

## Gynecology &amp; Reproductive Health

## Awareness and Perceptions of University Students on Infertility and Its Management in a Sub-Saharan African Setting

Mumuni K<sup>1</sup>, Sackey AT<sup>2</sup>, Swarray-Deen A<sup>1</sup> and Sefogah PE<sup>1\*</sup>

<sup>1</sup>Department of Obstetrics and Gynaecology, University of Ghana Medical School, Korle Bu, Accra, Ghana.

<sup>2</sup>Obstetrics and Gynaecology Department, 37 Military Hospital, Accra, Ghana.

**\*Correspondence:**

Dr. Promise Emmanuel Sefogah, Department of Obstetrics and Gynaecology, University of Ghana Medical School, Korle Bu, Accra, Ghana, E-mail: promees@hotmail.com.

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**ABSTRACT**

**Introduction:** Infertility is highly prevalent (30%) in sub-Saharan Africa where high value is placed on childbirth and children considered a form of social insurance for parents' old age. Infertility causes stigma, marital instability and significant psycho-emotional distress.

**Objective:** To assess the awareness and perceptions of university students in Ghana regarding infertility.

**Methods:** This cross-sectional multi-centre study involved administration of pretested online survey on various aspects of male and female infertility to students from two largest public universities in Ghana. Medical and Nursing students were excluded. Data was entered into Microsoft excel spreadsheet, cleaned and analysed with SPSS-22. Associations between participants' sociodemography and knowledge on infertility tested, multi-logistic regression analysis done,  $p < 0.05$  considered significant.

**Results:** Overall, 400 tertiary students participated in the study, mostly (78.5%) aged between 19 – 25years, with majority 51% being females and 49% males ( $p < 0.001$ ) and 82% (331/400) undergraduates. Only 37.3% (149/400) of participants correctly knew infertility is diagnosed following failure to conceive for one year; 86.5% ( $n=346$ ) knew infertility resulted from male and female causes; and 53.8% knew being overweight or obese contributed to infertility. Participants named these causes of infertility: long-term oral contraceptive use (60.3%,  $n=241$ ); previous abortion (96.0%,  $n=348$ ); vaginal/pelvic infection (83.2%,  $n=333$ ), pelvic surgery (74.0%,  $n=296$ ), wearing high-heel shoes (21.5%,  $n=91$ ); alcohol (64.0%,  $n=256$ ), smoking (60.7%,  $n=243$ ); males having multiple sexual partners 21.5% ( $n=91$ ); witchcraft or evil spirits 20%,  $n=80$ ). 78% participants knew there are infertility treatment options available but 67% ( $n=262$ ) considered the treatment costs as expensive; 18.7% indicated assisted reproductive technology (ART) results in normal children, but 17.9% feared ART causes genetic mental disorder, unhealthy children and premature death.

**Conclusion:** University students in Ghana have limited knowledge on what constitutes infertility but moderate awareness on causes and treatments of infertility. In their view, infertility treatment is available but expensive, with ART believed to result in genetic mental disorder and premature deaths.

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## Keywords

Awareness, Perceptions, Infertility, Treatments, University students.

## Introduction

Infertility is defined as a couple's inability to conceive after one year of regular, unprotected sexual activity [1]. Infertility affects more than 70 million couples worldwide, the majority of whom live in underdeveloped nations including Ghana [2]. In the Sub-Saharan Africa region, infertility prevalence varies from 9% in Gambia, 21.2% in north-western Ethiopia, between 20% - 30% in Nigeria and 11.8% among women and 15.8% among men in Ghana [3]. Compared to Western countries, developing countries suffer from the negative repercussions of childlessness to a greater extent, particularly in women who mostly get blamed for the couple's failure to conceive [4]. In many African settings, the fact that the male can also have a role in the infertility appears unknown or significantly downplayed and this drives society's tendency to blame the women in these infertile couples their failure to bear children [5].

In many sub-Saharan African societies including Ghana, many couples suffering from infertility get stigmatized and suffer major psychological and emotional distress. The women in some cases suffer intimate partner violence and social isolation [6]. Additionally, some affected couples suffer depression with reported cases of suicide from severe depression [7] while others face ostracism, loss of respect in society or resort to risky methods of conceiving out of desperation [8]. These major negative impacts of infertility largely due to a general lack of accurate awareness on infertility regarding the causes, treatment options and prevention in many low-resource settings. Currently available treatment modalities and options for couples with infertility are varied depending the cause of a couple's infertility and to some extent their ability to afford. The treatment of infertility can either be by conservative methods or by assisted reproductive technologies (ARTs) [9]. Some of the conventional conservative treatment methods include: ovulation induction, hormone treatments, improvement in nutritional status and weight management or the use of assisted reproductive technology involving vitro fertilisation and embryo transfer (IVF-ET) or intracytoplasmic sperm injection (ICSI). Other options include surrogacy or adoption [10]. Some disadvantages that come with treatment are, the prolonged duration of treatment, and high costs, which in most cases are beyond the reach of what most affected couples may be able to afford [9,11]. University students are considered at the peak of their education and could potentially influence accurate knowledge dissemination while in school and after completion as society generally considers these group of individuals as knowledgeable 'university' graduates. These students' knowledge levels, views and perspectives on this important social and public health issue could potentially have implications for the larger society's awareness on the condition, the causes and treatment options available, and largely help in dispelling the myths and misconceptions regarding infertility. These would be important for both prevention and stigma reduction

while potentially promoting appropriate help-seeking behaviour. There is however limited available data on this important subject.

Our study therefore sought to determine the university students' knowledge and perspectives with the view to generate scientific evidence that would inform policy towards increasing awareness and improve the quality of life and outcomes of individuals and couples with infertility in Ghana and other low-resource settings.

## Method and Materials

A multi-centred cross-sectional design was used for this study. Online based structured pre-tested questionnaires with both open-ended and close-ended questions were used to obtain the specific data from the study participants. Students from the University of Ghana, Accra and the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, both in Ghana who gave informed consent, participated in the survey. These two universities are the oldest and largest public universities in Ghana with student population approximately 53,000 and 40,000 respectively. Participants were male and female students aged 18 years and above across various undergraduate and postgraduate programmes at the two universities. Nursing, medical and public health students were excluded due to their likely inherent knowledge on the subject due to their courses of study which may introduce some bias.

An online structured pretested questionnaire with both open-ended and close-ended questions was administered. A specific weblink to the electronic questionnaire was shared through students' emails. Responses were directly received electronically into the database for subsequent analysis.

The online questionnaire gathered data under four main sections namely: sociodemography; perceptions about infertility (including the myths and misconceptions concerning infertility); knowledge and perspectives on infertility and its treatments; and awareness on the social, emotional and psychological impacts of infertility on the lives of the affected couples.

Data was entered into Microsoft Excel spreadsheet, checked for completeness, cleaned and exported into the Statistical Package for Social Science (IBM SPSS software version 25) for analysis. Descriptive statistics were determined and data presented using frequency tables and pie charts. Participants' knowledge about infertility was scored out of 10 as a way of assessing knowledge levels. A score of 8-10 indicated ranked as adequate knowledge, 5-7 indicated moderate knowledge and a score of less than 5 connotes inadequate knowledge. For questions which required the respondents to respond to by either selecting 'YES' or 'NO' answers were represented on bar charts to estimate the proportion of students who have adequate knowledge on the matters relating to infertility. Responses to open ended questions were grouped and represented as a bar chart.

Participants' baseline characteristics were summarised and presented with means and standard deviations for continuous

variables, and frequency and percentage for categorical variables. The responses obtained were compared across participants' institution of training, level, course of study, relationship status and the level of awareness of infertility and its impact. The student t-test was used to determine association between the respondents' sociodemographic characteristics and knowledge levels. The association between level of respondents' education, and their level of awareness on, as well as attitude towards infertility was assessed using logistic regression. Associations were considered statistically significant at 95% confidence interval with a p-value less than 0.05. Study was approved by the Community Health Review Committee of the University of Ghana Medical School.

## Results

A total of 400 university students participated in the study, 78.5% (314/400) aged between 19 – 25years, and a significant majority 51% (204/400) of whom were females ( $p < 0.001$ ). Table 1 displays the sociodemographic characteristics of participants and their institutions of study. Over 82% (331/400) participants were undergraduates studying at the University of Ghana, Legon in Accra (54.2%), and the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi (45.8%), ( $p < 0.001$ ).

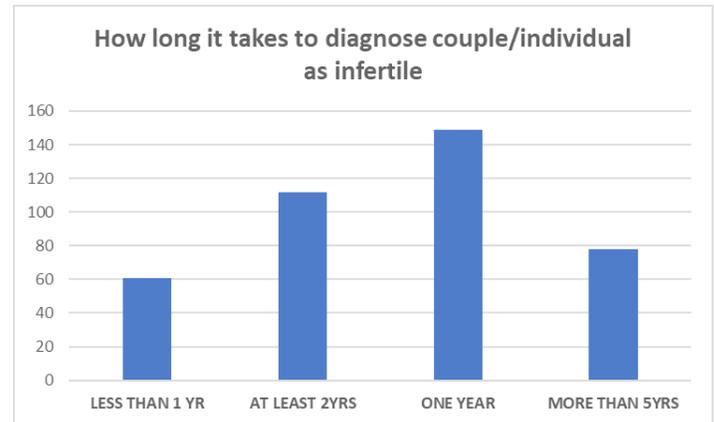
**Table 1:** Demographic Characteristics and Institutions of study of participants.

Gender	Frequency	Fraction (Percentage)	P Value
Male	196	196/400 (49%)	0.001
Female	204	204/400 (51%)	
<b>Age Group</b>			
15-18	24	24/400 (6%)	0.374
19-25	314	314/400 (78.5%)	
26-30	56	56/400 (14%)	
36-40	5	5/400 (1.25%)	
50 Yrs	1	1/400 (0.25%)	
<b>Level Of Education</b>			
Undergraduate	331	331/400 (82.8%)	0.002
Postgraduate	69	69/400 (17.2%)	
<b>Nationality</b>			
Ghana	391	391/400 (97.75%)	0.348
Nigeria	5	5/400 (1.25%)	
Britain	1	1/400 (0.25%)	
Egypt	1	1/400 (0.25%)	
Uganda	1	1/400 (0.25%)	
Other	1	1/400 (0.25%)	
<b>Institution</b>			
University Of Ghana	217	217/400 (54.2%)	0.001
KNUST	183	183/400 (45.8%)	

## Knowledge On Infertility Diagnosis

Only 37.3% (149/400) of participants correctly knew that diagnosis of infertility is made when there is inability to conceive after one year of trying (Figure 1). Further, a statically significant majority of participants 86.5% (n=346) were aware that infertility

does not only affect women ( $p < 0.001$ ); 53.8% (n=215) knew that being overweight or obese contributed to infertility ( $P < 0.001$ ). Instructively, 60.3% (n=241) of university students believe long term oral contraceptive pill use could lead to infertility ( $p < 0.354$ ); and two thirds (66.3%) of participants were knowledgeable that a woman could have secondary infertility ( $p < 0.492$ ) (Table 2).



**Figure 1:** How long it takes to diagnose infertility.

**Table 2:** Knowledge on infertility.

Statement	Frequency	Percentage	P Value
<b>Can A Woman Who Has Given Birth Be Diagnosed Of Infertility</b>			
Yes	265	265/400 (66.25%)	0.492
No	38	38/400 (9.5%)	
I Don't Know	97	97/400 (24.25%)	
<b>Infertility affects Only Women</b>			
Yes	47	47/400 (11.75%)	0.001
No	346	346/400 (86.5%)	
I Don't Know	7	7/400 (1.75%)	
<b>Prolonged Oral Contraceptive use causes infertility</b>			
Yes	241	241/400(60.25%)	0.354
No	91	91/400 (22.75%)	
I Don't Know	68	68/400 (17%)	
<b>Being Overweight Or Obese causes infertility</b>			
Yes	215	215/400 (53.75%)	0.001
No	88	88/400 (22%)	
I Don't Know	97	97/400 (24.25%)	

Regarding participants' views on other possible causes of infertility, an overwhelming majority (96%, n=348) indicated previous abortion; 21.5% (n=91) indicated wearing of high heel shoes; n=91 stated having multiple sexual partners caused infertility in men; 20% (n=80) indicated witchcraft or evil spirits while fewer numbers indicated other causes including medical conditions and genetic causes, couples suffering infertility as the result of having been cursed, medical conditions, smoking, etc. (Figure 2). From Table 3, a statistically significant majority of respondents knew that chronic heat exposure in men, uterine fibroids, pelvic infection, severe menstrual pains were associated with infertility.

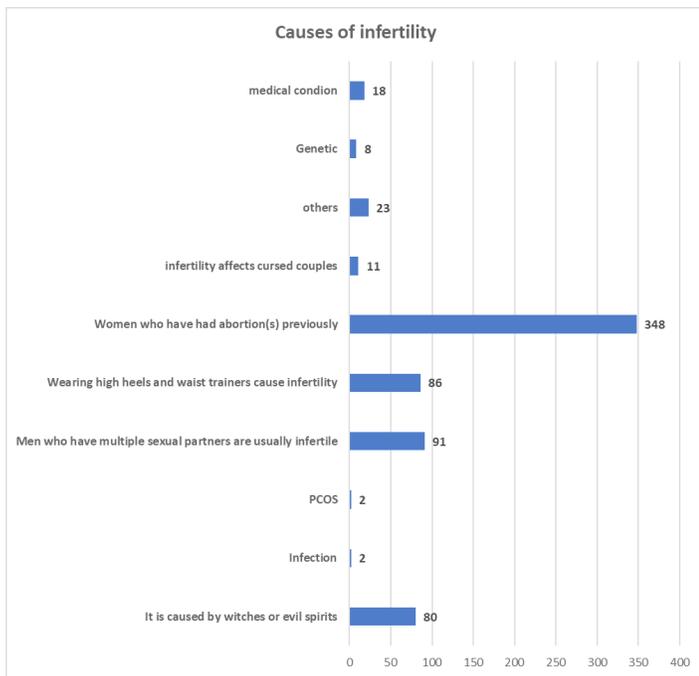


Figure 2: Participants beliefs and Views on the causes of infertility.

Table 3: Knowledge on the causes of infertility.

Condition	Frequency	Fraction (Percentage)	P Value
<b>Chronic Heat Exposure In Men</b>			
Yes	348	348/400 (87%)	0.055
No	52	52/400(13%)	
<b>Smoking</b>			
Yes	243	243/400 (60.75%)	0.34
No	157	157/400 (39.25%)	
<b>Chronic Alcohol</b>			
Yes	256	256/400 (64%)	0.117
No	144	144/400 (36%)	
<b>Previous Vaginal Or Pelvic Infection</b>			
Yes	333	333/400 (83.25%)	0.019
No	67	67/400 (16.75%)	
<b>Fibroids</b>			
Yes	354	354/400 (88.5%)	0.007
No	46	46/400 (11.5%)	
<b>Irregular Menses</b>			
Yes	287	287/400 (71.75%)	0.267
No	113	113/400 (28.25%)	
<b>Tight Underwear In Men</b>			
Yes	305	305/400 (76.25%)	0.458
No	95	95/400 (23.75%)	
<b>Genetic Or Inherited Disorder</b>			
Yes	348	348/400 (87%)	0.079
No	52	52/400 (13%)	
<b>Previous Pelvic Surgery In Women</b>			
Yes	296	296/400 (74%)	0.198
No	104	104/400 (26%)	
<b>Severe Menstrual Pain</b>			
Yes	214	214/400 (53.5%)	0.001
No	186	186/400 (46.5%)	

Approximately 77% (n=314) of respondents indicated they knew someone diagnosed with infertility. Regarding the effects of infertility on the affected couple, participants indicated that the couples with infertility are prone to depression (92.3%); they are depressed or sad (91.0%); they are ostracized by society (88.8%); they are prone to suicide (56.3%) and they are unable to take up leadership roles (19.5%) (Figure 5). Other effects of infertility mentioned include: loss of respect and recognition by society, divorce, physical and emotional abuse by partners, and couples seeking risky ways of conceiving. Also, 94.5% (n=378) participants were unanimous that the stigma associated with infertility was more directed at affected women than men. Even though 78% of participants were aware there are treatment options available for infertility, nearly 67%(n=262) considered the treatment costs as expensive, with only 4.5% (n=16) indicating treatment costs were affordable or cheap in Ghana. Approximately 6.3% of participants indicated traditional treatment modalities for infertility, mostly involving the use of cloves and garlic (Figure 3 and 4).

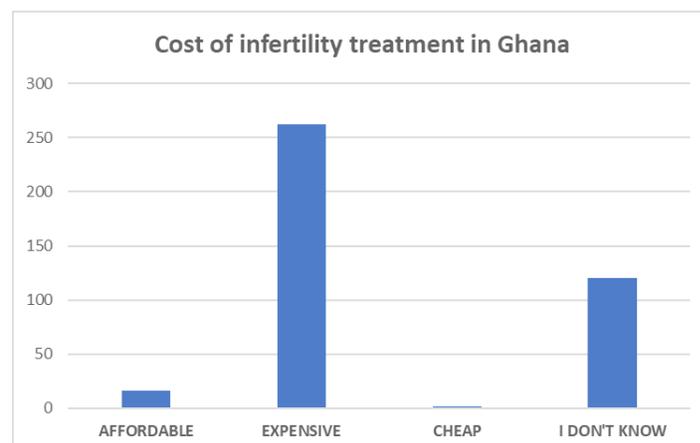


Figure 3: Participants' knowledge on the availability of treatment options.

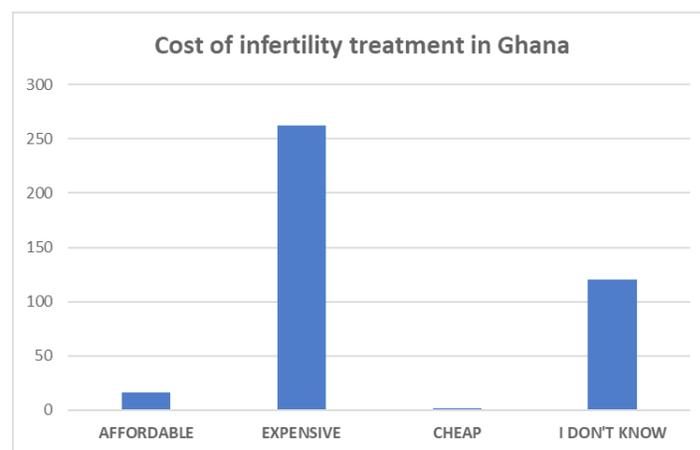
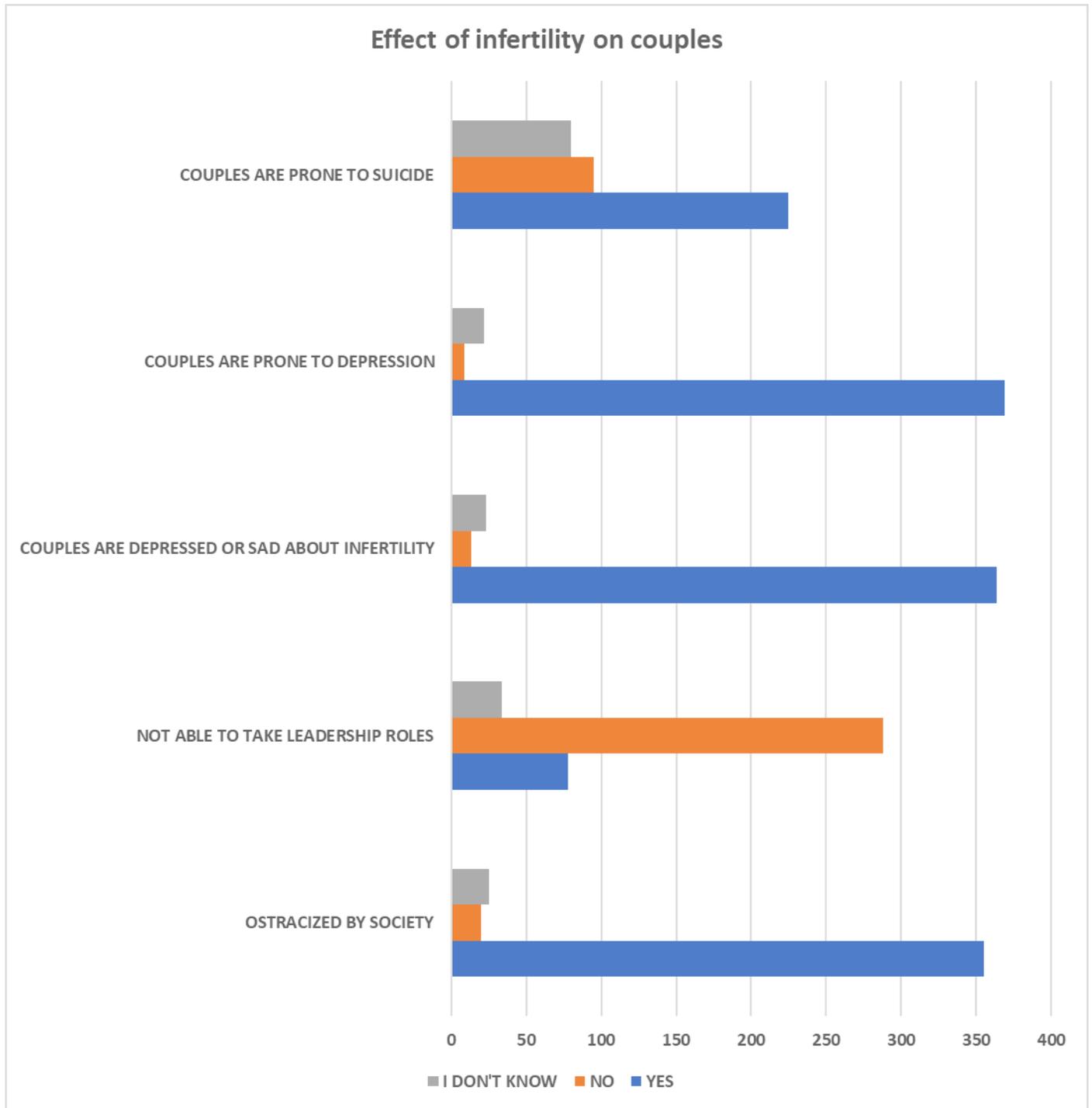


Figure 4: Knowledge on the cost of infertility in Ghana.



**Figure 5:** Effects of infertility on couples.

While majority of participants (59%, n=266) did not know of any harms associated with infertility treatment, 32.5% (n=130) knew fertility treatment had no associated harm while 11% (n=44) said there were associated harmful effects ( $p < 0.008$ ), of whom 38.5% indicated infertility treatments result in abnormalities in the babies. Specific views held among participants regarding the use

of assisted reproductive technology (ART) were that: it produced normal children (18.7%); it resulted in genetic mental disorder, unhealthy children and premature death (17.9%); it resulted in multiple pregnancies (8.1%); brilliant children (4.1%). However, another 4.1% of participants considered ART as dangerous, sinful and unethical. ( $p < 0.02$ ) (Table 4).

**Table 4:** Conceptions and misconceptions regarding children born through ART.

Conceptions and misconceptions	Frequency	Percentage	P Value
They are brilliant	5	5/123(4.07)	0.027
I don't know	40	40/123(32.52)	
Multiple pregnancies	10	10/123(8.13)	
Normal children	23	23/123(18.70)	
Genetic/mental disorder/unhealthy/premature death	22	22/123(17.89)	
Mother at risk of eclampsia	1	1/123(0.81)	
Children not from God	1	1/123(0.81)	
They are not real and mother is not a real woman	1	1/123(0.81)	
Witchcraft doing	2	2/123(1.63)	
The baby isn't the couples	3	3/123(2.44)	
Very dangerous/sinful/unethical	5	5/123(4.07)	
IVF	2	2/123(1.63)	
Surrogate methods	2	2/123(1.63)	
There won't be a strong parent-child bond	1	1/123(0.81)	
Others	5	5/123(4.07)	

Generally, there was little knowledge on the effects of infertility treatment among university students in Ghana with only 31/400 response to this open-ended question, majority (32.3%) of who had no idea about the effects treatment posed on individuals receiving it. Fewer others indicated blood loss from surgery, psychological effects following treatment failure, hormonal imbalance, increased risk of ovarian cancer, and low libido. Overall, 97% of participants had reproductive wishes, with the modal number of children wished for being 3, followed by 2 and 4 children.

## Discussion

This study assessed the knowledge, views and perceptions of university students in Ghana towards infertility and its treatment.

There were significantly more female respondents (51%) than males, and this is consistent with findings from a similar study on knowledge perceptions and myths among adults regarding infertility, where there were more females (55%) than male respondents (45%) in Pakistan [12]. The modal age group of respondents was 19 to 25 years, with a mean age of 22 years which is comparable with those reported by Arhin et al., in their previous similar study that reported modal age of tertiary students as 15-24 year, with mean age 25 years, and majority of the respondents being undergraduate students [13]. Another recent study in Ghana reported modal age of tertiary students at 20- 29 years. [9]. While majority of the respondents had some knowledge on infertility and its causes, about two-thirds of participants in this current study did not know the correct duration of inability to conceive that constitutes infertility. Only 37% knew this correctly. Although this knowledge level is low, it appears slightly higher than those reported from an earlier study by Ali S. et al, that only 25.0% of the participants correctly recognized that infertility is diagnosed usually after one to two years of regular unprotected sexual intercourse [12]. Majority of the respondents had adequate knowledge on the concept of secondary infertility, however a large proportion of participants held the incorrect view that infertility affects only women. Consistently, results of a recent systematic review found that from a total of 10 studies that assessed infertility

knowledge levels among college students, there was low to moderate awareness on infertility, with only two studies reporting high levels of infertility awareness [14]. While 21% of participants from this study indicated they knew someone or couple with infertility, a significantly higher proportion (80%) of participants reported such knowledge from another study in Ghana across a amore varied number of institutions [9].

On knowledge regarding risk factors for infertility, most participants indicated prolonged oral contraceptive use, being overweight or obese, previous abortion, chronic heat exposure in men, smoking, chronic alcohol intake, previous vaginal or pelvic infections, uterine fibroids, irregular menses, wearing of tight underwear in men, genetic or inherited disorders, previous pelvic surgery in women.

These agree with findings from various other studies that reported on students' awareness of fertility risk factors. These studies consistently suggested that that college students had some understanding of fertility risk factors and could answer most of the risk factors correctly, with majority naming smoking and alcohol as risk factors [15-17]. Also, consistent with findings from this current study, other studies found responses including overeating, unbalanced diet, sexually transmitted infections, and genetic diseases as risk factors for infertility [15]. A good proportion of participants mentioned previous abortions can cause infertility, in consonance with findings reported from a similar study on the sociocultural perceptions on infertility in Ghana, where results cited infertility being caused by previous multiple abortions and its complications. Also, in agreement with the named study, some respondents in this study stated witchcraft or evil forces as being the cause of infertility [18]. Majority of participants knew there were treatment options available, and also knew people who had received treatments and and further agreed that the treatment was helpful. This is consistent with the adequate knowledge on infertility treatment among tertiary students in Ghana reported by Johnson-Ekeleba et al. However, most participants indicated that infertility treatments in Ghana were expensive, and they were of

the view that infertility treatments such as assisted reproductive technology were harmful to the child. Few students knew of traditional or herbal methods of treating infertility such as the use of cloves and garlic.

Most respondents had a positive attitude towards infertility and were well informed about the effects infertility poses to individuals affected, psychologically, socially and mentally. This agrees with findings reported from earlier studies in Ghana that had reported significant psychological and emotional impacts of infertility among affected individuals and couples resulting in social isolation, physical and emotional abuse [6,19]. While participants in the current study opined that affected females suffered more stigma than men, Tabong et al. stated both men and women suffer from the social effects of infertility. Numerous other previous studies agreed that women were disproportionately stigmatized compared to males with infertility [5,6].

More female respondents in this study demonstrated positive attitudes towards infertility compared to males, consistent with reports by Iktidar et al. 2022, which mentioned females were more likely to have a positive attitude compared to males. In contrast, another study by Weiserma et al. in Vietnam showed that there was no difference with respect to the attitudes of males and females towards infertility [20]. Majority of participants who had adequate knowledge of infertility and its treatment options were females. Also a few correctly identified infertility to be caused by both male and female factors as compared to findings reported by Ali et al., which identified 40% of the participants correctly identifying infertility to be caused by both males and females factors [12].

## Conclusion

University students in Ghana have limited knowledge on what constitutes infertility. They displayed moderate awareness on causes and treatment of infertility. Most participants demonstrate a positive attitude towards people living with infertility and hold the view that infertility treatment, although available in Ghana, was expensive; with assisted reproductive technology interventions believed to result in genetic mental disorder and premature deaths. These findings underscore the need for increased comprehensive awareness creation on infertility among tertiary students in Ghana to promote knowledge, reduce stigma and enhance health-seeking behaviour by affected couples and individuals in the larger society.

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