https://doi.org/10.35845/kmuj.2024.23374

ORIGINAL ARTICLE

Awareness and attitude towards fertility and parenthood: a comparative study among medical students in Saudi Arabia

Fehmida Tehsin [1]✉, Sayed Ibrahim Ali [2], Ghadah Al Qarni [3]

ABSTRACT

OBJECTIVES: To compare the awareness, attitudes towards fertility, and intentions for parenthood between preclinical and clinical medical students.

METHODS: An online cross-sectional study was conducted among preclinical and clinical medical students of King Faisal University, Al Ahsa, The study was conducted during the first semester of the academic year of a medical bachelor's degree program, utilizing a convenience sampling technique. A total of 225 students, comprising 148 from the 3rd year and 77 from the 4th year blocks, voluntarily completed self-reported questionnaires. Data analysis was performed using IBM SPSS version-26.

RESULTS: The mean age of participants was 21.56±1.55 years, with a slightly higher representation of females (54.2%) compared to males (45.8%). Among the participants, 45.8% were married, and only 11.1% had children, while the majority expressed a desire to have children (73.8%) within the age range of 25-29 years. A significant proportion (44.9%) indicated a preference for 2-3 children. In terms of childcare, most participants agreed to its necessity. Interestingly, females across both academic years showed similar responses regarding the possibility of combining work/study, with almost equal numbers agreeing or remaining undecided. Clinical students exhibited greater fertility knowledge compared to preclinical students, with no significant differences observed based on gender. Furthermore, participants with a family history of infertility were more inclined to consider both IVF and adoption (p-value = 0.0001).

CONCLUSION: Clinical-year medical students showed improved understanding of female fertility decline and infertility causes, coupled with positive attitudes towards parenthood at a suitable reproductive age, preferring smaller families.

KEYWORDS: Fertility (MeSH); Awareness (MeSH); Parenthood (Non-MeSH); Parents (MeSH); Saudi Arabia (Non-MeSH); Students, Medical (MeSH).

THIS ARTICLE MAY BE CITED AS: Tehsin F, Ali SI, Qarni GA. Awareness and attitude towards fertility and parenthood: a comparative study among medical students in Saudi Arabia. Khyber Med Univ J 2024;16(1):16-24. https://doi.org/10.35845/kmuj.2024.23374

1. Department of Obstetrics & Gynecology, College of Medicine, King Faisal University, Al Ahsa, Kingdom of Saudi Arabia.
2. Department of FAMCO, College of Medicine, King Faisal University, Al Ahsa, Kingdom of Saudi Arabia.
3. Student, College of Medicine, King Faisal University, Al Ahsa, Kingdom of Saudi Arabia.

Cell #: +966-0538269202
Email✉: fehmidatehsin123@gmail.com

Date Submitted: July 09, 2023
Date Revised: February 12, 2024
Date Accepted: March 09, 2024

INTRODUCTION

Fertility diminishes with age, particularly in females, due to the finite store of eggs acquired since birth, with no replenishment throughout reproductive life—a phenomenon not observed in males. Advanced female age serves as a key indicator for fertility challenges, encompassing childlessness, miscarriage, and chromosomal abnormalities, attributed to declining egg count and quality.[1] The desire for parenthood ranks among the foremost aspirations for married couples. Primary infertility is defined as the inability to achieve pregnancy within 12 months of unprotected sexual intercourse, regardless of outcome. Female anovulation and tubal blockage constitute 45% of cases, while male factors such as abnormal semen parameters, premature ejaculation, and erectile dysfunction contribute 30%, with 25% remaining unexplained.[2] Both partners undergo infertility evaluation to identify underlying causes and explore management options, including ovulation induction, intrauterine insemination, and assisted reproductive techniques like in vitro fertilization, intracytoplasmic sperm injection, surrogacy, or adoption.[3] Studies have investigated risk factors, psychological ramifications, and counseling's role in infertility.[4-7] Lifestyle and environmental factors may also influence infertility through metabolic disturbances.[8]

In the contemporary era, self-imposed infertility is becoming increasingly prevalent as individuals intentionally postpone pregnancy to pursue career advancement, address employment challenges, cope with childcare limitations, or overcome financial constraints.[9,10] Recent research focusing on undergraduates' fertility and parenthood intentions has uncovered significant gaps in knowledge. It reveals that students often overestimate the age at which fertility declines and the success rates of fertility treatments.[11] Studies intriguing undergraduates' intentions toward parenthood and fertility awareness have revealed misconceptions and gaps in fertility knowledge and emphasized the necessity for a thorough education on fertility matters, as students frequently harbor misconceptions about fertility and the potential challenges of parenthood. Collectively, these studies underscore the crucial need to provide accurate and comprehensive information regarding fertility and parenthood to undergraduates.[12-14]

Our study aimed to evaluate fertility

awareness among medical undergraduates, taking into account the extended duration required for bachelor's degree completion and further specialization in the competitive medical field. Given the potential vulnerability to fertility issues, particularly among females marrying later in life, our focus was on assessing intentions towards parenthood, knowledge regarding female age, ovarian reserve, and risk factors for both male and female infertility. Additionally, we aimed to compare awareness levels between clinical-year and preclinical medical students. Furthermore, the study sought to evaluate participants' attitudes towards abnormal fertility investigation results, particularly in special circumstances.

METHODS

This cross sectional study was conducted in the College of Medicine, King Faisal university Al Ahsa, Saudi Arabia, in the first semester of the academic year, September 2022 – December 2022. Preclinical (3rd year) and clinical (4th year) medical students were the target participants of the study. The MBBS program curriculum is conducted in four blocks per academic year. A sample size of 225 students was retrieved through an online sample size calculator with a 5% margin of error and 95% confidence interval according to the total number of students in the first-semester 4th-year obstetrics / gynecology and a preclinical 3rd-year block. The three blocks (medicine, surgery, and movement) of the fourth year and one third-year block (development and reproduction) were excluded from the study. A validated English questionnaire was adopted from a German-published study[15] after obtaining permission and was tailored to the culture and needs of the Saudi Arabian students, as was done in a study conducted at King Saud Bin Abdul-Aziz University for Health Science published in 2019.[16] The English Questionnaire was distributed online to the students after the completion of a teaching session by study researchers. Students were briefed about the study aim before attempting the study questionnaire; verbal informed consent was retrieved, and voluntary participation was ensured. Through convenience sampling, 225 students voluntarily submitted responses. (148 from the 3rd year and 77 from the 4th year obstetrics / gynecology block).

Table 1: Demographic characteristics and intentions to have children

Variables		Frequency (n=225)	Percentage
Gender	Male	103	45.8
	Female	122	54.2
Academic Year	Preclinical third year	148	65.8
	4th year clinical	77	34.2
Family History of Infertility	Yes	26	11.6
	No	199	88.4
Are you married?	Yes	103	45.8
	No	122	54.2
Do you have children?	Yes	25	11.1
	No	78	34.7
How many children do you have?	0	78	34.7
	1	10	4.4
	2	7	3.1
	3	8	3.6
At what age do you think the first child be born?"	20 - 24 years	29	12.9
	25 - 29 years	166	73.8
	30 - 40 years	30	13.3
Number of desired children	1 - 2	35	15.6
	> 2 - 3	101	44.9
	> 3 - 4	44	19.6
	> 4	45	20.0

The questionnaire comprised two main sections. Section A focused on general personal information, while section B contained the following components: **I)** 5 items assessing intentions of having children, **ii)** 5 statements regarding important circumstances influencing the decision to have children using a Likert scale**, iii)** 19 knowledge questions / statements, with 5 having one best answer and 16 offering true/false options, all requiring selection of true answers, and **iv)** 6 attitude statements regarding infertility, rated on a 1-5 Likert scale from "strongly agree" to "strongly disagree."

Ethical permission was obtained from KFU Research Deanship (ETHICS378). Students' voluntary participation was ensured and respected.

The extracted data were analyzed using the statistical software IBM SPSS version 26 (SPSS, Inc., Chicago, IL). All statistical analyses were conducted using two-tailed tests, with a significance level set at $p < 0.05$. Descriptive analysis, including frequency and percent distribution, was performed for all variables. Cross-tabulation was utilized to assess factors associated with categorical variables. Relationships were evaluated using Pearson's chi-square test.

Table II: Important circumstances for the decision to have children (n=225)

Statements	Gender and academic year	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
I want to have a stable financial situation, e.g., a regular income	Male	1	2	6	6	78
	Female	1	2	7	12	100
	3rd year	1	4	7	20	116
	4th year	1	0	6	8	62
First I want to complete my studies	Male	1	0	21	25	56
	Female	1	0	16	21	84
	3rd year	0	0	25	28	95
	4th year	2	0	12	18	45
I want my work/study can be combined with having children	Male	6	9	32	32	24
	Female	10	9	41	28	34
	3rd year	12	15	51	32	38
	4th year	4	3	22	28	20
I must have access to childcare	Male	0	6	19	48	30
	Female	1	1	16	35	69
	3rd year	0	5	29	58	56
	4th year	1	2	6	25	43
I have to feel prepared	Male	1	2	11	29	60
	Female	1	1	5	27	88
	3rd year	1	2	12	30	103
	4th year	1	1	4	26	45

RESULTS

The mean age of the sample was 21.56±1.55 years. The response rate was 100% as all reached students answered the questionnaire. The age ranged from 20 to 26 years. The gender distribution of the sample is slightly skewed towards females, with 54.2% females and 45.8% males. The majority of the sample (65.8%) was from the preclinical third year of study, while 34.2% were in their fourth year of clinical study. About 45.8% of the participants were married. In terms of family history of infertility, 11.6% reported a positive family history of infertility. Of those who were married, only 11.1% reported having children. Regarding the anticipated age for the birth of their first child, the majority of participants (73.8%) indicated an age range of 25–29. The majority of participants (44.9%) expressed a desire to have 2-3 children [Table I].

In assessing decisions to have children using a five-point Likert scale ranging from strongly disagree to strongly agree, a higher proportion of female students, compared to male students, indicated agreement with the desire to have a stable financial situation, complete studies, and prepare for parenthood, across both academic years. The majority of students agreed on the importance of childcare. However, the notion that work/study can be combined with having children was more commonly selected by female students, with a mix of agreement and indecision, whereas male students showed a more balanced distribution between agreement and indecision (Table II).

The table III presents the results of knowledge questions among clinical and preclinical medical students regarding fertility-related topics. The analysis of knowledge awareness revealed that 4th year clinical students (n=77) exhibited a higher level of awareness compared to 3rd year students (n=148). Overall, there appears to be variability in understanding among students. While a majority correctly identified the duration for considering infertility in married couples and the age range for peak female fertility, knowledge gaps were evident in areas such as the timing of peak fertility within the menstrual cycle and the success rates of in vitro fertilization (IVF) treatment. Additionally, there were misconceptions observed, such as the belief that women are born with a fixed number of eggs that do not decrease

Table III: Knowledge questions (MCQS and True/False) and the correct answers of both clinical and preclinical students (n=225)

Knowledge items	One best answer options			Correct answers	Correct answers per academic year	
1- After how much period a married couple is considered to have infertility while living together and not observing contraception?	6 months N (f)	9 months N (f)	12 months N (f)	12 months N (f)	3rd year (n=148) N (f)	4th year (n=77) N (f)
	18 (8)	6 (2.66)	188 (83.5)	188 (83.55)	118 (79%)	70 (90%)
2- At what age woman is most fertile?	20-26	27-39	40-45	20-26		
	132 (58.66)	35 (15.55)	33 (14.66)	132 (58.66)	86 (58%)	46 (59%)
3- When is the most fertile time in a woman's menstrual cycle?	Throughout Cycle	Mid Cycle	Late Cycle	Mid Cycle		
	11 (4.8)	39 (17.33)	167 (74.2)	39 (17.33)	27 (18%)	12 (15%)
4- At what age is there a marked decrease in women's ability to become pregnant?	30-34	35-39	40-44	30-34		
	72 (32)	79 (35.11)	50 (22.22)	72 (32)	47 (31.7%)	25 (32%)
5- What are the chances on average of achieving a child from IVF treatment?	20-29%	30-39%	40-59%	20-29%		
	19 (8.44)	109 (48.44)	49 (21.78)	19 (8.44)	15 (10%)	4 (5%)

Close-ended items	Selected choices		True answers	
	False [n (f)]	True [n (f)]	3rd year [n (f)]	4th year [n (f)]
6- Do you know the concept of oocyte freezing?	85 (37.8)	140 (62.22)	78 (52.7%)	62 (80.5%)
7- A female is born with eggs which will never decrease in number.	202 (89.7)	23 (10.22)	14 (9.4%)	9 (11%)
8- At birth women have the maximum number of oocytes.	124 (55.1)	101 (44.88)	46 (31%)	55 (71%)
9- IVF allows a woman to conceive even with reduced egg stores.	138 (61.4)	87 (38.66)	50 (33.7%)	37(48%)
10- If a woman undergoes cancer treatment she can consider freezing eggs beforehand.	87 (38.6)	838 (61.33)	73 (49%)	65 (84.4%)
11- The ovarian reserve can be determined?	865 (73.4)	60 (26.66)	31 (21%)	29 (37.6%)
12- Anovulation can be treated with medicines/drugs.	140 (62.3)	85 (37.77)	33 (22.2%)	52 (67.5%)
13- Menstrual cycle irregularity can result in infertility.	104 (46.2)	121 (53.77)	61 (41.2%)	60 (77.9%)
14- Genital tract infections in males and females can cause infertility	77 (34.2)	148 (65.77)	87 (58.7%)	61 (79%)
15- Smoking can reduce fertility.	54 (24)	171 (76)	107 (72.2%)	64 (83%)
16- Psychological stress can affect fertility	52 (23.2)	173 (76.88)	109 (73%)	64 (83%)
17- Some drugs can result in male and female infertility	28 (12.4)	197 (87.55)	130 (87%)	67 (87%)
18- Diabetes and cystic fibrosis can cause infertility in males.	15 (55.6)	100 (44.44)	48 (32%)	52 (67%)
19- Alcohol consumption can affect fertility	97 (43.2)	128 (56.8)	65 (43%)	63 (81%)

IVF: In vitro fertilization

Table IV: Analysis of infertility knowledge among clinical and preclinical medical students: gender, academic year and family history

Knowledge Items (19)	Gender			Academic year			Family history		
	Male	Female	P Value	3rd preclinical	4th clinical	P Value	Yes	No	P Value
1	85	102	0.214	118 (79.7%)	70 (90%)	0.0001	21	167	0.0001
2	56	76	0.308	86 (58%)	46 (59.7%)	0.0001	13	19	0.0001
3	18	21	0.333	27 (18%)	12 (15%)	0.011	5	34	0.0001
4	34	38	0.409	47 (31.7%)	25 (32%)	0.0001	10	62	0.0001
5	11	8	0.415	15 (10%)	4 (5%)	0.018	4	15	0.014
6	52	88	0.0001	78 (52.7%)	62 (80.5%)	0.258	20	10	0.0001
7	9	14	0.299	14 (9.4%)	9 (11%)	0.357	4	19	0.0001
8	38	63	0.018	46 (31%)	55 (71%)	0.358	15	86	0.0001
9	40	47	0.338	50 (33.7%)	37 (48%)	0.152	12	75	0.0001
10	52	86	0.0001	73 (49%)	65 (84.4%)	0.522	20	118	0.0001
11	23	37	0.422	31 (21%)	29 (37.6%)	0.297	10	50	0.0001
12	22	63	0.0001	33 (22.2%)	52 (67.5%)	0.019	17	68	0.0001
13	41	80	0.0001	61 (41.2%)	60 (77.9%)	0.951	18	103	0.0001
14	68	80	0.521	87 (58.7%)	61 (79%)	0.021	22	126	0.0001
15	81	90	0.851	107 (72.2%)	64 (83%)	0.0001	23	148	0.0001
16	72	101	0.014	109 (73%)	64 (83%)	0.0001	22	151	0.0001
17	89	108	0.125	130 (87%)	67 (87%)	0.0001	24	173	0.0001
18	37	63	0.0001	48 (32%)	52 (67%)	0.425	19	81	0.0001
19	52	76	0.024	65 (43%)	63 (81%)	0.319	19	109	0.0001

over time. These findings underscore the importance of targeted education on fertility-related topics for medical students to ensure accurate understanding and informed decision-making in future medical practice.

Table IV shows the relationship of students' fertility knowledge (five multiple choice & fourteen close-ended true/false questions) with their gender, academic year, and family history of infertility. Correctly chosen one best answer showed statistical significance with clinical-year (4th-year) medical students and family history of infertility while no significant relationship was found with student's gender. Regarding gender differences, disparities are noticeable across academic years. For instance, in the 3rd preclinical year (item 1), no significant gender difference is observed (p-value = 0.214). However, in subsequent clinical years (e.g., items 4, 8, 12), p-values consistently fall below 0.05, suggesting significant gender-based variations. Furthermore, academic year trends within each gender group are apparent. For example, within the male group (e.g., item 12), there are significant variations across academic years (p-value = 0.0001), implying that academic progression may impact measured outcomes for male students.

Students with a family history of infertility exhibited a higher level of knowledge compared to those without such familial experiences, suggesting the potential influence of family background on understanding infertility. Across both male and female groups, the majority of p-values were consistently below the threshold of 0.05, indicating a statistically significant impact of family history on the measured outcome. These findings highlight the importance of considering familial experiences when assessing infertility knowledge among students, highlighting the potential role of shared experiences in shaping understanding in this area.

Table V shows the analysis of students' attitudes toward infertility reveals significant influences of gender, academic year, and family history on their perspectives and choices. Notably, gender differences are evident in the willingness to postpone studies or work for infertility treatment, with 30 male and 51 female students showing a

readiness to prioritize treatment, suggesting a gender-specific approach to managing infertility (p-value= 0.017).

The impact of academic advancement was evident in attitudes towards in IVF, with 27 students in the 3rd preclinical year considering it compared to only 10 students in the 4th clinical year. This observation suggests a shift in attitudes as students' progress through their medical education (p-value = 0.004).

The influence of a family history of infertility on attitudes was pronounced, with individuals having such a familial background significantly more inclined to consider both in IVF and adoption. Specifically, 4 individuals with a family history of infertility expressed willingness to consider IVF compared to 33 individuals without such a history (p-value = 0.0001). This points to the profound impact of personal and familial experiences on students' inclinations towards fertility treatments.

DISCUSSION

Recognizing the limitations of female fertility holds significant implications for family planning and aligning personal aspirations with the competitive demands of higher education. This awareness becomes particularly integral within the context of medical education, a path that typically spans five to six years for a bachelor's degree, followed by additional years of residency for specialization and, subsequently, a fellowship for a sub-specialty program. The extended duration of medical training underscores the importance of informed family planning decisions, as individuals navigate the pursuit of academic excellence in a world characterized by relentless competition across diverse fields of higher education. The correlation between fertility awareness and the prolonged time line of medical education accentuates the need for strategic and proactive considerations in balancing professional and personal aspirations.

The current study has assessed the awareness and attitude towards female fertility and parenthood among medical students. Female students were slightly more than male, less than half were found married, a small proportion of married students had children and one-quarter of them had a family history of infertility. The majority of the students wanted to have their first baby by 25-29 years of age where a good number desired two to three children while only one quarter thought of more than four. Clinical year students as was earlier speculated, had far better awareness regarding fertility issues than preclinical students. In the event of infertility issues female students were more concerned about dropping and postponing their studies/job to seek treatment, considering adoption as an option, dropping their desire for children, and feeling upset and depressed about infertility while students of clinical year were more inclined to consider IVF treatment than the preclinical third-year students.

A similar German study[15] stated that female non-medical students planned to have children at an earlier age than male non-medical and medical students, majority knew about oocyte freezing while less number of students were aware of ovarian reserve which is similar to our study results. Their study identified deficient knowledge concerning the most fertile female age which is opposite to our results. We did not include circumstances or statements for choosing these ovarian

Table V: Association of students' attitudes with gender, academic year, and family history of infertility in the event of infertility

Statements	Gender		Academic year		Family history	
	Male	Female	3rd preclinical	4th clinical	Yes	No
I would consider in vitro fertilization	85	102	118 (79.7%)	70 (90%)	21	167
p-value	0.214		0.0001		0.0001	
I would postpone my study/quit my job to seek treatment.	56	76	86 (58%)	46 (59.7%)	13	19
p-value	0.308		0.0001		0.0001	
I would continue my job/ work/study.	18	21	27 (18%)	12 (15%)	5	34
p-value	0.333		0.011		0.0001	
I would consider the adoption	34	38	47 (31.7%)	25 (32%)	10	62
p-value	0.409		0.0001		0.0001	
I would drop my desire for children	11	8	15 (10%)	4 (5%)	4	15
p-value	0.415		0.018		0.014	
I would be very upset and depressed	52	88	78 (52.7%)	62 (80.5%)	20	10
p-value	0.0001		0.258		0.0001	

technologies aspects but generally inquired about the ovarian reserve or oocyte freezing.

A study in Qassim,[16] city of Saudi Arabia, assessed different colleges of King Saud Bin Abdulaziz University, where participants considered having 3 children at 27 years' age for the first child almost similar to our study findings. They showed a lack of awareness about female fertility decline by age and our participants being medical students were well aware of age-related female fertility decline. In Iraq[17] a study found non-medical students had more desire for parenthood and wanted to have a first child between 21-24 years of age while medical students decided to have one at 25-27 years. Risk factors of infertility were better identified by medical students who opted for IVF than non-medical students. Regarding medical students' findings, these are almost consistent with ours. A Ukranian study[18] on medical students found a low level of female age-related infertility awareness and more than half thought a deep decline after 45 years, some males and females did not want children which is contrary to our findings. However, it's noteworthy that both studies aligned in terms of the age selected for the first baby, with participants in both studies commonly choosing ages 24 and 26. In another similar study in Nigeria[19] university undergraduates did not pick properly the slight and maximum decline in fertility for female age.

Interestingly, a majority of participants expressed a desire for three children, and females were notably more determined to have children at a younger age compared to males. These findings provide further insight into the perceptions and preferences regarding fertility among young adults in different cultural contexts.

A Serbian study[20] has assessed fourth-year medical students for parenthood intentions and fertility awareness. Almost all desired for children a maximum of up to 3, and both genders agreed on the importance of children, female chose IVF and adoption in the diagnosed case of infertility which is similar to our study findings. All students wanted their first baby to be born before 35 years of age which is contrary to our results where the majority wanted to have it by 25-29 years of age, females considered children after completion of study and availability of child care facilities which is similar to current study results. They showed low awareness of age-related woman fertility while the majority of our fourth-year medical students knew about the age-related decline in female fertility which is contrary to their results.

Another study [21] compared university students in Hong Kong with Western students' results. They also lacked knowledge of female fertility decline with age as Western students were less interested in children, and did not seriously take any action in case of infertility issues which was contrary to Western students and also is dissimilar with current study findings because of the different culture of their participants. Another study in an Australian university[22] revealed that students aimed to have children during their fertile years but prioritized other life goals first, demonstrating limited knowledge about female fertility decline with age. These findings emphasize cultural variations in perceptions and priorities regarding fertility.

A comparative study[23] involving medical students from Sweden, Belgium, and Greece showed satisfactory awareness of female fertility decline with age, with Belgians demonstrating higher consideration for oocyte and sperm freezing. The median age for the first child was reported to be 29 years. In contrast, a Mexican study[24] comparing undergraduate and graduate university students found a low level of awareness regarding female fertility decline and IVF success rates. Males showed greater eagerness to have children at age 30, with a higher inclination towards adoption in cases of infertility. These findings differ from the current study due to variations in the educational backgrounds of the participant.

Most of the study's findings align with existing literature, there is slight dissimilarity in results related to the decline in female fertility with age, particularly studies involving medical students. These disparities underscore the importance of additional education and awareness initiatives to enhance students' knowledge and comprehension of female fertility-related matters. The findings of this study have provided valuable insights into the awareness and attitudes of medical students in Saudi Arabia toward fertility and parenthood. In Saudi Arabia, there has been a historical inclination towards maintaining large family sizes. However, with advancements in education and literacy rates, there has been a noticeable shift among the younger generation towards embracing more effective family planning practices. Education is pivotal in shaping societal norms, contributing to a more informed and empowered approach to family life.

LIMITATIONS OF THE STUDY

The limitation of the current study is its single-center design, conducted exclusively at a medical college within a university in Al Ahsa, Saudi Arabia. Consequently, the findings may not be generalized to medical students of other medical colleges in the country.

CONCLUSION

Our study emphasizes the critical need for improved fertility education among medical undergraduates. Medical students, particularly clinical-year students, displayed a better grasp of female fertility decline with age and demonstrated familiarity with various infertility causes. Despite knowledge gaps, participants expressed positive intentions regarding parenthood, with many favoring smaller family sizes. Addressing these gaps and promoting proactive family planning strategies are vital for enhancing reproductive health outcomes among future healthcare professionals.

REFERENCES

1. Fledderjohann J. Difficulties conceiving and relationship stability in sub-Saharan Africa: the case of Ghana. Eur J Population 2017;33(1):129-52. https://doi.org/10.1007/s10680-016-9401-5

2. Raine-Fenning N. Subfertility. In: D. Keith Edmonds, Christoph Lees, Tom Bourne, editors. Dewhurst's

Textbook of Obstetrics & Gynecology. West Sussex: Wiley Blackwell: 2018. P.1342-65

3. Altiparmak S, Aksoy DY. The effects of fertility-supporting health training on healthy lifestyle behaviors and infertility self-efficacy in infertile women: a quasi-experimental study. Eur J Integr Med 2018;20:146-53. https://doi.org/10.1016/j.eujim.2018.05.005

4. Gerrits T, Van Rooij F, Esho T, Ndegwa W, Goossens J, Bilajbegovic A, et al. Infertility in the global south: raising awareness and generating insights for policy and practice. Facts Views Vis in ObGyn 2017;9(1):39-44.

5. Donkor ES, Naab F, Kussiwaah DY. "I am anxious and desperate": psychological experiences of women with infertility in The Greater Accra Region, Ghana. Fertil Res Pract 2017;3:6 https://doi.org/10.1186/s40738-017-0033-1

6. Amiri M, Khosravi A, Chaman R, Sadeghi Z, Raei M, Jahanitiji M A, et al. Social consequences of ınfertility on families in İran. Global J Health Sci 2015;8(5):89-95. https://doi.org/10.5539/gjhs.v8n5p89

7. Polis CB, Otupiri E, Hindin M, Chiu DW, Keogh SC, Aidoo C, et al. Prevalence and Correlates of Perceived Infertility in Ghana. Stud Fam Plann 2020;51:207-24. https://doi.org/10.1111/sifp.12136

8. Bala R, Singh V, Rajender S, Singh K. Environment, lifestyle, and female infertility. Reprod Sci 2021;28(3):617-38. https://doi.org/10.1007/s43032-020-00279-3

9. Atijosan A, Adeyeye O, Ogungbayi O. "Knowledge and Perception Regarding Infertility among University Students in ile-ife: a View through Gender Lens." Covenant J Business Soc Sci 2019;10(1):14. https://doi.org/10.20370/0tcm-n551

10. Alaee S, Yousefinan E, Talaiekhozani A, Ziaee GR, Hamayoon H. Infertility knowledge, attitudes, and beliefs among iranian college students. J Environ Treat Tech 2019;7(2):183-6 . https://dx.doi.org/10.4314/ahs.v18i1.22

11. Özerdoğan N, Yilmaz B. Turkish University seniors' knowledge of and opinions on fertility and expectations of having children. Afri Health Sci 2018;18(1):172-9. https://dx.doi.org/10.4314/ahs.v18i1.22

12. Sørensen NO, Marcussen S, Backhausen MG, Juhl M, Schmidt L, Tydén T, et al. Fertility awareness and attitudes towards parenthood among Danish university college students. Reprod Health 2016;13:146. https://doi.org/10.1186/s12978-016-0258-1

13. Brittany R, Martin SF. Infertility knowledge, attitudes, and beliefs of college students in grenada. Sci J Public Health 2015;3(3):353-60.

14. Khraif RM, Salam AA, Al-Mutairi A, Elsegaey I, Al Jumaah A. Education's impact on fertility: the case of King Saud University women, Riyadh. Middle East Fertil Soc J 2017; 22:125-31. https://doi.org/10.1016/j.mefs.2016.12.002

15. Meissner 16 C, Schippert C, von Versen-Höynck F. Awareness, knowledge, and perceptions of infertility, fertility assessment, and assisted reproductive technologies in the era of oocyte freezing among female and male university students. J Assist Reprod Genet 2016;33:719-29. https://doi.org/10.1007/s10815-016-0717-1

16. Alfaraj S, Aleraij S, Morad S, Alomar N, Rajih HA, Alhussain H, et al. Fertility awareness, intentions concerning childbearing, and attitudes toward parenthood among female health professions students in Saudi Arabia. Int J Health Sci (Qassim) 2019;13(3):34-9.

17. Khalil N, Hassan I, Saeed H. Fertility awareness among medical and non-medical undergraduate university students in Al-Iraqia University, Baghdad, Iraq. Am J Med Sci Med 2015;3:74-8. http://dx.doi.org/10.12691/ajmsm-3-6-1

18. Mogilevkina I, Stern J, Melnik D, Getsko E, Tydén T. Ukrainian medical students' attitudes to parenthood and knowledge of fertility. Euro J Contracept Reprod Health Care 2016;21:189-94. https://doi.org/10.3109/13625187.2015.1130221

19. Abiodun O, Alausa K, Olasehinde O. Ignorance could hurt: an assessment of fertility awareness, childbirth intentions and parenting attitudes among university students. Int J Adolesc Med Health 2016;30(2):20160091. https://doi.org/10.1515/ijamh-2016-0091

20. Vujčić I, Radičević T, Dubljanin E, Maksimović N, Grujičić S. Serbian medical students' fertility awareness and attitudes towards future parenthood. Eur J Contracept Reprod Health Care 2017;22(4):291-7. https://doi.org/10.1080/13625187.2017.1368478

21. Chan CH, Chan TH, Peterson BD, Lampic C, Tam MY. Intentions and attitudes towards parenthood and fertility awareness among Chinese university students in Hong Kong: a comparison with Western samples. Hum Reprod 2015;30(2):364-72. https://doi.org/10.1093/humrep/deu324

22. Prior E, Lew R, Hammarberg K, Johnson L. Fertility facts, figures and future plans: an online survey of university students. Hum Fertility 2019;22(4):283-90. https://doi.org/10.1080/14647273

.2018.1482569

23. Delbaere I, Pitsillos T, Group TGC, Tydén T, Kerckhof L, Iliadis SI. Fertility awareness and parenthood intentions among medical students in three European countries. Eur J Contracept Rep Health Care 2021;26(4):312-22. https://doi.org/10.1080/13625187.2021.1901877

24. Place JM, Peterson BD, Horton B, Sanchez M. Fertility awareness and parenting intentions among Mexican undergraduate and graduate university students. Hum Fertility 2020;25(2):397-406. https://doi.org/10.1080/14647273.2020.1817577

AUTHORS' CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

NN, RK & MA: Concept and study design, acquisition of data, drafting the manuscript, critical review, approval of the final version to be published

LG, FBH & SH: Acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest, whether financial or otherwise, that could influence the integrity, objectivity, or validity of their research work.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors declared no specific grant for this research from any funding agency in the public, commercial or non-profit sectors

DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request

KMUJ web address: www.kmuj.kmu.edu.pk
Email address: kmuj@kmu.edu.pk