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Abstract

Purpose: This study aims to identify the knowledge levels and attitudes of faculty of health sciences students towards social oocyte cryopreservation and donation.

Materials and Methods: This descriptive study was conducted with 667 university students. The study data were collected by using Google Forms.

Findings: The mean age of the participants who agreed to participate in the study was 21.3 ± 2.7 years. 34.3% of the participants stated that they had information about oocyte donation. 51.0% of the participants had positive attitudes towards oocyte donation. 74.5% of the participants reported that they had information about surrogate motherhood. The participants stated that oocyte cryopreservation can be performed mostly by those who will receive cancer/chemotherapy treatment with 30.9%. 82.5% of the participants stated that the most appropriate fertility age is between 25-29 years.

Result: The results of this study identified the students' knowledge levels and attitudes toward social oocyte cryopreservation, donation and fertility. The participants emphasise that the healthcare staff should be involved in debating these issues and finding solutions, especially in order to provide accurate information about the technical possibilities of social oocyte cryopreservation and donation, which are new and current in our country, to preserve both fertility, and ultimately delay childbearing.

Keywords: student; social oocyte cryopreservation; oocyte donation; knowledge; attitude

Özet

Amaç: Bu araştırmanın amacı, sağlık bilimleri fakültesi öğrencilerinin sosyal yumurta dondurma ve yumurta donasyonu konusundaki bilgi ve tutumlarının belirlenmesidir.

Yöntem: Araştırma tanımlayıcı tipte olup bir üniversitede öğrenim gören 667 öğrenci ile tamamlanmıştır. Araştırma verileri Google anket yöntemi ile toplanmıştır.

Bulgular: Araştırmaya katılmayı kabul eden öğrencilerin "yaş" ortalaması $21,3 \pm 2,7$ olarak saptanmıştır. Öğrencilerin %34,3'ü yumurta donasyonu hakkında bilgi sahibi olduğunu ifade etmiştir. Öğrencilerin %51,0'ı yumurta donasyonuna olumlu bakmaktadır. Öğrencilerin %74,5'i taşıyıcı annelik hakkında bilgi sahibi olduğunu, ifade etmiştir. Öğrenciler yumurta dondurma işleminin en çok %30,9 ile kanser/kemoterapi tedavisi alacak olanların yapabileceği görüşüne yer vermişlerdir. Öğrencilerin %82,5'i en uygun doğurganlık yaşının 25-29 yaş aralığı olduğunu ifade etmişlerdir.

Sonuç: Bu araştırma öğrencilerin sosyal yumurta dondurma, donasyon ve doğurganlık hakkındaki düşüncelerini ortaya koymuştur. Özellikle ülkemizde yeni ve güncel olan sosyal dondurma ve donasyon ile ilgili konuların hem fertilité hem de doğurganlığı korumaya yönelik teknik olanaklar hakkında doğru bilgi vermek ve nihayetinde çocuk doğurmayı ertelemek için sağlık camiasının bu soruları tartışmaya ve cevaplamaya dahil olması gerektiğini vurgulamaktadırlar.

Anahtar Sözcükler: öğrenci; sosyal yumurta dondurma; yumurta donasyonu; bilgi; tutum

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Introduction

The field of fertility preservation has developed over the last two decades, but there is limited data on its consequences. Today, an increasing number of women choose to postpone childbearing for various social reasons. Social oocyte cryopreservation allows women to preserve their fertility in anticipation of age-related fertility decline and ineffective fertility treatments in later stages of life. Social oocyte cryopreservation is a controversial term used to describe the process during which oocyte or ovarian tissues are cryopreservation for non-medical reasons and used later. The terminology used is controversial. However, elective oocyte cryopreservation is the term preferred by most women. Social oocyte cryopreservation emphasizes the fact that women's reproductive choices are socially established. The other common terms are non-medical oocyte cryopreservation or oocyte cryopreservation for non-medical reasons. The decision to freeze oocytes to protect women against age-related fertility decline should be considered as a preventive medical treatment, which has led to the term "AGE banking" (oocyte banking for anticipated gamete depletion (1,2).

The reasons why women delay childbearing can be traced back to professional, personal, financial and/or psychological factors. The most common reason is failure to find a suitable partner to start a family. Other reasons include busy professional life, ongoing educational procedures, career development and strict workplace, and women's perception that becoming pregnant before the age of 35 may affect their career (1,3,4).

Social oocyte cryopreservation is allowed for healthy women aged 30-41 years as a solution to age-related infertility problems, which is considered an act of preventive medicine. In addition, this medical technology offers the women capable of childbearing the possibility to have genetic children when they are financially stable and sufficiently mature and emotionally supported (5,6).

Epidemiologic studies have shown that women who prefer elective oocyte cryopreservation are usually Caucasian, aged between 36 and 40 years, highly educated, professionally employed, and without romantic partners or spouses (1,3).

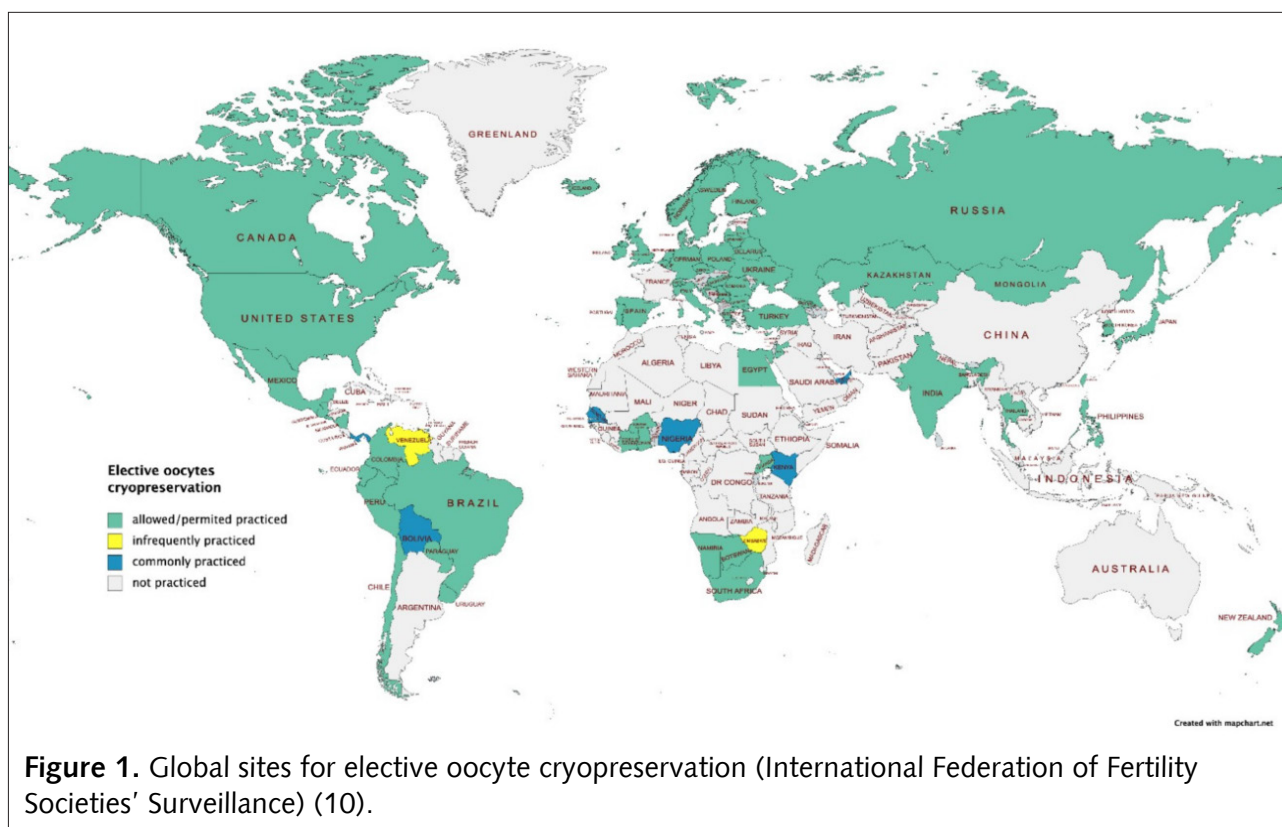
The reproductive period is more restrained for women than men. After turning the mid-thirties, women's fertility potential gradually dwindles, declining after the age of 35. The women's fertility continues to decline each year until menopause because the number and quality of primordial follicles of oocytes decreases, which is associated with a reduced chance of fertilization of oocytes, but increased risk of abnormal embryos and fetal loss (1,3,7).

Those women who prefer elective oocyte cryopreservation can consult a fertility preservation team consisting of an embryologist, a fertility specialist, and a psychologist or counselor (8). However, in order to make a robust decision, they must be informed about the risks, benefits and costs of the procedure, success rates, long-term consequences for physical health, psychological well-being, current known data on the health of children born from cryopreservation oocytes, the duration of storage of cryopreservation oocytes, and sign an informed consent form (2,5,9).

Since 2012, an increasing number of fertility centers worldwide have been providing elective oocyte cryopreservation to those women who want to maintain their reproductive potential in the long term (6) (see Figure 1). In addition, an increasing number of women delay childbearing for social reasons.

In Turkey, "sperm and oocyte cryopreservation", which was previously permitted by the Ministry of Health only in cases of necessity such as cancer, can now be used by single women with low ovarian reserve, a history of early menopause, when their condition is documented by a medical board report consisting of three specialist physicians, in accordance with the Regulation on Assisted Reproductive Treatment Practices and Assisted Reproductive Treatment Centers issued on September 30, 2014 (11).

Oocyte donation (OD) is a third-party reproductive treatment in which uses genetic material donated from a third party is used for fertility treatment in order for an aspiring woman to become pregnant and a parent with her potential partner. The donated oocytes are fertilized with the man's sperm or that of donor's. OD is a highly effective treatment in which the



women without functional oocytes become pregnant, give birth, breastfeed and become legal mothers (12).

Oocyte donation is usually performed as in vitro fertilization (IVF) by transferring oocytes from a healthy young donor and sperm from the recipient's partner into the recipient's uterus after controlling ovarian hyperstimulation. The first successful pregnancy using donated oocytes in a recipient woman was achieved in 1984 (13). Since then, oocyte donation has been an evolving area of assisted reproductive technology. Today, oocyte donation cycles account for approximately 10% of all assisted reproductive technology cycles in the United States, with live birth rates as high as 50% per cycle (14).

However, oocyte donation brings about ethical, social, religious, physiological and medical issues. In the process, the treatment and follow-up of oocyte donors is of utmost importance and must be taken with great care (15). The legal framework for oocyte donation may differ from country to country. In some countries, there are agreements between the donors and the recipients, whereas in others donations for commercial or financial compensation may be

prohibited. It is therefore important to follow the applicable legal regulations and ethical guidelines of each country (16).

Currently, along with the increasing age of marriage and fertility, having children is an important issue for women. In this process, they need to be aware of their biological clocks. However, studies have revealed that the students studying in the field of health have insufficient knowledge and poor awareness level pertaining to social oocyte cryopreservation and donation (17-19).

In this context, it is important for healthcare staff to gain knowledge on this subject in order to inform and counsel the women about fertility planning and contraceptive methods.

The main aim of this study is to examine the knowledge level and attitudes of health sciences faculty students (including nursing, midwifery, nutrition and diethetics departments) about social oocyte cryopreservation and donation for fertility preservation. In this way, future health professionals will be able to provide more robust information and conscious counseling on fertility-related issues.

Methods

Study Design

This study is designed as a descriptive and cross-sectional pattern.

Place and Time of the Study

The study was conducted at the faculty of health sciences (nursing, midwifery, nutrition and dietetics departments) of a public university between December 2022 and February 2023.

Population and Sample

The population of the study consisted of a total of 1181 students studying in the departments of nursing, midwifery, and nutrition and dietetics at Mardin Artuklu University Faculty of Health Sciences. 667 volunteer students were included in the study. The response rate was 56.5%.

Data Collection

The study data were collected between December 2022 and February 2023 through a Google survey form. A data form prepared by the researcher in line with the relevant literature was used to collect the necessary data (19,20). The data form consisted of two sections. The first section included several questions about the demographic characteristics of the students (age, place of residence, marital status, income status etc). The second section included a number of questions about social oocyte cryopreservation, oocyte donation and fertility.

Data Analysis

The data were evaluated using the SPSS v22 package program and $p<0.05$ value was considered as statistically significant. Frequencies, percentages, means, and standard deviation were used as descriptive statistics in evaluating the data. The differences between the ratios of categorical variables in independent groups were analyzed with Chi-Square and Fisher exact tests.

Ethical Approval

Ethical permission was obtained from Mardin Artuklu University Faculty of Health Sciences Non-Interventional Clinical Research Ethics Committee (Decision No: 09.11.2022, 2022/13-9) and institutional permission was obtained from Mardin Artuklu University Faculty of Health Sciences Dean's Office. The study was conducted in accordance with the Declaration of Helsinki and written consent was obtained from the students before the procedure.

Results

The findings regarding the demographic characteristics of the participants are shown in Table 1.

Table 1. Demographic Characteristics of The Participants		
Groups (n= 667)	Frequency (n)	Percentage (%)
Gender		
Female	548	82.2
Male	119	17.8
Department		
Nursing	316	47.4
Nutrition and Dietetics	134	20.1
Midwifery	217	32.5
Grade		
1 st year	195	29.2
2 nd year	224	33.6
3 rd year	155	23.2
4 th year	93	13.9
Marital status		
Married	25	3.7
Single	642	96.3
Social Security Status		
Available	359	53.8
Non-available	308	46.2
Income Status		
Income Exceeding Expenses	48	7.2
Income Equal to Expenses	290	43.5
Income Less than Expenses	329	49.3
Family Type		
Extended family	215	32.2
Nuclear family	452	67.8
Residence Before Starting University		
Countryside	151	22.6
City	516	77.4
Total	667	100.0

The mean age of the students who agreed to participate in the study was 21.3 ± 2.7 (Min=17; Max=42). Regarding gender, 82.2% of the students were female while 17.8% were male. It is seen that 47.4% of them studied in nursing, 32.5% in midwifery, 20.1% in nutrition and dietetics, respectively. Moreover, 29.2% of them were in the 1st grade, 33.6% in the 2nd grade, 23.2% in the 3rd grade, and 13.9% in the 4th grade. Of the students included in the study, 3.7% were married while 96.3% were single. 53.8% of them had social security while 46.2% did not have any social security. 7.2%

of them stated that their income was more than their expenses. 43.5% of them stated that their income was equal to their expenses, and 49.3% stated that their income was less than their expenses. Given the family type, 32.2% of the students lived in an extended family whereas 67.8% of them lived in a nuclear family. Finally, 22.6% of them lived in rural areas while 77.4% of them lived in a city.

The distribution of the knowledge levels and attitudes of the students included in the study towards social oocyte cryopreservation and oocyte donation are shown in Table 2 and Table 3.

Table 2. The distribution of the knowledge levels and attitudes of the students included in the study towards social oocyte cryopreservation and oocyte donation		
Knowledge levels and attitudes towards social oocyte cryopreservation and donation (n= 667)	Frequency (n)	Percentage (%)
What is IVF process?		
Unknown	275	41.2
Washing the sperm and placing it in the uterus	263	39.4
Waiting for natural gestation by taking an IVF to become pregnant	129	19.3
What is tube baby treatment?		
Unknown	62	9.3
Insertion of the mother's oocyte and the father's sperm into the mother's uterus after fertilization in the laboratory.	588	88.2
Tubal insertion into the mother's uterus after removing the uterus	17	2.5
Knowledge about oocyte cryopreservation		
Yes	229	34.3
No	438	65.7
Preferring oocyte donation when there is no baby		
Yes	112	16.8
No	555	83.2
Donating oocyte for someone else		
Yes	142	21.3
No	525	78.7
Agreeing to take an oocyte from a close relative		
Yes	85	12.7
No	582	87.3

Agreeing to donate an oocyte to a close relative		
Yes	129	19.3
No	538	80.7
Opinion about founding sperm banks		
Supporting	104	15.6
Not supporting	211	31.6
Undecided	186	27.9
No idea	166	24.9
Donor sperm retrieval in case of spousal genetic disorder		
Yes	52	7.8
No	444	66.6
Undecided	171	25.6
Donor sperm retrieval in case of azoospermia		
Yes	51	7.6
No	452	67.8
Undecided	164	24.6
Positive outlook on Oocyte Donation		
Agree	340	51.0
Disagree	327	49.0
Outlook of donor's future financial demand		
Agree	367	55.0
Disagree	300	45.0
Total	667	100.0

34.3% of the students stated that they had information about oocyte donation while 65.7% of them stated that they didn't have. 51.0% of the students supported oocyte donation. 21.3% of the students stated that they could be a donor for someone else. 12.7% of them stated that they would be willing to receive oocytes from a close relative whereas 19.3% of them stated that they would not be willing to give oocytes to a close relative (see Table 2).

73.5% of the students thought that oocyte donation could lead to inbreeding in the future. 77.5% of them thought that it was against religious beliefs and 52.9% of them thought

that it was not suitable for Turkish family structure. 71.4% of them did not know whether oocyte donation is legally prohibited in Turkey (see Table 3).

While 40.5% of the students stated that the ban on oocyte donation should be abolished if it is prohibited by law 59.5% of the students stated that the ban should continue (see Table 3).

74.5% of the students stated that they had information about surrogated motherhood while 25.5% of them stated that they did not. If surrogated motherhood was offered, 13.8% of the students stated that they would accept it, but 86.2% of them stated that they would not.

Table 3. The distribution of the knowledge levels and attitudes of the students included in the study towards social oocyte cryopreservation and oocyte donation		
Knowledge levels and attitudes towards social oocyte cryopreservation and donation (n= 667)	Frequency (n)	Percentage (%)
Feeling like real parents after Oocyte Donation		
Yes	272	40.8
No	395	59.2
Problems with genetic characteristics after Oocyte Donation		
Yes	391	58.6
No	276	41.4
Oocyte Donation may lead to Inbreeding in the future		
Agree	490	73.5
Disagree	177	26.5
Legitimacy of Oocyte Donation in terms of religious beliefs		
Yes	150	22.5
No	517	77.5
Oocyte Donation is not appropriate for Turkish family structure		
Agree	353	52.9
Disagree	314	47.1
Knowing that Oocyte Donation is legally prohibited		
Yes	143	21.4
No	48	7.2
Don't know	476	71.4
Opinion that if Oocyte Donation is prohibited by law		
The prohibition should be abolished	270	40.5
The prohibition should be maintained	397	59.5
Considering to have a baby through donor in the case of genetic disorders in spouses		
Yes	140	21.0
No	527	79.0
Knowledge about surrogated motherhood		
Yes	497	74.5
No	170	25.5
Accepting surrogated motherhood if offered		
Yes	92	13.8
No	575	86.2

Reason for accepting surrogate motherhood if offered		
In return for financial benefit	15	16.3
Solely helping	63	68.5
Due to being a close relative	14	15.2
Opinion on when oocyte cryopreservation should be performed for whom		
Those who will receive cancer treatment /chemotherapy	206	30.9
People with Low Ovarian Reserve	174	26.1
Those with a History of Early Menopause	58	8.7
Social (elective) Causes	20	3.0
Women who do not have a suitable husband/partner with whom they can have children	36	5.4
Women delaying Childbearing Due to Career and Job Opportunities	33	4.9
Older Single Women (35 Years and above)	59	8.8
Those who are married but not ready to have children and have insufficient financial means	63	9.4
Social Security covers the cost of oocyte cryopreservation	18	2.7
Opinion on appropriate fertility age		
24 Years	61	11.1
25-29 Years	452	82.5
30 Years	35	6.4
Age at which she wants to have her first baby		
Non-wanting	41	7.5
20-24 Years	65	11.9
25-29 Years	392	71.5
30 Years	50	9.1
Total	667	100.0

Similarly, 16.3% of the students stated that they would accept it in return for a financial benefit, 68.5% stated that it would be purely for charity and 15.2% stated that it would be because of kinship ties (see Table 3).

The participant students also reported that oocyte cryopreservation could be performed mostly by those who will receive cancer /chemotherapy treatment with a rate of 30.9% (see Table 3).

11.1% of them suggested that the appropriate fertility age was 24 years, 82.5% stating 25-29 years, and 6.4% stating 30 years respectively

(see Table 3).

A statistically significant difference was found between knowing what IVF treatment is and gender ($p<0.001$), department ($p<0.001$), grade ($p=0.006$) and income level ($p<0.001$) (Table 4).

A statistically significant difference was found between the students' positive view of oocyte donation and class ($p=0.004$). But no statistical correlation was found between other sociodemographic characteristics (Table 5).

A statistically significant correlation was found

Table 4. The relationship between knowing what IVF treatment is and sociodemographic variables

		What is IVF treatment								χ^2 p value
		No opinion		Fertilisation of the mother's oocyte and the father's sperm in the lab and implantation in the mother's uterus		Removal of the mother's uterus and insertion of a tube		Total		
n	%	n	%	n	%	n	%			
Gender	Female	39 _a	7.1	496 _b	90.5	13 _{a, b}	2.4	548	100.0	17.991 <0.001
	Male	23 _a	19.3	92 _b	77.3	4 _{a, b}	3.4	119	100.0	
Department	Nursing	45 _a	14.2	259 _b	82.0	12 _{a, b}	3.8	316	100.0	23.886 <0.001
	Nutrition and Dietetic	10 _a	7.5	122 _a	91.0	2 _a	1.5	134	100.0	
	Midwifery	7 _a	3.2	207 _b	95.4	3 _{a, b}	1.4	217	100.0	
Class	1	18 _a	9.2	171	87.7	6 _a	3.1	195	100.0	17.943 0.006
	2	32 _a	14.3	184 _b	82.1	8 _{a, b}	3.6	224	100.0	
	3	5 _a	3.2	149 _b	96.1	1 _{a, b}	0.6	155	100.0	
	4	7 _a	7.5	84	90.3	2 _a	2.2	93	100.0	
Marital status	Married	3 _a	12.0	22 _a	88.0	0 _a	0.0	25	100.0	0.866 0.648
	Single	59 _a	9.2	566 _a	88.2	17 _a	2.6	642	100.0	
Social security	They have	35 _a	9.7	312 _a	86.9	12	3.3	359	100.0	0.232 0.328
	They haven't	27 _a	8.8	276 _a	89.6	5 _a	1.6	308	100.0	
Income status	Income more than expenditure	4 _a	8.3	43	89.6	1 _a	2.1	48	100.0	19.536 <0.001
	Income is equal to expenditure	13 _a	4.5	273 _b	94.1	4 _{a, b}	1.4	290	100.0	
	Income less than expenditure	45 _a	13.7	272	82.7	12 _{a, b}	3.6	329	100.0	
Family type	Large Family	23 _a	10.7	185 _a	86.0	7 _a	3.3	215	100.0	1.454 0.483
	Nuclear Family	39 _a	8.6	403 _a	89.2	10 _a	2.2	452	100.0	
Where he/she lived before coming to university	Rural	17 _a	11.3	129 _a	85.4	5 _a	3.3	151	100.0	1.419 0.492
	Urban	45 _a	8.7	459 _a	89.0	12 _a	2.3	516	100.0	

a, b: Groups with different superscript letters within the same row are significantly different from each other based on post hoc comparisons following the Chi-square test ($p < 0.05$). Statistical analysis: Pearson Chi-square test was used. Fisher's Exact Test was applied where expected cell counts were less than 5.

Table 5. The relationship between knowledge about oocyte donation and sociodemographic variables

		Do you know about oocyte donation?						
		Yes		No		Total		χ^2 p value
		n	%	n	%	n	%	
Gender	Female	190 _a	34.7	358 _a	65.3	548	100.0	0.156 0.693
	Male	39 _a	32.8	80 _a	67.2	119	100.0	
Department	Nursing	111 _a	35.1	205 _a	64.9	316	100.0	4.551 0.103
	Nutrition and Dietetic	36 _a	26.9	98 _b	73.1	134	100.0	
	Midwifery	82 _a	37.8	135 _a	62.2	217	100.0	
Class	1	80 _a	41.0	115 _b	59.0	195	100.0	13.148 0.004
	2	60 _a	26.8	164 _b	73.2	224	100.0	
	3	49 _a	31.6	106 _a	68.4	155	100.0	
	4	40 _a	43.0	53 _a	57.0	93	100.0	
Marital status	Married	12 _a	48.0	13 _a	52.0	25	100.0	1.568 0.210
	Single	217 _a	33.8	425 _a	66.2	642	100.0	
Social security	They have	130 _a	36.2	229 _a	63.8	359	100.0	1.217 0.270
	They haven't	99 _a	32.1	209 _a	67.9	308	100.0	
Income status	Income more than expenditure	21 _a	43.8	27 _a	56.3	48	100.0	2.922 0.232
	Income is equal to expenditure	103 _a	35.5	187 _a	64.5	290	100.0	
	Income less than expenditure	105 _a	31.9	224	68.1	329	100.0	
Family type	Large Family	71 _a	33.0	144 _a	67.0	215	100.0	0.241 0.643
	Nuclear Family	158 _a	35.0	294 _a	65.0	452	100.0	
Where he/she lived before coming to university	Rural	55 _a	36.4	96 _a	63.6	151	100.0	0.379 0.538
	Urban	174 _a	33.7	342 _a	66.3	516	100.0	

a, b: Groups with different superscript letters in the same row differ significantly ($p < 0.05$), based on post hoc Chi-square comparisons. Statistical tests applied: Pearson Chi-square test was used for most variables. Fisher's Exact Test was applied to the variables where the assumption of expected frequency (>5) was violated (e.g., "Marital status", "Income more than expenditure").

between the students' concern that oocyte donation may lead to inbreeding in the future and gender ($p<0.001$), department ($p=0.002$), grade ($p=0.020$) and family type ($p=0.039$).

A statistically significant difference was found between the students' knowledge about surrogated motherhood and gender ($p=0.006$), social security status ($p=0.016$) and place of residence before coming to university ($p=0.003$).

A statistically significant difference was found between the students' acceptance of surrogated motherhood if offered and gender ($p=0.0015$), social security status ($p=0.016$) and place of residence before coming to university ($p=0.003$).

There was a statistically significant difference between the participants' opinions in which case oocyte cryopreservation can be performed and gender ($p=0.001$), family type ($p=0.044$) and place of residence before coming to university ($p=0.009$).

Finally a statistically significant difference was found between the students' thoughts about the foundation of sperm banks and their department ($p=0.049$), knowing what IVF treatment is and their grade ($p=0.003$) and marital status ($p=0.022$).

Discussion

Over the last three decades, there has been a progressive social trend in Western countries to delay childbearing among the women in reproductive age. This delay stems from different factors related to lifestyle and societal changes, such as improved educational and professional opportunities for women, family care commitments, economic challenges and the need for greater financial security. The absence of a suitable partner. The need to create a stable home environment. increased access to contraceptives. or a feeling of not being "ready" for parenthood. This impairment of ovarian function. aligned with the tendency to delay motherhood. Has led to an increase in both the number of women who remain involuntarily childless and the number of women over 45 years who use donor oocytes instead of their own. Consequently, these women may be affected by age-related infertility when they decide to have a baby and contraceptive techniques may be recommended as a solution due to low oocyte quantity and quality (21,22).

The majority (82.5%) of the students who participated in our study stated that the most appropriate age for childbearing was 20-25 years, and 71.5% stated that they would like to have their first child in this age range (Table 3). These results may be closely related to the geographical and cultural context in which the study was conducted. Especially in regions where traditional family values and early marriage tendencies are more prevalent, perceptions regarding the ideal timing of fertility are similarly shifted to earlier ages. This finding shows a notable difference when compared to the study conducted by Meissner et al. (2016) with university students in Hannover, Germany. Meissner et al. reported that 1,144 students stated that the optimal age of fertility was between 20-26 years, but they planned to have their first child at the age of 29 (17). This suggests that there is a level of knowledge about the ideal timing of fertility, but real-life planning varies according to socioeconomic conditions. Similarly, Tan et al. (2014) found that 64.3% of the participants planned to have children between the ages of 26-30 (18). This result shows that having children is postponed to older ages due to both fertility awareness and career goals or the expectation of economic stability. In the context of Turkey, the study by Daşkan and Taner (2020) also shows similar trends. In their study, 79.4% of the students stated that they wanted to have their first child between the ages of 25-29, and 85.1% of them considered 25-29 to be the most appropriate fertility age (19). This finding shows that even in different university populations in Turkey, perceptions about fertility vary according to regional, cultural and socioeconomic differences. In a community-based study, it was found that both women and men overestimated the age at which fertility begins to decline by an average of 10 years (18). This reveals that there is a lack of information on fertility in the general public. This deficiency may lead individuals to postpone their reproductive plans to more risky ages. Global trends also show that the age of fertility is gradually increasing. In Germany, the average age at first childbearing increased from 25.2 years in 1980 to 29.5 years in 2014 (23). Similarly, the average age increased to 30.0 in the UK and 30.2 in Luxembourg (24,25). The Turkish Demographic and Health

Survey (TDHS) 2018 data also show that the highest age-specific fertility rate is in the 25-29 age group, confirming that the age at first childbearing increases over time (26). The tendency to postpone childbirth to later ages is more common, especially among women with higher education (27). This is even more striking in the case of Germany, where 30% of women with academic careers do not have children. This rate reveals how the structural challenges faced by women in academic and professional life affect their fertility decisions. In this context, one of the reasons why the 20-25 age preference obtained in our study is lower than the older age ranges in the literature may be that the study was conducted in a region where more traditional values prevail. Such social and cultural factors directly affect individuals' knowledge and attitudes about fertility. Therefore, information and education strategies for fertility awareness should take into account not only biological data but also the social context.

In this study, 30.9% of the students thought that oocyte cryopreservation should be used for those who will receive cancer/chemotherapy treatment, 26.1% for those with low ovarian reserve, 9.4% for those who are married, but not ready to have children, 8.8% for those with insufficient financial means. 8.8% for single women of advanced age (35 years and above), and 8.7% for those with a history of early menopause, 5.4% of women who do not have a suitable husband/partner to have children, 4.9% of women who delay childbearing due to career and job opportunities, 3.0% for social (elective) reasons and 2.7% in cases where the cost of oocyte cryopreservation is covered by social security (see Table 3). In a study by Daşkan and Taner, the students reported that oocyte cryopreservation for social reasons could be preferred mostly by single women (74.9%) with advancing age (≥ 35 years). The women who delay childbearing due to career and job opportunities (70.7%) and the women who do not have a suitable spouse/partner to have children and for medical reasons. It could be preferred mostly by the women who will receive cancer/chemotherapy treatment (74.5%) (19). In a study conducted by Pritchard et al. (28) in Australia, 90% of the women who

cryopreservation their oocytes for social reasons were single women. The most common reasons for social oocyte cryopreservation were reported as not finding a suitable partner and being with a partner who did not want to be a father. In another study, 46.5% of the participants stated that they would prefer social oocyte cryopreservation for not finding a suitable partner, 45.7% for delaying childbearing due to professional reasons, and 31.1% for both reasons (18). In this study, the reports of the participant students do not overlap with the social reasons reported in the literature and they are more inclined to oocyte cryopreservation for medical reasons.

34.3% of the students stated that they had information about oocyte donation. 51.0% of the students had positive attitudes towards oocyte donation. 21.3% of the students stated that they could be a donor for someone else. 12.7% stated that they would be willing to receive oocytes from close relatives and 19.3% stated that they would not be willing to give oocytes to close relatives (see Table 2). In a similar study conducted by Tozzo et al. (2019) in Italy. It was reported that when it came to oocyte donation, female university students were generally not willing to donate their oocytes and were more likely to donate to a biobank (42.5%) than to women or couples they knew well (33.4%). While law students tended to donate less. possibly because they were more aware of the possible legal and perhaps ethical implications of gamete donation and possibly because they were concerned (29). In a similar study conducted by Tozzo et al. in 2017, it was found that law students were less open to donating their biological samples to a biobank than medical students (30). Oocyte donation has become an integral part of assisted reproductive techniques procedures as an alternative to embryo cryopreservation, which may not be an option for all couples seeking assisted reproductive techniques due to personal religious or moral objections or restrictive legislation in some countries. In recent years, the demand for oocyte donation has increased as it has become an alternative solution for a large number of women experiencing age-related infertility. Oocyte cryopreservation has led to the development of donor oocyte banks (31).

Cryopreservation of oocytes may increase the number of available donor oocytes due to the fact that a certain number of women whose oocytes are cryopreserved (for both medical and/or social reasons) may eventually not use all or any of their donor oocytes and decide to donate them. In spite of these breakthroughs, the present shows that there is a favorable attitude towards donation but an unfavorable attitude towards becoming a donor.

74.5% of the students stated that they had information about surrogated motherhood. If offered surrogacy, 13.8% of the students stated that they would accept and 86.2% stated that they would not accept. The students stated that the reasons for accepting surrogacy in case they were offered surrogated motherhood were 68.5% for purely charitable purposes, 16.3% for a fee, and 15.2% because of kinship ties (Table 3). In a study conducted on GATA School of Nursing students, it was found that the rate of those who stated that they would accept surrogated motherhood if they learned that they could not have children in the future due to infertility was 60.2%. However, the rate of those who stated that they would accept surrogated motherhood if someone else had a fertility problem was lower (18.1%). These findings show that while the participants have a more positive attitude towards getting help from others to have a child. They are not as willing to help others. Approximately 70% of those who stated that they could be surrogate mothers stated that they would only do so for a close relative or friend (32). Similarly in a study conducted with medical students in Germany. It was reported that students were reluctant to become a surrogate mother for someone else. But had a more positive approach to adoption (33). These results emphasize that acceptance of surrogated motherhood and attitudes towards helping others may differ among individuals and personal connections are an important factor in these decisions. It can be argued that such studies play an important role in understanding surrogated motherhood and other fertility-related issues in our country. According to the findings of the study, the low level of acceptance of surrogated motherhood is an expected result considering the fact that it is a multifaceted issue with cultural,

religious, ethical and legal dimensions that involves a society-specific value system and that sociocultural uncertainties and people's sense of insecurity are also taken into consideration.

Conclusion

This study has identified some important points and revealed the students' opinions about social oocyte cryopreservation, donation and fertility. The participants emphasise that the healthcare staff should be involved in debating these issues and finding solutions. Especially in order to provide accurate information about the technical possibilities of social oocyte cryopreservation and donation. Which are new and current in our country to preserve both fertility and ultimately delay childbearing.

In our country it is absolutely necessary to raise greater awareness of fertility issues in both the female population and the medical and scientific community to encourage health professionals to better inform their patients.

Obtaining more information about fertility issues and possible solutions to age-related infertility is not only useful for delaying parenthood, but can also offer a more concrete and informed reproductive autonomy, which is desirable to be realized independently of career pressures and lack of services.

It is important for healthcare professionals to have sufficient knowledge, starting at the undergraduate level. In order to inform and counsel the public about age-related fertility decline and fertility preservation. Training on fertility will enable them to specialize in this field and to convey accurate information to the patients.

In public education and awareness-building activities, it should be emphasized that those who want to have children have a better chance through natural reproduction at the appropriate age. In these activities young women should be identified as the target group for fertility and the fact that the chances of fertility decrease in older women should be clearly conveyed.

At the same time it is important that the women who have no plans to have children and are interested in methods such as social oocyte cryopreservation are offered this as an option.

Social oocyte cryopreservation as a preventive measure against the risk of having no babies should be explained to women who have this desire.

In our country; studies on social oocyte cryopreservation should be conducted in different social groups. These studies should be aimed at increasing the level of knowledge of different segments of the society on this issue and effective communication methods should be used to reach all segments.

If health professionals have accurate and up-to-date information on fertility. It will increase the effectiveness of education and awareness-building activities for the public. In this way, it should be aimed to increase the number of individuals who can make informed decisions about fertility and protect their fertility when necessary.

Furthermore, while this study covers important themes on assisted reproductive technologies such as surrogacy, oocyte donation and IVF, the lack of discussion on the concept of family planning and related national/international policies stands out as a notable limitation. Family planning is a fundamental public health element that supports individuals to make informed fertility choices and is directly related to fertility postponement practices such as social oocyte cryopreservation.

In this context, the study only assessed students' individual knowledge and attitudes; it did not address how these knowledge and attitudes interacted with existing health policies, reproductive rights, state support or family planning services. However, the prevalence of practices such as social oocyte cryopreservation is directly related to legal and structural arrangements as well as public awareness of these issues. A more holistic assessment would have been possible if the scope and accessibility of family planning services in Turkey and the extent to which young people are aware of these services had been included in the scope of the study.

Therefore, in future research, it is important to consider not only technological opportunities such as social oocyte cryopreservation, donation and surrogacy, but also structural factors such

as family planning services, reproductive rights and state policies that shape how individuals perceive these opportunities.

Strengths and Limitations of the Study

Strengths

One of the main strengths of this study is the relatively large sample size ($n=667$), which increases the reliability and generalizability of the findings within the health sciences student population. The inclusion of students from three different departments (nursing, midwifery, and nutrition and dietetics) provided a diverse perspective on knowledge and attitudes regarding social oocyte cryopreservation and donation. Furthermore, the study's structured questionnaire, based on current literature, allowed for the collection of detailed data on students' awareness, opinions, and ethical perceptions related to fertility preservation methods. Another strength is the high participation rate among female students, who are the primary stakeholders in the topic under investigation, thus adding depth and relevance to the insights gained.

The study also contributes to the limited body of research conducted in Turkey on this topic, offering region-specific findings that reflect cultural and societal attitudes. Additionally, the use of Google Forms for data collection facilitated anonymity, which may have encouraged honest and reflective responses on a sensitive topic such as fertility and assisted reproductive technologies.

Limitations

Despite these strengths, the study has several limitations. Firstly, the research was conducted at a single university located in a more traditional and possibly conservative region of Turkey. This geographical limitation may influence the generalizability of the results to more urban or culturally diverse student populations. Secondly, the cross-sectional design only provides a snapshot of attitudes and knowledge at one point in time; longitudinal studies would be necessary to explore how these perceptions evolve with education and exposure.

Another limitation is the self-reported nature of the data, which may be subject to social desirability bias, especially in questions related to sensitive ethical or religious topics. Moreover,

while the questionnaire covered a broad range of issues, it did not allow for in-depth qualitative exploration of students' personal reasoning, emotional responses, or cultural values shaping their views. Finally, the study did not include male students' perspectives in depth, although their understanding and support may also be important in public reproductive health discussions.

Future studies could benefit from a mixed-methods approach and include participants from a broader demographic and educational background to better understand the nuanced perceptions and decision-making processes regarding fertility preservation.

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