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"Infertility is mostly for women": University students' knowledge and perceptions of risk factors associated with infertility in Ghana

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Abstract

Understanding knowledge and perceptions of infertility risk factors is crucial for promoting fertility preservation. While prior studies have explored infertility awareness among university students based on gender, limited research examines both genders within a single study. This study investigates university-aged males' and females' knowledge and perceptions of infertility risk factors, identifying gender-specific risks. Conducted at the University of Ghana, the study employed a descriptive cross-sectional qualitative design, involving semi-structured interviews with 21 male and 18 female students. Qualitative data analysis indicates that participants were aware of infertility and could identify gender-specific risk factors. However, many perceived infertility as a condition affecting only women. The findings highlight that excessive contraceptive use and abortion were identified as female infertility risk factors, while substance abuse and multiple sexual partnerships were linked to male infertility. This study suggests that there must be comprehensive education to address misconceptions and promote awareness of infertility risk factors across genders. *(Afr J Reprod Health 2026; 30 [5]:109 -122).*

Keywords: Infertility, Risk factors, Knowledge, Perception, University students, Ghana

Résumé

Comprendre les connaissances et les perceptions des facteurs de risque d'infertilité est essentiel pour promouvoir la préservation de la fertilité. Bien que des études antérieures aient exploré la sensibilisation à l'infertilité chez les étudiants universitaires en fonction du genre, peu de recherches examinent les deux genres au sein d'une même étude. Cette étude examine les connaissances et les perceptions des hommes et des femmes en âge universitaire concernant les facteurs de risque d'infertilité, en identifiant les risques spécifiques à chaque genre. Menée à l'Université du Ghana, l'étude a adopté une approche qualitative descriptive transversale, impliquant des entretiens semi-structurés avec 21 étudiants de sexe masculin et 18 étudiantes de sexe féminin. L'analyse des données qualitatives indique que les participants étaient conscients de l'infertilité et pouvaient identifier les facteurs de risque spécifiques au genre. Cependant, de nombreuses personnes percevaient l'infertilité comme une condition affectant uniquement les femmes. Les résultats mettent en évidence que l'utilisation excessive de contraceptifs et l'avortement ont été identifiés comme des facteurs de risque d'infertilité féminine, tandis que l'abus de substances et les partenaires sexuels multiples ont été liés à l'infertilité masculine. Cette étude suggère qu'une éducation complète est nécessaire pour corriger les idées fausses et sensibiliser aux facteurs de risque d'infertilité, et ce, pour tous les genres. *(Afr J Reprod Health 2026; 30 [5]: 109-122).*

Mots-clés: Infertilité, Facteurs de risque, Connaissances, Perception, Étudiants universitaires, Ghana.

Introduction

Infertility is characterized as the inability to achieve conception and successfully bear offspring following a period of one year of engaging in sexual intercourse without the use of contraception.[1] Harzif et al.[2] reported that the prevalence of infertility ranges from 10% to 15% among couples, exhibiting variations across different countries and geographic regions. A significant proportion of individuals experience infertility at some point in their lives, as indicated by recent data released by the World Health Organisation (WHO).[3] Approximately 17.5% of the adult population, or about 1 in 6 individuals globally, experience infertility, highlighting the pressing necessity to enhance access to affordable, high-quality fertility services for those with this condition. Both men and women make equal contributions to the issue, and it is common for multiple infertility factors to be

involved. Understanding infertility is a crucial and fundamental measure in ensuring the prevention of future infertility. Several research studies have provided evidence indicating that individuals enrolled in higher education institutions face an increased likelihood of experiencing infertility. This heightened risk can be attributed to their tendency to delay motherhood as a result of their commitment to academic and career endeavors.[4,5]

Furthermore, it has been observed that students enrolled in higher education institutions show an insufficient level of comprehension and knowledge, defined in this study as an individual's understanding of infertility and the factors that contribute to it.[6,7] The aforementioned constraint can be ascribed to the impact of social norms, traditions, and beliefs. Moreover, the limited availability of studies investigating the level of awareness and perception understood here as beliefs and interpretations shaped by sociocultural contexts, of infertility risk factors among university students - particularly those residing in sub-Saharan Africa (SSA) — further compounds this challenge. In the context of sub-Saharan Africa, couples experiencing infertility are frequently stigmatized and encounter many social challenges, in contrast to their counterparts in Western nations. It is worth noting that women, in particular, are disproportionately subjected to acts of aggression.[8,9] This phenomenon can be attributed to the perception in this particular geographic area that children symbolize social status, influence, and affluence. As a result, being unable to have children in this particular region comes with a distressing existence that may have negative effects on one's mental and physical health, as well as anguish, individual sorrow, discontentment, societal disapproval, exclusion, and financial difficulties.[10-12]

Moreover, scholarly research shows that within the region of Sub-Saharan Africa, socio-cultural norms and traditional factors such as stigma associated with premarital sex exert a detrimental influence on the sexual development of young individuals. Consequently, these influences may adversely affect beliefs about infertility, thereby potentially resulting in the circulation of misleading information and the adoption of misguided decisions pertaining to fertility.[13] Engaging in conversations pertaining to reproductive health with their children proves to be a challenging task for many parents residing in sub-Saharan Africa.[14,15] Consequently, these children endeavor to acquire knowledge through online sources or their social circles, and the majority of the knowledge they obtain from these channels is frequently skewed, increasing their vulnerability to various reproductive health concerns. Ghana is one of the countries that is concerned with how their children (youth) acquire such knowledge. The issue of infertility in Ghana warrants greater acknowledgment as a significant public health concern. The Ghanaian populace predominantly comprises young individuals who have exhibited a growing inclination toward acquiring knowledge pertaining to their reproductive health.[16] Infertility emerges as a prominent concern within the context under examination. There is a prevailing belief that the progressive rise in infertility rates in Ghana can be attributed to the evolving habits exhibited by students as they progress through their educational journey. Nevertheless, a limited amount of empirical research has been conducted to ascertain the primary risk factors that have contributed to the increase in infertility rates in Ghana. The current study explores the knowledge and perceptions of university students in Ghana regarding the risk factors defined in this study as behaviors, health conditions, or exposures that may negatively affect fertility, associated with infertility.

Most of the research conducted on students' understanding of the risk factors associated with infertility has mostly concentrated on either a gender-based approach or has specifically examined a particular form of infertility, such as primary or secondary infertility. In the study conducted by Sami et al.,[17] the objective was to report findings regarding the factors associated with infertility among married women residing in Karachi, Pakistan. The study's exploration centered on the subject of secondary infertility and concluded with the finding that the utilization of unsuitable absorbent materials for menstrual blood management, as well as the presence of a birth attendant during the most recent delivery who failed to adhere to proper hand hygiene practices using soap and water, are associated with infertility. In investigating and analyzing the prevalence and risk factors of infertility at a representative rural site in Northern China, Cong et al.[18] focused only on women of childbearing age and concluded that risk factors associated with infertility among women

include women's infertility incidence in relation to their BMI, state of exercise, amount of menstrual flow, number of pregnancies, and number of abortions. When the female participants were queried about potential risk factors for male infertility, they expressed the belief that both staying up late and engaging in high-temperature professions are distinct variables that can independently impact male fertility.

In an assessment of the risk factors for secondary infertility in women who sought care at the obstetrics and gynecology clinics of a tertiary hospital, Emmanuel et al.[19] concluded that individuals who had a history of unsafe abortion, alcohol use, a family history of secondary infertility, and a history of sexually transmitted infections were more likely to experience secondary infertility. Additionally, it emerged that obstetrical and gynecological variables, including sexually transmitted infections, ectopic pregnancy, induced abortion, and cesarean section delivery, were associated with an increased risk of secondary infertility. However, it implied that maintaining a normal menstrual cycle and experiencing spontaneous vaginal discharge was associated with a reduced risk of subsequent infertility. Siyez et al.[20] highlighted that there was a significant dearth of information among university students regarding family planning and the impact of age and timing of sexual intercourse on infertility. Nevertheless, it was established that there was a significant level of awareness regarding the risk factors associated with infertility, specifically in relation to substance use and body mass index. According to the findings of Moridi et al.,[21] the primary factors contributing to infertility in males and females were identified as varicocele and ovulation abnormalities, respectively. A notable correlation was observed between female factor infertility and variables such as educational attainment, age of women, age at marriage, number of abortions, alcohol consumption, the existence of an underlying condition, and body mass index (BMI). A noteworthy correlation was observed between male factor infertility and many factors, such as occupation, addiction, smoking habits, and the presence of an underlying medical condition.Based on the studies conducted by Atijosan et al.,[22] Liang et al.,[23] and Wellington,[24] several significant risk factors have been identified in relation to infertility from the perspective of students. These risk factors encompass female promiscuity, a history of gynecological surgery, consumption of sugary foods, and a decline in ovarian reserve (DOR). Upon carrying out additional analyses, several characteristics were shown to be related to primary infertility. These factors include the age at which individuals were married, the age at which they engaged in their first sexual intercourse, exposure to long-term air-conditioning environments, a diminished ovarian reserve, and advancing age. The characteristics that were found to be related to secondary infertility included a history of gynecological surgery, lower ovarian reserve, a waist-to-hip ratio (WHR) above 0.85, and the number of previous births. The students involved in their academic pursuits acknowledged the prevailing perception that infertility is a condition mostly affecting women. Based on a comprehensive literature assessment pertaining to the research domain under investigation, it becomes apparent that the majority of previous studies conducted to identify risk factors associated with infertility adopted a quantitative approach. Furthermore, the majority of this research was conducted in Asia and Europe, with a limited number of studies conducted in Africa, notably Nigeria. Therefore, the present study possesses three distinct characteristics that set it apart. The primary objective of this study is to address the existing research gap by conducting a qualitative investigation into the knowledge and perception of risk factors related to infertility among university students. Additionally, the study aims to explore the knowledge of Ghanaian students regarding their understanding of infertility and their perspectives on potential strategies for addressing this issue. Finally, this study was conducted in Ghana, a context that has been under-researched when it comes to the subject of risk factors associated with infertility. The rest of the paper is organized as follows: Section 2 provides an exposition of the theoretical foundation that underpins the study. Section 3 provides a comprehensive account of the methodology employed in the present study. The findings and analysis are presented in Section 4, while Section 5 encompasses the conclusions and potential avenues for future research.

Theoretical framework

The theory of attribution is utilized for this study. The theory pertains to the framework humans

employ to elucidate or ascertain the underlying factors behind behaviors.[25] Therefore, given that the study aims to investigate the knowledge and perception of university students regarding the risk factors associated with infertility, the theory of attribution is deemed suitable for accomplishing the established objectives. The attribution theory posits that individuals possess an inherent inclination to seek understanding and exploration into the determinants of events. This phenomenon has resulted in the emergence of religion, philosophy, and science, all of which have been pursued in an attempt to elucidate various occurrences.[26] This aligns with the set goal of this study, as the researchers aim to explore the risk factors associated with infertility in Ghana. In doing so, they aim to assess the knowledge and perceptions of university students regarding these risk factors.

In addition, individuals serve as interpreters of the events that occur in their lives, employing logical forms of sense-making in the process. However, it is important to acknowledge that several elements have the potential to impact one's interpretation. The elements can be categorized as either stable or unstable, contingent upon the stability, justifiability, or intentionality of the underlying cause of a given circumstance. These advancements have significantly influenced individuals' perspectives on the world, leading to ongoing transformations and adaptations in their cultural practices, social relationships, and personal experiences.[27] Perception is contingent upon an individual's cognitive framework and subjective understanding,[28] whereas knowledge pertains to the acquisition of information, skills, and comprehension through educational or experiential means.[29] The present study aims to utilize this theoretical framework to explore students' cognitive processes about their understanding of infertility, their knowledge of associated risk factors, and potential strategies for addressing them. However, it is imperative to assess whether individuals possess any knowledge about infertility and whether they have had any personal encounters with this condition. Perception is seen as a fundamental means of acquiring knowledge, enabling individuals to form justified factual ideas regarding the external environment. However, it should be acknowledged that while perception might serve as a means of acquiring knowledge, this does not imply that a comprehensive understanding of knowledge can only be achieved by invoking the concept of perception.[30,31]

According to Harvey et al.,[32] when behaviors are attributed to external sources, the resultant effect on the individual affected is limited, and conversely, when behaviors are assigned to internal factors, the impact on the victim is significant. When examining behaviors, four functions are of utmost importance: explanation, prediction, egocentric attribution, and interpersonal attribution.[33,34] The act of explaining aids individuals in achieving clarity and facilitates comprehension for observers. Conversely, the act of making predictions enables individuals to envision the potentiality of a future event. Furthermore, it offers a method through which behavioral explanations can be analyzed. The egocentric individual seeks to fulfill their own needs and, so, alleviates certain negative sentiments or emotions. In essence, the egocentric individual endeavors to safeguard and uphold their own self. The interpersonal role functions as a means of communication and information exchange while also attempting to influence the construction of attributional inferences. This is achieved by providing individuals with the opportunity to elucidate the underlying motivations driving their behavior, thereby enabling them to evade accountability or remorse. Each of these attributions has a distinct purpose and collectively contributes to the comprehension of an event

Methods

Research design

The research design employed in this study was a descriptive cross-sectional qualitative approach, which was chosen due to the nature of the topic under study. The research design employed in this study primarily relies on conducting in-depth interviews as a means of collecting data from participants, which will subsequently be subjected to analysis. The approach selected for the study also proved to be suitable, as it facilitated an in-depth examination of the knowledge and perceptions of risk factors associated with infertility among university students at the University of Ghana. A significant advantage of this approach is its ability to simultaneously assess numerous results, facilitating the determination of the prevalence of

all causes.[35] Consequently, this approach enabled the researchers to conduct a comprehensive examination and assessment of the knowledge and perceptions regarding risk factors associated with infertility. The main drawback of cross-sectional qualitative design, however, was that it prevented the researchers from establishing any cause-and-effect relationships, which is a hallmark of all cross-sectional studies.

Participants

The participants in the study were selected from the University of Ghana, which is recognized as the oldest and largest among the fifteen public universities in Ghana. The university's various lecture halls each played host to announcements about the study, which selected the participants using convenience and snowball sampling techniques. These announcements invited interested students to participate in one-on-one semi-structured interviews aimed at exploring their knowledge and perceptions of infertility risk factors. Although snowball sampling may introduce selection bias, its use in this study was intended to facilitate access to participants for a sensitive topic. To minimize potential bias, the approach was combined with convenience sampling across different lecture halls, academic levels, genders, and religious backgrounds, and recruitment chains were deliberately limited.

This study involved a sample size of 21 males and 18 females. According to the 2022 University of Ghana student population data record, males comprise 51.3% of the total student population, whereas females comprise 48.7%.[36] The study encompassed individuals whose ages ranged from 17 to 28 years. 33% of the male participants were between the ages of 17 - 20, and a19% were between 25 - 28 years old (see Table 1).

The vast majority of male participants, comprising 48%, fell between the age range of 21-24 years. The majority of female participants fell within the age range of 17 - 20 years, accounting for 33% of the total. Additionally, 44% of female participants were between the ages of 21-24 years, while 6% were in the age range of 25-28 years. Furthermore, level 300 students made up a significant proportion of the study participants (36%). It is worth mentioning that a majority of the participants identified as Christians (72%), while the remaining 28% identified as Muslims. The study attributes this phenomenon to the significant prevalence of individuals practicing Christianity among the student population at the University of Ghana campus.

Data collection

The study administered the semi-structured interview to a total of thirty-nine participants from May to August 2023. The interviews were audio recorded, and detailed notes were also made. The researchers developed a comprehensive interview guide that examined the participants' knowledge and perceptions of risk factors related to infertility. The guide consisted of a combination of open-ended, closed-ended, and structured response questions. The interview questions were derived from previously published quantitative and qualitative studies.[20, 37, 38, 39, 40, 41] The interview guide included inquiries regarding the participants' understanding of infertility, their desire for childbirth, the gender-specific nature of infertility, the many reasons for infertility in both men and women, and the available alternatives for individuals experiencing infertility (See the Appendix). The study also collected demographic information from the participants, which encompassed variables such as gender, age, educational level, field of study, and religious affiliation. The study interviews were conducted in English. Before commencing the interviews, all participants were provided with comprehensive details regarding the study, the intended utilization of the obtained data, and an approximate timeframe for the interview process. The researchers obtained informed consent from all participants before conducting the interview, ensuring their agreement for audio documentation. Following mutual agreement, the participants were requested to provide their signatures on an informed consent form. The study ensured the preservation of confidentiality regarding participants' information. Consequently, the individuals interviewed were not associated with any personal identifiers.

Table 1: Participant characteristics

Characteristics	Frequency	%
Gender		
Male	21	46
Female	18	54
Age		
Male age range		
17-20	7	33
21-24	10	48
25-28	4	19
Female age range		
17-20	9	50
21-24	8	44
25-28	1	6
Level of study		
100	8	20
200	7	18
300	14	36
400	10	26
Religious Background		
Christian	28	72
Muslim	11	28

Furthermore, it should be noted that the names employed in the analysis are all pseudonyms, chosen to ensure the confidentiality and anonymity of the participants, and they do not correspond to their actual identities. To validate the auditory files and transcribed interviews, the researchers additionally employed the methods of peer debriefing and member check.

Analysis

The study conducted a thematic analysis of the data after transcribing the audio-recorded interviews. NVIVO was used to run the codes, categorize the themes and subthemes that emerged from the transcripts of the participant interviews, and organize the data analysis in brief. The researchers conducted thematic analysis using both inductive and theoretical coding techniques. During the analysis process, the researchers used both inductive and theoretical coding methods because they made it easier to find patterns in the data, analyze them, and show them. It is known that thematic analysis is a useful way to explore qualitative data because it helps us understand experiences, thoughts, or behaviors within a dataset without being limited to a certain study paradigm[42]. The researchers started the inductive coding process by carefully reading through the interview transcripts and finding themes that were important in the data. This led to the creation of descriptive codes. Next, the researchers identified cluster themes and interpreted them based on the research objectives. Furthermore, a comprehensive examination of the existing literature refined these themes. By contacting fifteen of the participants to confirm the reported results, the credibility and reliability of the findings were similarly guaranteed by utilizing the participant validation technique.

Ethical approval

The study received ethical approval from the Ethics Committee for Humanities (ECH) at the University of Ghana, Legon, under approval number ECH 143/20–21. All participants in the study provided written consent to participate.

Results

Knowledge about infertility

The study participants were questioned regarding their knowledge or understanding of the term infertility. This was because infertility served as the foundational aspect for the associated questions that the study aims to explore. The findings derived from the study show that all participants have an understanding of what infertility is. The female participants' understanding of infertility was characterized by the inability to conceive or bear children, as well as the incapacity of a woman to become pregnant. One example is provided by *Abena*, *female*, *Level 300 student and a Christian* who is *20 years old*, who mentioned that:

Infertility is a situation in which a woman or a man is unable to bear a child. So, let's say a man can't impregnate a woman, and a woman can't even go through the process of giving birth.

Another participant also said that:

To me, hmm...I believe infertility is the inability of a woman to conceive. I say woman because I have grown to know that this is usually the fault of the woman. (Yaa, female, 23 years old, Level 400, Muslim)

In the context of male participation, infertility is defined as the condition when a couple is unable to

conceive, typically due to health-related factors that prevent a woman from becoming pregnant. The narrative provided by *Michael, male, 21 years old*, a third-year student and a follower of the Christian faith, clearly demonstrated this fact.

It is when a woman or a lady is not able to get pregnant due to health issues, I believe these health issues are a result of some bad lifestyles that they have had in the past.

It is important to acknowledge that some male participants also held the belief that infertility can be described within the framework of couples. As an example, a participant given the name *John*, *male*, aged 19, who identifies as a Christian and is now enrolled in Level 100, expressed the following viewpoint:

Yes, I believe it is the inability of a couple to reproduce in a way. I believe the emphasis should be placed on the two people in a union and not just one of them.

Knowledge about the causes of infertility

The study findings show a significant proportion of the participants held the belief that infertility is predominantly associated with women rather than men. The observed phenomenon was perceived to have a clear correlation with the inability to undergo ovulation. While acknowledging the possibility of the disease affecting men, the focus of the responders predominantly centered on women. This perspective mostly stems from the belief that women serve as the bearers of the fetus, and as such, any challenges pertaining to their capacity to conceive and sustain a pregnancy are deemed more critical than a man's failure to impregnate a woman.

If two people get married and they are not conceiving, they will always blame the woman until much later, when they decide to go to the hospital and the doctor finds out maybe it's rather the man's fault or something like that (Mabel, female, 22-years-old, Christian, Level 200)

Come to think of it, mostly I think it's from the woman because if the woman does not release an egg, there is no way the sperm will be able to fertilize the egg (Muttakah, male, 20-year-old student, Muslim, Level 300)

It is both. Everyone can be infertile, but from what I have been hearing, I think it is mostly associated with women. We always hear that women are infertile (Kofi, male, 19-year-old student, Christian, Level 100)

Some participants also voiced their dissatisfaction with the erroneous belief that infertility is only a condition affecting women.

It could be either the man or the woman because you need both to conceive a child. In our traditional settings, people think it is a woman who causes it, but I don't believe that at all. In fact, it can be very upsetting just thinking about it. As for me, I believe it could be either of them, so both need to go to the hospital and check if everything is okay with both of them (Elaine, female, 22-year-old student, and Christian, Level 400)

Perceptions of risk factors associated with infertility

In general, the participants expressed the belief that specific lifestyles and diseases may serve as risk factors for infertility in both males and females. Based on the participants' responses,

Some people live wild lifestyles…party lifestyles…up and about all the time, and some people just overdo it. Always drinking, smoking, vaping, all those things, wild lifestyles, and I think that can affect them in the future if they want to have a child (Albert, male, 23-year-old student, Christian, Level 300)

I believe having indiscriminate sex can lead to infertility…this campus dierrr…it's a very interesting place. All kinds of unimaginable things are happening here; you won't believe it. The guys are sleeping around with different girls, and the girls are also sleeping around with different guys and infecting each other with diseases. And I feel some of them, like gonorrhea or syphilis or chlamydia, are quite expensive to treat, and even when you treat them, they never really go away, so it can cause problems for you…like your reproductive organs can get damaged (Efia, female, 24-year-old student, Christian, Level 400)

Certain circumstances, like being involved in an accident… (Micky, male, 19-years-old, Christian, Level 100)

My mother always says that…hahaha, when girls don't clean their private parts well, specifically, excuse me to say vagina, well, the small bacteria

there can feed in and affect their womb (Akos, female, 17-year-old, Christian, Level 100)

Some of the girl seeking to gain weight intentionally get pregnant to develop big boobs and hips, and finally, terminate the pregnancy on their own when they achieve these things…these lifestyles just surprise me..hmm..(Lydia, female, 23-year-old, Christian, Level 300)

Certain risk factors identified by the participants exhibit gender specificity. In the context of males, the following sentiments were articulated as factors that contribute to risk.

I heard that if a man masturbates multiple times, it can cause low sperm count. And also, the intake of some foods, like fatty foods, can also cause it (Mabel, female, 19-year-old student, Christian, Level 200)

I think for the men, having sexual intercourse frequently, like 3 times a day every day, and the use of energy boosters like Viagra and those things...even though some may be prescribed I think the guys on campus use it a lot and it's not prescribed… just to impress someone and those things can cause problems with one's sperms later on (Fati, female, a 24 years old student, Muslim, Level 400)

I believe hard work and stress are also key risk factors. Because often we sit for long hours learning and revising our lecture notes…hmm... I believe we get tired, and since we continue this habit till we graduate, it is likely to affect us. hahaha...(Eben, male, a 20-year-old student, Christian, Level 200)

For me, I heard alcohol is a major cause, but it confuses me a lot. Ah! Why is it that outside the scope of this university, I know of many drunkards… I mean, heavy drunkards and they have a lot of kids, and so I am beginning to believe that alcohol is not a factor (Yaw, male, a 23-year-old student, Christian, Level 300)

The risk factors pertaining to female infertility encompassed the excessive utilization of contraceptives, wearing of high-heeled shoes, spiritual factors, abuse of drugs, and a history of many abortions. The aforementioned themes were derived from the subsequent narratives.

The continuous use of contraceptives can affect you in the future when you want to have children (Julie, female, a 20-year-old student, Christian, Level 200)

There was this girl that I knew in my hall of residence, she used to have a lot of abortions, and I always wondered. Because I mean, growing up, my mother always told me that if you have a lot of abortions, you cannot give birth in the future. Although I don't really believe it's entirely true, I feel like having so many abortions has its disadvantages. I mean, for this particular girl, let's say she gets pregnant this month, then she will abort it, the next month she is pregnant again, and she will abort that one too, the next month, the same thing. It happened 4 months in a row, and I kept thinking, Is she that fertile? Because if you know about yourself, you know you get pregnant easily, I feel like you should take precautions to stop that, but she didn't seem to care about it at all. It was a normal thing to her, and that one is definitely a problem (Akosua, female, a 23-year-old student, Christian, Level 400)

I feel like, as a girl, why do you have to smoke and drink? But some girls are doing it, and I believe it can affect their fertility (Kwabena, male, a 19-year-old student, Christian, Level 100)

There is a belief that the wearing of high heels by women can have an impact on their ability to undergo the process of childbirth. I recall a period during which my mother expressed the belief that the birth delays of my auntie could be attributed to her frequent use of high-heeled footwear during her youth. However, I believe that this point lacks significance (Martha, female, a 22-year-old student, Christian, Level 400)

The ladies on campus are currently abusing drugs, and now they mix everything with 'wee' (referring to cannabis) … the egg, popcorn, and plantain chips are all mixed with 'wee'. So, they mix the 'wee' with the pepper they put in the boiled egg to get high. I also heard that for the plantain chips, they first mix the oil used to fry the chips with the 'wee' before frying them. I believe these are all bad habits they must stay away from (Ayesha, female, a 23-year-old student, Muslim, Level 300)

Eermmmm…we are in Ghana, so I would say some people may be cursed. I don't really know how true

that one is, but some people believe they have been cursed, and it can be a possible risk factor (Afi, female, a 20-year-old, Christian, Level 200)

Age as a determinant of fertility potential

Advancing age was seen as more detrimental to a woman's fertility potential than a man's fertility potential, with many participants pegging the age at which fertility begins to decline in women as ranging from age 40 and above. According to Hannah, a 24-year-old female Christian who is in Level 400:

I read in an article that as a woman grows, it becomes more difficult for her to produce eggs. I believe that is what is referred to as menopause. So, once she stops having her period, she cannot have children again. I know that it usually happens around age 45.

In contrast, some participants believed that advancing age does not cause infertility in men. Evans, a 20-year-old male Christian in Level 200, believes that:

A man can always have children whenever he wants, even at age 50 or 60. I know of a man in my area who has a little child less than five years old; meanwhile, he is more than 60 years old. So, for us men, I don't think there is any age restriction when you want to have a child

Discussion

The study involved participants who were students at the University of Ghana. The objective of the study was to examine their knowledge and perceptions of risk factors related to infertility. Infertility, as defined by students at the University of Ghana, refers to the condition in which an individual, whether male or female, is unable to conceive and bear offspring. There are, however, proponents who maintain that infertility refers to the incapacity of a woman to get pregnant. However, the students proceeded to elaborate that the focus should be directed towards both individuals involved in a relationship, rather than solely on one of them. Some participants added the definition of infertility as the inability of a woman to become pregnant as a result of medical problems. Nevertheless, it is important to recognize that the respondents have shown a commendable level of knowledge regarding the idea of infertility. The student's knowledge did not align with the World Health Organization's[3] definition, which characterizes infertility as a medical condition affecting the male or female reproductive system, wherein the inability to conceive a pregnancy persists after 12 months or more of regular and unprotected sexual intercourse. The results attained about the knowledge students have about what infertility is, are in line with previous studies by Whitaker et al.[6] and Kassim and Ndumbaro[7] that acknowledged that it has been observed that students enrolled in higher education institutions show an insufficient level of comprehension and knowledge of fertility and the multitude of factors that contribute to infertility. This is because the students who participated in the current study equally provided an insufficient level of knowledge of what infertility was.

The students involved in the study held the belief that infertility is mostly linked to women rather than men. The observed phenomenon had an exclusive relationship with the inability to have an ovulation. While accepting the possibility that infertility may also impact men, the majority of the study's participants blamed the women. This perspective mostly arises from the notion that women carry the fetus, leading to the perception that any difficulties related to their ability to conceive and carry a pregnancy are considered more significant than a man's inability to impregnate a woman. This is problematic because research has shown that male factors equally contribute to the incidence of infertility[2] and, in some contexts, may contribute more than female factors[43].

In addition, research has shown that regardless of the duration, when couples decide to seek medical assistance at a hospital, it frequently results in attributing the guilt to the male partner. According to Ogar et al.,[10] Verkroost and Monden,[11] and Xie et al.,[12] existing literature shows that the inability to conceive offspring is associated with a distressing state of being that can detrimentally impact an individual's mental and physical well-being. Furthermore, this condition is often accompanied by feelings of anguish, personal sorrow, discontentment, societal disapproval, exclusion, and financial challenges. Therefore, the findings additionally show that women who are erroneously held responsible for their inability to

conceive, despite it being the fault of their husbands, are likely to experience adverse psychological and physical consequences.

The results of the study also show that the students held a collective belief regarding the potential risk factors for infertility in both males and females, specifically attributing certain lifestyles and diseases as contributing causes. The observed lifestyles encompass consistent engagement in social gatherings, characterized by frequent indulgence in alcohol consumption, smoking, and vaping. These students hold the belief that such behaviors may potentially lead to infertility. Indiscriminate sexual behavior has been recognized as a risk factor contributing to infertility, as individuals of both genders engage in several sexual partnerships, increasing their likelihood of contracting sexually transmitted diseases such as gonorrhea or syphilis. Due to the high costs associated with treating such diseases, it is common for these students to refrain from seeking medical attention at hospitals and instead resort to self-medication practices. The present findings are consistent with the results obtained in the study conducted by Emmanuel et al.,[19] which show that individuals who have a history of alcohol intake and a previous incidence of sexually transmitted diseases are at a higher risk of developing secondary infertility.

Additionally, it has been established that females who do not maintain proper hygiene in their genitals may experience infertility as a long-term consequence. This was in line with Sami et al.,[17] who concluded that the utilization of unsuitable absorbent materials for menstrual blood management, as well as the failure to adhere to proper hand hygiene practices using soap and water, are associated with infertility. The current study also found that some girls who are trying to gain weight purposefully become pregnant to have large breasts and hips, and when they succeed in their goal, they spontaneously terminate the pregnancy. This finding provides additional support for the study conducted by Cong et al.,[18] which established a correlation between the frequency of pregnancies and abortions with the occurrence of infertility.

In particular, the study found that some risk factors reported by the participants show gender uniqueness. In the context of male infertility, various risk factors have been identified. These factors include, but are not limited to, frequent masturbation leading to decreased sperm count, consumption of certain foods such as fatty foods, high frequency of sexual intercourse (e.g., three times per day), utilization of sexual energy-enhancing drugs like Viagra, higher stress levels, and excessive alcohol consumption. Although excessive alcohol consumption was seen as associated with male infertility for some respondents, the findings also indicate that excessive alcohol consumption was not associated with male infertility for other respondents. Some students who took part in the study contended that they possessed knowledge regarding individuals of the male gender who exhibit a propensity for excessive alcohol consumption yet concurrently maintain a substantial number of offspring. The risk factors for male infertility identified in this study align with the findings of previous studies conducted by Amoah et al.,[16] Moridi et al.,[21] and Atijosan et al.[22] These studies have collectively concluded that the increasing prevalence of (male) infertility can be attributed to the changing behaviors observed among students as they advance in their educational pursuits. Their research findings also indicate that risk variables, such as the consumption of sugary food, were associated with infertility in men.

Furthermore, the study identifies certain risk factors that are associated with female infertility. These risks encompass the prolonged utilization of contraceptives, history of abortions, smoking, alcohol consumption, wearing high-heeled shoes, excessive drug intake (specifically "wee"), and potential consequences of curses. The phenomenon of women increasingly engaging in excessive alcohol consumption and the utilization of illicit substances, while neglecting to consider the potential long-term consequences, is a noteworthy and unexpected development. The risk factors found in the present study align with the findings reported by Emmanuel et al.[19] and Liang et al.,[23] which show that female promiscuity, unsafe abortion, and alcohol intake have significant implications for female infertility.

Finally, age was shown to be a factor in determining a woman's fertility potential as opposed to a man's. The majority of participants, regardless of gender, contended that, irrespective of a man's age, he has the potential to impregnate a woman if he maintains good physical health and refrains from engaging in unhealthy behaviors. Nevertheless, as

women age, regardless of their adherence to healthy lifestyles and self-care practices, they encounter increasing challenges in conceiving as well as starting a family. The findings align with previous research conducted by Moridi et al.,[21] Atijosan et al.,[22] and Liang et al.,[23] which establishes a significant association between female factor infertility and various factors, including the age of women and the age at marriage as key underlying conditions for infertility in women. However, biologically speaking, advancing age is a contributor to decline in fertility potential in men as well.[38]

Limitations, future directions, and implications for practice

While employing a qualitative methodology was deemed appropriate for assessing the knowledge and perceptions of undergraduates regarding the many risk factors linked to infertility, it is important to acknowledge certain constraints that were encountered. The limitation of the present study is in the utilization of a semi-structured interview approach, which restricted the researchers from fully investigating the participants' experiences with abortions and other sensitive risk factors disclosed by the participants throughout the interview. The study did not ascertain if the program of study undertaken by the participants had any influence on their knowledge or perception of the risk factors associated with infertility. Additionally, the research primarily concentrated on undergraduate students. Therefore, it would be interesting for future studies to incorporate graduate students. Furthermore, as this study was conducted at one of the largest public universities in Ghana, it would be intriguing for future studies to encompass all public universities in Ghana.

The study also has implications as it specifically examines infertility, which is a significant public health concern. Therefore, according to the results obtained from the study, it is recommended that the public universities in Ghana should consider organizing informative seminars or integrating reproductive health education into their curriculum to enhance the knowledge of their students regarding their reproductive health status and related issues. Moreover, given that a significant number of students avail themselves of the services provided by the university hospital when they experience illness, it is imperative for healthcare professionals to periodically engage in educating these students about recognized risk factors, particularly pertaining to the utilization of contraceptives and the practice of abortion. Given the significant influence that religious leaders hold over the majority of students, churches and other religious authorities must acquire knowledge regarding the risk factors contributing to infertility. Furthermore, these religious institutions must disseminate information to their congregations, particularly the youth, regarding the causes of infertility and the potentially detrimental effects of adhering to unfounded spiritual beliefs. It is advisable to promote the regular utilization of medical services for addressing reproductive health concerns at suitable healthcare establishments, while discouraging practices such as abortion, excessive alcohol consumption, and overutilization of contraceptives, especially emergency contraceptives.

Conclusion

The present study examined the depth of knowledge and perception regarding the risk factors linked to infertility among undergraduate students. Based on the results, it can be inferred that both male and female students possessed an acceptable knowledge of infertility and contended that, within their respective cultural contexts, it was frequently perceived as a condition mostly affecting women. This erroneous impression is problematic. The students successfully identified various risk factors associated with both male and female infertility. These criteria were primarily correlated with the lifestyle adopted by some students. However, there is still a notable knowledge gap and a lack of clarity surrounding the association between alcohol consumption and infertility. Many students mentioned situations when they were aware of individuals who excessively consumed alcohol and still managed to conceive multiple children. Therefore, our study serves as a foundation for future investigations to explore the identified risk variables and the necessity of further assessing the independent impact of these risk factors on infertility.

Consent for publication

All the authors have read and agreed to the published version of the manuscript.

Data availability

The data supporting the findings of the study are available from the authors upon reasonable request.

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Competing interests

There are no competing interests.

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Authors' contributions

Conceptualization: R.A.H and G.B.A; Data curation: R.A.H and G.B.A; Formal analysis: R.A.H and G.B.A; Investigation: R.A.H and G.B.A; Methodology: G.B.A; Validation: R.A.H; Writing – original draft: R.A.H and G.B.A; Writing – review & editing: G.B.A. All authors read and approved the final version of the manuscript

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