Effect of Educational Program on Knowledge and Attitude of Female Students' Regarding Oocyte Cryopreservation

Nabila Salem Mohamed [1] , Hanan Abdelmohdy Mohamed [2], Naeima Mohamed Elsayed Ahmed [3]

[1,2,3] Assistant professor of Obstetrics and Gynecological Nursing, Faculty of Nursing, Zagazig University, Egypt

Abstract :Background: Cryopreservation of human ovarian tissue has been widely used all over the world to protect fertility, not only for women undergoing chemotherapy, but also for women who wish to delay pregnancy for a certain period in order to preserve fertility. **Aim of the study** was to find out the effect of an educational program on knowledge and attitude of female students' regarding oocyte cryopreservation. **Research Design:** quasi-experimental research design was used in this study. **Setting:** This study was conducted at faculties of art and education, Zagazig University, Egypt. **Sample:** purposive sample composed of 115 of postgraduate female students. **Results**: After implantation of an educational program 97.2% of study subject shows highly satisfactory score of total knowledge compared to 12.3% in pre-intervention phase. As well as 92.3% of study subject reported positive attitude in posttest compared to 25.3% in pretest. **Conclusion:** The educational progam was effective on increase knowledge and change attitude of post graduated female students regarding oocyte cryopreservation. **Recommendation:** More efforts needed by the health care system, to increase the youth knowledge about ways to preserve their fertility especially unmarried girls

Keywords: post graduate female, Knowledge, Attitude, oocyte cryopreservation

Introduction

Over the past thirty years, a progressive social trend has been observed towards delaying childbearing among women. This is due to many reasons, including those related to lifestyle and societal changes, such as improving educational and professional opportunities for women, family care obligations, economic difficulties, and the need for more financial security. As a results of these delaying women's may find themselves affected by age-related infertility when they decide to become pregnant, and fertility preservation techniques can be suggested to them as a solution [(1)] .Furthermore, the fact that female fertility gradually decreases with age has been recognized by several demographic and epidemiological studies that have shown a decline in fertility since the mid-third decade[(2)] .

Fertility preservation is an important issue for young people at risk of becoming infertile due to clinical conditions, illnesses, or medications. Egg freezing as a personal choice, also called social egg freezing, is defined as oocyte cryopreservation (OC) for potential future use by women who are choosing to delay childbearing for personal causes, such as career pursuits, progress in education, lack of a partner or financial stability[(3)] .

The OC is one of the methods used to preserve fertility for an extended period of time after the normal time of pregnancy, where the eggs are collected using assisted reproductive technology ART then

Cryopreserved by verification and put into storage until a later time when it can be used to create embryos through in vitro fertilization (IVF) [4].

As for the safety of OC a preliminary data assuring with good evidence that fertilization and pregnancy rates are similar to those achieved with fresh oocytes or with frozen eggs and no increase in chromosomal abnormalities' , birth defect or development deficits have been noticed in the children born from frozen eggs [5].

Cryopreservation is used to preserve the fertility of females if they are going to undergo ovarian chemotherapy or some surgeries. Also, to reduce the risk of ovarian hyper stimulation syndrome and some women resort to preserve their fertility if they have a genetic predisposition to early menopause (which referred to medical indications) [6] . However, more recently non-medical indications of OC have become an option for women who had social reasons that require postponing pregnancy for a certain period. The Oocyte freezing allows women to consider pregnancies later as it halts the aging of egg [7].

The Ethics Committee of the American Society for Reproductive Medicine (2018) concluded that elective OC is an ethically permissible medical therapy, with the sole purpose to preserve reproductive potential of healthy women. On other hand , Islamic authorities in Egypt permit the procedure where the Egyptian's Dar Al-Ifta issued fatwa declaring the OC among single women is permissible if carried out under four conditions including: prevention of any damage to the eggs which might pose a risk to future offspring, safe control over the frozen eggs to prevent intentional and unintentional mixing with other frozen eggs, no donation of frozen eggs to other women and fertilization of the frozen eggs with a husband's sperm during the course of married with no use of frozen eggs or fertilized embryos following divorce or death of the husband [8].

Oocyte cryopreservation process takes almost 4 to 6 weeks for a single retrieval. The procedure of egg retrieval includes "2-4 weeks of self-administered hormone injections and birth control pills to temporarily turn off natural hormones" and "10-14 days of hormone injections to motivate the ovaries and ripen numerous eggs." [9] . For preserving virginity and intact hymen until marriage oocyte retrievals would be done trans-anally or by the use of laparoscope rather than through-vagina[10] . The success of oocyte freezing technology depending on several factors as costs, culture, attitudes, beliefs and increasing age of the woman when the eggs were frozen where the highest success rates are for women aged below 35 years old [11].

In spite of the availability of successful collection and oocyte freezing, it remains vague to what extent females are aware of the availability of this technique, their attitudes towards its use, or the conditions under which this technique may be considered [12].

Postgraduate students are at a stage in their lives where they consider their future and career goals. Given the currently increased visibility and feasibility of oocyte cryopreservation technology, these students are increasingly faced with OC as an option that may influence their life and career decisions [13] . On other hand , the deficiency of knowledge or uncertain expectations regarding oocyte

cryopreservation among post graduate students have a negative effect on poor uptake in oocyte preservation among them. So they should be provided with the required knowledge regarding fertility preservation, and explore their attitude regarding it [14].

With the existence of such a phenomenon, the nurse midwife is the key member and have in important role in education and increasing awareness regarding the latest technology that have a role in preserving fertility, as well as increasing the chances of pregnancy after the age of thirty. Lately, findings from previous studies revealed that from the physicians' viewpoint, it is the nursing responsibility to discuss about fertility preservation options [15].

Significant of the study:

Throughout the world, the age at which women become first-time mothers has increased over the past several decades because of the increased role of women in social and economic participation. An increasing number of women in developed countries are postponing childbirth, despite well-documented evidence of a decrease in fertility with increasing age. In report of **The Central Agency for Public Mobilization and Statistics, 2020** [16], in Egypt revealed that the average age of marriage among males reached 30.4 years, compared to 24.7 years among females nationwide during 2020. Although there are many factors that affect the level of fertility among women, including delay age of marriage, there is little attention to level of female's awareness of the effects of ovarian aging on fertility and reproductive planning, as well as the medical options available and knowledge of the various aspects of social egg freezing [17]. To provide competent counseling, it is important to identify females' knowledge level, as well as attitude that influence their decision-making regarding fertility preservation, especially in unmarried and childless women. Therefore, it is important to inform about fertility preservation at early age.so the current study conducted to find out effect of educational intervention program on postgraduate nonmedical female students' knowledge and attitude regarding oocyte cryopreservation

Aim of the study:

This study aimed to find out the effect of an educational program on knowledge and attitude of female students' regarding oocyte cryopreservation.

Research hypothesis:

After implementation of an educational program regarding oocyte cryopreservation the female students' knowledge and attitude will expect to be improved.

Subjects and method:

Research Design: quasi-experimental research design with pre\posttest for one group was used in this study. Quasi-experimental research designs examine the cause-and-effect relationship between two variables (the independent and dependent variable). The independent variable (educational program) is the variable of influence and the dependent variable (knowledge and attitude of non-medical female students)' is the variable that is being influenced. The independent variable is expected to bring about some variation or change in the dependent variable **(18).**

Setting: This study was conducted at two non-medical faculties (faculty of education and faculty of Art) at Zagazig University. Zagazig University is one of the largest governmental universities in Egypt, its

establishment in 1974 and enrolled in 24 academic colleges and institutions. A list of nonmedical faculties at Zagazig University was prepared by the researchers and two faculties were chosen randomly (simple random sample) from the list of 15 faculties, these were namely (faculty of education and faculty of art).

Sampling technique: A purposive sampling technique was used to recruit students' according to the inclusion until the sample size was fulfilled.

Inclusion criteria:

- Age ≥ 25 - 40 years
- Postgraduate non-medical students
- Unmarried students

Sample Size: The total number of postgraduate female students at faculty of education and faculty of Art Zagazig University who engaged in diploma, master and PHD program for the academic year 2022/2023was estimated.

Based on the following formula:

$x = Z(c/100)^2 r(100-r)$ $n = Nx/((N-1)E^2 + x)$

$E = \text{Sqrt}[(N - n)x/n(N-1)]$

Where N is the population size, r is the fraction of responses that you are interested in, and Z(c/100) is the critical value for the confidence level c. The sample was carefully chosen based on their agreement to participate in the study.

Sample: According to the previous formula 142 female postgraduates' students were calculated to be involved in the study only 115 accepted to participate and complete posttest of the study

Tool of the study: Self-administered questionnaire was designed by the researchers written in Arabic language to avoid unobvious wards regarding oocyte cryopreservation, it involved two tools.

Tool I: This tool was composed of two parts:

Part one: included demographic characteristics' of post graduated female students' as (age, residence, employment condition and economic level).

Part two: This part was concerning with students' previous knowledge regarding oocyte cryopreservation and their source of this knowledge. It involved 6 close ended questions. As well as students' knowledge assessment regarding oocyte cryopreservation was used in pre and posttest. The construction of this part was designed by the researchers after checking, reviewing the related and previous literature [1, 18 & 19]. It included 16 multiple choice questions which were divided into four categories. The first-category was coverage the general concept of cryopreservation which includes 6 items as (definition, indications, total duration, success rate and factors effect on success rate for oocyte-cryopreservation and the availability of special bank for oocyte cryopreservation in Egypt). The second section was discussed the preparation and steps of cryopreservation. Signs and the risk of oocyte cryopreservation were presented in the third category. The fourth section was containing 2 items for religion opinion in Egypt about this procedure.

Knowledge scoring system:

The response of each question was scored as 1 for a correct answer and zero for incorrect answer or does not know. The range of total scores was 0-16 points; the higher scores reflect a higher level of knowledge. The total knowledge score was graded as the following: knowledge was considered satisfactory if the percent score

was<60% and considered unsatisfactory if the percent score was ≥60%.

Tool II: **Likert scale** (Students' attitudes regarding oocyte cryopreservation):

It was an Arabic self-administered questionnaire developed by the researchers after reviewing related literature and guided by **[1&20].** This tool used in pre and posttest and included14 sentences to assess post graduated female students' attitudes by using a 2 point Likert scale(disagree or agree),

Attitude scoring system:- Each statement was scored 1 for disagree answer and 2 for agree answer. The total attitudes scores ranged from 1 to 28, attitude was considered to be positive if the percent score was 70 % or more and if less than 70% is consider negative attitude.

Tools Validity and reliability: Once prepared in its initial form the tools and educational intervention were presented and reviewed by a panel of three experts' professors in the field of obstetrics and gynecological nursing who revised the tools for clarity, relevance, and comprehensiveness. Minor modifications were applied accordingly. To assess reliability of tool used in the study Alpha Cronbach was conducted to evaluate the steadiness of the instruments' internal consistency; it was 0.790 for knowledge questionnaire and 0.89 for the attitudes. The coefficient suggesting the items have average internal consistency and appears to be acceptable.

Ethical consideration:- The Zagazig University nursing faculty's Scientific Research Ethical Committee officially approved the study before it got started. All ethical considerations were taken into account at every stage of the investigation, and the subjects' confidentiality and anonymity were upheld. The researchers introduced themselves and briefly described the study's purpose and nature before each student provided their consent to participate. After student agreement they informed that the data collected was only used for the purpose of research and they have right to discontinue at any time.

Pilot study: On 10 %(12) of the study sample the Pilot study was conducted to assess the applicability and clarity of the instruments, evaluate the feasibility of fieldwork, and identify any potential difficulties that the investigator could encounter and impede the collection of data. Important improvements have been made based on the findings of the pilot study, such as (removing certain questions and adding others) to endorse their content or for clearer and more specific purposes. The participants in pilot study were excluded from the studied sample.

Administrative design: An official permission was obtained using proper channels of communication. This was done through letters addressed from the Dean of the Faculty of Nursing, Zagazig University explaining aim and procedures of the study and asking for cooperation to the study setting's responsible authorities for obtaining their data collection permit.

Field work: Once the approval was granted to progress in the study, the researchers started to organize a schedule for collecting the data. The data was carried out from the first of October to the end of December 2022 over a period of three months. To accomplish the aim of the study the researchers had followed the following three phases:

1. Assessment phase (pre-test)

The researchers conducting the first meeting with each student in the postgraduate programs (diploma, master and PHD) according heir schedule of attendance and free time and explained the nature and aim of the study, its duration, and how to fill out the questionnaire. As well as, they informed that their participation is optional and they had the right to withdraw from the study at any time. An informed consent to participate in the study was obtained from the students and after that each student received pre-test self-administered questionnaire to fill the data concerning to demographic characteristics and evaluate data regarding knowledge and attitude towards oocyte-cryopreservation. The filling of the questionnaire was took an average of thirty minutes.

2. Implementation phase

After evaluating the students' knowledge and attitude toward oocyte cryopreservation by pretest questions tools. The educational sessions were conducted to implement the educational program which focused on information regarding cryopreservation as definition, indication ,total duration , success rate ,factors affect success rate, preparation , steps of preparation and religious believes . Three planned sessions were provided in Arabic language to each postgraduate program. The researchers visited the pre-mentioned setting three times /week for 8 weeks for conducting the sessions. The students in each postgraduate program were divided into sub groups and the total number of all small groups was (nine groups), each group contains 10-15students. This distribution was done in accordance with the students' availability and readiness to make it easier for them to attend the sessions. Each session consumed 30-45 minute divided for PowerPoint presentation and for open discussion .At the beginning of each session a feedback was attained to ensure students understanding. The educational training methods were lectures, group discussions and brain storming. The sessions were aided by using videos and pictures to facilitate and illustrate teaching.

3. Evaluation phase (post-test):

In order to the influence of the educational sessions on improving knowledge and attitudes of students towards oocyte cryopreservation, the post-test was administrated after two weeks of implementation of the educational intervention. The same tools used in the pre-test were re-used

Statistical design: The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X) 2, P-value to test association between two variables and R-test to the correlation between the study variables.

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS)
- P-value ≤ 0.05 Significant (S)
- P-value ≤ 0.01 Highly Significant (HS).

Results

Table 1: reveals the demographic data of postgraduates females and reports that 60 %

have an age ranged between 25 -<30 years with a mean ± SD of 25.53±4.95.As for the residence and occupation, it was obvious that 61.7 %& 56.6% respectively of the participants were lives in Urban areas and not working. Also, 51.4% of study subjects were had a moderate level of socio-economic level.

Figure (1): demonstrates the sources of information about oocyte cryopreservation for the study subjects, it was found that the main sources were TV and internet (31.3% & 30.8% respectively).

Table(2) shows the correct knowledge of postgraduate unmarried females regarding oocyte-cryopreservation through-out the intervention phases of the study, and clarifies that there is a highly statistically significant difference between pre and post intervention phases regarding the all items of oocyte-cryopreservation. Figure 2 illustrate that only 2.8% of studied student's had satisfactory level of knowledge about the oocyte-cryopreservation at pre intervention and this percentage was changed to 97.2% at post intervention with statistically highly significant (p<0.001).

Table (3) reflects attitude of studied subjects regarding OC, and illustrates that there was marked increase in study subjects' agreements in all items of attitude after implementation of educational intervention than pre intervention.

Figure (2) illustrate that only 2.8% of studied student's had satisfactory level of knowledge about the oocyte-cryopreservation at pre intervention and this percentage was changed to 97.2% at post intervention with statistically highly significant (p<0.001).

Figure (3): displays that total attitude score about oocyte-cryopreservation improved from 25.6% positive in pretest compared to 90.3% in posttest.

Table (4): represents that, there is marked increase mean scores of study subject's knowledge towards oocyte-cryopreservation and their demographic characteristics. As age group 25-<30 and rural residence subjects shows significant improve in their score 14.01±1.17&14.1±1.17 in posttest respectively. As regards occupation working subjects shows 12.1±1.17. And moderate socio-economic level shows 14.1±1.15 in posttest.

Table(5) indicates there was a statistically significant correlation between total knowledge and total attitude score among the study subjects throughout intervention phase. As with increase in total knowledge of the study subjects 14.27±1.75 there was improve in their attitude score 8.97±1.77 in posttest scor

Table (1):-Demographic characteristics of the study subjects (n=115)

Items	No	%
Age		
25- <30	69	60.0
30-<35	35	30.5
>35	11	9.5
Mean ± SD of 25.53±4.95		
Residence		
Urban	71	61.7
Rural	44	38.3
Occupation		
Working	50	43.4
Not working	65	56.6
Socio-economic level		
Low	36	31.3
Moderate	59	51.4
High	20	17.3

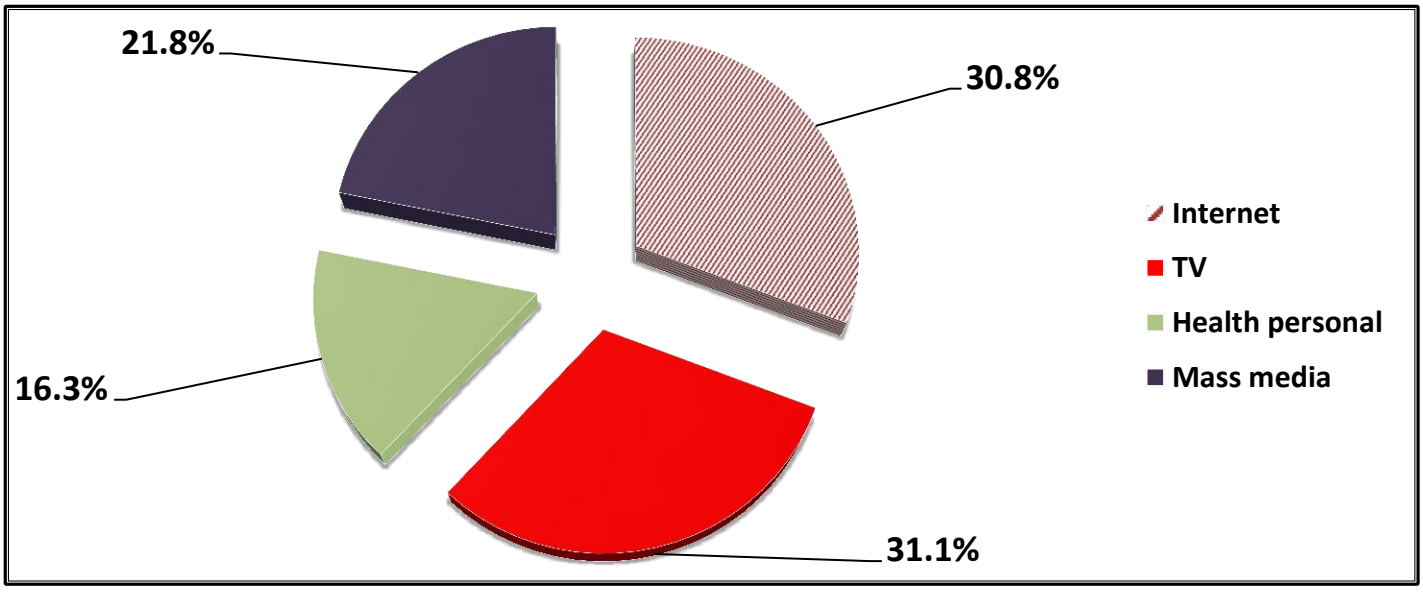

Figure (1): Distribution of study subjects according to source of knowledge about oocyte-cryopreservation (n=20)

Table (2): Distribution of study subjects regarding their correct knowledge about oocyte-cryopreservation throughout the intervention phases (n=115)

Items of knowledge	Intervention phases				X^2 test	p-value
	Pre		Post			
	No.	%	No.	%		
General concept regarding oocyte cryopreservation :						
• Definition	**17**	**14.7**	**100**	**86.9**	159.74	0.000**
• Indication	15	13.0	105	91.3		
• Total duration	20	17.3	110	95.6		
• Success rate	30	26.0	109	94.7		
• Factors affect success	25	21.7	98	85.2		
Preparation of cases	8	9.6	103	89.5	162.5	0.000**
Steps of preparation	3	2.6	99	86.0	163.8	0.000**
Signs and risk of oocyte cryopreservation	4	3.4	95	82.6	157.43	0.000**
Religious opinion toward cryopreservation	6	5.2	110	95.6	160.67	0.000**

** = statistical highly significant

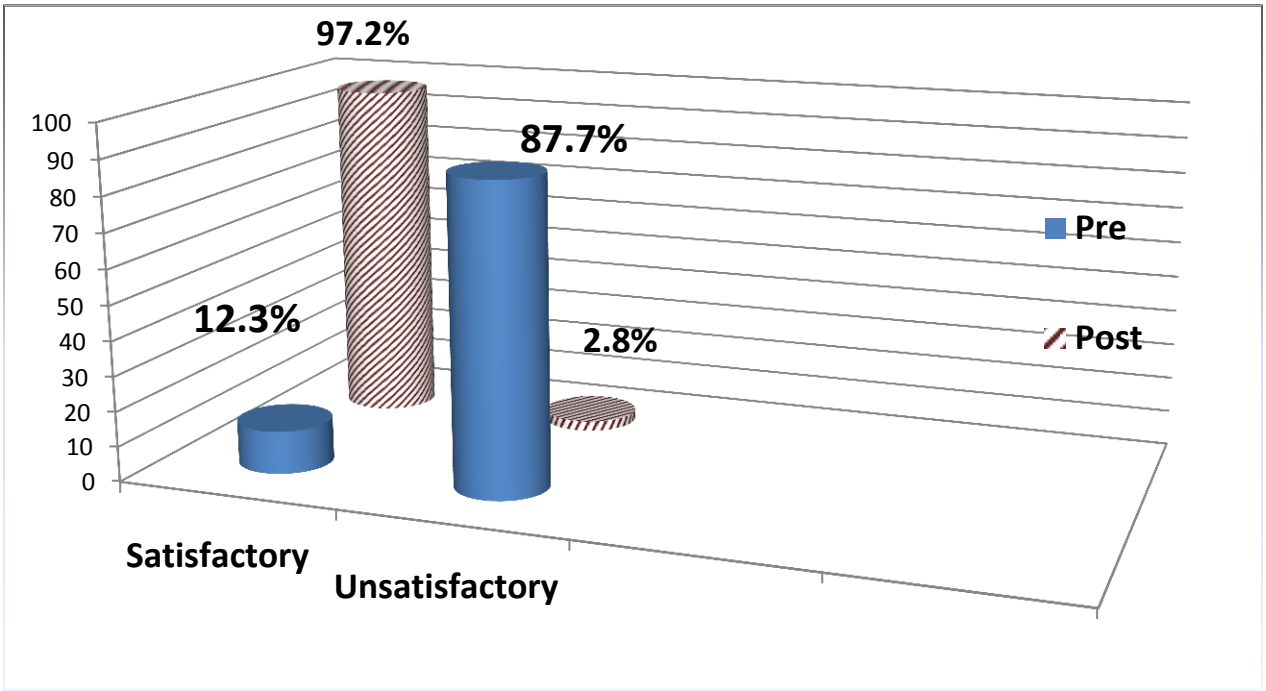

Figure (2): Total Score of study subjects knowledge regarding oocyte-cryopreservation throughout Study Phases (n= 50).

Table (3): Distribution of study subjects regarding their attitude toward oocyte-cryopreservation throughout the intervention (N=115)

Items		Pre		Post	
		N	%	N	%
Oocyte-cryopreservation may be a possible option for unmarried girls	Agree	98	85.2	115	100
	Disagree	17	14.8	0	0.0
Oocyte-cryopreservation is dangerous because of its complicates	Agree	28	24.3	100	86.9
	Disagree	87	75.7	15	13.1
Oocyte-cryopreservation should be encouraged	Agree	62	53.9	105	91.3
	Disagree	53	46.1	10	8.7
Worried about missed used of oocyte-cryopreservation	Agree	30	26.0	90	78.2
	Disagree	85	73.9	25	21.8
Worried about bad storage of oocyte	Agree	28	24.3	100	86.9
	Disagree	87	75.7	15	13.1
Worried of long-time storage of oocyte	Agree	98	85.2	115	100
	Disagree	17	14.8	0	0.0
Would consider oocyte-cryopreservation for medical reasons only	Agree	105	91.3	10	8.7
	Disagree	10	8.7	105	91.3
Infection control precautions must be used during oocyte-cryopreservation	Agree	62	53.9	115	100
	Disagree	53	46.1	10	0.0
Would consider oocyte-cryopreservation for social and career reasons	Agree	35	30.4	85	73.9
	Disagree	80	69.6	30	26.1

Oocyte-cryopreservation should be followed up	**Agree**	**51**	**44.3**	**82**	**71.3**
	Disagree	**64**	**55.7**	**33**	**29.7**
Oocyte-cryopreservation applicable in Egypt	**Agree**	**105**	**91.3**	**82**	**71.3**
	Disagree	**10**	**8.7**	**33**	**29.7**
Oocyte banks should be accredited and standards	**Agree**	**43**	**37.3**	**95**	**82.6**
	Disagree	**72**	**63.7**	**20**	**17.4**
It is very expensive and therefore cannot be feasible to anyone	**Agree**	**35**	**30.4**	**82**	**71.3**
	Disagree	**80**	**69.6**	**33**	**29.7**
Would consider oocyte-cryopreservation if it's cost is suitable for me	**Agree**	**50**	**43.4**	**78**	**67.8**
	Disagree	**65**	**56.6**	**37**	**32.2**

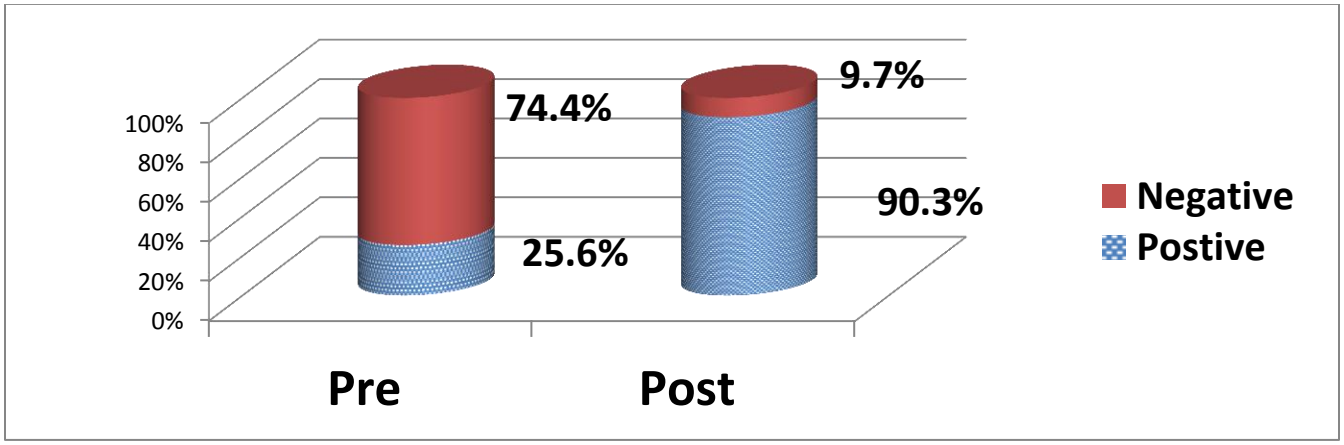

Figure (3): Distribution of study subjects according to total attitude score about oocyte-cryopreservation throughout intervention phases

Table (4): relation between the mean scores of study subject's knowledge towards oocyte-cryopreservation and their demographic characteristics.

Items	Pre-test	Post test
Age		
25- <30	2.23±1.12	14.01±1.17
30-<35	2.32±1.12	12.01±1.16
>35	2.13±1.12	13.01±1.17
Residence		
Urban	2.22±1.12	13.1±1.17
Rural	2.03±1.12	14.1±1.17
Occupation		
Working	3.22±1.12	12.1±1.17
Not working	3.03±1.12	13.1±1.15
Socio-economic level		

Low	2.23±1.12	12.1±1.17
Moderate	2.32±1.12	14.1±1.15
High	2.13±1.12	13.1±1.17

Table 5: Correlation matrix between total knowledge and total attitude score among the study subjects throughout intervention phase.

	Pre	**Post**	**T**	**P**
Total knowledge score	**3.99±1.66**	**14.27±1.75**	**0.566**	**0.034**
Total attitude score	**3.17±0.62**	**8.97±1.77**	**11.114**	**0.00****
P	**0.00****	**0.01***		

Discussion

Fertility maintenance is an important issue for all workers using reproductive technologies, and it is the responsibility of maternity nurses to maintain older girls' knowledge and attitudes in this regard. As the field continues to evolve, dilemmas related to fertility treatments and ethical considerations should be explored [(21)] . Awareness of elective egg freezing varies widely, even among medical and non-medical professionals, and caregivers play an important role in educating and advising others about fertility. Therefore, it is necessary to raise the awareness of "self-first, then others" among non-medical students.

Judging from the demographic characteristics of female graduate students, more than half of female graduate students are between 25 and 30 years old, live in urban areas, have no jobs, and are in the middle socioeconomic level. These are representative of the characteristics of graduate students in Egypt, as reported in a similar study by **Fahmy S., Mohamed M. (2021)**[(22)] where individual data for undergraduate nursing students in this bridging program reported a mean age of 25.23 ± 4 years, 25 years old, lives in the countryside. Less than half of them work in university hospitals. Specialization in the same age group, but differences in residence and work status lead to geographical differences and differences in the mandatory employment of all nursing students after graduation.

Regarding the subjects' sources of information regarding oocyte preservation, this study found that one-third of the participants obtained information from television and the Internet. It is not surprising to find such a result, as the target group of the current study justifies the age of young people they are interested in through social media and the internet, which are always readily accessible and provide them with a wealth of information. Information provided in different fields. This result is similar to the study by **Fotopoulou et al., (2015)**[(23)] who found the internet, magazines and/or television to be the main sources of information. On the other hand, earlier results contradict those of **Will et al.,**

(2017) [24] who mentioned formal education as the most common source, followed by social media and friends and **Tozzo et al., (2019)** [1] found that more than a third of participants had heard of oocyte cryopreservation through their family, friends, media and school or university

According to the results of the current study, the knowledge score of postgraduate females regarding ovum cryopreservation was significantly higher post-intervention compared to pre-intervention, when the majority of them had given accurate answers regarding the general concept, preparation, risks, and religious beliefs. These results were in line with those of **Hong et al., (2019)** [25] who examined the level of awareness and knowledge on elective oocyte cryopreservation among reproductive unmarried women in Korea. They found that the majority of the women who participated in the study had the correct response for EF.

Concerning total knowledge score of study subjects regarding oocyte-cryopreservation, the majority of the study subjects show satisfactory score of total knowledge after implantation of study intervention compared to pre-intervention. This may return to clarity and simple way used in explanation of the educational material used in the study. The implementation of educational intervention has proven to meet their needs in enhancing their knowledge and improving their attitudes which led to acceptance of the research hypothesis.

Similar results were discovered by **Rafiei N., Zanjani SE., and Khodamoradi (2020)** [15] in their quasi-experimental study the impact of educational package on nursing Students' knowledge towards fertility preservation. After receiving the teaching materials, all of the participants showed increased change awareness towards fertility preservation when they answered questions correctly. These alterations show that the instructional programme had a greater influence on these inquiries. In the same line**, Abdelwahab and Samy (2017)** [26] in Egypt conducted a study to determine the challenges that oocyte cryopreservation in the Middle East faces and showed that the majority of the investigated sample cited lack of knowledge about the intervention's efficacy, and excess or expense..

Alternatively, in a study by **Fahmy S. and Mohamed M. (2021)** [22] to assess knowledge, attitude, and barriers of unmarried female bridging program nurses regarding egg frozen at South Valley University, they found that 60% of the students' knowledge of EF was insufficient. This may indicate that the study subjects in the two studies were different because nursing students may have more knowledge from their study than non-nursing or non-medical students.

As regards attitude of the study subjects regarding oocyte cryopreservation the present study results shows that there was marked increase in study subjects total score of attitude in posttest after implantation of educational intervention. Total attitude score about oocyte-cryopreservation improved from one quarter positive in pretest to majority of them in posttest. Similar research was done in Egypt by **Hasab Allah MF, Abdelnaem SA, and Abuzaid ON. (2021** [10] about the influence of educational guidelines on nursing students' knowledge, beliefs, and attitudes towards oocyte cryopreservation. According to the study's findings, only 25.6% of nursing students had a positive attitude towards egg freezing in the pretest, but this number rose to 56.8% in the posttest, with a statistically significant difference.

The current study findings showed that there is marked increase mean scores (mean ± standard deviation) of study subject's knowledge towards oocyte-cryopreservation and their demographic characteristics. As age group 25-<30 and rural residence subjects shows significant improve in their score in posttest respectively. As regards occupation working subjects and moderate socio-economic level shows increased in posttest.

In line with the previous finding, **Hasab Allah MF., Abdelnaem SA., & Abuzaid ON., (2021)** [(10)] found a highly statistically significant relationship between students' overall knowledge of oocyte cryopreservation and their demographic information, including their age, academic standing, marital status, and mothers' level of education, in both the pretest and posttest. However, **Rafiei et al. (2020)** [(15)] who revealed that knowledge score is not substantially different between different sex, residence, and marital status post-education program, disagreed with the previous findings.

Regarding the relationship between the study respondents' overall knowledge and attitude scores during the intervention phase. The study subjects' posttest attitude score improved along with their overall knowledge, which increased. According to **Hasab Allah MF., Abdelnaem SA., & Abuzaid ON., (2021),**[(10)] there was moderately positive correlation between the studied students' knowledge and attitudes about oocyte cryopreservation and weakly positive correlation between their beliefs and attitudes about the practice in the pretest, where the r_ values were.406 and.270, respectively, with statistically significant differences where the p_ values were 0.022 and 0.050, respectively

Conclusion:- Based on the results of the present study results and verified of the research hypothesis, it can be concluded that the impact of an educational intervention regarding oocyte cryopreservation on knowledge and attitude of post graduated female students was effective in increase their knowledge and change their attitude. And there was positive relation between satisfactory knowledge and positive attitude regarding oocyte cryopreservation among study subjects after implementation of educational intervention. So, the previously mentioned findings justified the current research hypothesis

Recommendation

- As a result of delay age of marriage in Egypt , more efforts needed by the health care system, to increase the youth knowledge about ways to preserve their fertility especially unmarried girls
- Further study involved a provision of educational courses for different non-medical faculties to improve their knowledge and change their attitudes regarding oocyte cryopreservation

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