Effect of an Educational Program on Knowledge and Behavior about Egg Frozen among Unmarried Females

Noha Hassan AbdElfattah Mohamed[1], Hanaa Kamal Helmy[2], Safaa Soliman Ahmed Mohamed[3], Amal Ahmed Abdelhafez[4]

[1]Lecturer of Maternal and Neonatal Health Nursing Department, Beni-Suef University, Egypt.
[2,3] Assistant Professor of Maternal and Neonatal Health Nursing Beni-Suef University, Egypt.
[4]Assistant Professor of Obstetrics and Gynecology Nursing, Faculty of Nursing, Minia University, Egypt.

Abstract

Background: Egg frozen is a crucial component of assisted reproductive technology and can significantly enhance the biology of reproduction and the treatment of infertility. **Aim:** To evaluate the effect of an educational program on knowledge and behavior about egg frozen among unmarried females. **Research design:** A quasi experimental pretest/posttest research design was conducted. **Sample:** A convenience sample includes 300 working unmarried females at Minia University. **Tools:** data were collected via two tools. tool I: The structured interview questionnaire and **Tool II**: behavior assessment tool regarding egg frozen. **Results:** Unsatisfactory knowledge scores in the pretest for 86% of the investigated unmarried females were lowered to 10% and 13% of them in the post test immediately and follow up, respectively, with a highly statistically significant difference. Additionally, 91.7% and 88.3% of the investigated unmarried working females had unfavorable beliefs about egg freezing in the posttest immediately and follow up, respectively, with a statistically significant difference. In contrast, 90% of them had negative beliefs in the pretest. Additionally, with a statistically significant difference, just 10% of them showed a favorable attitude towards frozen eggs in the pretest. **Conclusion:** After the execution of the teaching program, there were highly statistically significant improvements in the total knowledge and behavior of unmarried females regarding egg frozen. **Recommendation:** Delivering health education campaigns regarding frozen eggs through the ministry of health and in cooperation with Egyptian Dar Al Iftaa.

Key words: egg frozen, unmarried females, knowledge, behavior, educational program.

Introduction

A new clinical specialty called "fertility preservation" aims to keep young adults who are at risk of infertility from losing their capacity to procreate. 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).** Many people around the world had hope for having children thanks to fertility preservation. According to data, about three million babies have been born utilizing cryopreservation techniques and assisted reproductive technologies (ART) in the past 30 years worldwide **(European Society of Human Embryology & Reproduction, 2016).** A fertility preservation technique called egg freezing (EF) has the potential to prolong fertility past the average woman's' reproductive cycle. Via in vitro fertilization (IVF), eggs are obtained via assisted reproductive technology (ART), cryopreserved by verification, and then kept in storage until needed **(Fahmy& Mohamed, 2021).**

For women who choose to put off having children for personal reasons, such as job goals, educational advancement, absence of a spouse, or financial security, egg freezing, also known as social egg freezing, is described as the storage of oocytes for

potential future use. The first successful human oocyte cryopreservation (OC) and fertilization done by Chen in 1986, during which he was able to conceive twins. Although cryopreservation is now regarded as an established technique for medical conditions like cancer, it is still a relatively new idea in terms of society **(Hasab Allah et al., 2021).**

Egg ageing is stopped by the freezing procedure, allowing women to think about getting pregnant later. Initially, EF was only made available to women who were at risk of infertility due to medical conditions including early ovarian failure or illnesses like chemotherapy (referred to as "medical" EF). However, EF (also known as "non-medical" EF) has recently emerged as a viable option for women facing the possibility of age-related infertility. The majority of women that use non-medical EF stated that lack of a spouse to share their eggs is the key factor in their decision **(Inhorn et al., 2018).**

The decision to freeze eggs is challenging. Outcomes for elective egg freezing (EEF) are uncertain and vary between providers, and success declines with age at freezing. Additionally, EEF is costly, with doctors frequently advising more than one cycle to gather enough eggs to increase the likelihood of a live birth. Cost is frequently a deterrent to use **(Blakemore et al., 2021).** Although there is variation in each person's effectiveness with egg freezing, on average 14 eggs are collected per cycle, and this number declines with age. Live birth rates are approximately 34% at 10- to 15-years follow-up, albeit they are not statistically significant. The risk of difficulties during egg collection is typically less than 1%, but when they do happen, they can be very significant, necessitating hospitalization in about 0.6% of patients **(D'Angelo et al., 2019).**

EEF may also have an emotional effect, such as feelings of loneliness, which must be taken into account. Ultimately, many women who are thinking about EEF are balancing their future family goals against their financial condition, romantic status, and personal convictions which intern forced the majority of women go to websites for fertility clinics, social media, and news reports to learn more about EEF **(Stevenson et al., 2021).**

The availability of information in the media, however, is frequently constrained, and the quality and bias of the information on the websites of fertility clinics has been criticized. Moreover, women who have previously frozen their eggs have stated that having comprehensive EEF information that focuses solely on women is their top priority **(Peate et al., 2022).**

Nurses encompass a pivotal part in advising examined females approximately the association between age and fertility. Moreover, costs, risks, and approximate number of eggs required to offer women a reasonable chance of getting to be pregnant as a result of EF. Right now, unmarried females need to be updated with new practices and coordinates into modern evidence-based innovations **(Yu et al., 2016).**

Significance of the study:

Infertility affects 8 to 12% of partners who are of reproductive age worldwide. However, certain locations have substantially higher infertility rates, which can exceed 30%. The expected rate of infertility among married couples in Egypt is 10.4% **(Ghraib &Khait, 2017; Hasab Allah et al., 2021)**. Despite all the advantages of cryopreservation, a number of factors, including as the couples' awareness and perception of the treatment, can influence their decision to undergo it.

The primary responsibility of the nurses is to evaluate the knowledge and attitudes of infertile couples towards cryopreservation in order to provide further clarification or adjustment of their concepts. **(Farrag & Eltohamy, 2020).**

Also, in contrast to other sources like the media, peers, and the internet, the majority of women who want children believe that their health care provider is the preferred and most trustworthy source of information regarding reproductive health **(Fahmy& Mohamed, 2021).**

However, women generally postpone asking their doctors for advice on conception and fertility until they are older, at a time when their fertility may already be deteriorating or damaged. Additionally, not all medical professionals are familiar with or at ease discussing age-related reproductive decrease with their patients **(Mahesan et al., 2019).** Therefore, the current study sought to enhance knowledge and behavior of unmarried females regarding EF.

Aim of the study:

This study aimed to evaluate the effect of an educational program on knowledge and behavior about egg frozen among unmarried females.

Operational definitions

Knowledge

Information acquired through experience (or) education

Behavior

The action or reaction of something under specified circumstances.

Egg freezing (EF) is a fertility preservation technique that could prolong fertility beyond a woman's natural reproductive cycle. Utilizing Assisted Reproductive Technology (ART), eggs are obtained.

Hypothesis:

The educational program will have a positive effect on unmarried females` knowledge and behavior of egg frozen.

Subjects and methods:

Research Design:

A quasi-experimental pretest/ posttest design was used to conduct this survey.

Setting:

This study was implemented during the period from January, 2023 to the end of June, 2023 at Minia University, Egypt which is the only university for Minia Governorate and serve all districts of it.

Sample:

A convenience sample consisted of 300 unmarried working females in Minia University (hospital and faculties)

Tools of data collection:

Two tools were used for data collection of the study. These tools were developed by the researchers after reviewing the related literature and research studies.

The tool I: The structured interview questionnaire:

It included two parts:

Part one: unmarried females` demographic data as (age, level of education, occupation, residence, sources of information and challenges.

Part two: **Unmarried females' knowledge: (Fahmy& Mohamed, 2021; Hasab Allah et al., 2021**) Eleven multiple-choice questions about egg freezing are included in order to evaluate participants' pre, post, and follow-up knowledge. These questions cover terms like "EF, indications, appropriate age for freezing, life span, number of eggs needed for freezing, factors affect EF, advantages, complications, and methods of egg freezing".

Knowledge scoring system:

Each question received a score of one for correct answer and zero for incorrect answer. The overall knowledge score was rated as follows: knowledge was deemed inadequate if the percent score was below 60% and deemed adequate if the percent score was above 60% and the final score is 11 degrees.

Tool II: Unmarried females` behavior: (Hasab Allah et al., 2021): The seven sentences identify the pre-, post-, and follow-up effects of the educational program on female behavior towards egg freezing as concerned about (EF missed use, bad and long-term storage of frozen eggs, and infection control practices, the significance of health care providers' awareness about EF, and the need to monitor freezing and storing. Furthermore, un married female dealing with official approved egg frozen banks.

Behavior scoring system:
Each sentence received a score of 2 for agree and 1 for disagree. When the percent score was 70% or more, a behavior was regarded positive; when it was less than 70%, it was considered negative. A total score is 14.

Tools Validity:
A panel of three experts in the field of pregnancy and newborn health nursing staff, faculty of nursing, South Valley University assessed the study instrument to ensure that it was clear and thorough.

Tools Reliability:
Using Cronbach's Alpha, the study tool's ratability coefficient was determined, and it came out to be 0.821.

Ethical consideration
After receiving official consent from the hospital and the Minia University faculties, to carry out this study. Every single unmarried female was asked for their informed consent and had the purpose and nature of the study explained to her. Furthermore, confidentiality was upheld throughout the research procedure.

Pilot study:
To assure the clarity of the tool, 10 percent (30 participants) of the study sample included in the pilot study. Then excluded from the sample after appropriate modifications were done.

Fieldwork: This study began in January 2023 and ran through the last day of June 2023.

Preparatory phase
After receiving official approval from the previously mentioned settings, the researchers conducted an interview with participants to obtain their consent. The researchers then requested the subjects to complete tools of data collection (pretest). The explanation session lasted two hours and included 20 minutes for discussion. Many questions were raised due to the topic's importance and general ignorance about it. Age at which eggs can be frozen, the number of eggs that must be frozen, and the life duration of egg freezing. Then each female received a lecture that covered all the points raised in the questionnaire and answered any questions on the subject and contained all the information regarding frozen eggs.

Implementation phase
Educational program phases
The five phases of this program's execution were assessment, development, implementation, evaluation, and follow-up.

Phase 1: Using the structured interview questionnaire to gather information from the aforementioned locations, a per-educational program guideline assessment was carried out. In order to understand the needs of the unmarried working women, an attitude scale was utilized to evaluate their behavior in relation to the instructional program on egg freezing.

Phase 2: Based on a need evaluation for an educational program about the sample's knowledge and behavior regarding EF, a program guideline was prepared. Theoretical information included the following topics: an explanation of EF, the optimal age, EF life span, eggs number that need to be frozen, as well as challenges and assessments of female behavior before, after, and following the educational program. Additionally, practices done to maintain safety of frozen eggs.

Phase 3: Implementation of the program:
At the aforementioned locations, the educational program guideline was put into

practice. An introduction to the educational program guidelines and their purpose was given at the start of the first session. Participants divided into groups (11-15 for each). Each session began with an overview of the information presented in previous sessions and the goals of the current topic, taking into account the use of straightforward language to meet the educational level of single females. The session concluded with a recap of its points and comments from other participants.

The educational program outline was delivered over the course of five sessions, with each session lasting between 30 and 45 minutes, depending on the needs of the single women and the group as a whole. Power point presentations and posters were efficient information-delivery tools employed by the researchers. Unmarried females were provided with a handout that serves as a reference for the guidelines after they have been put into effect.

Phase 4 and 5: Evaluation phase and follow up:

The evaluation phase involved evaluating changes in participants' knowledge and behavior about the educational program guidelines for egg freezing immediately following the implementation and at one month later for follow-up.

Statistical design:

Statistical Package for Social Sciences (SPSS) version 18 was used to organize, categories, code, tabulate, and analyses the data that had been gathered. Numbers, percentages, averages, standard deviation, and chi-square test were used to portray data as tables, charts, and graphs.

Results

Table (1): This table shows that, the highest percentage of study subjects related their age (33.3%) were < 20 years old with a mean age± SD of 25.65 ± 5.33, while 50% of the sample were secondary & technical institute education and 23.3% were finance office. According to residence, two thirds (63.3 %) of unmarried females were from rural area.

Figure (1) illustrates that the unmarried females` sources of information about eggs frozen were health care team (40%), followed by mass media (30%), then friends (15%), while the least source of information were from books and administrative staff (10% and 5%) respectively.

Figure (2) displays challenges of EF and states that 35%, 17% and 16% of study subjects consider cost, religious believes and lack of knowledge are challenges to perform EF.

Table (2) points out that, the study subjects' knowledge toward EF improved through program implementation phases as the majority of them had unsatisfactory knowledge pretest which improved to be most of them had satisfactory knowledge post program implementation and at follow up respectively.

Figure (3): describes the study subjects total knowledge score, most (86%) of them had unsatisfactory level before the program implementation, which improved to be satisfactory for most (90.0%, 87%) of them, immediately post program implementation and in follow up respectively, with a highly statistically significant difference (P<.0001).

Table (3) points out that, the studied females' behavior toward educational program of eggs frozen improved through program implementation phases as the majority (90%) of them had a negative behavior related to eggs frozen before the program implementation, which improved to be most of them had a positive behavior (91.7%, 88.3%) post program implementation and at follow up respectively with a statistically significant difference (P 0.001).

Table (4) shows a statistically significant positive correlations between knowledge and behavior scores and educational level age, at the post and follows up phases of guidelines implementation (p< 0.001).

Table (1): Distribution of Demographic Characteristics of the Studied Sample of unmarried females (n =300).

Items	Working women (n=500)	
	Frequency	%
Age in years		
< 20	100	33.3
20 < 25	90	30.0
25 < 30	70	23.3
≥ 30	40	13.4
Mean ±SD	**25.65 ± 5.33**	
Educational qualification		
Illiterate & primary	90	30.0
Secondary & technical institute	150	50.0
University, Master and doctor degree	60	20.0
Occupation		
Secretarial	30	10.0
Student affairs office	20	6.7
Teaching staff member office	50	16.7
Employer affairs office	60	20.0
Finance office	70	23.3
Nurses	30	10.0
Others	40	13.4
Residence		
Rural	190	63.3
Urban	110	36.7

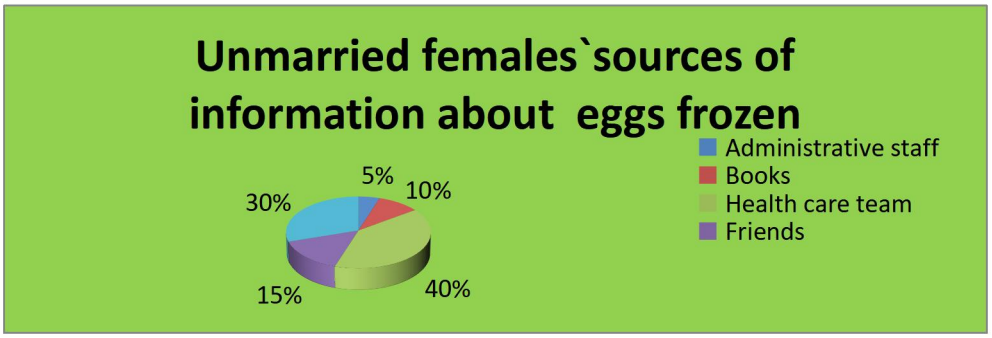

Figure (1): Distribution of Unmarried females regarding the Source of information about eggs frozen

Table (2): Percentage distribution of the studied sample of unmarried females according to their knowledge about eggs frozen throughout the program phases (n =300).

Knowledge related to eggs freezing	Pre-program		Post-program		Follow up	
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
	%	%	%	%	%	%
Definition of egg frozen	40.0	60.0	95.0	5.0	92.0	8.0
Storage of eggs	10.0	90.0	95.0	5.0	95.0	5.0
Suitable age for frozen	37.0	63.0	96.0	4.0	95.0	5.0
Indications	45.0	55.0	95.0	5.0	92.0	8.0
Number of eggs would you like to frozen	30.0	70.0	90.0	10.0	90.0	10.0
Factors affect egg frozen	5.0	95.0	88.0	12.0	85.0	15.0
Advantages of eggs frozen	10.0	90.0	95.0	5.0	95.0	5.0
Complications of eggs frozen	25.0	75.0	90.0	10.0	90.0	10.0
Methods of egg frozen	20.0	80.0	90.0	10.0	90.0	10.0

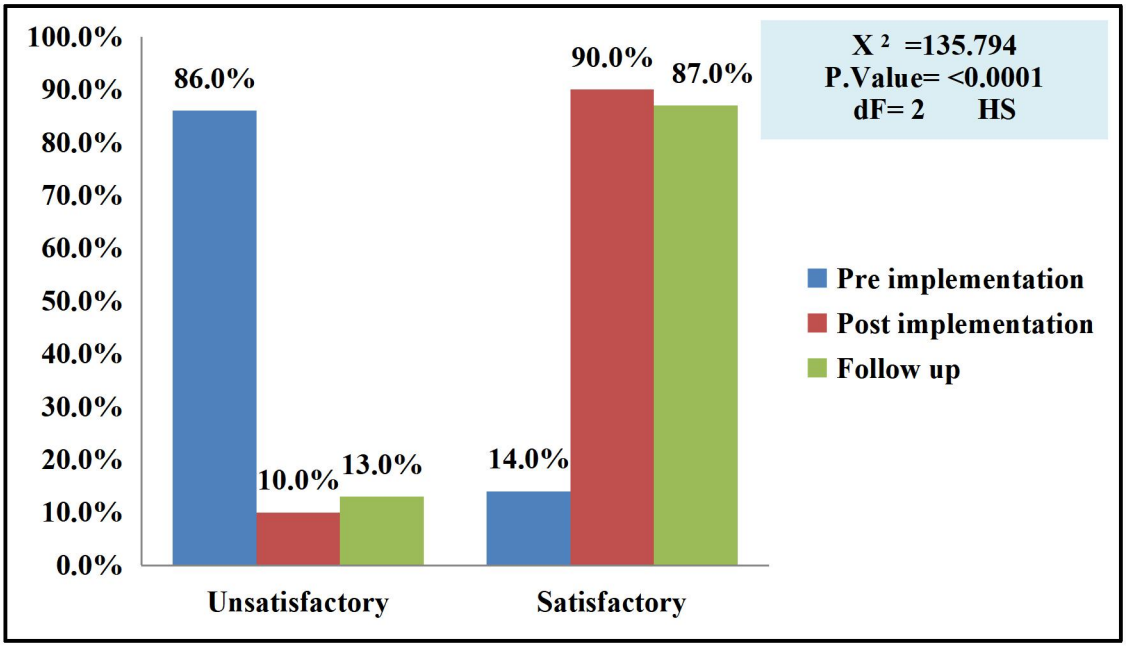

Figure (2): Percentage distribution of total score knowledge of the studied unmarried females about eggs frozen throughout the program phases (n = 300)

Table (3): Total unmarried females' behavior toward eggs frozen through program phases (n=300).

Items	Total Attitude					
	Pre implementation		Post implementation		Follow up	
	No	%	No	%	No	%
Positive	**30**	**10.0**	**275**	**91.7**	**265**	88.3
Negative	270	90.0	25	8.3	35	11.7
X^2	X^2 (1) = 18.03 X^2 (2) = 22.12 X^2 (3) = 13.04				P value <0.001**	

<0.001** highly statistically significant
X2 (1) Pre versus post implementation
X2 (2) Pre implementation versus follow up

Table (4): Correlations coefficient between working unmarried females' total knowledge and behavior about egg frozen at (pre, post & follow-up) phases and their demographic characteristics (n=300).

Variables		Age		Educational level		Residence		Occupation	
		R	P	R	P	R	P	R	P
Knowledge	Preprogram	0.53	>0.05	0.135	>0.05	0.37	>0.05	0.70	>0.05
	Post program	0.422	0.001	0.268	0.001	0.89	>0.05	0.034	>0.05
	Follow up	0.463	0.001	0.364	0.001	0.65	>0.05	0.58	>0.05
Behavior	Preprogram	0. 34	>0.05	0.42	>0.05	0.31	>0.05	0.13	>0.05
	Post program	0.266	0.001	0.442	0.001	0.56	>0.05	0.122	>0.05
	Follow up	0.243	0.001	0.287	0.001	0.24	>0.05	0.66	>0.05

* Statistically insignificant (p> 0.05)

** Highly statistically significant correlations (P< 0.001)

Discussion

Egypt's Dar El-Iftaa, the country's Islamic institution responsible for issuing religious edicts, released a statement on September, 2019 saying that the freezing of women's eggs is permissible under certain conditions. For a practitioner who uses reproduction procedures, understanding of and behavior in relation to the many religious conceptions of the reproductive health issue, particularly fertility preservation is crucial. Because of the ongoing development of this science, ethical questions and dilemmas relating to fertility medicines should be investigated **Harzif et al., (2020), Fahmy& Mohamed, (2021)**. The benefits of this issue forced the researchers to assess knowledge and behavior of unmarried females about egg frozen.

Regards sources of information about egg frozen, health care team and mass media were the main sources of information for the majority of unmarried working females. This may be due to that many unmarried females are ignored and shy about asking for details resulting from closed communities. This result supported by **Hasab Allah et al., (2021)** who found the main sources were social media, school and university (three quarters). This illustrates that there were limited resources of information for unmarried females about egg frozen. This educational program fills this gap by helping as holistic resources for caregivers to utilize in order to achieve a high knowledge and attitude or behavior about egg frozen. For this reason, it is important to tell to unmarried females that health education programs could

bring significant improvements in their knowledge and behavior about egg frozen. So, communication with females is a necessary factor in providing essential knowledge demands.

The results of the current survey revealed that the mean age of single females was 25.65 years, with the highest distribution (nearly one-third) below 20 years. Similarly, to the results of the study by **Fotopoulou et al., (2015)** in Athens, which discovered that students' mean ages were twenty years, and the study by **Tozzo, et al. (2019),** which was done in Italy, agreed that the majority of participants were between the ages of eighteen and twenty-two. More over one third of the subjects who participated in the study correctly identified the definition of egg freezing in the pretest. It unsupported with the results of **Tozzo et al., (2019)** who found that the majority of nursing students do not understand what egg frozen means.

Additionally, **Fahmy & Mohamed, (2021)** stated that more than half of studied bridging program, nursing students had inadequate knowledge. It was in the same line with the present study revealed that the majority of them had unsatisfactory knowledge related to eggs frozen before the program implementation. Also, **Hong et al., (2019)** demonstrated that the awareness and knowledge about elective OC were relatively poor among the female Korean population.

As regards total knowledge scores, the study results revealed that most of the studied unmarried females had satisfactory knowledge about egg frozen at immediately post and follow up phase than preprogram implementation. This finding supported by **Hasab Allah et al., (2021**) who showed that there were highly statistically significant improvements in students' knowledge, beliefs and attitudes about oocyte cryopreservation after implementation of educational guidelines.

According to total behavior scores of studied unmarried females about egg frozen, there was an improvement in their total behavior as the majority of them had positive behavior immediately after, and at follow up program implementation, compared to the majority of them who had negative behavior at preprogram implementation with a highly statistically significant difference. Furthermore, according to **Fahmy& Mohamed, (2021),** more than half of studied bridging program nursing students had a positive attitude towards EF. In the other way **Sandhu et al., (2023),** who emphasized that, the most women who considered using OC had high decisional conflict indicating a need for decision support. The improvement in total knowledge and behavior of participants reflects the greater impact of educational program on their awareness.

Regarding the relation between studied unmarried females' knowledge and behavior about egg frozen and their demographic characteristics, a highly statistically significant relation between their total knowledge & behavior and their age & educational level of studied females were founded in both pretest and posttest immediately and follow up. These results of the current study supported by **Hasab Allah, et al., (2021)** who stated that the pretest and posttest results supported a very statistically significant relationship between students' overall knowledge of oocyte cryopreservation and their age, academic standing, marital status, and degree of education of their mother. On the other hand, this contradicts a study by **Rafiei, et al., (2020)** that highlighted the fact that knowledge scores after completing an education program are not significantly different based on sex, place of residence, or marital status. Furthermore, **Fahmy & Mohamed, (2021)** who demonstrated that, while there is no relationship between total attitude score and age, residence, or place of study for bridging program nursing students, there is a positive relationship between total knowledge score and place of work for those students and no

relationship between total knowledge score and those students' ages and residences.

Regarding what discussed preceding, we can utilize the results of the present study, not only through with increasing awareness of unmarried females about egg frozen but also changing their behavior, beliefs, perception and attitudes toward it. They need to be aware of options for fertility preservation. Nurses' main duties involve communicating with couples in a variety of settings, including hospitals, infertility clinics, in-vitro fertilization facilities, and maternal and child heath (MCH) center during premarital counseling. Growing awareness can change their misconceptions and explain any ambiguities about the procedure and enable them to interact with the new technologies and acquire benefits of it.

Conclusion:

After implementing an educational program, there were highly statistically significant differences in the awareness level of unmarried females concerning egg freezing, according to the study's findings. It illustrates the larger impact of the educational program offered on enhancing and altering the knowledge and behaviors of unmarried females about egg freezing. Additionally, there was a statistically correlation between knowledge& behavior with age and educational level of participants through all phases of program implementation.

Recommendations:

The researchers recommend the Ministry of Health, in cooperation with the Egyptian Dar Al Iftaa, to increase citizens' awareness regarding the use of modern technology in freezing eggs and the use of all institutions to implement the health education sessions.

References:

Abdelwehab, S., & Samy, M. (2017). Obstacles facing oocyte cryopreservation in the Middle East. Obstetrics & Gynecology International Health, 7(2), 00238.

Blakemore, J. K., Grifo, J. A., DeVore, S. M., Hodes-Wertz, B., & Berkeley, A. S. (2021). Planned oocyte cryopreservation—10–15-year follow-up: return rates and cycle outcomes. *Fertility and Sterility*, *115*(6), 1511-1520.

D'Angelo A, Panayotidis C, Amso N, et al. (2019). Recommendations for good practice in ultrasound: oocyte pick up. Hum Reprod Open 2019;(4): hoz025.

European Society of Human Embryology and Reproduction (ESHER) (2016): Annual Scientific Meeting Lisbon, Portugal 14-17 June

Fahmy S.G. & Mohamed M.H., (2021). Knowledge, Attitude and Barriers of unmarried female bridging program Nurse regarding Egg Frozen at South Valley University. Egyptian Journal of Health Care, 2021 EJH Vol 12. no.3.

Farrag R., & El-tohamy, N. (2020): Oocyte Cryopreservation: Awareness and Perception of Infertile Couple Undergoing In-Vitro Fertilization. Egyptian Journal of Health Care, 11(4), 300-321

Fotopoulou V., Chasiakou A., Gryparis A., &Baka S. (2015): Greek medical student's knowledge and attitudes towards infertility and assisted reproductive technologies (Greek medical students and ART). Women's Health Care, 4, 4-7.

Ghraib, S., & Khait, A. A. (2017). The relationship between primary infertility and depression among women attending royal medical services hospitals in Jordan. J Community Med Health Edu, 7, 533.

Harzif, A. K., Maidarti, M., Silvia, M., Mariana, A., Mutia, H. D., & Wiweko, B. (2020). Knowledge, attitude, intention, and religion aspect toward fertility preservation among obstetrics and gynecology residents in Indonesia: A cross-sectional study. International Journal of Reproductive BioMedicine, 18(1), 47.

Hasab Allah, M. F., Abdelnaem, S. A., & Abuzaid, O. N. (2021). Impact of educational guideline on nursing students' knowledge, beliefs and attitudes toward oocyte cryopreservation. *Assiut Scientific Nursing Journal*, *9*(26), 1-14.

Hong, Y. H., Park, J. W., Kim, H., Kim, S.

K., Choo, C. W., Jee, B. C., ... & Kim, S. H. (2019). A survey on the awareness and knowledge about elective oocyte cryopreservation among unmarried women of reproductive age visiting a private fertility center. *Obstetrics & Gynecology Science*, *62*(6), 438-444.

Inhorn, M. C., Birenbaum-Carmeli, D., Birger, J., Westphal, L. M., Doyle, J., Gleicher, N., ... & Patrizio, P. (2018). Elective egg freezing and its underlying socio-demography: a binational analysis with global implications. *Reproductive Biology and Endocrinology*, *16*(1), 1-11.

Kostenzer, J., de Bont, A., & van Exel, J. (2021). Women's viewpoints on egg freezing in Austria: an online Q-methodology study. *BMC medical ethics*, *22*, 1-12.

Mahesan, A. M., Sadek, S., Ramadan, H., Bocca, S., Paul, A., & Stadtmauer, L. (2019). Knowledge and attitudes regarding elective oocyte cryopreservation in undergraduate and medical students. *Fertility research and practice*, *5*(1), 1-7.

Peate, M., Sandhu, S., Braat, S., Hart, R., Norman, R., Parle, A., ... & Hickey, M. (2022). Randomized control trial of a decision aid for women considering elective egg freezing: The Eggsurance study protocol. *Women's Health*, *18*, 17455057221139673.

Rafiei, N., Khosravizadeh, Z., Esmaeilpour Zanjani, S., & Khodamoradi, K. (2020). 315 The Impact of Educational Package on Nursing Students' Knowledge Towards Fertility Preservation, A Quasi-experimental Study. *The Journal of Sexual Medicine*, *17*(Supplement_1), S77-S77.

Rodriguez-Wallberg, K. A., Hao, X., Marklund, A., Johansen, G., Borgström, B., & Lundberg, F. E. (2021). Hot Topics on Fertility Preservation for Women and Girls—Current Research, Knowledge Gaps, and Future Possibilities. *Journal of clinical medicine*, *10*(8), 1650.

Sandhu, S., Hickey, M., Braat, S., Hammarberg, K., Lew, R., Fisher, J., ... & Peate, M. (2023). Information and decision support needs: a survey of women interested in receiving planned oocyte cryopreservation information. *Journal of Assisted Reproduction and Genetics*, 1-16.

Stevenson, E. L., Gispanski, L., Fields, K., Cappadora, M., & Hurt, M. (2021). Knowledge and decision making about future fertility and oocyte cryopreservation among young women. *Human Fertility*, *24*(2), 112-121.

Tozzo, P., Fassina, A., Nespeca, P., Spigarolo, G., & Caenazzo, L. (2019). Understanding social oocyte freezing in Italy: a scoping survey on university female students' awareness and attitudes. *Life sciences, society and policy*, *15*(1), 1-14.

Yu, L., Peterson, B., Inhorn, M. C., Boehm, J. K., & Patrizio, P. (2016). Knowledge, attitudes, and intentions toward fertility awareness and oocyte cryopreservation among obstetrics and gynecology resident physicians. *Human reproduction*, *31*(2), 403-411.