Original Article

Investigation of Fertility Awareness and Fertility Anxiety Levels of Midwifery Students

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Abstract

Aim: This study was conducted to investigate the fertility awareness and fertility anxietylevels of midwifery students.

Methods: The sample of the study, which was conducted in a descriptive and correlational design, consisted of 208 students studying in the 1st, 2nd, 3rd and 4th grades of the Midwifery Department of a public university in the 2023-2024 academic year *(Participation Rate: 61.2%)*. Data were collected with "Descriptive Information Form" and "Fertility Awareness Scale (FAS)". Descriptive statistics, Mann Whitney U and Kruskal Wallis Test wereused in the evaluation of the data.

Results: The mean age of the students participating in the study was 21.14$\pm$2.39, the mean age at menarche was 12.96$\pm$1.19, and the mean age at which they planned to have children was 25.58+7.19. The students stated that 9.6% of them had a family member diagnosed with infertility and 69.7% of them knew the current treatment approaches for infertility treatment. It was determined that 41.3% of the student midwives considered themselves at risk for fertility and the mean level of fertility anxiety was 4.36$\pm$2.09 (range: 1-10). It was determined that the variables of income status, presence of infertile individuals in the family and knowledge of current treatment approaches for infertility treatment had a significant effect on the mean FAS scores. It was found that there was a significant positive correlation between the fertility anxiety levels of the students and their FAS scale scores.

Conclusion: In line with the findings of the study, it was determined that the fertility awarenesslevels of midwifery students were at a moderate level. In line with the findings of the study, it is thought that determining the fertility awareness of midwifery students will make a significantcontribution to both themselves and the individuals around them in creating fertility awareness,preventing infertility and reducing its incidence.

Keywords: *Fertility anxiety; fertility; midwifery; student.*

Introduction

Having a child is one of the most important decisions in human life. Fertility is not a simple biological experience; rather it is a complex phenomenon that has biological, social and culturalaspects and is influenced by different factors. In traditional and patriarchal societies, a great deal of importance is attached to women's fertility. Women's fertility status can affect their reputation, personal identity and satisfaction, social status, role in the family, economic and social rights,

education and health levels (Bayraktar, 2018). It can even lead to sexual, physical, emotional and economic violence against women by the society and their families. While fertilewomen can be rewarded for fulfilling their duty to continue the family lineage, infertile womencan be penalised on the grounds that they do not contribute to the family and even become a burden (Fırat & Sahin, 2022).

Fertility rates have been declining worldwide in recent years and the maternal age at first birth has been increasing. This situation causes demographic transformation and seriously affects thesocial structures, health systems and economies of societies. When 2022 world and Turkey- specific data on birth rate per woman are analysed, it is determined as Belgium 1.5, Canada 1.3, Egypt 2.9, Morocco 2.3 and Turkey 1.6 (TSI, 2023; World Bank, 2022). In Turkey's data for the year 2023, it was found that it decreased to 1.5 (TSI, 2024). Education and career, economic factors, cultural-social changes and migration are thought to be the reasons for this picture (Rotella et al., 2021).

When the factors affecting fertility awareness were analysed, according to a systematic reviewconducted by Ren et al., (2023), it was found that gender, education level, working or being educated in the field of health and age variables affected fertility awareness. According to a similar systematic review by Pedro et al., (2018), age, education, gender and reproductive statuswere found to affect fertility awareness. In a study conducted by Zhang and Hao (2024), it was found that family life, employment status, age and gender affect fertility anxiety. In addition, itwas determined that fertility anxiety affects the quality of life and causes emotional burnout (Zhang & Hao, 2024).

There is also a relationship between fertility awareness and fertility anxiety. Fertility awareness can both decrease and increase fertility anxiety. Consciously having information about reproductive health can reduce anxiety by increasing individuals' sense of control (Maeda et al., 2016). On the other hand, having knowledge about fertility problems and being aware of these problems may increase anxiety for some individuals. In conclusion, the relationship between fertility awareness and fertility anxiety can be complex and multifaceted. Therefore, it is important for individuals to increase their knowledge on this issue and to receive professional support when necessary (Singh et al., 2023).

University students constitute an important group in terms of the development and change of society and shaping the future of the country. The attitudes of young people towards fertility and childbearing will form the basis for estimating the fertility rates of the country and determining population policies, and will guide the design of forward-looking plans and strategies for the development of the country.

Based on this, it was aimed to examine the interaction between fertility awareness and fertility anxiety in midwifery students and the effects of different variables on these concepts. In addition, it is thought that determining the fertility awareness of the students, who will be the mothers of the future, will make a significantcontribution to both themselves and the individuals around them in creating fertility awareness, preventing infertility and reducing its incidence.

Materials and Methods
Population and Sample of the Study: The population of the study, which was conducted in descriptive and correlational design, consisted of 340 students studying in the first, second, thirdand fourth grades of the Department of Midwifery at a public university in the 2023-2024 academic year. The minimum sample size was determined as 186 students with 95% confidence interval and 5% margin of

error with Raosoft sample size calculator. No sample selection was made in the study and 208 students who voluntarily participated in the study from 340 students constituted the sample of the study. The participation rate in the study was determined as 61.2%.

The research was started after obtaining ethics committee and institutional permission. Students who were actively studying in the midwifery department of the relevant public university and who were open to communication and co-operation constituted the inclusion criteria of the research. According to these criteria, the statements of the participants were taken as basis whilebeing included in the research.

Data Collection Tools: The data of the study were collected using the "Introductory Information Form" and "Fertility Awareness Scale (FAS)" created by the researchers.

Introductory Information Form: It was designed by the researchers by conducting literature research and taking expert opinion (Aydemir & Saricoban, 2023; Uwajenea et al., 2023). The form includes questions assessing the students' sociodemographic characteristics (age, education level, family type, income status, etc.) and fertility awareness and fertility anxiety levels.

Fertility Awareness Scale (FAS): It was developed by Ozsahin and Derya in 2022 to assess women's fertility awareness levels. The scale is scored with a five-point Likert scale and consists of 19 items. The scale has two sub-dimensions, "Physical Awareness" and "Cognitive Awareness". There are no reverse coded items in the scale and the total score that can be obtained from the scale varies between 19 and 95. The increase in the total score indicates that the fertility awareness levels of individuals increase. When evaluating the total score obtained from the FAS; if the total score obtained is between 19-43, awareness is scored as low level, ifthe total score is between 44-69, awareness is scored as medium level, and if the total score is between 70-95, awareness is scored as high level. Cronbach alpha internal consistency coefficient of the scale was determined as 0.88 (Ozsahin & Derya, 2022). For the sample of this study, Cronbach's alpha value was found to be 0.91.

Data Evaluation: The research data were evaluated in SPSS 16.0 (Statistical Package for Social Science) package programme. Frequency and percentage analyses were used to determine the descriptive characteristics of the women participating in the study, and mean and standard deviation statistics were used to examine the scales. The normality of data distributionwas checked by Kolmogorov-Smirnov test. Spearman correlation test was used to compare two continuous variables and Mann-Whitney U-test and Kruskal-Wallis tests were used to compare categorical variables with continuous variables. $P < 0.05$ was considered statistically significant.

Ethical Principles of the Research: Ethics committee approval was obtained from the Health Sciences University Hamidiye Scientific Research Ethics Committee (Date: 05.04.2024, Number: 27148). In all stages of the research, the "confidentiality principle" was complied with and the rules in the Declaration of Helsinki were followed. After the participants were informed about the study, their informed consent was obtained.

Results

It was determined that the mean age of the students participating in the study was 21.14 ± 2.39, 35.1% were 4th grade students, 95.7% were single and 66.8% of them had an income equal to their expenses. It was determined that 90.4% of the students spent most of their lives in the province, 62.5% stayed with their families during the education period and 73.1% graduated from Anatolian high school. Descriptive characteristics of the

midwifery students are summarized in Table 1.

The age at first menstruation was found to be 12.96±1.19 and the age at which they planned tohave a child was found to be 25.58±7.19. Within the scope of the study, they were asked to score their fertility anxiety levels between 1 and 10 (1 point: low anxiety; 10: high anxiety) and the mean score was calculated as 4.36±2.09 (Table 2).

The students stated that 9.6% of them had a family member diagnosed with infertility and 69.7% of them knew the current treatment approaches for infertility treatment. It was found that 38.9% of the students knew the tests to determine the ovarian reserve capacity, 1% of them had a test to determine the ovarian reserve capacity and 41.3% of them considered themselves at risk for fertility (Table 2).

It was determined that 63.5% of the students would perform egg donation, 52.9% would adopt, 51% would marry early, 34.1% would perform embryo donation and 24% would accept the situation due to their belief in fate (Table 3).

The participants' Fertility Awareness Scale total scores were 65.23±14.55 (range: 19-94), Physical Awareness subscale totals were 37.81±8.82 (range: 10-50), and Cognitive Awareness subscale totals were 27.41±6.85 (range: 9-44).

It was determined that the variables of income status, presence of infertile individuals in the family, and knowledge of current treatment approaches in infertility treatment had a significanteffect on the mean scores of the FAS (Table 4). It was also determined that the variables of class, income status and knowledge of current treatmentapproaches in infertility treatment had a significant effect on the mean Physical Awareness sub-dimension score. In addition, it was found that the variables of class and the presence of infertile individuals in the family significantly affected the mean score of the Cognitive Awareness sub-dimension (p<0.05) (Table 4). There was no statistically significant difference (p>0.05) between the mean scale scores and the variables of marital status, knowledge of tests for determination of ovarian reserve capacity and self-perception of being at risk for fertility (Table 4).

It was found that there was a positive, weakly significant relationship between the fertility anxiety levels of the students and the FAS scale scores (r=0.138; p=0.040).

Table 1. Descriptive Characteristics of Midwifery Students (n=208)

	X̄±SD	Min.	Max.
Age	21.14±2.39	18	36
		n	**%**
Classroom	**1st Class**	41	19.7
	2nd Class	52	25
	3rd Class	42	20.2

	4th Class	73	35.1
Marital status	**Married**	9	4.3
	Single	199	95.7
Income status	**Income less than expenses**	47	22.6
	Income equals expenses	139	66.8
	Income more than expenses	22	10.6
The place where he spent most of his life	**Village**	9	4.3
	Town	11	5.3
	Province	188	90.4
Place of stay during the study period	**Together with the family**	130	62.5
	At home	62	29.8
	Private House	16	7.7
Graduated high schooltype	**Anatolian High School**	152	73.1
	Other*	56	26.9

*Health High School, Science High School, Imam Hatip High School

Table 2. Findings of the students about their fertility (n=208)

	$\overline{X}\pm SD$	Min.	Max.
Age at Menarche	12.96±1.19	10	17
Fertility anxiety level	4.36±2.09	1	9
Age at which she plans to have achild	25.58±7.19	21	35
		n	**%**
Presence of a family member diagnosed with infertility	**Yes**	20	9.6
	No	188	90.4
To know the current treatment approaches in infertility treatment	**Yes**	145	69.7
	No	63	30.3

To know the tests for the determination of ovarian reserve capacity	Yes	81	38.9
	No	127	61.1
Test to assess ovarian reserve	Yes	2	1
	No	206	99
Perceiving oneself at risk in terms offertility	Yes	32	15.4
	No	88	41.3
	Partially	88	41.3

Table 3. Students' solution approaches in case of insufficient overcapacity

*When faced with the problem of infertility	n	%
I'd do an egg donation.	132	63.5
I'd adopt a child to have a child.	110	52.9
I'll get married early and have children.	106	51
I'd perform embryo donation.	71	34.1
I would have accepted the situation because of my belief in fate.	50	24

*More than one answer was given.

Table 4. Comparison of the mean total and subscores of the Fertility Awareness Scale according to some characteristics of the students

		Physical Awareness	Cognitive Awareness	Scale Total
Classroom	[a]1st Class	33.19+9.75	25.41+7.48	58.60+16.58
	[b]2nd Class	36.86+9.49	27.42+6.90	64.28+15.48
	[c]3rd Class	39.73+6.92	27.88+7.66	67.61+13.36
	[d]4th Class	39.98+7.75	28.26+5.78	68.24+12.09
		KW: 8.644 p: 0.034 c>a ; d>a	KW: 15.862 p: 0.001	KW: 3.724 p: 0.293

Marital status	Married	40.33+7.43	29.00+4.79	69.33+11.59
	Single	37.70+8.88	27.34+6.92	65.04+14.66
		U: -0.850	U: -0.672	U: -1.062
		p: 0.395	p: 0.502	p: 0.288
Income status	[a]Income less than expenses	34.00+9.21	25.40+6.55	59.40+14.82
	[b]Income equals expenses	39.43+7.64	28.27+6.72	67.70+1.04
	[c]Income more thanexpenses	35.77+11.96	26.27+7.50	62.04+19.00
		KW: 13.500 **p: 0.001** **b>a**	**KW: 6.989** **p: 0.030**	**KW: 12.433** **p: 0.002** **b>a**
Presence of a family member diagnosed with infertility	Yes	38.04+9.03	27.79+6.94	65.84+14.82
	No	35.65+6.31	23.85+4.73	59.50+10.26
		U: -1.947 p: 0.052	**U: -2.904** **p: 0.004**	**U: -2.772** **p: 0.006**
To know the current treatment approaches in infertility treatment	Yes	39.24+7.81	27.73+6.47	66.98+12.93
	No	34.52+10.10	26.66+7.64	61.19+17.16
		U: -3.034 **p: 0.002**	U: -0.738 p: 0.460	**U: -1.967** **p: 0.049**
To know the tests for the determination of ovarian reserve capacity	Yes	39.28+6.81	28.17+6.45	67.45+11.98
	No	36.88+9.80	26.92+7.07	63.81+15.85
		U: -1.171 p: 0.242	U: -0.992 p: 0.321	U: -0.898 p: 0.369
Perceiving oneself at risk in terms of fertility	Yes	41.65+6.37	28.00+4.31	66.65+9.26
	No	36.51+9.34	27.39+7.31	63.90+15.74
	Partially	37.72+8.73	27.21+7.16	64.94+14.70

	KW: 5.920	KW: 0.319	KW: 2.990
	p: 0.052	p: 0.852	p: 0.224

U:Mann Whitney U Test, **KW:** Kruskal Wallis Test

Discussion

This study was conducted to evaluate the fertility awareness and fertility anxiety levels of midwifery students. Women's active role in education and business sectors, their desire to advance their careers and establish stable relationships cause delay in the age of first pregnancy. Delaying the gestational age brings reproductive problems (Bavan et al., 2011). In order to maximise fertility outcomes and minimise complications, it is very important to improve women's fertility awareness. In the study conducted by Mahey et al. in India, it was found that85% of women were not aware of their ovulation cycles and had low fertility knowledge (Mahey et al., 2018). In a study conducted in Uganda to determine the fertility awareness of university students, it was determined that students' fertility awareness levels were low (Byamugisha et al., 2006). In the study conducted by Hasbek & Daglar, women's Fertility Awareness Scale total scores were found to be 64.17±11.63 at a moderate level (Hasbek & Daglar, 2024). In the study conducted by Ozsahin in 2020, women's Fertility Awareness Scale total scores were determined as 57.59±12.36 at a moderate level (Ozsahin, 2020). Similar to theliterature, the Fertility Awareness Scale total scores of the participants in this study were found to be at a moderate level as 65.23±14.55 (range: 19-94). The reason for this situation is thoughtto be the inclusion of first and second year students in our study population. It was found that the fertility awareness levels of third and fourth year students, where midwifery education is concentrated, were higher.

Age is among the important factors affecting fertility in men and women. Postponement of theage of marriage due to many factors such as education and career planning leads to advancement in the age of childbearing (Bosdou et al., 2016). In men, there is a decrease in semen parameters and sperm motility after the age of 35, and in women, ovum quality/number decreases in parallel with advancing age, fecundability starts to decrease at the age of 30 and this decrease accelerates after the age of 35 (Hammarberg et al., 2013; Hart, 2016). There are studies in the literature stating that university students have misperceptions that they have a high chance of having children at an advanced age (Conceição et al., 2017; Shin et al., 2020). In the study conducted by Tyden and colleagues, it was determined that students were not concerned about having children at an advanced age (Tyden et al., 2006). In the study conducted by Akhondi et al. among graduate students, it was found that 41% of the students planned to have their first child between the ages of 30-34 and 46.7% planned to have their last child between the ages of35-39 (Akhondi et al., 2023). In the study conducted by Peterson et al. it was found that 19% of women wanted to have their first child between the ages of 30 and 34 (Peterson et al., 2012). Similarly, in the study conducted by Lampic and colleagues, it was determined that the time when 30% of women wanted their first pregnancy coincided with the age when their fertility started to decrease (30-34) (Lampic et al., 2006). Our study findings differ from the literature. In our study, the age at which midwifery students planned to have a child was found to be 25.58±7.19. It is thought that the reason for this situation is that our sample consists of midwifery students and the inclusion of fertility-related topics in the content of vocational courses positively affects the fertility planning age of the students. At the same time, the population of the study consisted of students belonging to Turkish culture. In Turkish culture, which is patriarchal, motherhood is considered sacred, fertility increases the status of women and motherhood increases the approval and acceptance of women in terms of gender roles in society and the encouragement of family establishment as a result of traditional

teachings can be seen as the reason why students want to have children at an earlier age compared to individuals in other countries.

In the last decade, the improvement of In Vitro Fertilisation (IVF) protocols and developments in assisted reproductive technologies in parallel with advancing technology have enabled infertile couples to have children at advanced ages (Meissner et al., 2016). However, despite the progress in treatment protocols, many external factors such as age, lifestyle (smoking, alcohol use, etc.), and the high cost of assisted reproductive treatments may prevent individuals from having children (Carson & Kallen, 2021). In studies determining the level of knowledge of university students about fertility awareness in the literature, it was determined that students had a significant lack of awareness about fertility problems and factors affecting them. Similarly,in the same studies, it was found that students had limited knowledge about assisted reproductive technologies (Hickman et al., 2018; Rovei et al., 2010; Sorensen et al., 2016). In the study conducted by Ekelin et al. among Swedish high school students, female students stated that they would try in vitro fertilisation, adopt and avoid having children, respectively, if they had fertility problems in the future (Ekelin et al., 2012). In the study conducted by Peterson et al. it was found that women would prefer in vitro fertilisation method as the first choice in case of infertility problems (Peterson et al., 2012). Similarly, in a study conducted with 166 female and male undergraduate students enrolled in five universities, it was determined that IVF was the first method that students would prefer in case of fertility problems (Shin et al., 2020). Whenthe current study data are evaluated, it is seen that the majority of individuals have a low level of awareness about innovative assisted reproductive technologies. In the study conducted by Nouri et al., it was found that other students had low awareness of assisted reproductive technologies compared to medical students. In the same study, it was found that medicalstudents had a positive attitude towards using assisted reproductive technologies compared to other students (Nouri et al., 2014). In the study conducted by Hickman et al. with graduate and medical

school internship students, it was found that 92% of the students knew egg donation, 61% embryo donation and 12% ovarian tissue cryopreservation methods as a solution approach in case of fertility problems (Hickman et al., 2018). In our study, it was determined that 63.5% of the students would perform egg donation, 52.9% would adopt, 51% would marry early, 34.1%would perform embryo donation, and 24% would accept the situation due to their belief in fate. 69.7% of the students stated that they knew the current treatment approaches in infertility treatment. It was determined that the fertility awareness level of midwives who stated that they knew the current treatment approaches in infertility treatment was significantly higher. The reason for this situation is thought to be that our population consists of midwifery students and the subject of innovative practices in the field of reproductive health is included in the education curriculum. The high level of awareness of current infertility treatment methods in studies conducted in medical faculty students in the literature supports this view (Nouri et al., 2014; Hickman et al., 2018).

Women's fertility awareness and infertility method preferences are affected by many factors such as age at marriage, education level and economic status (Beekle & McCabe, 2006; Salari et al., 2017). In the study conducted by Ozsahin & Altiparmak, when the total and sub- dimension averages of women's FAS were evaluated according to their economic status; it wasfound that the fertility awareness levels of individuals with low and medium economic status were higher compared to individuals with high economic status (Ozsahin & Altiparmak, 2021).In the study conducted by Mahey et al. with 205 women, it was found that women with socio-economic status in the middle and upper class had higher fertility awareness levels (Mahey et al., 2018). Our study findings are similar to the literature. It was determined that the income status variable significantly affected the fertility awareness level. It was found that individualswith income equal to expenses had higher fertility awareness levels compared to individuals with low income. The reason for this situation is that with the increase in socioeconomic   level,   individuals'   easier

access to mass media may contribute positively to their awareness levels. Today, individuals' access to information has become much easier with web-based applications.

Limitations and Strengths of the Research: The results of this study will be an important data source in terms of determining the fertility awareness and fertility anxiety levels of midwifery students in Turkey and the factors affecting them. In addition, it will contribute to the literature in terms of planning education and creating educational content according to the results obtained from the research data. However, the results of the study are limited to the population of midwifery students of a public university.

Conclusions and Recommendatıons: In line with our study findings, it was determined that the fertility awareness levels of midwifery students were at a moderate level. It was determined that the fertility awareness levels of the students who knew the current treatment approaches about infertility were higher. In this direction, it has been determined that education increases the awareness on this subject, and the development of educational content for infertility and current treatment methods in undergraduate education will contribute positively to the professional development of midwifery students who will provide counselling in the future as well as increasing the individual awareness levels of students. However, it is recommended to conduct similar studieson women who do not receive midwifery or health education and to plan various training programmes related to fertility awareness suitable for the general population according to the results obtained.

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