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Fertility knowledge, childbearing intentions and attitudes towards social egg freezing: A study of female students of a private university in Kumasi, Ghana

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Abstract

Background As women increasingly delay childbearing for educational and career pursuits, understanding the age-related decline in ovarian reserve becomes crucial to avoid infertility. Egg freezing offers a solution, extending the window for achieving pregnancy with a biological child. However, awareness and acceptance of age-related fertility decline and elective egg freezing vary across countries and social groups.

Methods This descriptive cross-sectional study investigates fertility awareness, childbearing intentions, and attitudes toward elective egg freezing among 138 undergraduate female students at a private university in Kumasi, Ghana. Data were collected via a Google App-based questionnaire.

Results The majority of respondents were below 28 years old (76.3%), Christians (79.26%), and single (57.78%). Many respondents overestimated their knowledge of age-related fertility decline, with almost half (48.89%) incorrectly believing it occurs after age 40. Primary sources of fertility education included health professionals, the Internet, and television. While most (62.96%) considered childbearing necessary, they would not have a child without a partner. Acceptance of donor egg in vitro fertilisation (IVF) varied based on circumstances, and a significant portion was open to donating their eggs (41.48%). Awareness of elective egg freezing was low, but nearly half (48.89%) expressed interest in it, primarily to retain the option for a biological child. The cost of elective egg freezing was a significant deterrent.

Conclusions The study revealed a significant lack of awareness regarding age-related fertility decline and elective egg freezing among female university students in Kumasi. Most prefer having a biological child only with a partner. While few were open to donating their eggs or accepting the same to achieve a pregnancy, interest in elective egg freezing was notable, albeit hindered by cost. The study recommends enhanced education by health professionals using social media and television to address these gaps.

Keywords Attitudes, Childbearing intentions, Fertility, Knowledge, Social Egg freezing

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Introduction

Globally, many women are postponing marriage and childbearing due to various factors such as economic challenges, pursuing higher education, acquiring trade skills, and advancing their careers [1, 2]. A few decades ago, early or child marriages were prevalent in Africa, including Ghana, with multiple births being common. However, there is evidence suggesting a shift towards delayed marriages and childbirth in these regions. For instance, the median age of the timing of the onset of parenthood among women of reproductive age in Ghana increased from 17 years in 1998 to 19 years in 2014 [3, 4]. These delays can stem from voluntary choices or involuntary circumstances, contributing to issues of infertility. In rural Ghana, for instance, infertility affects approximately 11.8% of women and 15.8% of men, underscoring the significance of these trends [5].

Women are becoming increasingly aware of their age-related fertility decline and the potential to expand their reproductive lifespan through elective egg freezing using Assisted Reproductive Technology (ART) [6–8].

Fertility preservation through egg freezing does not require sperm at the time of egg collection. Therefore, women who freeze their eggs for social reasons save themselves the pressure of looking for a suitable partner while their biological clocks tick. They can also pursue their professional and career goals while maintaining the potential to have a biological child through IVF treatment when advanced in age.

Despite the devastating consequences of infertility or childlessness, few women have adequate knowledge about its causes [9–13], especially the decline of ovarian reserve with age [1, 14, 15]. This lack of awareness of the age-related decline in fertility can lead to unnecessary delays in childbearing, depletion of ovarian reserve, and childlessness [16]. The risk of involuntary childlessness increases with age from 2 to 3% for women under 30 years to 36% for those over 40 years [17].

Egg freezing for non-medical reasons, also called elective egg freezing or social egg freezing, if done for social reasons such as being single or without a suitable partner, has become increasingly common [11, 18–20]. Even though it helps women prolong their reproductive life span, it is associated with some misconceptions and stigmatisation [21].

Knowledge and acceptance rate of egg freezing varies globally [22]. It offers better outcomes for live births when the woman is less than 35 [23–25]. However, most women become aware of fertility preservation opportunities only after age 35 [15, 18, 21, 26, 27]. Egg freezing is more acceptable among the younger generation than the old, with a 40–85% range [18, 28, 29]. Older women consider women who freeze their eggs selfish and greedy

[18, 21]. The cost of elective egg freezing is prohibiting for many eligible and desirous women [15, 21, 28, 30, 31].

Appropriate and timely health education can prevent delays in childbearing and the need for elective egg freezing. With awareness and wherewithal, women in many developed countries have avoided childlessness by freezing their eggs early [27, 32].

There is a paucity of data on the awareness of Ghanaian women about their age-related decline in fertility and the opportunity to prolong their reproductive life span through egg freezing. The knowledge of Ghanaian women about elective egg freezing, its cost, and its success rates, as well as the factors that would influence them to consider fertility preservation for social reasons, has not been explored.

Most university students are single and will soon have to choose between marriage and childbearing, career progression, and pursuing higher academic qualifications. These choices, if uninformed, could lead to childlessness. Awareness of infertility and its causes and the opportunity to prolong their reproductive life span through elective egg freezing would influence their choices positively. A well-informed graduate could be a community ambassador for elective egg freezing.

Aim of the study

This study aimed to determine fertility knowledge, childbearing intentions, and attitudes toward elective egg freezing among female undergraduate students in Kumasi. It addressed the following research questions: (a) What is the level of awareness of age-related diminishing ovarian reserve and social egg freezing among college students in Kumasi? (b) What are the intentions of these college students towards childbearing and their careers? (c) What are the attitudes of Ghanaian students to childbearing with donor or frozen eggs?

The findings of this study provide baseline data on the level of awareness of young Ghanaian women about their natural decline of fertility and its preservation as they advance in age and defer childbearing. Our study serves as the model for future research on the subject. It also provides fertility doctors in Ghana with some reference material on Ghanaians' information gaps and concerns for essential policy proposals, education, and advocacy on social egg freezing.

Methods

Study design

The study utilised a cross-sectional design and investigated female students' fertility knowledge, childbearing intentions, and attitudes toward social egg freezing at Garden City University College (GCUC), Kenyasi, in Kumasi, Ghana. Kumasi is the capital city of the Ashanti

Region and the second largest city in Ghana. It has a population of 3,490,000 people (2021). The city has three public and five private universities, including the GCUC. We conveniently chose this private university because it was familiar territory for many key authors of this article. It was established in 2001 and is one of the prominent private universities in Kumasi. The university offers undergraduate programmes in business, health and applied sciences. The study included 18 to 42-year-old levels 300 and 400 female nursing and midwifery students who were single, married, or separated without biological children or those who retained the desire for more children in the future despite having a child or children in a previous relationship. The data were collected between 1st and 30th April 2023. We selected the level 300 and 400 students over the juniors in levels 100 and 200 because the seniors were about to complete school and were more likely to be making decisions on childbearing, marriage or education and career progression sooner. The authors visited the classes to explain the study aims and rationale to the students. Subsequently, we sent a Google App-based structured questionnaire (available as supplementary material s1) developed from previously validated questionnaires [18, 21] with open and closed-ended questions through WhatsApp Class Group Pages of levels 300 and 400 female students to collect data. Even though our determined sample size was 133, we could not pre-determine how many students would consent and respond to the questionnaire since this was an online survey. Therefore, the questionnaire was sent to the two classes' group WhatsApp pages to target all female students who met the inclusion criteria. However, the students were requested not to send the data-gathering questionnaires outside the year group pages. After opening the Google-based form sent to them by WhatsApp, they received a pop-up with respondent information, indicating that they had given their informed consent by proceeding to fill out the form. Only those who consented could proceed to answer the questionnaire. We received 138 responses.

Ethical approval, Ref: CHRPE/AP/057/24, was obtained from the Committee for Human Research, Publications and Ethics (CHRPE) of Kwame Nkrumah University of Science and Technology. Informed consent to participate was obtained from all participants, as they were required to acknowledge their consent by proceeding to fill out the Google-based form after reviewing the respondent information provided. Only those who consented were able to complete the questionnaire.

Sample size

We used Slovin's formula to calculate the sample size for this study.

$$n = \frac{N}{(1 + Ne^2)}$$

Where.

'n' is the estimated sample size for a finite population, N is the population size, and 'e' is the margin of error taken as 5% [33].

The estimated sample size thus, $n = N / (1 + Ne^2)$: gives; $n = 200 / 1 + 200(0.05)^2$. This gives an estimated sample size of 133 participants.

$$n = \frac{200}{1 + 200(0.005)^2}$$

$$n = \frac{200}{1 + 200(0.00025)}$$

$$n = 133.33$$

The sample size for an unknown population, $n_0 = 133$.

Adjusting for an estimated non-response rate (incomplete data) of 5% gives $5(100)/133 = 6.65$ non-response.

This gives a final sample size of $133 + 7 = 140$ participants.

Instrument

To evaluate knowledge, childbearing intentions, and attitudes about social egg freezing, we utilised a structured questionnaire developed from previously validated instruments with open and closed-ended questions [3, 4]. The questionnaire sampled answers from four (4) areas: socio-demographics (Table 1), fertility awareness (Table 2), childbearing intentions (Table 3; Fig. 2), and attitude toward elective egg freezing (Tables 4, 5, 6, 7 and 8).

Table 1 A summary of their sociodemographic characteristics

Variables	Frequency (N= 135)	Percentage (%)
Age (Years)		
18–35	130	96.30
36–42	5	3.70
Religion		
Christianity	107	79.26
Islam	28	20.74
Relationship status		
Single	119	88.15
Married	16	11.85
Year of Study		
Year four	72	53.33
Year three	63	46.67

Table 2 Knowledge of age-related fertility decline

Variables	Frequency (n)	Percentage (%)
Knowledge of fertility and infertility issues?		
Adequate knowledge	88	65.19
Inadequate knowledge	47	34.81
What period, in your opinion, is most fertile for a woman? (years)		
15–19	23	17.04
20–24	50	37.04
25–29	46	34.07
30–34	7	5.19
35–39	4	2.96
40–44	5	3.70
What age is too old to have a child? (years)		
30–35	9	6.67
36–40	9	6.67
40–45	18	13.33
46–50	30	22.22
50–55	33	24.44
> 55	36	26.67
In which period will the egg number decline be most prominent? (years)		
15–19	8	5.93
20–24	12	8.89
25–29	14	10.37
30–34	18	13.33
35–39	17	12.59
40–44	66	48.89
Have you previously sought a consultation about your fertility?		
Yes	49	36.30
No	86	63.70
Does your advancing age worry you about your future ability to have children?		
Yes	50	37.04
No	85	62.96
Do you think that, as a woman, your egg number and effectiveness reduce as you grow older?		
	Frequency (n)	Percentage (%)
Yes	101	74.81
No	34	25.19
What, in your opinion, constitutes the best treatment options for infertility?		
A visit to the spiritual leader for prayer	9	6.67
Herbal treatment	6	4.44
In – Vitro Fertilization	20	14.81
Medical treatment	100	74.07

The instrument was pre-tested on a small group of graduate students for clarity and wording.

Data analysis

STATA. Version 17 was used for the analysis of data. Descriptive statistics were computed for each question. A chi-square analysis was done to determine an association between sociodemographic characteristics and the likelihood of freezing eggs for non-medical reasons (Table 4).

All tests were conducted at 5% significance level with 95% confidence intervals.

Results

Sociodemographic characteristics of respondents

Table 1 contains a summary of the sociodemographic characteristics of respondents. Of the 138 students surveyed, 135 respondents accurately answered the questionnaires, resulting in a non-response rate of 2.2%.

Knowledge of age-related fertility decline

Almost two out of three (65.19%) respondents claimed adequate knowledge of age-related fertility and infertility issues. About three-quarters (74.81%) knew that ovarian reserve reduces as they age, and 71.11% believed women were most fertile in their early to late twenties. However, only a little more than one-third, 37.04%, of the respondents were worried about their advancing age and ability to have children. A similar number, 36.30%, had already sought consultation for fertility.

About half (48.89%) of the respondents thought a woman's egg number declined most prominently within the ages of 40–44 compared to only a few, 12.59%, who otherwise correctly believed the decline is most prominent between 35 and 39 years (Table 2).

Sources of health information

The primary sources of information for respondents on fertility knowledge were health professionals (33.33%), the Internet (30.37%), and television (14.81%). Radio was the least source of information (Fig. 1).

Childbearing intentions

Table 3 shows the responses of student participants concerning their future family goals. Almost 9 out of 10 (88.89%) students planned to have children. Three out of four (74.81%) respondents indicated that childbearing was important to them, but about two out of three (62.96%) would not have a child without a partner. Over three-quarters (75.56%) of respondents planned their first child at age 25–29 (Fig. 2), and only about half (50.37%) wished to have

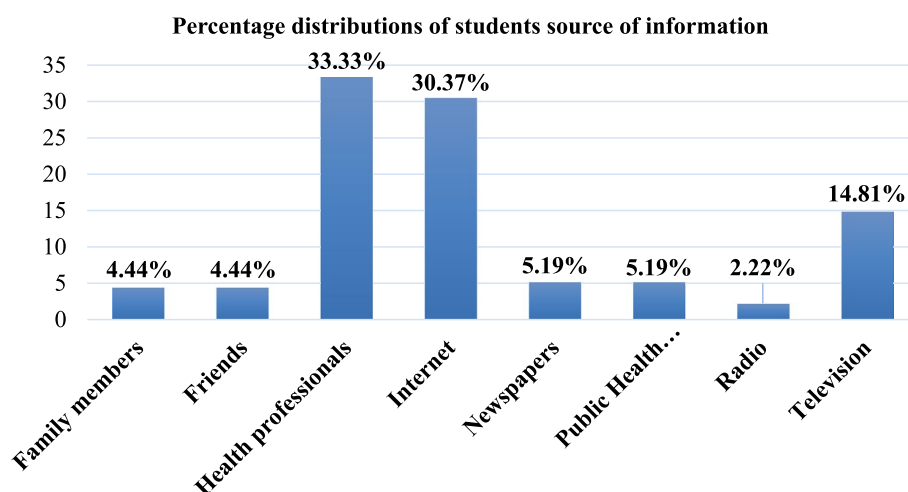


Fig. 1 Source of information

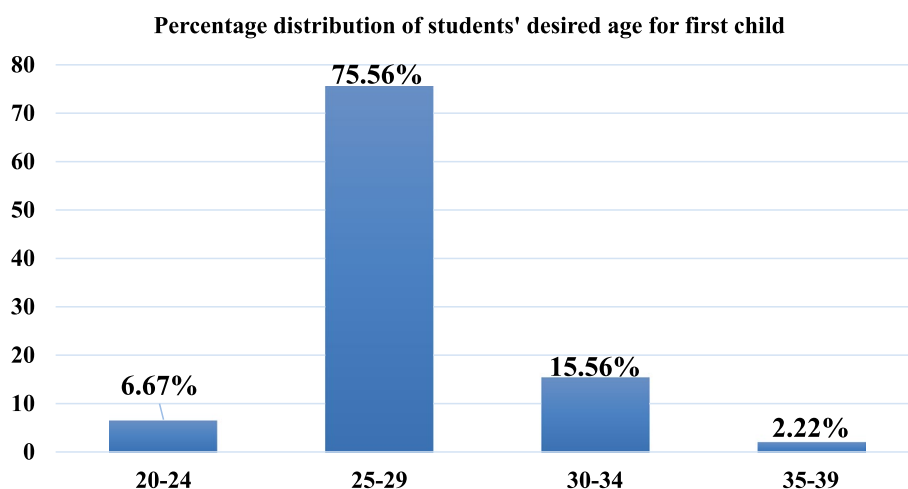


Fig. 2 Desired ages for a first child

Table 3 Childbearing intentions

Variables	Frequency (n)	Percentage (%)
Do you plan on having children?		
Yes	120	88.89
No	15	11.11
Will you start having children if you don't have a partner?		
Yes	17	12.59
No	85	62.96
Maybe	33	24.44
How many children do you intend to have?		
1–3	63	46.67
4–6	71	52.6
7–8	1	0.74
At what age do you plan to have your last child? (years)		
21–25	2	1.48
26–30	26	19.26
31–35	68	50.37
36–40	24	17.78
> 40	15	11.11
How important is/was it for you to have children?		
Important	101	74.81
Not important	34	25.19
Which of these would you consider if you cannot achieve a pregnancy with your partner?		
Go for adoption	21	15.56
Live with childlessness	7	5.19
Seek fertility treatment	97	71.85
Use a surrogate	10	7.41
How confident are you that you will have your desired number of children?		
Confident	130	96.30
Not confident	5	3.70

their last child at age 31–35. Almost all (96.30%) respondents were confident about having their desired number of children in the future; about three out of four (71.85%) would seek fertility treatment if they could not have children. Only 7 (5.19%) would consider remaining childless.

Association between sociodemographic characteristics of female students and attitudes towards social egg-freezing

The study revealed a marginally significant statistical association between only the level of study and attitude towards social egg freezing, with p -values of 0.050 (Table 4).

Attitude toward social egg freezing

Awareness of social egg freezing

More than half, 76 (56.3%) of respondents had heard about social egg freezing, mainly from the media (47.37%) (Table 5).

Factors that will influence a decision to consider social egg freezing

The desire to have a biological child was the most important reason for which almost half (48.89%) of participants would likely or very likely consider social egg freezing. The cost of elective egg freezing was the reason more than half (51.11%) would likely or very likely not consider elective egg freezing (Table 6).

Factors that will influence a decision to donate eggs for IVF

About 4 out of 10 (41.48%) participants would be willing to donate their eggs to an anonymous recipient (Table 7).

Factors that will influence a decision to consider using donated eggs for IVF

Almost half (47.41%) of the participants would accept donated eggs for IVF if it were the only option for childbearing. Only about a third (32.59%) of participants would be willing to use donated eggs to achieve a

Table 4 Association between sociodemographic characteristics of female students and attitudes towards social egg-freezing

Variables	Likelihood of Social Egg Freezing (%)		
	Certain	Not Certain	Total
Age (Years)			
< 35	38.46	61.54	100
> 35	20.00	80.00	100
Total	37.78	62.22	100
Fisher's Exact Test: <i>p</i> -value			0.650
Religion			
Christian	34.58	65.42	100
Muslim	50.00	50.00	100
Total	37.78	62.22	100
Fisher's Exact Test: <i>p</i> -value			0.188
Relationship status			
Single	37.82	62.18	100
Married	37.50	62.50	100
Total	37.78	62.22	100
Fisher's Exact Test: <i>p</i> -value			1.000
Year of Study			
Year four	45.83	54.17	100
Year three	28.57	71.43	100
Total	37.78	62.22	100
Fisher's Exact Test: <i>p</i> -value			0.050
Knowledge of fertility and infertility issues			
Adequate knowledge	36.36	63.64	100
Inadequate knowledge	40.43	59.57	100
Total	37.78	62.22	100
Fisher's Exact Test: <i>p</i> -value			0.711
Attitude towards social egg-freezing			
Important	34.65	65.35	100
Not Important	47.06	52.94	100
Total	37.78	62.22	100
Fisher's Exact Test: <i>p</i> -value			0.223

pregnancy for the sake of their husbands. The absence of a genetic connection with the child was the main reason 40% of respondents would likely or very likely not accept donated eggs for IVF. More than a third (37.78%) of respondents who already had a child were not willing to use donated eggs for IVF (Table 8).

Discussion

We sought the 'respondents' knowledge of age-related fertility decline. Evidence from the study suggests that overall, there was a lack of knowledge regarding age-related fertility decline among the students. Even though two out of three (65.19%) respondents claimed adequate knowledge of age-related fertility and infertility issues,

the evidence in this study proved contrary to this claim as about half (48.89%) of the respondents wrongly thought that the age-related decline in a woman's egg number and quality becomes most prominent within the age range of 40–44. This finding was consistent with a similar study conducted in Nigeria in which respondents overestimated the ages of slight and marked decline in female fertility [34]. This lack of knowledge on age-related decline in ovarian reserve and fertility may encourage voluntary delay in childbearing with the costly consequence of infertility from depletion of ovarian reserve. Consequently, almost all (96.3%) of the respondents were very confident about having their desired number of children in the future, while only a little more than one-third were worried about their advancing age and ability to have children. The lack of knowledge and concern over the age-related decline in fertility may be attributed to the youthful age of the respondents.

While in this study, health professionals, the Internet, and television were the primary sources of knowledge on age-related decline in fertility, women in Nigeria, Denmark, and the UK were informed through families, friends, the media, and common knowledge [9, 34]. This implies that the most effective means of impacting young Ghanaian women concerning age-related decline in fertility will be disseminating relevant information on the subject through health professionals, social media and television. Childbearing intentions also varied drastically between the respondents. Almost 9 out of 10 of the respondents in this study planned to have children. This finding is comparable to the conclusions of a similar survey in Saudi Arabia, where 8 out of 10 undergraduate students expressed the desire to have children [35]. Most students in this study hoped to have 4–6 children in the future, starting from their late 20s and ending in mid-30s. They would have completed their family before age 35, after which age-related decline in fertility is most pronounced. This outcome was consistent with similar research in Sweden [36]. Most of the students in this study (74.81%) indicated that it would be crucial to have children and were willing to seek fertility treatment if they could not achieve a pregnancy. This finding contrasts with a survey conducted in Iraq, which reported the majority of undergraduate students opting for adoption so that they could concentrate on their careers [37]. Differences in the two countries' cultural values on childbearing may explain this disparity.

We found out that while only one out of four (25.19%) of the students considered donating oocytes to a woman they know, 41.48% considered doing so anonymously to help infertile couples/women conceive a child. It implies that if the young women in this study were called upon to donate their eggs to help another

Table 5 Awareness of Social Egg freezing

Variables	Frequency (n)	Percentage (%)
Have you ever heard about social egg freezing?		
Yes, I know what it refers to	38	28.15
Yes, but I don't know what it means	38	28.15
No	59	43.7
Where or from whom have you heard it?		
A doctor/gynaecologist	4	5.26
A nurse/midwife	2	2.63
Family	3	3.95
Friend	9	11.84
Media	36	47.37
School/university	17	22.37
Scientific literature	5	6.58
How do you understand the term social egg freezing?		
Freezing a "woman's eggs for medical reasons to be used to achieve a biological child in future.	84	62.22
Freezing a "woman's eggs for non-medical reasons to be used to achieve a biological child in future.	51	37.78

Table 6 Factors that will influence a decision to consider Social Egg freezing

Variable	Very unlikely (%)	unlikely (%)	Neutral (%)	Likely (%)	Very Likely (%)	Frequency (n)
What will make you consider freezing your eggs for non-medical reasons?						135
No partner	30.37	22.22	21.48	18.52	7.41	
Uncertainty of future fertility	17.78	26.67	25.19	21.48	8.89	
Partner abroad	18.52	24.44	30.37	20.74	5.93	
Unemployment	25.19	33.33	22.96	12.59	5.93	
A desire to pursue further studies	16.30	27.41	27.41	17.04	11.85	
A desire for a biological child	13.33	18.52	19.26	33.33	15.56	
A desire for more children	17.78	15.56	23.70	28.15	14.81	
What would be your reason if you do not consider social egg freezing?						135
It may affect my ability to conceive naturally later	19.26	23.70	26.67	20.74	9.63	
It will be too expensive	8.15	18.52	22.22	28.89	22.22	
The process is too complex	17.04	16.30	25.19	27.41	14.07	
I am content without a child	17.78	28.89	28.89	14.07	10.37	
I am content with the child(ren) I have	14.07	23.70	26.67	24.44	11.11	
It is against my religion	25.93	24.44	31.85	10.37	7.41	
Babies from frozen eggs may not be normal	24.44	19.26	22.22	17.04	17.04	
I cannot have a child without a partner	21.48	18.52	28.15	15.56	16.30	
I believe I am fertile and will get pregnant anytime I am ready	12.59	11.85	31.85	18.52	25.19	

woman achieve a pregnancy, they would prefer to do so anonymously. This finding contrasts with a study conducted in Belgium in which the exact proportion of women (40.2%) in their reproductive ages considered

donating their eggs to a woman they know, and 26.9% considered doing so anonymously [21].

The proportion of women who would likely consider egg freezing for non-medical reasons ranged between

Table 7 Factors that will influence a decision to Donate Eggs for IVF

Variables	Frequency (n)	Percentage (%)
Would you consider donating your eggs to a woman you know?		
Yes	34	25.19
Maybe	50	37.04
No	51	37.78
If, in the future, you decide not to use your frozen eggs, would you consider donating them:		
For medical reasons?		
Yes	69	51.11
Maybe	31	22.96
No	35	25.93
To a friend or family member with a fertility problem to help them conceive a child?		
Yes	58	42.96
Maybe	39	28.89
No	38	28.15
To an anonymous egg donor program to help infertile couples/women conceive a child?		
Yes	56	41.48
Maybe	40	29.63
No	39	28.89
For money?		
Yes	40	29.63
Maybe	51	37.78
No	44	32.59

Table 8 Factors that will influence a decision to consider using Donated Eggs for IVF

Variable	Very unlikely (%)	unlikely (%)	Neutral (%)	Likely (%)	Very Likely (%)	Frequency (n)
What will make you accept donated eggs for IVF?						135
If it is my only option	20.74	8.15	23.70	29.63	17.78	
I will do it for my husband	19.26	20.00	28.15	24.44	8.15	
I will still have a family, anyway	17.04	18.52	23.70	27.41	13.33	
People will not know the difference	15.56	19.26	27.41	17.78	20.00	
What will make you reject donated eggs for IVF?						135
Baby formed will not be my biological child	25.19	14.81	20.00	25.19	14.81	
I already have a child, and I am not desperate to have another	114.07	27.41	20.74	25.93	11.85	
I can adopt a child instead	18.52	17.04	31.11	17.78	15.56	

18.52 and 48.89%, with the opportunity to prolong a biological lifespan being the reason about half of the women would consider doing so. However, the cost of elective egg freezing would prohibit the same number of respondents from preserving their fertility, and this finding resonates with the works done by Mertes & Pennings [38]. It is pretty revealing and assuring that, in this predominantly Christian and Islamic country, religion (17.78%) did not appear to be a significant barrier to social egg-freezing, with only less than 2 out of 10 women being unlikely to consider egg-freezing for religious reasons. However, a considerable proportion (34.08%) of the women were

unlikely to consider social egg freezing for fear of their babies being abnormal. This finding implies that Ghanaians working in reproductive health have a big responsibility to defuse the myth about the association between abnormal babies and Assisted Reproductive Technology among Ghanaian women.

Conclusion

The majority of participants in this study were young, single Christians who tended to overestimate their knowledge of fertility issues, particularly regarding age-related decline in fertility and elective egg freezing. Their

primary sources of information were health professionals, the Internet, and television.

While most respondents valued childbearing highly, they were reluctant to pursue parenthood without a partner. Few indicated willingness to donate eggs or accept donor eggs, often citing concerns about genetic ties. However, many expressed interest in egg freezing to preserve their reproductive options, though cost emerged as a significant barrier.

Limitations and recommendations

The authors acknowledge that convenience sampling could introduce a selection bias and limit the generalizability of the findings. Additionally, the small sample size further limits the extent to which the results can be generalised to the broader population, as it did not allow for rigorous analysis. Despite these limitations, the present study provides valuable preliminary insights that can inform future, larger-scale research. It is recommended that a qualitative study with larger sample size or a larger-scale mixed method study is conducted to allow for in-depth analysis and provide more insight into young women's perceptions about social egg freezing.

Abbreviations

ART	Assisted Reproductive Technology
ET	Embryo Transfer
CHRPE	Committee on Human Research, publications and Ethics
IVF	In-Vitro Fertilization
ICSI	Intracytoplasmic Sperm Injection
GCUC	Garden City University College

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12905-024-03387-3>.

Supplementary Material 1.

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Authors' contributions

MO, EAD, FJMKD and CMS conceptualized the proposal. MO, VMKA, HED, BY, FJMKD and DZK were involved in the project design, data acquisition, analysis and interpretation. MO, VMKA, EAD, HED, BY, FJMKD and CMS wrote the manuscript. All authors reviewed the manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

In this study, all methods adhered to the guidelines and regulations outlined in the Declaration of Helsinki. Ethical approval, CHRPE/AP/057/24, was

obtained from the Committee on Human Research, Publications, and Ethics (CHRPE) at Kwame Nkrumah University of Science and Technology (KNUST), School of Medical Sciences. Participation in the study was voluntary, and all communication on social media emphasised the anonymity of the survey and the non-collection of personal information from participants. Before beginning the study, participants were directed to a homepage outlining the project's summary and inclusion criteria. They were informed of their right to exit by proceeding to the final page. Upon electronically agreeing to participate by ticking a consent box, participants could commence the online survey. The survey concluded with a 'Submit' button, accompanied by a reminder that participants could only finalise their participation by clicking it. Informed consent was obtained from all participants through the electronic consent process prior to their participation in the survey.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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