Original Article

The Effect of the Infertility Elective Module on Attitudes and Knowledge in Nursing Students: A Quasi-Experimental Study

Semra Yilmaz
Adiyaman University, Faculty of Health Sciences, Department of Nursing, Adiyaman, Turkiye

Correspondence: Adiyaman University, Faculty of Health Sciences, Department of Nursing, Adiyaman, Turkiye. E-mail: smr_bydk02@hotmail.com

Abstract
Infertility is one of the most important problems of our age. Nursing is a profession that is in direct contact with infertile individuals at all stages of infertility. The study was conducted to determine the effectiveness of the infertility Module given to nursing students. The study has a single group pre-test-post-test quasi-experimental research design. The study sample consisted of 38 third-year nursing students studying at the Faculty of Health Sciences of a university in Turkey. Within the scope of the infertility Module given in the spring semester, a theoretical training program of 2 hours per week was used for 14 weeks and active teaching methods such as lecture, question and answer, discussion, illustration, literature review and visualization were used. Data were collected using the Student Introduction Form, Attitudes Towards Infertility Scale (ATIS) and Infertility Knowledge Test (IKT).Data were evaluated with descriptive statistics and related sample t-test in dependent groups. The results showed that the post-test scores were significantly higher than the pre-test scores Attitudes Toward Infertility Scale (ATIS) and Infertility Knowledge Test (IKT) Average Scores of the students participating in the research ($p < 0.05$). It was concluded that the Infertility Module given to nursing students changed their attitudes towards infertility and increased their knowledge levels. It is thought that including the Infertility Module in the curriculum of the nursing department will increase the level of knowledge about infertility among students and contribute positively to the care processes for infertility in the nursing care process.

Key Words: Infertility; Module; Nursing Care; Nursing Students.

Introduction

The World Health Organization defines infertility as "a reproductive system disease defined by the inability to achieve clinical pregnancy after 12 months or more of regular unprotected sexual intercourse." Infertility is a major health problem globally (Mascarenhas et al, 2012; World Health Organization). Infertility means that approximately one in six people of reproductive age will have problems achieving pregnancy during their lifetime, and is estimated to affect 8 to 12% of couples. It is also stated that there were 48.5 million infertile couples worldwide in 2010. As a matter of fact, infertility is a condition that affects millions of people and has an impact on the family and society.

According to Turkey Demographic and Health Survey data, the rate of married women between the ages of 15-49 in Turkey who have never had children and who stated that it is not possible to have children was 3.9% in 2008, and was found to be 11.2% in 2013 (Hacettepe University Institute of Population Studies, 2013). Infertility can be primary or secondary. Primary infertility is the failure to achieve any pregnancy, and secondary infertility is the achievement of at least one pregnancy before. Infertility can be caused by many different factors in the male or female reproductive systems. However, sometimes it is not possible to explain the causes of infertility. Factors affecting fertility in both genders are hypogonadotropic hypogonadism,

hyperprolactinemia, ciliary dysfunction, cystic fibrosis, infections, systemic diseases and lifestyle-related factors/diseases (Flyckt and Falcone, 2019; Inhorn and Patrizio, 2015; Vander and Wyns, 2018; Siyez et al., 2018(b).

Causes of infertility in the female reproductive system include untreated sexually transmitted infections, unsafe abortion, postpartum sepsis, tube disorders such as blocked fallopian tubes caused by complications of abdominal/pelvic surgery, endometriosis, congenital uterine anomalies, polycystic ovary syndrome, endocrine disorders causing reproductive hormone imbalance. system disorders, pituitary cancers and hypopituitarism (Soderbeg et al., 2013; Siyez et al., 2018; Cakir et al., 2020).

The causes of infertility in the male reproductive system include reproductive system obstructions, dysfunctions in the excretion of semen, injuries, blockages and effects in the genital system, abnormalities in the hormones produced by the pituitary gland, hypothalamus and testicles, hormonal disorders, pituitary or testicular cancers. Lifestyle factors such as smoking, excessive alcohol consumption and obesity can affect fertility. Additionally, exposure to environmental pollutants and toxins can be directly toxic to gametes, causing the number of gametes to decrease and their quality to decrease (Alaee et al., 2016; Atijosan et al., 2019).

Women's postponement of fertility until later ages, the existence of fertility problems that may develop with age, and the development of new diagnostic and treatment opportunities in the field of infertility with technology have enabled major changes and developments in the diagnosis and treatment process of infertility. Therefore, these changes; The development and widespread use of assisted reproductive techniques, the differentiation of demographic characteristics of the society, and the decision of couples to have babies at older ages have made it necessary to raise awareness and inform the society about infertility and its treatments (Peterson et al., 2012; Ozdemir and Kaplan, 2021; Ozturk et al., 2020).

In Turkiye, different health professionals provide care to couples experiencing infertility problems. As a matter of fact, nurses are a professional group that provides care to couples experiencing infertility problems. Therefore, determining the attitudes of nursing students who will practice the nursing profession regarding infertility and increasing their level of knowledge while providing care will positively affect their attitudes and behaviors towards individuals experiencing infertility problems. Therefore, allocating more time to infertility-related issues in the nursing profession curriculum is an important issue that should be taken into consideration so that nursing students can provide better care to individuals experiencing infertility problems (Jang, 2017; Singh and Rahman, 2022).

The aim of this research is to determine the effectiveness of the infertility Module given as an elective Module to 3rd year nursing students and the relationship between the students' attitudes towards infertility after the infertility Module.

Hypotheses of the research:

Hypothesis (H_0)

The Infertility Module does not affect nursing students' attitudes and knowledge levels towards infertility.

Hypothesis (H_1)

Infertility Module affects nursing students' attitudes and knowledge levels towards infertility.

Material Method

Research Type: The rstudy was conducted quasi-experimentally with a single group pre-test-post-test design.

Population and Sample of the Research: The population of the research consisted of third-year students of Adiyaman University, Faculty of Health Sciences,

Department of Nursing. Since all students who chose the Infertility Module will be included in the research, sampling method was not used. The sample of the research consisted of 38 third-year nursing students.

The criteria for inclusion in the study are agreeing to participate in the research, being a third-year nursing student, and attending classes at least 70% of the time. Exclusion criteria from the study are wanting to withdraw from the research and not filling out any of the pre-test or post-test forms. It was stated to the students who participated in the study that they could stop participating in the research whenever they wanted.

Data Collection Tools: In this study, as a data collection tool; Student Introduction Form, Attitude Towards Infertility Scale (ATIS) and Infertility Knowledge Test (IKT) were used.

Student Introduction Form: The Student Introduction Form includes questions about age, gender, Living place, Economical situation, Wanting to have children, Infertile individuals in the family or close relatives, Obtaining information about infertility.

Attitudes Towards Infertility Scale (ATIS): The Turkish validity and reliability of the scale developed by Soderberg et al., in 2013 was evaluated by Siyez et al. It was conducted by in 2018 (Soderberg et al., 2013; Siyez et al., 2018). The scale is a 5-point Likert type scale consisting of 12 questions and is evaluated with strongly disagree (1), disagree (2), undecided(3), agree (4) and strongly agree (5) points. Items 1, 2, 5, 6, 8, 9, 11 and 12 in the scale are scored reversely and the highest score on the scale is 60 and the lowest score is 12. Increasing scores from the scale indicate that the level of knowledge about infertility is high and that there is a positive attitude towards infertility. In the validity and reliability study conducted by Siyez et al. in 2018, the Cronbach's Alpha reliability coefficient was determined as 0.85 Cakir et al., 2020). In this study, the Cronbach's alpha reliability coefficient obtained from the pre-test of the scale was found to be 0.83.

Infertility Knowledge Test (IKT): It was developed by Siyez et al. in 2018. It consists of 33 items in total. The test consists of 33 items and the answer format of the test is arranged as (True), (False) and (I don't know). In the test, items 2, 3, 14,17, 18, 19, 20, 22, 23, 24, 25, 27 and 32 were coded reversely, and the other items were coded straight. Participants receive points for each correct answer in the test. The lowest score to be obtained from the test is 12 and the highest score is 33. A high score from the test indicates that their level of knowledge about infertility is high. In the study conducted by Siyez et al., the IBT reliability coefficient was found to be 0.77 (Siyez et al., 2018; Cakir et al., 2020). In this study, the Cronbach's alpha reliability coefficient obtained from the pre-test of the scale was found to be 0.86.

Data collecting: The research consisted of 38 third-year nursing students who agreed to participate in the study. The data collection of the research was carried out with third-year nursing students within the scope of face-to-face education in the spring semester of the 2023-2024 academic year and the elective infertility Module (theoretical 2 hours/week) conducted in the classroom between 4.03.2024 and 14.06.2024.

Data Collection Process: After the students were first informed about the research, the student information form, ATIS and IKT were applied to those who volunteered to participate in the study. Pre-test measurements will be collected face-to-face with the Student Introduction Form, ATIS and IKT before the first infertility Module. Following the pre-test, "Infertility" Module training was given for 14 weeks. Immediately after the completion of the Module, at the end of the Module period, 1 week after the last day of the Module e, post-test data with ATIS and IKT were collected face-to-face through students' self-reports. Pre-test and post-test measurements were applied to both groups

simultaneously and with the same measurement tools.

Infertility Module Procedure: The nursing department of the university where the study was conducted uses the classical education system. The Infertility Module in the nursing department is an elective Module in the spring semester of the 3rd year and is taught as a theoretical Module for 2 hours per week. The aim of this Module is to provide students with information on diagnosis, evaluation and treatment methods for couples experiencing infertility or using assisted reproductive techniques. The Module content includes topics such as anatomy and physiology of the reproductive system, infertility problem, prevalence, risk factors, causes, psychosocial effects of infertility on couples, evaluation of couples experiencing infertility, treatment approaches in infertility, nursing approach in the treatment process of couples experiencing infertility, assisted reproductive techniques, ethical issues in infertility treatment, and counseling of couples experiencing infertility education, support and counseling are included. Active teaching methods such as lecture, question-answer, discussion, exemplification and counseling were used as teaching methods and activities in the Infertility Module education program. The Module recordings were shared with students at the end of each Module so that they could listen to the Module when they wanted to repeat it. Students are required to attend at least 70% of the theoretical Module. Students who did not attend more than 30% of the Module were not included in the study. The Infertility Module aimed to inform nursing students about infertility and to increase their awareness of infertility.

Data analysis: The data will be evaluated with descriptive statistics (number, percentage, mean, standard deviation) and related sample t-test in dependent groups in IBM SPSS Statistics 23.0 program. Statistical significance level was taken as $p<0.05$.

Ethical Dimension of Research: Permission will be obtained from Adiyaman University Social and Human Sciences Ethics Committee to collect data in the research. It was carried out with the necessary permission from the Nursing Department of the Faculty of Health Sciences. The purpose and method of the research, and that participation was voluntary, were explained to the students verbally and in writing, and their consent was obtained. Students were informed that their information would remain confidential and be used only for scientific purposes.

Results

The average age of the students participating in the study is 21.42±1.0 (minimum 21-maximum 25). It was determined that 76.3% of the students were female, 55.3% were in the city center, and 57.9% were in medium/bad economic status. It was determined that 86.8% of the students participating in the study wanted to have children in the future, 34.2% had infertile individuals in their family or close relatives, and 65.8% did not receive information about infertility (Table 1).

It was determined that there was a statistically significant difference between the Pretest-Posttest Attitude towards Infertility Scale (ATIS) and Infertility Knowledge Test (IKT) Average Score of the students participating in the study (Table 2; $p<0.05$).

Comparison of the Descriptive Characteristics of the Students Participating in the Research and the Attitude Towards Infertility Scale (ATIS) Score Averages are given in Table 3. It was determined that there was a significant relationship between the place where the students lived, their economic status and their desire to have children, and their post-test Attitude Towards Infertility Scale (ATIS) score average (Table 3, $p<0.05$).

Comparison of the descriptive characteristics of the students participating in the research and their infertility

knowledge test (IKT) score averages are given in Table 4. It was determined that the post-test Infertility Knowledge Test (IKT) score average of the students increased compared to the pre-test and the students' knowledge level about infertility increased ($p<0.05$). Additionally, it was determined that there was a significant relationship between the students' characteristics of wanting to have children and their average Infertility Knowledge Test (IBT) scores (Table 4; $p<0.05$).

Table 1. Descriptive Characteristics of the Students Participating in the Research (n=38)

	n	%
Age (X ±SD, Years)	21.42±1.0	
Gender		
Man	29	76.3
Women	9	23.7
Living place		
Village/District	17	44.4
Centre	21	55.6
Economical situation		
Good	15	39.5
Fair/Poor	23	60.5
Wanting to have children		
Yes	33	86.8
No	5	13.2
Infertile individuals in the family or close relatives		
Yes	13	34.2
No	24	63.2
Obtaining information about infertility		
Yes	13	34.2
No	25	65.8

Table 2. Comparison of Students' Pre-Test-Post-Test Attitude Towards Infertility Scale (ATIS) and Infertility Knowledge Test (IKT) Average Score

Scale (n=38)	Pretest X ±SD	Posttest X ±SD	Statistical Analysis*
Attitude Towards Infertility Scale (ATIS)	43.55±6.6	45.73±5.3	t=-2.336 **p=0.000**
Infertility Knowledge Test (IKT)	16.71±6.6	20.00±4.4	t=-8.069 **p=0.000**

t: Paired Samples t-test

Table 3. Comparison of the Descriptive Characteristics of the Students Participating in the Research and the Average Scores of the Attitude Towards Infertility Scale (ATIS)

	ATIS Pretest X ±SD	ATIS Posttest X ±SD	Statistical Analysis*
Age	43.55+6.6	45.73+5.3	t=4.482 p=0.062
Gender			
Man	44.48±5.3	46.37±4.8	t=1.354
Women	40.55±9.5	43.66±6.4	p=0.184
Living place			
Village/District	42.20±3.0	48.6±6.1	t=-2.336
Centre	43.66±7.2	45.73±5.3	**p=0.025**
Economical situation			
Good	45.20±4.9	44.93±5.2	t=3.498
Fair/Poor	33.45±5.8	46.77±4.9	**p=0.012**
Wanting to have children			
Yes	43.60±6.8	45.93±5.4	t=1.356
No	43.20±5.5	44.40±4.9	**p=0.017**
Infertile individuals in the family or close relatives			t=4.954
Yes	43.70±4.5	45.76±4.8	p=0.725
No	43.33±7.7	45.45±5.5	

Obtaining information about infertility			
Yes	45.69±5.2	47.76±5.3	t=9.588 p=0.962
No	42.40±7.0	44.68±5.0	

*t: Paired Samples t-test

Table 4. Comparison of Descriptive Characteristics of Students Participating in the Research and Infertility Knowledge Test (IKT) Score Averages

IKT	IKT Pretest X ±SD	IKT Posttest X ±SD	Statistical Analysis*
Age	16.71±6.6	20.00±4.4	t=1.987 p=0.054
Gender			
Man	17.68±5.6	19.48±4.7	t=1.661
Women	13.55±8.8	21.6±2.44	p=0.058
Living place			
Village/District	17.40±6.6	21.00±2.9	t=-0.051
Centre	17.56±5.4	20.02±5.3	p=0.876
Economical situation			
Good	17.26±6.6	19.33±5.3	t=-1.332
Fair/Poor	15.02±1.0	24.26±2.1	p=0.745
Wanting to have children			
Yes	15.87±6.7	20.42±3.3	t=-2.057
No	22.20±1.3	17.20±8.9	**p=0.009**
Infertile individuals in the family or close relatives			
Yes	17.07±7.2	21.23±2.3	t=1.164
No	16.20±6.4	19.45±5.1	p=0.214
Obtaining information about infertility			
Yes	20.50±2.1	22.00±2.8	t=1.989
No	16.50±6.7	19.88±4.4	p=0.744

* t: Paired Samples t-test

Discussion

Although infertility is a non-life-threatening condition, it is a health problem that affects individuals socially, culturally, psychologically and economically. Nurses and nursing students who will practice the nursing profession are the professional groups that are in most contact when caring for infertile individuals (Atijosan et al., 2019; Alaee et al., 2016). At the same time, it is important that they constitute the largest part of the healthcare team in terms of providing safe and quality nursing care. Therefore, recognition of infertility by nurses who care for infertile individuals has a significant impact on patient care. It is necessary to raise awareness of nursing students about infertility and increase their

knowledge levels during the nursing vocational education process (Siyez et al., 2018; Cakir et al., 2020; Karaca et al., 2017; Jang, 2017; Ozdemir and Kaplan, 2021). For this reason, this study contributes to the literature in terms of increasing the infertility perception, attitude and knowledge level of nursing students who are prospective nurses. Donmez and Emul emphasized that it is very important for nursing students to have sufficient knowledge about infertility and to develop their awareness, which will enable them to improve their skills in providing support and consultancy to infertile individuals (Donmez and Emul, 2021).

In research, a statistical significance was found between the students' living place and economic situation and the Attitude Towards Infertility Scale (ATIS). The mean post-test Attitude Towards Infertility Scale (ATIS) score was found to be statistically higher in nursing students with Fair/Poor economic status and living in Village/District. It has been determİned that theİr awareness about infertility has increased. This situation is thought to be due to the students' low awareness of accessing information about infertility and their having never met infertile couples (Table 3; $p<0.05$). In research, it was found that there was a significant increase in the mean scores of the Attitudes Towards Infertility Scale (ATIS) and infertility knowledge test (IKT) after the training compared to the pre-training (Table 3; $p<0.05$). There is a significant relationship between the students' their characteristics of wanting to have children and their Attitude Towards Infertility Scale (ATIS) Average Score (Table 3; $p<0.05$); It was determined that there was a significant relationship between the characteristics of wanting to have a child and the average Infertility Knowledge Test (IKT) scores (Table 4; $p<0.05$). In their study, Donmez and Emul found that among the students' average scores on the Infertility Knowledge Test according to whether they have children in the future; It was found that there was a statistically significant difference between the place of residence and the mean scores of the Attitude Towards Infertility Scale (Donmez and Emul, 2021). The research findings are similar to the findings of the study conducted by Donmez and Emul. In their study, Isbir and Ozan suggested that the use of some active learning techniques could be effective in helping nursing/midwifery students understand the infertility process and transform their knowledge into behavior, and that active learning techniques for infertility not only facilitate students in obtaining information but also develop an emotional and psychosocial perspective and attitude in students (Isbir and Ozan, 2018).

In research, it was determined that after the training, students developed positive attitudes towards infertility and their knowledge levels increased. In light of this result, "Hypothesis (H_1): Infertility Module affects nursing students' attitudes and knowledge levels towards infertility." His hypothesis was accepted. In their study, Singh and Rahman found that the level of knowledge about fertility among nursing students was low. It recommended that fertility-related topics be included in the education curriculum for nursing students (Isbir and Ozan, 2018). The research findings are similar to the findings of the study conducted by Singh and Rahman. Again, in the study conducted by Safarisi et al., it was stated that infertility Module education was suitable for use as a complementary method in student teaching (Safari et al., 2020).

Limitations of the study: The study's limitation is that the sample size is small and it can only be generalized to the class where the infertility education model is applied.

Conclusion: The nursing profession is one of the professional groups that primarily provides care to infertile couples. As a matter of fact, in order to determine the attitudes of nursing students about infertility while providing care and to increase their

knowledge levels, it is important to allocate more time in the curriculum of the infertility Module during the theoretical training of the students. With these trainings, students will contribute to increasing and maintaining their skills in providing support and care to infertile individuals. As a matter of fact, it is important to integrate the "Infertility" Module into the nursing undergraduate curriculum in a more detailed and up-to-date manner in order to positively develop parameters such as knowledge, opinions, behavior and attitudes regarding Infertility in nursing students. Therefore, infertility training will enable students, the nurses of the future, to provide support and consultancy to infertile individuals, while being able to solve and develop problems related to lack and pollution of attitudes and knowledge about infertility, as well as to guide, support and care for infertile individuals more accurately.

Acknowledgements: I would like to express my sincere gratitude to all the students who agreed to participate in the research.

References

Alaee, S., Talaiekhozani, A., Ziaei, G. R., Lohrasbi, P. (2016). Evaluation of Iranian College Students' awareness about ınfertility risk factors. Jundishapur Journal of Health Science, 8(2), e60321.

Atijosan, A., Adeyeye, O., Ogungbayi, O. (2019). Knowledge and Perception Regarding Infertility among University Students in Ile-Ife: A view through Gender Lens. Covenant Journal of Business & Social Sciences, 10(1), 1-14.

Cakir, D., Daglar, G., & Bilgic, D. (2020). Determination of the attitudes of senior midwifery and nursing students towardsinfertility. Balikesir Journal of Health Sciences, 9(2), 109-114.

Donmez, C., & Emul, T. G. (2021). The knowledge and attitudes of nursing students infertility and determination of factors affecting these variables. Ordu University Journal of Nursing Studies, 4(3), 375-381.

Flyckt, R. & Falcone, T. (2019). Infertility: A practical framework. Cleve Clin J Med, 86(7), 473-482.

Hacettepe University Institute of Population Studies, 2013. (2014). Türkiye Population and Health Survey. Ankara, Hacettepe University Population Studies Institute. Date of access: 12.02.2024.

Inhorn, M. C. & Patrizio, P. (2015). Infertility around the globe: new thinking on gender, reproductive technologies and global movements in the 21st century. Human reproduction update, 21(4), 411-426.

Isbir, G. G., & Ozan, Y. D. (2018). Nursing and midwifery students' experiences with the course of infertility and assisted reproductive techniques: A focus group study from Turkey. Nurse education in practice, 28, 235-241.

Jang, S. (2017). Subjectivity for infertility of nursing students. International Journal of Advanced Nursing Education and Research, 2(1), 91-96.

Karaca, A., Ozkan, F. S., & Gulen, H. S. (2017). Perceptions of infertility in Turkish nursing students. Turkish Clinics Journal of Nursing Sciences, 9(1), 51-60.

Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA. National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. PLoS Med. 2012;9:e1001356.

Ozdemir, E. and Kaplan, S. (2021). Infertility and Nursing Approach. Turkish Journal of Health Sciences and Research, 4(1), 79-89.).

Ozturk, B., Siyez, D. M., Esen, E. ve Kagnici, Y. (2020). Effects of infertility prevention programme on college students. Sex Education, 20(5), 517-534.

Peterson, B. D., Pirritano, M., Tucker, L., Lampic, C. (2012). Fertility awareness and parenting attitudes among American male and female undergraduate university students. Human Reproduction, 27(5), 1375-1382.

Safari, M., Yazdanpanah, B., & Hatamipour, S. (2020). Learning outcomes and perceptions of midwifery students about peer-teaching and lecture method in gynecology and infertility course. Journal of Pedagogical Research, 4(3), 291-298.

Soderbeg, M., Lundgren, I., Christensson, K., Hildingsson, I. (2013). Attitudes toward fertility and childbearing scale: an assessment of a new instrument for women who are not yet nothers in Sweden. BMC Pregnancy Childbirth, 13, 197-204.

Siyez, D. M., Esen, E., Baran, B., Seymenler, S., Kagnici, D. Y., Siyez, E. (2018b). Development of the Attitude toward Infertility Scale (ATIS): validity and reliability study. Cukurova Medical Journal, 43, 173-180.

Siyez, D. M., Seymenler, S., Esen, E., Siyez, E., Kagnici, Y., Baran, B. ve Ozturk, B. (2018). Investigating knowledge levels of university students about infertility. Turkish Journal of Urology, 44(2), 153.

Singh, K., & Rahman, H. (2022). Fertility Awareness, Knowledge, Attitude, and Practices among Nursing Students of a Tertiary Care Hospital of East Sikkim. Journal of South Asian Federation of Obstetrics and Gynaecology, 14(4), 404-409.

Vander Borght, M., & Wyns, C. (2018). Fertility and infertility: Definition and epidemiology. Clinical biochemistry, 62, 2-10.

World Health Organization. Reproductive Health and Research. Reproductive health indicators: guidelines for their generation, interpretation and analysis for global monitoring. World Health Organization; 2006. Date of access: 12.02.2024.