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# Effect of an Educational Program on Women's Intention Regarding Oocyte Cryopreservation

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## Abstract

**Background:** Oocyte cryopreservation is a rapidly growing technology in reproductive health, enabling healthy and non-healthy females to delay marriage and progeny, providing a viable alternative to traditional methods.

**Aim:** The current study was conducted to enhancing females' intention regarding oocyte cryopreservation via an educational program.

**Subjects and Methods:**

***Design:*** A quasi-experimental design was used.

***Sample and Settings:*** A study from Beni-Suef University on a purposive sample consisted of 334 working females at Beni-Suef University.

***Tools*** (I): An Arabic-structured interview questionnaire sheet contains female socio-demographic characteristics. (II): Females' intention regarding oocyte cryopreservation.

**Results:** Revealed that 48.8% of the studied females had insufficient income, and 59.3% were rural residents. After program implementation, 86.5% had moderate intentions which is higher as compared to 77.5% who had moderate intentions pre-program. A highly significant statistical differences between overall intentionspre and post program implementation (P=0.000).

**Conclusion:** Although there was no significant statistical relation between the studied working females' intention levels and all items of socio-demographic characteristics found either pre-program or post-program implementation. An observable improvement in females' intention was found after program implementation.

**Recommendations:** Structured educational and counseling programs regarding oocyte cryopreservation should be provided by maternity nurses to females of reproductive age to make informed and timely decisions aligned with their future reproductive life.

**Key words:** Educational Program, Women's Intention, Oocyte Cryopreservation

## Introduction

The most serious pathological health issue with the greatest geographic difference in incidence is cancer, which has also been elevated to a top priority on the global health agenda [1-7]. Globally, gynecological malignancies are a significant cause of illness and mortality in women [8-12]. Additionally, it is ranked as the fourth most prevalent cancer in women and is thought to affect more than 1.39 million women worldwide [13-20].

In light of this, many researchers emphasized the importance of nurses caring for cancer patients, addressing the issue of infertility as early as possible before starting treatment, and mentioning the potential option of FP [21-30]. Since time is a critical factor in the management of these patients, fertility counseling and referral to FP should be considered as soon as females are diagnosed with cancer, rather than when they begin gonadotoxic treatment [31-38].

In addition, an interactive process is used to concentrate on health requirements or concerns of the individual and close family members in order to enhance or assist with overcoming disease or health difficulties. As a result, nurses are essential in assisting cancer patients who are young females in changing their health-related behaviors by enhancing their knowledge and altering their attitudes regarding cryopreservation [39].

Besides, OC can be an important fertility option for females with a range of medical conditions other than cancer, such as benign ovarian teratoma, severe or recurrent ovarian endometriosis, and recurrent ovarian torsion. Among these, ovarian endometriosis is particularly concerning, as it can significantly diminish the ovarian reserve by triggering follicle "burnout," a process where excessive follicle activation leads to premature atresia, as shown in figure 1 [40].

That is why various methods of fertility preservation (FP) can be used to help females to get pregnant during their suitable time depending on their conditions, preferences, and the indications, results, and risks associated with each method. FP includes medical therapy before chemotherapy, ovarian tissue cryopreservation,

embryo cryopreservation, and oocyte cryopreservation (OC) / vitrification [42]. Among these, OC has gained increasing attention in recent years, as more females are choosing to preserve their fertility, making it likely to become part of routine clinical practice [43].

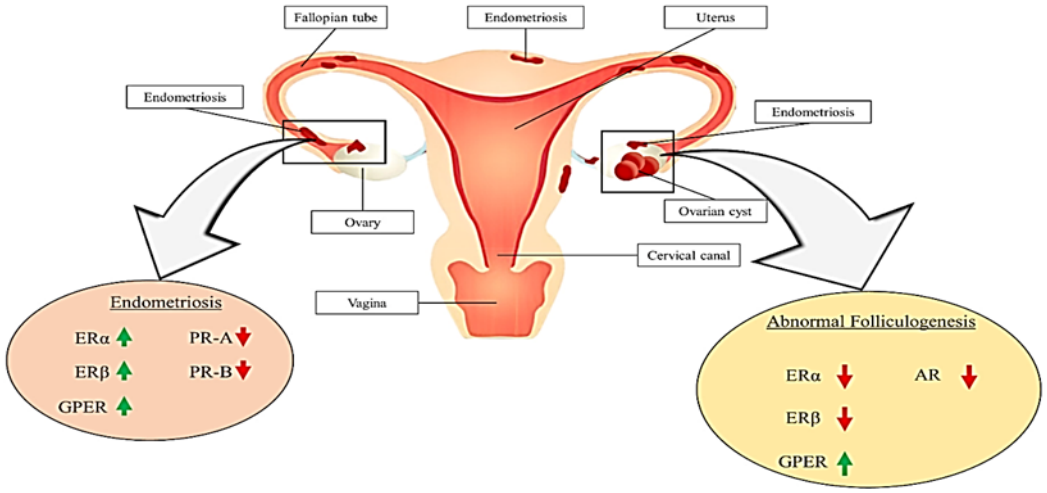


Figure (1): Association of receptors expression changes with the pathogenesis of abnormal folliculogenesis and endometriosis [41]

In this context, human OC is a procedure used to preserve a woman's eggs for future use and enable women to conceive at a later date. Initially, this technique was only used for medical purposes when a woman faced a medical condition or required treatment that may potentially compromise fertility. However, over the last decade, OC has become more significant as a means of maintaining fertility for social reasons [44].

Nurses play a crucial role in the care and education of females, as well as in raising awareness about oocyte cryopreservation and the respect for women's right to understand fertility preservation options. [45]. Nurses should also include a discussion of potential downstream costs, including those associated with oocyte thaw, fertilization, embryo culture, preimplantation genetic testing of embryos (PGT), and embryo transfer (ET). Providers are encouraged to share their own clinic-specific statistics for oocyte survival, fertilization, implantation, and live birth rate (LBR) in an effort to be transparent as patients choose whether and where to undergo their OC procedure [46].

Accurate information, counseling provision, and a clear referral pathway are vital to ensure prompt, appropriate access to fertility services to maximize future reproductive opportunities. Prior to the gamete cryopreservation, females must be screened for transmissible viruses to prevent cross-contamination of stored samples. In addition, they must give written informed consent allowing the storage of their gametes and specifying the intended storage duration [47].

Besides their counseling and educating role within society, nurses have a greater number of relationships with patients and families than other healthcare professionals. In recent years, the results of previous studies have shown that the nursing profession is accountable for the discussion of fertility preservation options from a physician's point of view [48-54].

## Aim of the study

The current study was conducted to enhancing females' intention regarding oocyte cryopreservation via an educational program.

## Researchhypothesis

Following the implementation of an educational program, females' knowledge regarding oocyte cryopreservation will be improved.

## Subject and Method

**Research design:**

Quasi-experimental research design (pre/post-test) was utilized to achieve the aim of the current study.

**Subjects and Settings:**

A study from Beni-Suef University on a purposive sample consisted of 334 working females at Beni-Suef University.

**Tools of data collection:**

**Tool (I):- An Arabic-structured interview questionnaire sheet:**

The researcher conducted a study on female socio-demographic characteristics, including age, education, marital status, occupation, residence, income, and delayed marriage or childbearing, based on advanced literature review and data collection.

**Tool (II): Females' intention regarding oocyte cryopreservation:**

It was adapted by the researcher from relevant literature to assess females' intentions regarding OC by 7 items as mentioned: (Interested in checking the ovarian reserve, the decision to freeze ova is a valid decision, the influence of social acceptance and culture on decision-making regarding OC, fear of future husband refusal impact on woman's decision, lack of knowledge impact on woman's decision, being in favor of ovum freezing, being ashamed of making the decision to freeze ova).

***Scoring system:***

On a five-point Likert scale, the responses were scored as follows: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5), with a total score of (1-35). The total intention score was calculated and divided into three categories:

§ High intention: for scores of ≥75% (≥ 26 degrees).

§ Moderate intention: for scores of 50%– <75% (17-26 degrees).

§ Low intention: for scores of <50%.(< 17 degrees)

**Tools Validity:**

Three experts assessed the content validity of the study tools, ensuring comprehensiveness, accuracy, relevance, applicability, and linguistic clarity, and made necessary adjustments based on the findings.

**Tools Reliability:**

The study tools' reliability was assessed using Cronbach's Alpha test, revealing a coefficient of 0.774, indicating stable and consistent results over time.

**Fieldwork**

The study aimed to create an educational program on oocyte cryopreservation (OC) among females. It involved three phases: preparatory, pilot study, and fieldwork. The preparatory phase involved

reviewing literature and developing data collection tools. The pilot study evaluated the tools' applicability and efficiency. Fieldwork was conducted over six months, with pretest data serving as the baseline. The program was implemented at Beni-Suef University faculties, with four interactive sessions held twice weekly. The post-test evaluated the program's effectiveness. The study received approval from the Dean of the Faculty of Nursing and the Faculty of Medicine, Beni-Suef Scientific Ethical Committee.

**Statistical Design:**

The data was analyzed using SPSS 22.0 for descriptive statistics, Pearson correlation coefficient, Chi-square tests, and paired sample t-tests to measure categorical variables, with a significance level of $P<0.05$ for statistical analysis.

## Results

**Figure (2)** Summarizes the distribution of studied working females' socio-demographic characteristics. Concerning their monthly income from their point of view, results revealed that 48.8% of the studied females had insufficient income. For their residence, 59.3% were rural residents.

**Table (1)** reveals the overall levels of studied working females' intentions regarding oocyte preservation through program phases. After program implementation, 86.5% had moderate intentions which is higher as compared to 77.5% who had moderate intentions pre-program. Using chi square test revealed highly significant statistical differences between overall intentions pre and post program implementation (P=0.000).

**Table (2)** summarizes the overall mean score of studied working female's intentions regarding oocyte preservation through program phases. The overall mean score of studied working females' intention regarding oocyte preservation after program implementation (21.89±2.15) was higher as compared to preprogram (19.74±2.98). Using paired sample t test revealed highly significant statistical difference between pre and post program implementation regarding overall intention (P=0.000).

**Table (3)** demonstrates the relation between studied working females' socio-demographic characteristics and their intention levels through program phases. There was non-significant statistical relation between studied working females' intentions levels and all socio-demographic characteristics pre and post program implementation.

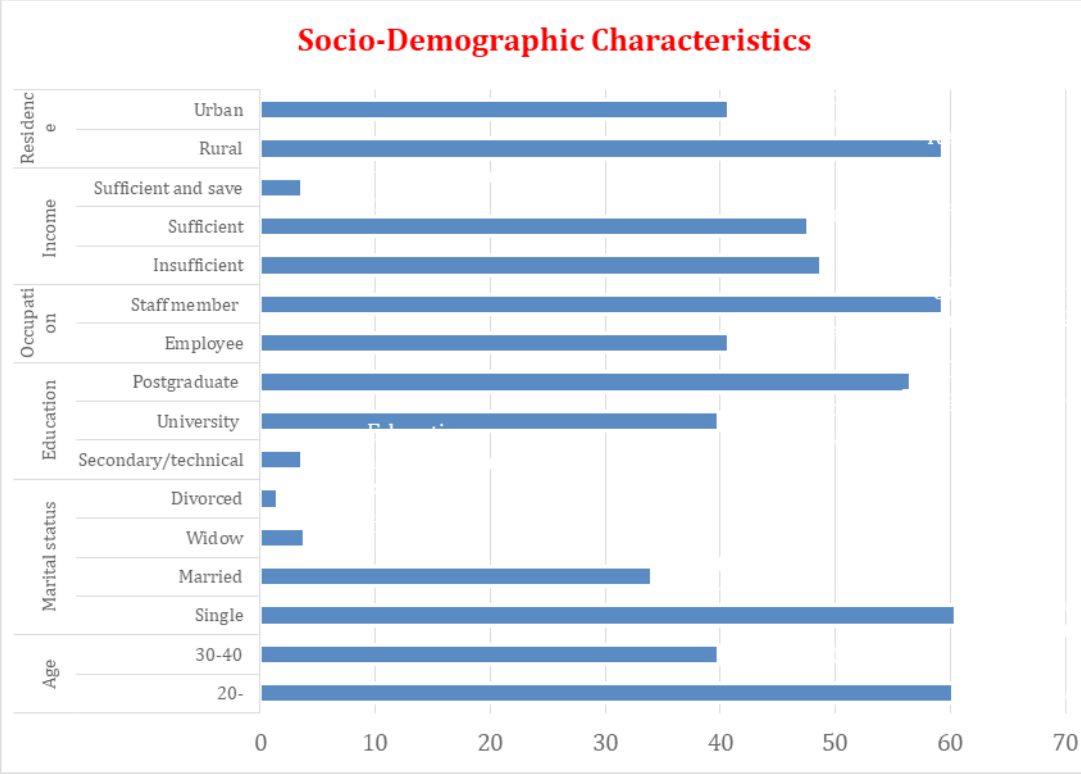


Figure (2): Frequency and percentage distribution of studied working females' socio-demographic characteristics

| Intentions Categories | Pre Program | | Post Program | | χ2 | P-value |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | | |
| High | 5 | 1.5 | 36 | 10.8 | 72.183 | 0.000** |
| Moderate | 259 | 77.5 | 289 | 86.5 | | |
| Low | 70 | 21 | 9 | 2.7 | | |

Table (1): Overall levels of studied working females' intentions regarding oocyte preservation through program phases (n=334)

** Highly statistical difference at P<0.01 χ2: Chi Square test

| Dimensions | Min-Max | Pre Program | Post Program | t Value | P-Value |
|---|---|---|---|---|---|
| | | Mean±SD | | | |
| Overall Intentions | 7 – 35 | 19.74±2.98 | 21.89±2.15 | -13.069 | 0.000** |

Table (2): Overall mean score of studied working female's intentions regarding oocyte preservation through program phases (n=334).

** Highly statistical difference at P<0.01 t: Paired sample t test

| Socio-demographics | Pre Program | | | | | | χ2 | P-value | Post Program | | | | | | χ2 | P-value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | High | | Moderate | | Low | | | | High | | Moderate | | Low | | | |
| | No. | % | No. | % | No. | % | | | No. | % | No. | % | No. | % | | |
| **Age (years)** | | | | | | | | | | | | | | | | |
| 20 < 30 | 3 | 0.9 | 154 | 46.1 | 44 | 13.2 | 0.266 | 0.876 | 7 | 2.1 | 187 | 56 | 7 | 2.1 | 1.653 | 0.438 |
| 30 < 40 | 2 | 0.6 | 105 | 31.4 | 26 | 7.8 | | | 3 | 0.9 | 128 | 38.3 | 2 | 0.6 | | |
| **Marital status** | | | | | | | | | | | | | | | | |
| Single | 4 | 1.2 | 161 | 48.2 | 37 | 11.1 | 3.845 | 0.698 | 9 | 2.7 | 189 | 56.6 | 4 | 1.2 | 5.840 | 0.441 |
| Married | 1 | 0.3 | 83 | 24.9 | 30 | 9 | | | 1 | 0.3 | 108 | 32.3 | 5 | 1.5 | | |
| Widow | 0 | 0 | 11 | 3.3 | 2 | 0.6 | | | 0 | 0 | 13 | 3.9 | 0 | 0 | | |
| Divorced | 0 | 0 | 4 | 1.2 | 1 | 0.3 | | | 0 | 0 | 5 | 1.5 | 0 | 0 | | |
| **Educational Level** | | | | | | | | | | | | | | | | |
| Secondary | 0 | 0 | 10 | 3 | 2 | 0.6 | 2.188 | 0.701 | 0 | 0 | 12 | 3.6 | 0 | 0 | 2.207 | 0.698 |
| University | 1 | 0.3 | 107 | 32 | 25 | 7.5 | | | 4 | 1.2 | 127 | 38 | 2 | 0.6 | | |
| Postgraduate | 4 | 1.2 | 142 | 42.5 | 43 | 12.9 | | | 6 | 1.8 | 176 | 52.7 | 7 | 2.1 | | |
| **Occupation** | | | | | | | | | | | | | | | | |
| Employee | 4 | 1.2 | 107 | 32 | 25 | 7.5 | 3.960 | 0.138 | 6 | 1.8 | 128 | 38.3 | 2 | 0.6 | 2.817 | 0.245 |
| Staff member | 1 | 0.3 | 152 | 45.5 | 45 | 13.5 | | | 4 | 1.2 | 187 | 56 | 7 | 2.1 | | |
| **Monthly Income** | | | | | | | | | | | | | | | | |
| Insufficient | 3 | 0.9 | 116 | 34.7 | 44 | 13.2 | 7.972 | 0.093 | 5 | 1.5 | 153 | 45.8 | 5 | 1.5 | 0.845 | 0.932 |
| Sufficient | 2 | 0.6 | 132 | 39.5 | 25 | 7.5 | | | 5 | 1.5 | 150 | 44.9 | 4 | 1.2 | | |
| Sufficient and save | 0 | 0 | 11 | 3.3 | 1 | 0.3 | | | 0 | 0 | 12 | 3.6 | 0 | 0 | | |
| **Residence** | | | | | | | | | | | | | | | | |
| Rural | 4 | 1.2 | 153 | 45.8 | 41 | 12.3 | 0.908 | 0.635 | 7 | 2.1 | 188 | 56.3 | 3 | 0.9 | 3.007 | 0.222 |
| Urban | 1 | 0.3 | 106 | 31.7 | 29 | 8.7 | | | 3 | 0.9 | 127 | 38 | 6 | 1.8 | | |

Table (3): Relation between studied working females' socio-demographic characteristics and their intention levels through program phases (n=334).

* Statistical difference at P<0.05

** Highly statistical difference at P<0.01

## Discussion

Worldwide, oocyte cryopreservation (OC) is a cutting-edge emerging technology field in reproductive health that is gaining popularity for both medical and nonmedical reasons. This technology has made childbearing possible for healthy females who want to postpone marriage and progeny, as well as non-healthy females who suffer from disease or treatment that limits their fertility [55].

In Upper Egypt, the concept of fertility preservation is scarcely known and rarely discussed. To date, no prior research has investigated this topic at Beni-Suef University. Therefore, raising awareness about fertility preservation at an early age is essential. So, the current study is conducted to improve, intention regarding oocyte cryopreservation among working females at Beni-Suef University.

Through advocacy, education, and support, maternity nurses significantly impact women's health intentions by addressing fertility and preservation topics. They must remain informed about various considerations, medical, ethical, cultural, and financial that affect reproductive options [56-63].

Concerning the overall intention levels of working females regarding OC, the results of the current study revealed that the mean score of females' intention levels increased from 19.74±2.98 pre-program to 21.89±2.15 post-program. Moreover, the majority of the studied females had moderate intention post-program compared to only 1.5% of them having high intention pre-educational program.

This finding came in agreement with Sousa-Leite et al. (2019), who assessed "Women's attitudes and beliefs about using fertility preservation to prevent age-related fertility decline-A two-year follow-up," declared that only 14% reached a decision and almost decided not to do FP, and found that women's intentions, desire, and number of children wanted decreased, and a low number of women progressed through the stages of the decision-making process [64].

Overall, the study reveals that females' intention to undergo oocyte cryopreservation improved after program implementation, aided by positive reinforcement, lectures, and instructional strategies. The use of clear language aligns with Edgar Dale's Pyramid of Learning, emphasizing that discussions and audiovisual aids enhance retention rates [65-72].

Likewise, Malhotra et al. (2022) emphasized that more than half of the respondents expressed low intention of fertility preservation [21], and Stevenson et al. (2021) showed that only 7.2% had considered use of FP [73]. This agreement may be attributed to many challenges impacting females' intention regarding OC, like cultural & social norms, cost, lack of awareness, and fear of future husband refusal.

Furthermore, according to Ikhena-Abel et al. (2017), who reported that more than two-thirds of the studied sample consider OC as a future desire [74]. This disagreement may be due to the fact that the concept of OC appears to be more widely accepted among women in Western societies, with comparatively lower levels of acceptance observed in Eastern societies. In addition, acceptance of OC may be attributed to cultural, educational, and socioeconomic differences between Lower and Upper Egypt.

Regarding the studied working females' socio-demographic characteristics and their intention levels, there was no statistically significant relation between working females' intention level and all socio-demographic characteristics pre- and post-program implementation. This finding is aligned with EL-Adham & Shaban (2023), who revealed that there was no statistically significant relation between intention regarding OC and all socio-demographic characteristics of the studied unmarried healthy females before and after implementation of the educational program [75]. From the researcher's point of view, this may be due to challenges that might affect females' intentions regarding OC.

Moreover, another study contradicted by Jenninga et al. (2013), entitled "Female Fertility Preservation: Knowledge, attitude, practical considerations, and ethical aspects of an underutilized procedure, "produced results that odds the findings of the current study. Given that the aforementioned study recruited females from a variety of ethnic backgrounds, some of whom believed that any FP technology violated God's will and was ethically forbidden [76]. The variance in the results could be attributed to diverse sample subjects.

## Conclusion

Based on the findings of the present study, it can be concluded that Although there was no significant statistical relation between the studied working females' intention levels and all items of socio-demographic characteristics found either pre-program or post-program implementation. An observable improvement in females' intention was found after program implementation.

## Recommendation

Ø Structured educational and counseling programs regarding oocyte cryopreservation should be provided by maternity nurses to females of reproductive age to make informed and timely decisions aligned with their future reproductive life.

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