation. This finding differs from study by Okafor and Odo [14], which reported that majority of the donors were aged between 26 and 30. Bracewell, et al reported age range of 20-37 as the predominant age bracket for egg donation [15]. The differences in the findings may be due to different research settings: While Okafor and Odo examined the awareness of students on ovum donation, the study by Bracewell, et aI, was a systematic review [14,15]. Younger ovum donors generally have better ovarian reserves. However, some very young women may also experience challenges [16]. Though Obuna and Nwidagu reported that the fertility of a female increases and reaches peak at age 25 [1], no reason from this study can clearly be adduced as to why age 23 constituted the highest number of donors.

In this study, majority of the ovum donors were single and nulliparous. This finding is similar to other studies [6,14,17]. This is expected because majority of the donors were still very young at 23 years. More so, in this part of the world, it is not common for unmarried females to engage in procreation [1]. It is therefore more likely that once a female is single, she will also be nulliparous.

Majority of the ovum donors in this study were undergraduate students. This is in consonance with other studies which indicated that majority of the willing egg donors were university undergraduates [5, 6, 14, 17]. Studies have shown that nowadays females tend to defer marriage in favour of pursuit of academics [18].

This study showed that the main motivating factor for egg donation is financial gratification. This agrees with other studies [9, 14, 19,20].

When this finding is coupled with the fact that majority of the donors were undergraduate students, one can easily conclude that the financial demands posed by their academics and the global economic down-turn, especially in Nigeria, may be the reason why majority of the willing egg donors are undergraduate students. This was corroborated by other studies [6,17,21,22].

Majority of the donors in this study had normal body mass index (BMI). Female fertility is sensitive to body weight. A critical threshold of body fat is required for girls to enter puberty and a critical body weight must be attained by a female for effective function [23,24]. A BMI between 18 and 25 kg/m2 is generally considered healthy for follicular optimal follicular function [23].

Abnormal BMI (obesity and under-weight) has been shown to be detrimental to the follicular environment [23,24]. There are more oxygen reactive species in obese females, hence, more oxidative stress in females with high BMI. This has been found to interfere with ovarian function [23].

Majority of the egg donors in this study did not engage in at least three (3) non-strenuous sporting activities per week, this is not surprising because many females in this part of the world are not exercise-friendly either as a result of ignorance of the value of exercise on ovarian function or shear lethargy to exercise. It has been shown that non-strenuous exercise of at least three (3) times a week improves ovarian function in women of reproductive age group [25].

Majority of the ovum donors were non-cigarette smokers. This is expected because in our environment, cigarette smoking is not a common phenomenon among female folk. Cigarette smoking has been shown to negatively affect follicular environment [26].

Majority of the donors confessed that they were not under any form of stress (physical or psychological). This is not unexpected since majority of the donors were undergraduate students who were still dependent on their parents who bear their stress and burdens. Stress has been shown to be detrimental to follicular environment [27,28].

Majority of the oocyte donors in this study attained menarche at age 13. Normal menarche occurs at age between 12 and 14 [29]. While age of menarche is not a direct measure of ovarian function, however, it may signify the general fertility integrity of such females. Early or late menarche can be a risk factor for diminished ovarian function and fertility issues later in life [30]. Late menarche may signal underlying issues such as polycystic ovarian syndrome (PCOS) or other underlying hormonal imbalance which may affect female fertility30. Menstruation is known to be a window through which the fertility of female is viewed1. Commencing menstruation at age 13 may probably demonstrate that the fertility of such female is high which is a sign of good ovarian environment.

Majority of the donors were recruited through their friends who had donated eggs in the past. This is in consonance with other studies [5,11]. This is not surprising because, advertisement of health programs by orthodox health facilities are generally not allowed in our environment and so, IVF operators, like other healthcare practitioners generally rely on neighbours telling neighbours about healthcare activities. So, students tend to tell their fellow students about the egg donation.

In conclusion, majority of the egg donors in this study were aged 23, unmarried, nulliparous, undergraduate students and with normal BMI. Majority of the donors were non-exercise friendly and not under undue stress. The main reason for egg donation was financial gratification while friends constituted the major source of recruitment.

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