

## Efficacy of Educational Package regarding Oocyte Cryopreservation on Knowledge and Attitude of Gynecological Cancer Females

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### Abstract

**Background:** Advances in cancer treatment have a significant impact on the survival rate of gynecologic female cancer patients. Oocyte cryopreservation is one method females can use to keep their fertility. **Aim:** Evaluate the effect of educational package regarding oocyte cryopreservation on knowledge and attitude of gynecological cancer females. **Design:** Quasi- experimental design of one group was utilized. **Setting:** At Al-Shifa Medical Complex and Radiotherapy Center at Al Sulaiman Private Hospital in Port Said. **Sample:** According to the inclusion criteria, 374 female cancer patients were included in the purposive sampling. **Tools:** Two tools were used includes structured interview and attitude Likert scale regarding oocyte cryopreservation. **Results:** Before intervention, Mean and SD of total score of knowledge and attitude were poor (.82±.523 & .48±.862), while at the post-intervention; there was an improved to 1.80±.535 and 1.80±.606. Also at follow up there was an improvement to 1.70±.647 and 1.64±.776 compared to pre intervention phase with statistically significant (P=0.000\*). Also, there was a significant, positive correlation between knowledge and attitude throughout the program phases (P=0.000\*). **Conclusion:** The educational package was highly effective at changing the female cancer patients' knowledge and attitudes regarding fertility preservation as an innovative approach to maintain their future ability for reproduction. **Recommendations:** The importance of including this innovative approach as one of the foundational nursing curricula for female patients who have just received a cancer diagnosis, as well as evolving protocols and pathways to empower prompt health education and communication between the healthcare team and newly diagnosed female cancer patients regarding fertility preservation options.

**Keyword:** Educational Package, Gynecological cancer females & Oocyte cryopreservation.

### Introduction:

The most serious pathological health issue with the greatest geographic difference in incidence is cancer, which has also elevated to a top priority on the global health agenda (Obora, et al., 2022). Globally, gynaecological malignancies are a significant cause of illness and mortality in women. Additionally, it is ranked as the fourth most prevalent cancer in women and are thought to affect more than 1.39 million women worldwide (Mofrad, et al., 2021).

In 2019, 100,000 newly diagnosed cases of gynaecological cancers were noted, according to the American Cancer Society (Siegel, et al., 2019). The most prevalent type of cancer is uterine cancer 53%, which precedes malignancies of the ovary 25% and cervix 14%. Less frequently, vaginal and vulvar malignancies as well as neoplastic types like trophoblastic tumors, are found (Mofrad et al., 2021).

Treatments for these tumors had a significant effect on sexuality and fertility, altering women's

psychosexual balance and perception of their bodies (Linn et al., 2019). Chemotherapy and radiotherapy are now more successful than they formerly were, and cancer females frequently have favourable long-term prognoses that allow them to lead healthy lives. These advancements in cancer treatment are a result of current research. Having a child is one of the key components of a healthy existence. Numerous chemotherapy and radiotherapy regimens have the potential to be gonadotoxic, which could lead to an irreversible loss of ovarian reserve or its complete diminution (Fahmy & Mohamed, 2021).

One of main long term side effects of chemotherapy and radiation therapy used to treat gynecological cancers in young women is loss of fertility (Dittrich et al., 2016). High-energy rays are used in radiation therapy to eliminate cancer cells. Additionally, these rays could damage female's ovaries. Infertility in young women receiving radiation treatment for the pelvis or abdomen is influenced by how much radiation is taken up by the ovaries. Infertility and an

early menopause may result from high doses that harm part or all of the eggs and the ovaries. The majority of women who get pelvic radiotherapy become infertile. In certain cases, brain radiation may disrupt the pituitary gland and interfere with the signals sent to the ovaries, preventing them from producing hormones that regulate ovulation. Depending on radiation's focal point and dose, this could have an impact on **fertility (Rafiei et al., 2020)**.

Oocyte cryopreservation therefore provided many people all around the world hope for having children. Nearly three million infants have been delivered utilizing assisted reproductive technologies (ART) in the past 30 years globally, according to statistics **(Fahmy & Mohamed, 2021)**.

Oocyte cryopreservation is also thought of as a new clinical specialized that aims to keep young and adolescents female at risk of infertility's capacity for reproduction. In addition to surgical advancements, the area is growing quickly thanks to developments in cryopreservation techniques and assisted reproductive technologies. For young people who are at danger of becoming infertile owing to medical issues, illnesses, or medications, fertility preservation potential is a crucial issue **(Rodriguez et al., 2021)**.

According to recent studies, up to 75% of cancer patients who are young women want to establish a family after receiving a cancer detection and treatment. Young females may lose the opportunity to preserve their fertility before beginning cancer treatment if they not instructed about hazards posed to their fertility by chemotherapy or radiotherapy **(Kim et al., 2018)**.

Furthermore, oocyte cryopreservation is a medical therapy that is ethically acceptable, with its only objective of protecting healthy women's reproductive potential, according to a report from the American Society for Reproductive Medicine's (ASRM) Ethics Committee published in 2018 **(Ethics Committee of the American Society for Reproductive Medicine, 2018)**.

There have only recently been a few options available for oocyte cryopreservation to delay childbirth. Although oocyte freezing and successful thawing are now possible, it is unclear how much females are aware of this technique's existence, how they feel about using it, or the circumstances in which it would be considered. In western societies, women have a great deal of freedom and control over almost every area of their lives, including marriage, family planning, employment, and communication. The "biological fertility clock" is still outside of their control, though, and most women who wanted children in their late thirties had a lower likelihood of

becoming pregnant naturally or through in vitro fertilisation **(Lallemant et al., 2016)**.

In an educational package, an interactive process is used to focus on the health requirements or issues of the individual and close family members in order to enhance or assistance with overcoming disease or health difficulties. As a result, nurses are essential in assisting cancer patients who are young women in changing their health-related behaviours by enhancing their knowledge and changing their attitudes about cryopreservation **(Mahesan et al., 2019)**.

Additionally, educational package for young cancer patients have been regarded as one of the most successful ways to change female's knowledge and attitude on cryopreservation. Female young patients could not receive adequate knowledge regarding the possibility of freezing a portion of their ovarian tissues in order to maintain their fertility in the absence of sufficient guidance. Loss of the chance to preserve fertility may result from a lack of guidance. In order to give the best therapeutic services, healthcare professionals— particularly nurses who work with patients with cancer must be knowledgeable on latest advancements in fertility preservation technologies **(Fahmy & Mohamed, 2021)**. Thus, this study was conducted to improve young female's knowledge and change their attitude regarding cryopreservation to prevent loss of their ability to preserve fertility.

### **Significance of the Study:**

Infertility is the main frequent side effects of cancer management, thus there is growing worry about fertility preservation for female young cancer patients. Cancer females do have the option to prioritize fertility treatment, though. According to estimates made by **Abdelaziz et al. (2021)**, 36.7 % of young female cancer patients in Egypt at risk for gynecologic cancer, and more than 22,000 new cases are discovered every year. For female cancer survivors who are of reproductive age, having children is frequently seen as a priority **(Logan & Anazodo, 2019)**. It is important to note that some scientific articles have described how those females may not have received sufficient guidance from a relevant healthcare provider prior to beginning their cancer treatments, leaving them unaware of the potential hazards of infertility and ways to keep it **(Zhang et al., 2019)**. In their systematic review, **Logan & Anazodo (2019)** found that 29 out of 33 fertility preservation recommendations supplied therapeutic advice on the value of fertility counseling, especially in young cancer patients.

In light of this, nurses who care for patients should immediately discuss the potential of infertility with

young females' patients during treatment planning and be prepared to talk about potential fertility preservation techniques or as soon as feasible introduce appropriate and interested young females to reproductive specialists (El-Said Mansour & Hassan, 2021). Therefore, this study was conducted to evaluate the effect of educational package regarding oocyte cryopreservation on knowledge and attitude of young female patients with cancer

#### Aim of the study:

The study aimed to evaluate the effect of educational package regarding oocyte cryopreservation on knowledge and attitude of gynecological cancer female.

#### The aim was fulfilled through the following:

- Assessing level of knowledge and attitude of young female cancer patients regarding fertility preservation.
- Developing and implementing an educational package regarding fertility preservation for gynecological cancer females.
- Evaluating the effectiveness of an educational package regarding fertility preservation on level of knowledge and attitude for gynecological cancer females.
- Exploring the correlation between knowledge and attitude of young female cancer patients regarding fertility preservation.

#### Research Hypothesis:

**H1:** It was anticipated that an educational package on fertility preservation would be an effective way to change the attitudes and improve knowledge of gynecological cancer female.

**H2:** There was a significant correlation between attitude and knowledge of young female cancer patients.

#### Operational Definitions:

**Educational Package:** Provided information about fertility preservation to assist young females with gynecological cancer.

**Fertility Preservation (FP):** The goal of this effort is to help young females' cancer patients to maintain their procreative capacity or fertility.

#### Subjects and Method:

##### Research Design:

Quasi- experimental pretest and posttest design of one group.

##### Study Setting:

It took place conducting this study at Al-Shifa Medical Complex and Radiotherapy Center at Al Sulaiman Private Hospital in Port Said city from the period of November 2022 to April 2023 because there were no other places for radiotherapy in Port Said city.

#### The Study Subjects:

The following inclusion criteria of purposive sampling that were used to select young female cancer patients:

- Females who are unmarried and between the ages of 20 and 25.
- Females who have been diagnosed with gynecological cancer and who will have treatment with radiotherapy or chemotherapy in the pelvic area (alone, following or in advance of surgery).
- Having at least a basic education and being open to participating in the study. Never having received guidance on the subject of the current study.
- Don't have a hysterectomy and uterine cancer.

**The sample size** was estimated using the formula below (Dobson, 1984), and the result was as follows:

$$\text{Sample size (n)} = \frac{Z^2 \cdot P(100 - P)}{\Delta^2}$$

$p$  : The prevalence of young female cancer patients in Egypt = 33 (Abdelaziz et al., 2021).

$Z_{\alpha/2}$ : A typical normal distribution percentile with a 95% confidence interval equals 1.96

$\Delta$  : The confidence interval's width= 5.

$$\text{Sample size (n)} = \frac{1.96^2}{5^2} \cdot 33 \times (100 - 33) = 340 \text{ Women}$$

340 women represented the sample size used for the analysis. Because the anticipated non-participation rate (10%), the final sample size was 374 females.

#### Data Collection Instruments:

##### Two tools were used to collect the data:

**Tool I: Structured interview:** It was adapted from Miok et al. (2019) in English format and modified by researcher to evaluate young women's knowledge about cryopreservation before and after receiving instructional materials. It is separated into the following three sections:

**Section I:** Sociodemographic information, including age, education, occupation, place of residence, and income.

**Section II:** Medical history (including information on the current diagnosis, length of treatment, and chemotherapy type planned, anticipated number of doses, and the radiotherapy sessions).

**Section III:** It includes questions that covered knowledge about cryopreservation as (effect of chemotherapy, types of chemotherapy, definition of egg freezing, benefits for resorting to egg freezing, suitable time, suitable age for egg freezing, places of egg freezing, and success rate, etc.). It includes ten closed-ended questions in all. The test was graded as follows: 2 for a correct response, 1 for "don't know,"

and 0 for an incorrect response. The overall score could be between 0 and 20. The ranges for poor knowledge were 0 to 7, average knowledge was around 8 to 15, and good knowledge was around 16 to 20.

**Tool II: Attitude Likert scale:** It was adopted from **Rashed, et al., (2018)** in English format to evaluate young females patients' attitude regarding cryopreservation. It used a Likert scale with three options: zero disagree, one neutral, and two agree. There were ten statement questions in total. The overall score could be between 0 and 20. Positive attitude was indicated by total score that around 10 to 20, whilst negative attitude was indicated by total score that around 0 to 10.

**Validity of the instruments:** The tool's content validity was examined by ten specialists in the fields of obstetrics and gynaecological nursing as well as medical and nursing staff. Additionally, they were asked to assess the items' clarity and completeness. The instruments were designed with suggestions in mind. The finished form was ready for use after the suggested revisions were made.

**Reliability of the instruments:** It was used by the researchers to check the instruments' internal consistency. It involves administering the same instrument to the same individual many than once while maintaining identical circumstances. With these reliabilities, the tools appear to be satisfactory, and the Cronbach's Alpha coefficient test results of 0.720 for the first tool and 0.701 for the second tool indicate that the items have an average level of internal consistency.

**Ethical Consideration:** The Port Said University Faculty of Nursing's Research Ethics Committee approved the study under approval code NUR 6 /8/2023 (28). The study's sample of young female participants was all told that they could choose whether or not to participate. To each woman in the study sample, the researcher explained the study's objective. They were informed that all research data would be kept confidential and solely used for the objectives of the study. The subjects' confidentiality was always maintained. The women signed informed written consents prior to enrollment.

**Administrative Design:** After the nursing faculty formally requested permission to gather data from the necessary parties in the aforementioned setting in a letter, official approval was given.

**A Pilot Study:** Thirty-seven young females were used in a pilot study to assess the instruments' applicability and determine how long it would take to collect the data. The researchers established the session schedule and determined the viability of the data collection methods based on the findings of the piloting.

**The filed work:** The data was gathered between November 2022 and April 2023. Intervention Technique: The four primary stages of the current study's execution were preparation, assessment, implementation, and evaluation.

**Preparatory Phase:**

- The researchers performed a pilot study to evaluate the viability of the tools and determine the duration allotted for data collection after revising pertinent literatures and data collection methods related to the study's subject and obtaining the official, written consent formal letter from the Port Said university faculty of nursing and the director of the oncology centers. Based on the goals of the educational package, the researcher corrected the questionnaire after filling it out during interviews with young females.
- The educational sessions' material was compiled and translated into Arabic. A guidance handbook and PowerPoint presentations were both used to create the topic. The data gathering tools and the booklet were then presented to a panel of experts for review.

**Assessment phase:**

Based on the previously mentioned inclusion criteria, participants were chosen. After introducing themselves and outlining the study's objectives to the women females, the researchers obtained their agreement to participate. For the purpose of maintaining confidentiality and gathering information about their general characteristics, each female was interviewed separately for 20 minutes. Then, using the aforementioned tools, a pre-test was carried out to determine the level of knowledge and attitude of females towards fertility preservation. This was done in order to identify the facilitators and barriers for discussing fertility preservation education with a young female after receiving a new cancer diagnosis in oncology settings.

**Implementation Phase:** The instructional package sessions were carried out based on the results of the pre-test evaluation. About sixteen young females were chosen by the researchers each week and the researchers visited the centers 2 days per week. To receive the sessions of an educational package and the instruction manual, study subjects were eight patients in each day who are young females. 30-45 minutes were allotted for each session. These were the educational sessions:

**Session (1):** Outlines study's objectives, the intervention processes, how to gain oral informed permission, how much time is allotted for additional educational sessions, and how to get in touch with the researchers. Also it includes general information about effect of gynecological cancer treatment on fertility, definition of the egg freezing and the suitable age for egg freezing.

**Session (2):** The point of view of religion in the freezing of eggs, reasons for resorting to egg freezing in single girls, risks of egg freezing, procedures required before the egg freezing process, and steps in the egg freezing process.

**Session (3):** Methods of freezing eggs, how to get pregnant using frozen eggs, danger signs for contacting a health care provider, pros and cons of egg freezing.

**Session (4):** Factors affecting the success of egg freezing and thawing procedures, effect of oocyte freezing on the fetus, costs of egg freezing, the success rate of pregnancy by oocyte freezing, and common questions.

**Session (5):** All of the content from the previous sessions was covered in the fifth session. Additionally, participants were encouraged to discuss any struggles they were facing.

**Teaching Resources:** A laptop computer showing a PowerPoint presentation, a video describing the cryopreservation procedure, and printed hand copies of the session's contents. Weekly phone call is used to monitor and follow up on the all women educational package and update data.

**Evaluation Phase:** To assess the impact of the educational package on the females' knowledge level and attitude utilizing the same tools as described above, the post-test was administered twice: immediately following all prior educational sessions and one month later. To assess the impact of the intervention, the researchers compare the data they have gathered.

#### Statistical Data Analysis:

On an IBM compatible computer, SPSS software version 20 was used to tabulate and analyse the most recent set of data that had been obtained. Standard deviation and mean ( $X \pm SD$ ) were used to express quantitative data. The Chi square ( $\chi^2$ ) test was used to analyze categorical variables. Using the paired t tests was conducted to compare continuous quantitative variables. It was determined the Pearson ( $r$ ) correlation coefficient for two significant continuous variables. P-values of 0.05 or less were utilised to determine statistical significance and P-values for more than 0.05 represent not statistically significant (S).

#### Results:

**Table ( 1): Distribution of the Studied Sample According to their General Characteristics**

General Characteristics	Studied Participants (n=374)	
	No.	%
<b>Age (years)</b>		
Min-Max	20-25	
Mean $\pm$ SD	22.5 $\pm$ 2.5	
<b>Level of education</b>		
Reading & write	4	1%
Basic	15	4%
Secondary education	142	38%
High education	213	57%
<b>Number of family members</b>		
2-5	224	60%
6-8	101	27%
9-11	49	13%
<b>Employee</b>		
Yes	97	26%
No	277	74%
<b>Residence</b>		
Urban	277	74%
Rural	97	26%

**Table ( 2): Distribution of the Studied Sample According to their Medical History**

Medical history	Studied Participants (n=374)	
	No.	%
<b>Duration since diagnosis per months</b>		
Mean ± SD	4±1.5	
<b>Type of cancer</b>		
Endometrium	142	38%
Ovary	116	31 %
Cervix	60	16%
Vulva	41	11%
Vagina	15	4%
<b>Planned treatment type</b>		
Chemotherapy only	142	38%
Chemotherapy then surgery	98	26%
Surgery then chemotherapy	67	18%
Radiotherapy on pelvic region	67	18%

**Table (3): Distribution of the Studied Sample According to their Knowledge about Cryopreservation at pre-intervention, post- intervention and at follow up phase (No. =374).**

Knowledge	Pre-intervention	Post-intervention	Follow-up	t test / p-value1	t test / p-value2
	Mean ± SD	Mean ± SD	Mean ± SD		
1. Causes of infertility.	.92±.634	1.80±.535	1.60±.728	5.858 / 0.000*	4.056 / 0.000*
2. Effect of chemotherapy/ radiotherapy on fertility.	1.02±.553	1.88±.385	1.78±.545	7.523 / 0.000*	5.480 / 0.000*
3. Types of chemotherapy/radiotherapy that can affect fertility.	1.00±.452	1.60±.728	1.50±.763	4.583 / 0.000*	3.796 / 0.000*
4. Definition of cryopreservation.	.90±.303	1.64±.563	1.52±.677	11.809 / 0.000*	8.941 / 0.000*
5. Benefits of cryopreservation.	.96±.198	1.90±.416	1.74±.600	27.707 / 0.000*	10.885 / 0.000*
6. Suitable time for cryopreservation.	.08±.274	1.82±.560	1.72±.671	14.854 / 0.000*	12.913 / 0.000*
7. Suitable age for cryopreservation.	.18±.482	1.86±.495	1.76±.625	12.699 / 0.000*	10.253 / 0.000*
8. Costs of cryopreservation.	.98±.141	1.94±.314	1.90±.416	34.293 / 0.000*	19.107 / 0.000*
9. Places of cryopreservation.	1.00±.000	1.90±.416	1.80±.571	15.280 / 0.000*	9.899 / 0.000*
10.Expected success rate of fertility preservation.	1.00±.000	1.86±.495	1.72±.671	12.278 / 0.000*	7.584 / 0.000*
<b>Mean and SD of total knowledge score</b>	.82±.523	1.80±.535	1.70±.647	8.202 / 0.000*	7.550 / 0.000*

t test / p-value1: t test & significance between pre/post-interventions

t test / p-value2: t test & significance between pre/follow-up

(\*) statistically significant at  $p \leq 0.001$

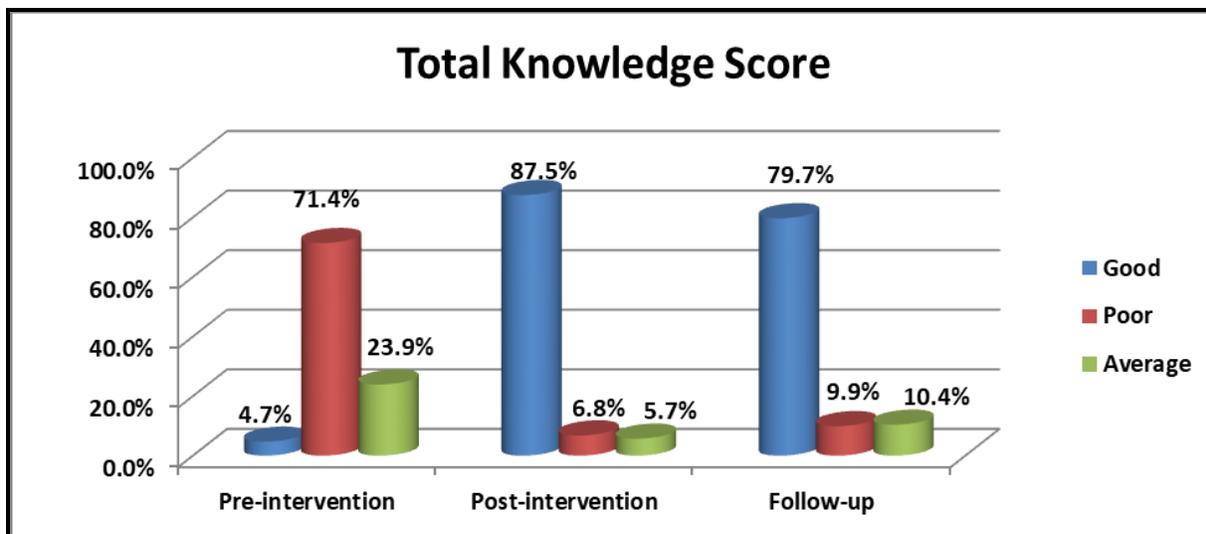


Figure (1): Comparison between total knowledge score of the Studied Sample at pre-intervention, post- intervention and at follow up phase.

Table (4): Distribution of the Studied Sample According to their Attitude about Cryopreservation at pre-intervention, post- intervention and at follow up phase (No. =374).

Attitude	Pre-intervention	Post-intervention	Follow-up	t test / p-value1	t test / p-value2
	Mean ± SD	Mean ± SD	Mean ± SD		
1. I am concerned about preserving my fertility before starting chemotherapy/ radiotherapy.	.72±.757	1.94±.313	1.88±.435	9.480 / 0.000*	7.908 / 0.000*
2. I support cryopreservation before chemotherapy/ radiotherapy as fertility preservation method.	1.00±.571	1.94±.313	1.90±.416	8.984 / 0.000*	7.584 / 0.000*
3. I will be childless without cryopreservation/ radiotherapy.	1.00±.571	1.86±.495	1.64±.721	6.567 / 0.000*	3.914 / 0.000*
4. I think that having cryopreservation will have negative impact on my relationship with future spouse.	1.30±.814	1.84±.421	1.78±.464	6.244 / 0.000*	5.915 / 0.000*
5. I will inform my friends and relatives if I have cryopreservation.	.80±.451	1.72±.640	1.62±.696	11.500 / 0.000*	11.096 / 0.000*
6. If one need cryopreservation, the decision should be taken by self, parents and physician only.	.34±.745	1.48±.677	1.42±.730	6.496 / 0.000*	6.084 / 0.000*
7. A future child should never know that he/she is born after fertility preservation.	.92±.565	1.92±.395	1.90±.416	12.533 / 0.000*	12.374 / 0.000*
8. It is necessary to have psychological counseling before cryopreservation.	.06±.313	1.90±.416	1.86±.404	18.995 / 0.000*	18.318 / 0.000*
9. I agree with advertisement on cryopreservation in the mass media.	.56±.884	1.90±.416	1.86±.404	8.477 / 0.000*	7.891 / 0.000*
10. I think that I will preserve fertility through cryopreservation.	.22±.615	1.98±.141	1.94±.239	18.118 / 0.000*	15.031 / 0.000*
<b>Mean and SD of total attitude score</b>	<b>.48±.862</b>	<b>1.80±.606</b>	<b>1.64±.776</b>	<b>7.092 / 0.000*</b>	<b>5.226 / 0.000*</b>

t test / p-value1: t test & significance between pre/post-interventions

t test / p-value2: t test & significance between pre/follow-up

(\*) statistically significant at p≤0.001

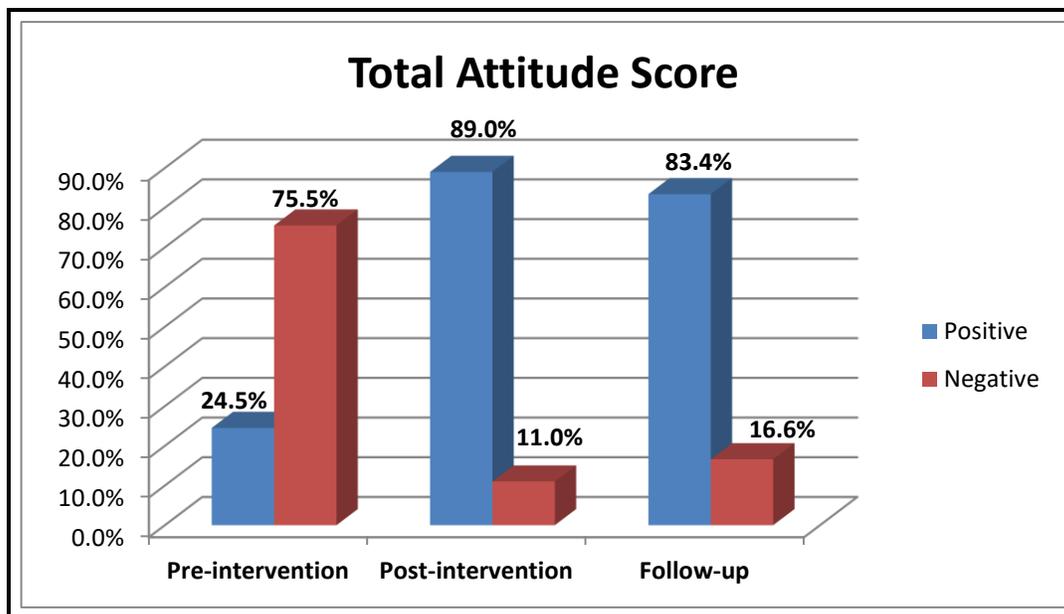


Figure (2): Comparison between total attitude score of the Studied Sample at pre-intervention, post- intervention and at follow up phase.

Table (5): Correlation between total knowledge and total attitude scores at pre-intervention, post-intervention and at follow up phase.

	Total knowledge score			
Total attitude score	Pre-intervention	r=0.49* p = 0.000 **	-	-
	Post-intervention	-	r= 0.882* p =0.000 **	-
	Follow-up	-	-	r= 0.919* p =0.000 **

(\*) Pearson's correlation

(\*\*) Statistically significant at  $p \leq 0.001$

According to their general characteristics, the studied females are distributed as shown in **Table (1)**: Their mean age was 22.5 years. About more than half of young female patients was highly educated (57%) and had two to five numbers of family members (60%). Regarding the place residence; 74% were urban residents and did not work.

**Table (2)**: Showed how the study sample was distributed based on their medical histories. Four months had passed on mean time since the cancer diagnosis. The highest percent of the study sample had endometrium cervix (38%) then ovarian cancer (31%). Also, 38% of young female patients were just going to have chemotherapy treatment, whereas almost a quarter of them (26%) were going to both chemotherapy and surgery.

According to their knowledge of cryopreservation at the pre-intervention, post-intervention, and follow-up phases, the studied sample is distributed in **Table (3)**: All knowledge-related items showed

a statistically improvement after the intervention and during the follow-up phase in comparison to the baseline before intervention ( $P=0.000^*$ ). The Mean and SD of the overall knowledge score were low ( $.82 \pm .523$ ) before the intervention, but they were significantly improved ( $1.80 \pm .535$ ) after intervention. Additionally, an improvement in mean and standard deviation was seen at follow-up phase versus the pre-intervention phase ( $1.70 \pm .647$ ).

**Figure (1)**: Showed that before intervention, the vast majority of young female patients (71.4%) had poor knowledge levels. However, the majority of them (87.5%) had good knowledge following the intervention. Additionally, compared to the pre-intervention phase, more than two thirds (79.7%) of the studied females had good knowledge level at the follow-up phase.

**Table (4)**: Demonstrated distribution of the studied sample according to their attitude about cryopreservation at pre intervention, post

intervention and at follow up phase. It's evident that after intervention, all items of attitude significantly improved as compared to before ( $P=0.000^*$ ). Prior to intervention, the total attitude score's mean and standard deviation were  $.48\pm.862$  and they increased to  $1.80\pm.606$  following intervention. Additionally, compared to the pre-intervention phase, the follow-up phase was enhanced to  $1.64\pm.776$ .

Only 24.5% of the studied females had positive attitude towards cryopreservation at pre intervention phase, as shown in **Figure (2)**: In comparison to the pre-intervention phase, the intervention raised the percentage of positive attitude to 89% at the post-intervention stage and to 83.4% at the follow-up.

**Table (5)**: Explained the correlation between all total knowledge and attitude scores at pre, after, and throughout the follow-up stage. At pre-intervention, post-intervention, and follow-up phases all displayed a substantial, knowledge and attitudes are positively correlated ( $r=0.49$ ,  $r=0.882$ , and  $r=0.919$ , respectively). The younger female had a more attitude as her knowledge score was improved.

## Discussion

Infertility is a known side effect of gynecological cancer and the corresponding treatment techniques (chemotherapy or radiotherapy). There weren't many options for females in the past to maintain their fertility. Today, ovarian tissue can be protected using a variety of methods to lessen the damaging impact of radiation and chemotherapy (**Kohale & Kumar, 2021**). In spite the availability of cutting-edge treatments, cancer sufferers lack knowledge. So, the current research was performed to evaluate effect of educational package regarding oocyte cryopreservation on knowledge and attitude of young female cancer patients with gynecological cancer.

According to the current study's findings, there were a statistically improvement in the examined young females' knowledge about cryopreservation after intervention as compared to before intervention regarding effect of chemotherapy, types of chemotherapy, definition of egg freezing, benefits for resorting to egg freezing, suitable time, suitable age for egg freezing, places of egg freezing, and success rate. This might due to the instructional package contains the most necessary, simplest and accurate knowledge. This finding was supported by **Rashed, et al. (2018)** investigation on "Female knowledge, practices and attitude about fertility preservation" validated this conclusion. According to the aforementioned study, the majority of studied sample had bad knowledge scores.

Also, a different study by **Goldfarb et al. (2013)** that

looked at "Female knowledge, practices and attitude about fertility preservation" was also undertaken. Only half of the population under examination was informed of the concept of fertility preservation, according to this study, which found that awareness of the concept was low. It is believed that the fact that the practice of preserving fertility is new and little known by female's young patients is the cause of the stated low knowledge and awareness levels in various researches.

The study's findings was in contrast to those of **Hong et al. (2019)**, who conducted research on Elective oocyte cryopreservation (EOC) awareness and knowledge levels among Korean unmarried women of reproductive age. They found that most of the women in the study gave the right response to one of six questions meant to gauge their level of knowledge about egg freezing. This might be relevant to the cultural, educational differences and adequate knowledge of fertility preservation between the analyzed sample in the present study and those in the studies previously stated may be the cause.

With regard to the current study's findings, young female attitudes towards cryopreservation have improved since receiving instructional materials from negative to positive. This can be explained by the hypothesis that attitude changes occurred as a result of obtaining thorough explanations during a series of instructional sessions. The thought that the nurse's responsibility is a counselor is crucial in enhancing knowledge and changing attitude towards innovative techniques and procedures was also confirmed by the fact that young females are becoming more self-prepared to the issue of fertility preservation.

This study's findings was supported by a study by **Shimizu et al. (2013)** that examined attitudes about preserving ovarian function and fertility in breast cancer patients and found that the study sample had positive attitudes towards doing so at the time of the post-test. In addition, **Tozzo et al. (2019)**, who conducted their study in Italy to evaluate young girls' attitudes and understanding of social oocyte freezing, discovered that only roughly one-third of female students were familiar with the practice.

Furthermore, **O'Mahony et al. (2017)** observed that the use of educational sessions led to an improvement in attitude towards the researched topic in their study concerning "Irish cancer women's awareness of strategies for fertility preservation after chemotherapy."

These results contrast with those of **Grabowski et al. (2017)**, who found that a number of variables influence people's attitude regard fertility preservation. Others, such outside influences, time restraints, and therapy, may act as hurdles. Some of these factors, like self-awareness and confidence, may

act as facilitators. These results may be more strongly correlated with patient concerns about their prognosis than with future goals for child preservation, such as educational attainment, financial situation, and work load.

The findings of the current study demonstrated a substantial increase in positive correlation between all knowledge and attitude total scores following the instructional package compared to the baseline. This might be because the knowledge of the young females is significant in altering their attitudes from low to high or from negative to positive, which aids in handling the obstacles and restraints.

In the same line according to **Rashed, et al. (2018)** conducted research on the knowledge and attitude of young females about fertility preservation and found a favorable association around knowledge and attitude. Additionally, **Quinn et al. (2014)** found a similar association between knowledge score and attitude in their study "A national study of practitioners' behaviors was conducted on fertility preservation in cancer patients".

The current study's findings disagree with those of **Jenninga et al. (2013)** who investigated "knowledge, attitudes, practical considerations, and ethical aspects of an underutilized procedure for female fertility preservation" and produced different findings. The study described above reported enrolling females with different ethical perspectives, some of whom thought that using any fertility preservation technology was unethical and against the Good's well. This could explain why the results were inconsistent between the two studies.

### Conclusion

The study hypotheses were found to be valid according to the findings of this study and thus, it can be concluded; the total knowledge and attitude scores of studied young females with gynecological cancer towards cryopreservation were improved after intervention as compared to before intervention. Also, at all program phases, there was also a substantial, positive significant correlation between total knowledge and attitude scores.

### Recommendations:

- The importance of including this innovative approach as one of the foundational nursing curricula for female patients who have just received a cancer diagnosis.
- Evolving protocols and pathways to empower prompt health education and communication between the healthcare team and newly diagnosed female cancer patients regarding fertility preservation options.
- To increase knowledge of and accessibility to future

fertility preservation in cancer patients, there is a need for interdisciplinary collaboration between the members of the oncology health team and reproductive health care professionals.

### Further study:

The current study may be repeated on a sizable sample and different area to provide a baseline for pre treatment programs to raise public awareness toward fertility preservation.

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