ISSN 2786-0183

Helwan International Journal for Nursing Research and Practice

Vol. 4, Issue 10, Month: June 2025, Available at: https://hijnrp.journals.ekb.eg/

The Effect of Educational Guidelines on Fertility Nurses' Performance Regarding Invitro Fertilization in the Fertility Unit

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Abstract

Background: Nurses' attitude regarding in vitro fertilization is very important, while research of their attitude regarding In Vitro Fertilization is limited. **The aim** of the current study is to evaluate the effect of educational guidelines on fertility nurses' performance regarding In Vitro Fertilization. **Study design:** A quasi-experimental design was utilized to conduct the study. **Study Setting**: at fertility center in Mansoura university hospital. **Sample:** A convenience sample of all fertility nurses (40), who working at fertility center in Mansoura university hospital. **Tools**: Structured interviewing questionnaire sheet, structured sheet to assess fertility nurses' knowledge regarding In Vitro Fertilization (pre/post), an observational checklist (pre/post). **Results:** positive correlation between total level of knowledge of the studied fertility nurses and total level of practice regarding In Vitro Fertilization in pre and post educational guidelines. **Conclusion:** educational guidelines had a positive effect on studied nurses' performance regarding In Vitro Fertilization. **Recommendations:** Continuous educational program and training should be offered to nurses on updating knowledge and practice to raise standard of care to in Vitro Fertilization.

Keywords: Educational guidelines; Fertility Nurses; In Vitro Fertilization; Knowledge; Practice

I. Introduction

Infertility is "the failure of a couple to conceive a pregnancy after trying to do so for at least one full year". In primary infertility, pregnancy has never happened. In primary infertility, one or the two individuals from the couple have already considered, yet can't imagine again following an entire year of endeavoring. (5)

Term "in vitro fertilization" (IVF) has become synonymous with hope for patients seeking advances in care options to fulfill dream of parenthood. Early days of ART, treatment was considered something available only for the privileged or wealthy. Today, with the advent of ART treatment coverage by healthcare insurance, even more patients are able to seek and successfully pursue treatment and realize goal of becoming parents. (1)

The current trends in reproductive health support the need for nursing professionals to assume an ongoing, visionary, scientific, and academic approach to advancement. Nurses remain a primary influence in the industry and define the nature and future of nursing standards in reproductive health. As Jean Purdy demonstrated through her determination to partner with scientific professionals and focus on the goals of success, many of today's eager professionals seek the same alignment with clinical and research teams. (2)

ISSN 2786-0183
Helwan International Journal for Nursing Research and Practice
Vol. 4, Issue 10, Month: June 2025, Available at: https://hijnrp.journals.ekb.eg/

Appropriate continuing education and opportunities for clinical certification are essential to support this determined group of nursing professionals. Professional growth and clinical expertise come to who seek excellence, show a willingness to improve, and expand future of IVF nursing practice. Continued participation in nursing research initiatives offers professionals a collaborative role in field who are interested in development of state-of-IVF standards. (3)

Nurses' attitude regarding in vitro fertilization is very important, while research of their attitude regarding IVF is limited. Nurses may have more time and opportunity in the clinical setting to discuss IVF than other health care providers. Several barriers may affect nurses' attitude regarding IVF. These include nurses may not be up to date about IVF or may have difficulty in communication with couple about IVF technique. (4)

II. Significance of the study:

Overall infertility is a worldwide medical problem and an issue of worldwide extents, that influences roughly 6.1 million couples to encounter infertility every year as indicated by the American culture for conceptive pharmaceutical (2020). (6) with a rate in Egypt around 20% to 27% of all couples, 9.2 percent suffer from secondary infertility and 5.8 percent suffer from primary infertile, which mean about 3 million women are infertile According to The Egyptian Ministry of Health. (7)

At Fertility Center in El-Mansoura University Hospital, the rate of infertility is 12 %, 64 % out of them are due to female factors, while 20.5 % are due to male factors**.** Infertility treatment has known psychological impact on women and their partners. Since assisted reproductive technologies are often a last resort to achieve pregnancy, treatment is stressful for most couples.

Aim of the study

The aim of this study is to evaluate the effect of educational guidelines on fertility nurses' performance regarding In vitro Fertilization in the fertility unit through the following objectives:

1. Assess fertility nurses' knowledge regarding normal menstrual cycle.
2. Assess fertility nurses' practice regarding In vitro Fertilization.
3. Design of educational guidelines for fertility nurses regarding In vitro Fertilization in the fertility unit.
4. Implementation of the educational guidelines on fertility nurses' knowledge and practice.
5. Evaluation of fertility nurses' performance after Implementation of the educational guidelines.

The research hypothesis

The fertility nurses' performance will be improved after implementation of In vitro Fertilization educational guidelines.

III. Subjects and Methods

Research design

The current study was conducted using a quasi-experimental design (one group) (pre and post).

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Helwan International Journal for Nursing Research and Practice
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Setting

This study was conducted at fertility center in Mansoura university hospital. The fertility center at Mansoura university hospital occupies four units Reception/Administration, Clinical Areas, Laboratory Zone and Patient Procedural area.

Subjects

Sample type and size:

A convenience sample of all fertility nurses (40), who working at fertility center in Mansoura university hospital.

Data collection tools.

Tool (1): Structured interviewing questionnaire sheet:

It was consists of seven questions and used to assess the nurses general characteristic data as: age, marital status, level of education, job description, years of experience in fertility center, previous training programs about In Vitro Fertilization and the benefit of the training programs in working in fertility nursing.

Tool (2): Structured sheet to assess fertility nurses' knowledge regarding In Vitro Fertilization (pre/post):

The structured sheet was designed by the investigator after reviewing the relevant literature. It was written in simple Arabic language to collect data which cover the aim of the study.

Part I: It was consists of seven questions in the form of multiple choice questions (MCQ) to assess the fertility nurses' knowledge regarding normal menstrual cycle (Pre/post).

Part II: It was consists of thirty four questions in the form of multiple choice questions (MCQ) to assess the fertility nurses' knowledge regarding In Vitro Fertilization (Pre/post). Each question was given a score ranging from 1 to 3, with (3) for accurate and complete answers, (2) for correct but incomplete answers, and (1) for incorrect or unknown answers or no answer. The total scores of nurses' knowledge were (41) score classified as the following:

Item	Score	%
Poor knowledge	1-20	< 50%
Average knowledge	21-31	50-75%
Good knowledge	32-41	>75%

Tool (3) - An observational checklist (pre/post)

Adapted from clinical competencies in the role development of fertility nurses. This tool was developed by **Obioha, et al (2020)** and adapted by the researcher to assess fertility nurses' practice regarding In Vitro Fertilization, it consists of eighty four (84) items it was containing sex checklists about fertility nurse's practice. The correct step was scored (2), and the incorrect step was scored (1). The total scores of observational checklist were summed up (84 marks) and classified as the following:

Item	Score	%
Poor practice	1-42	< 50%
Average practice	43-63	50-75%
Good practice	64-84	>75%

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Validity:

validity was conducted to determine whether the tool covered the aim. Validity was tested through a jury of four experts who composed of, three professors of Maternity and Newborn Health Nursing, one professor of community health nursing at Helwan University. Who reviewed the content of tools for comprehensiveness, accuracy, clarity, relevance and applicability. Minor modifications were done.

Reliability:

To verify the consistency of the measuring device, the tool's reliability was examined. The Cronbach's Alpha will be used to determine the tool's internal reliability, which is the degree to which an instrument measures the same way each time it is used under the same conditions with the same individuals.

Ethical consideration

The Scientific Research Ethics Committee granted official approval to undertake the proposed investigation. Subjects were provided thorough information about the study and their involvement before completing the informed consent form. Explaining the goal and nature of the study, as well as the opportunity of withdrawing at any time, are all ethical concerns. The information was kept secret and wasn't accessed by anyone else without the participants' agreement. Ethics, values, culture and beliefs was respected.

Preparatory phase:

The researcher reviewed the previous, current, national, and worldwide related literature as well as theoretical understanding of many parts of the research through the use of books, papers, the internet, journals, and magazines to construct data gathering techniques. Then tools were designed and tested for being valid and reliable.

Pilot study

The purpose of the pilot project was to determine the feasibility and application of these tools as well as the time necessary to gather data. A pilot study was conducted on 10% of the total study subjects (4 nurses) prior to the main trial. Based on the results of the pilot research, certain tool improvements were made. The final forms were produced after several statements were deleted, added, or rewritten. The pilot study were excluded from the main study group.

Fieldwork:

- Sampling was started and completed within 10 months beginning at July 2023 and ends in April 2024.
- The researcher introduced herself to fertility nursing staff and the approval of nurses was obtained orally after explaining the purpose of the study and tries to establish trustful relationship.
- The field work of the current study according to nursing process included the following stages:

Stage (I) preparatory phase:

Firstly the investigator introduced herself to fertility nursing staff, then the researcher create a learning community by having every fertility nurse select and change learning partners throughout the program. Define the main goals in attending the program.

Stage (II) initial assessment:

Firstly assess fertility nurse's knowledge using the previously mentioned tools. Filling the questionnaire in the morning and afternoon shifts in fertility center. The fertility nurses assured that the information collected would be treated confidentially, and it would be used only for the purpose of the research. Its filling took about 30-40 minutes for each nurse.

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Secondary assess fertility nurses practice regarding In vitro Fertilization in which investigator directly observing nurses performance during In vitro Fertilization steps using tool (III) An observational checklist for assessment of fertility nurses' practice regarding In Vitro Fertilization in the fertility center. Its filling took about 30-40 minutes for each nurse.

Stage (III) Educational Guidelines interventions implementation:

During this phase the researcher start to teach the correct knowledge and practice for study nurses about In Vitro Fertilization through 4 sessions for theoretical part and 4 sessions for practical part. The fertility nurses were divided into groups (3-5) nurses in each group.

Theoretical part divided into 4 sessions

Session (1) : It took 45 minutes for each group to meet the following objectives:

- Identify the program structure and its objectives.
- Gain fertility nurses trust and build an interacting relationship between nurses and researcher.
- Describe briefly the basic concept of Fertility, periconception and Lifestyle
- Recognize effect of Educational Guidelines Regarding In vitro Fertilization

Session (2): It took 45 minutes for each group to meet the following objectives:

- Define menstrual cycle according to (WHO) definitions
- Clarify normal menstrual cycle
- Identify how to track Menstrual cycle
- Recognize factors lead to irregular menstruation cycle
- List how to avoid irregular menstruation cycle

Session (3): It took 45 minutes for each group to meet the following objectives:

- Demonstrate guidance that a fertility nurse should give a woman about menstruation and its characteristics
- Demonstrate when fertility nurses alert the woman to visit the fertility center
- Definite In vitro fertilization

Session (4): It took 45 minutes for each group to meet the following objectives:

- List indication of In vitro fertilization.
- Illustrate how to prepare the right environment at the fertility center.
- Demonstrate how to prepare couples for In vitro fertilization.
- Demonstrate Hormone Tests for couples indicating In vitro fertilization.

Total time for Theoretical part 3 hours for each group.

Practical part divided into 4 sessions

Session (1): It took 45 minutes for each group to meet the following objectives:

- Apply importance of Sonar inspection before In vitro fertilization
- Illustrate Diagnostic endoscope before In vitro fertilization
- Recognize Patient Support Strategies for In vitro fertilization
- Definite Ovulation stimulation before In vitro fertilization
- List drugs used for Ovulation stimulation
- List Ovulation stimulation protocols before In vitro fertilization

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Session (2): It took 45 minutes for each group to meet the following objectives:

- Follow-up stimulation and induce ovulation before In vitro fertilization
- Illustrate Sperm Preparation Day of In vitro fertilization

Session (3): It took 45 minutes for each group to meet the following objectives:

- Demonstrate how to perform Examination of sick liquid on In vitro fertilization day
- Identify Methods of In vitro fertilization
- Recognize Split oocyte in the laboratory to perform In vitro fertilization
- Demonstrate Transfer of embryos

Session (4): It took 45 minutes for each group to meet the following objectives:

- Define Embryo freezing
- Apply Women's follow-up after the transfer of embryos
- Apply how to Discontinuance of treatment
- Demonstrate Side effects of In vitro fertilization
- Illustrate In vitro fertilization failure

Stage (IV) Evaluation phase:

During this phase the investigator evaluated the studied fertility nurses to evaluate nurses' knowledge and practice regarding In Vitro Fertilization immediately after implementation of educational guidelines using the same tools of data collection.

Administrative items:

Official letters, including the title and purpose of the study were issued from the faculty of nursing Helwan University. After explanation of the study aim and objectives, an official agreement was obtained from the Hospital Manager and to get approval to conduct the study after explanation of the purpose of the study and requesting the permission for data collection from the study group.

Statistical Item:

The data obtained was analyzed, and presented in numbers, percentages in the form of tables, figures and diagrams as required and suitable statistical tests were used to test the significance of the results obtained. Data were coded to facilitate data manipulation and double entered into Microsoft access and analysis was performed using statistical package of social science (SPSS) software version 18 in windows 7.

Simple descriptive analysis in the form of numbers and percentages for qualitative data, and arithmetic means as central tendency measurement, standard deviation as measures of dispersion for quantitative parametric data. Quantitative data included in the study was first tested for normality by one sample Kolmogorov–Smirnov test in each study group then inferential statistic tests were selected.

For quantitative parametric data Paired t-test in comparing two dependent quantitative data. For qualitative data Chi square tests to compare two or more than two qualitative groups. Bivariate spearman correlation test is to test association between quantitative non- parametric variables. General linear model to compare repeated measures the p-value ≤ 0.05 was considered the cut off value for significance.

IV. Results

Table (1) showed the distribution of the studied fertility nurses according to their characteristics, the above table revealed that, about half (50%) were in the age group of 20-30 years with mean ±SD 32.5±2.3. Also nearby two

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thirds were married, and more than one third (40%) of them had diploma and specialty nurse respectively, and the majority (87.5%) of them had a nurse job description. third of them (30%) had less than 5 years of experience in fertility nursing. Also less than two third (60%) of them were not attended previous training courses about In Vitro Fertilization.

Figure (1) clarified that, there were statistically significant difference between fertility nurses total level of knowledge related to In Vitro Fertilization in pre and post educational guidelines. The studied fertility nurses' total level of knowledge improved after educational guidelines.

Figure (2) clarified that, there were statistically significant difference between fertility nurses' total level of practice related to In Vitro Fertilization in pre and post educational guidelines. ($p<0.05$).

Table (2) illustrated that, there were statistically significant relation between Age, level of education and years of experience in fertility nursing of the studied fertility nurses and their total level of knowledge regarding In Vitro Fertilization in pre and post educational guideline at ($p<0.05$) respectively. Also this table showed that there were statistically insignificant relation between marital status and attendance of training courses of the studied nurses and their total level of knowledge regarding In Vitro Fertilization in pre and post educational guidelines at ($p>0.05$) respectively.

Table (3) illustrated that, there were statistically significant relation between level of education, years of experience in fertility nursing and attendance of training courses of the studied nurses and their total level of practice regarding In Vitro Fertilization in pre and post educational guidelines at ($p<0.05$) respectively. Also this table showed that there were statistically insignificant relation between age and marital status of the studied fertility nurses and their total level of practice regarding In Vitro Fertilization in pre and post educational guidelines at ($p>0.05$) respectively.

Table (4) illustrated that, there were positive correlation between total level of knowledge of the studied fertility nurses and their total level of practice regarding In Vitro Fertilization in pre and post educational guidelines. The studied fertility nurses' knowledge and practice improved after educational guidelines.

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Table (1): Distribution of the studied fertility nurse according to their general characteristics (no=40)

Items	No	%
Age		
20 < 30 years	20	50.0
30 > 40 years	13	32.5
≥ 40 years	7	17.5
Mean ±SD	32.5±2.3	
Marital status		
Single	8	20.0
Married	26	65.0
Divorced	1	2.5
Widowed	3	7.5
Level of Education		
Diploma	5	12.5
Diploma and specialty	16	40.0
Technical institute of nursing	11	27.5
Bachelors in nursing	8	20.0
Job description		
Nurse	35	87.5
Supervisor	4	10
Head nurse	1	2.5

Continue Table (1): Distribution of the studied fertility nurses according to their general characteristics.

Items	No	%
Years of experience in fertility nursing		
≥ 5 years	12	30.0
5 > 10 years	8	20.0
10 > 20 years	8	20.0
≤ 20 years	12	30.0
Attendance of training courses before or after working in fertility nursing		
Yes	16	40.0
No	24	60.0
Usefulness of training courses in working in fertility nursing		
Yes	7	17.5
No	33	82.5

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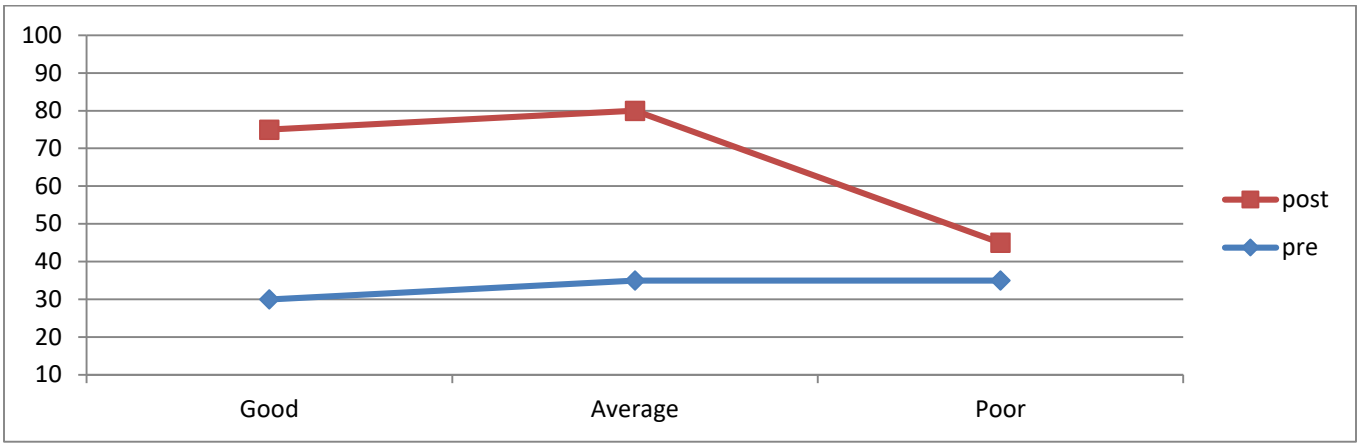
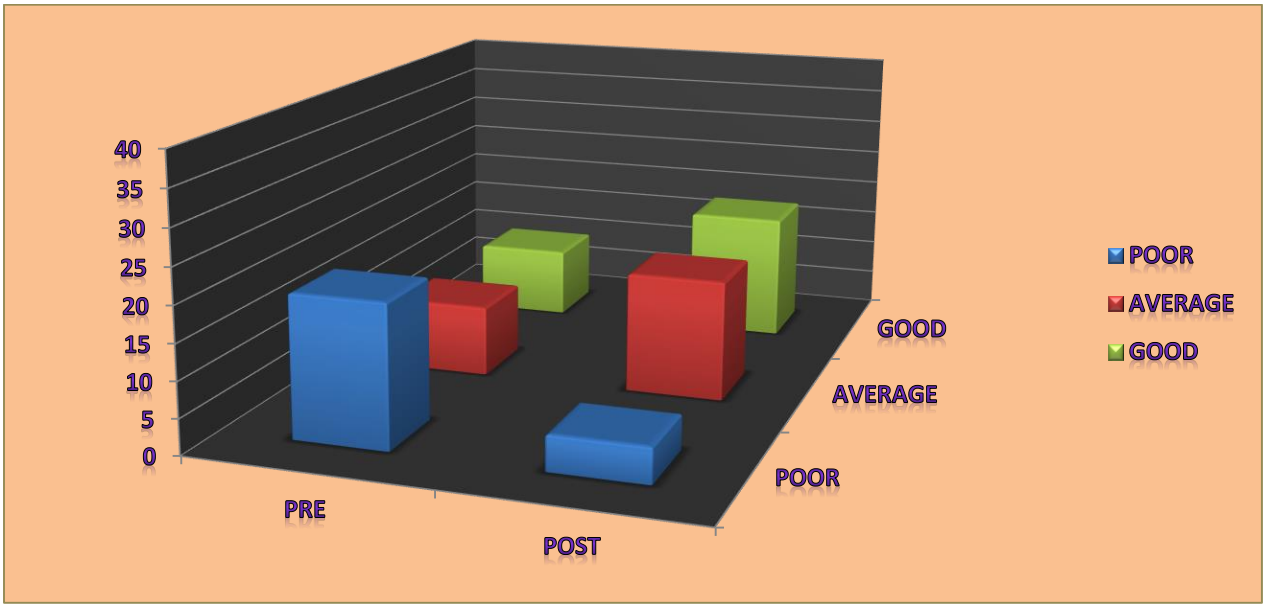


Statistically significant at p value= 0.01

Figure (1): Distribution of the studied fertility nurses according to their total level of knowledge regarding in Vitro Fertilization. (no=40)



Statistically significant at p Value=0.02

Figure (2): Distribution of the studied fertility nurses according to their total level of practice regarding in Vitro Fertilization (no=40)

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Table (2): Relation between total knowledge of the studied fertility nurses regarding In Vitro Fertilization and socio-demographic characteristics. (n=40)

General characteristics		Studied Nurses Total knowledge								X 2	P Value
		Poor knowledge		Average knowledge		Good knowledge		Total			
		No	%	No	%	No	%	No	%		
Age	20 < 30 years	3	7.5	3	7.5	5	12.5	11	27.5	9.6	**0.02***
	30 > 40 years	6	15.0	5	12.5	14	35.0	25	62.5		
	≥ 40 years	1	2.5	2	5.0	6	15.0	9	22.5		
Marital Status	Single	2	5.0	4	10.0	7	17.5	11	27.5	5.8	0.11
	Married	4	10.0	4	10.0	12	30.0	20	50.0		
	Divorced	0	0.0	2	5.0	1	2.5	3	7.5		
	Widowed	0	0.0	0	0.0	1	2.5	1	2.5		
Level of education	Diploma	2	5.0	2	5.0	3	7.5	7	17.5	10.13	**0.01***
	Diploma and specialty	1	2.5	1	2.5	2	5.0	4	10.0		
	Technical institute of nursing	5	12.5	3	7.5	5	12.5	13	32.5		
	Bachelors in nursing	2	5.0	4	10.0	10	25.0	16	40.0		
Years of Experience in fertility nursing	≥ 5 years	2	5.0	3	7.5	3	7.5	8	20.0	8.5	**0.02***
	5 > 10 years	1	2.5	4	10.0	7	17.5	12	30.0		
	10 > 20 years	2	5.0	2	5.0	7	17.5	11	27.5		
	≤ 20 years	0	0.0	2	5.0	3	7.5	5	12.5		
Attendance of training courses	Yes	0	0.0	2	5.0	10	25.0	12	30.0	0.09	0.75
	No	11	27.5	7	17.5	10	25.0	28	70.0		

(*) Statistically significant at p<0.05

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Table (3): Relation between total practice of the studied fertility nurses regarding In Vitro Fertilization and socio-demographic characteristics (n=40)

general characteristics		Studied Nurses Total Practice						X2	P Value
		Poor practice		Average practice		Good practice			
		No	%	No	%	No	%		
Age	20 < 30 years	4	10.0	2	5.0	5	12.5	9.59	0.65
	30 > 40 years	3	7.5	10	25.0	7	17.5		
	≥ 40 years	2	5.0	4	10.0	3	7.5		
Marital Status	Single	1	2.5	3	7.5	9	22.5	0.71	0.69
	Married	4	10.0	10	25	11	27.5		
	Divorced	0	0.0	1	2.5	2	5.0		
	Widowed	0	0.0	0	0.0	1	2.5		
Level of education	Diploma	3	7.5	5	12.5	5	12.5	15.8	**0.001****
	Diploma and specialty	3	7.5	9	22.5	4	10.0		
	Technical institute of nursing	2	5.0	3	7.5	2	5.0		
	Bachelors in nursing	3	7.5	1	2.5	1	2.5		
Years of Experience in ferility nursing	≥ 5 years	3	7.5	2	5.0	3	7.5	8.24	**0.02***
	5 > 10 years	3	7.5	8	20.0	5	12.5		
	10 > 20 years	2	5.0	5	12.5	4	10.0		
	≤ 20 years	1	2.5	2	5.0	2	5.0		
Attendance of training courses	Yes	4	10.0	4	10.0	4	10.0	8.9	**0.02***
	No	5	12.5	9	22.5	12	30.0		

(*) Statistically significant at p<0.05 (**) High statistically significant at p<0.0

Table (4): Correlation between total level of knowledge of the studied fertility nurses and their total level of practice regarding In Vitro Fertilization.

	Knowledge and practice	
	R	P Value
Pre Educational Guidelines	0.57	0.8
Post Educational Guidelines	0.91	**0.01***

(*) Statistically significant at p<0.05

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V. Discussion

As regard the studied fertility nurse's characteristics, the current study showed that about half of the studied sample was in the age group of 20-30 years with mean ±SD 32.5±2.5. Also nearby two thirds were married, and more than one third of them had diploma and specialty nurse respectively, and the majority of them had a nurse job description. About third of them had less than 5 years of experience in fertility nursing. Also less than two third of them were not attended previous training courses about In Vitro Fertilization.

This was in accordance with **(Kirsty Foster,2022)**, who studied "The prevalence of job stressors among nurses in private in vitro fertilization (IVF) centers" mentioned that, half of the studied fertility nurses were in the age group 30-40 years and more than one third of them had less than 5 years of experience. Meanwhile more than three quarters of them had bachelor degree in nursing, and didn't attend any training courses about In Vitro Fertilization.

But in the study of **(Petitte, 2022)**, which was about "Job stress in new nurses during the transition period: an integrative review" reported that, more than half of the studied fertility nurses were in the group age 20-30 years. More than one third of them had nursing diploma, and had 5-10 years of experience. Moreover the majority of them attended previous training courses about In Vitro Fertilization.

Concerning the total level of knowledge to the studied fertility nurses regarding In Vitro Fertilization the current work reported that, there was statistically significant difference between nurses knowledge about In Vitro Fertilization throughout the intervention. This was in accordance with the study of **(kambli, 2019)**, which was about "knowledge regarding In Vitro Fertilization among nurses" clarified that; there was statistically significant difference between nurses knowledge about In Vitro Fertilization prevention pre – post instructional guidelines intervention. From the researcher point of view it might be due to nurses keen on women's health improvement and have the responsibility to improve their knowledge through periodic educational program.

Concerning the total level of practice of the studied fertility nurses regarding In Vitro Fertilization the current study reported that, there was statistically significant difference between nurses practice regarding In Vitro Fertilization throughout the intervention. From the researcher point of view it might be due to the effect of implementation of educational guidelines and the fertility nurses' ability to learn and develop.

This was in agreement with **(Steptoe, Edwards & Purdy., 2022)**, who studied "Clinical aspects of pregnancies established with cleaving embryos grown in vitro" mentioned that, there was statistically significant difference between total practice of nurses regarding In Vitro Fertilization pre/ post instructional guidelines interventions.

As regard the relation characteristics of the studied fertility nurses and their total level of knowledge regarding In vitro Fertilization, the current findings illustrated that, there were statistically significant relation between age, level of education and years of experience in fertility nursing. While there was statistically insignificant relation between marital status and attendance of training courses of the studied fertility nurses and their total level of knowledge regarding In Vitro Fertilization throughout the intervention.

The current study findings was supported by **(Templeton, Morris & Parslow., 2023)**, who studied "Factors that affect outcome of in-vitro fertilization treatment" mentioned that there was statistically insignificant relation between the study sample demographic data, age, experiences and their knowledge regarding In Vitro Fertilization. And recorded versus the nurses' knowledge scores regarding In Vitro Fertilization were low.

Also on assessing the relation between characteristics of the studied fertility nurses and their total level of practice regarding In Vitro Fertilization, the current finding enumerated that there was statistically significance

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relation between level of education, years of experience in fertility nursing and attendance of training courses of the studied fertility nurses and their total level of practice regarding In Vitro Fertilization.

The current study findings were supported by **(Berman and Snyder, 2022)**,who studied " nurses practice for In Vitro Fertilization" suggested nursing guidelines mentioned that there was statistically insignificant relation between the study sample demographic data, age, experiences and their practice regarding In Vitro Fertilization. From the researcher point of view it might be due to instructional guidelines can improve nurse's performance regarding In Vitro Fertilization.

The current study illustrated that, there was positive correlation between total knowledge of the studied fertility nurses and their total practice regarding In Vitro Fertilization throughout the intervention. It was supported by **(Jones, et al., 2019)**, who studied "Three years of in vitro fertilization." Clarified that, there was positive correlation between the total level of knowledge of the studied fertility nurses and their total level of practice regarding In Vitro Fertilization throughout the intervention.

The researcher believe that, the educational level help in improve the effect of educational program implementation rapidly; also it can help the researcher while implementing the study in achieve the hypnosis of the study more effective. The researcher observed that this during the evaluation. The score level of the studied subjects is high in pre- educational guidelines intervention at the subject of bachelor degree for the studied fertility nurses who had bachelor degree comparing after educational guidelines intervention they pass the competence level rapidly.

VI. Conclusion

Based on the finding of the present study, it can be concluded that:

Educational guidelines had a positive effect on studied fertility nurse's knowledge and practice regarding In Vitro Fertilization. There was significant improvement in the level of knowledge and practice among the studied fertility nurses before and after educational guidelines. The results of the current study supported by the study hypothesis.

There were statistically significant differences between nurses' total level of knowledge and total level of practice related to In Vitro Fertilization in pre and post educational guidelines.

VII. Recommendations

Based on findings of the current study, the researcher recommends the following:

- Creating ongoing educational programs for nurses, including evidence-based guidelines based on needs assessments, to help them improve their performance regarding In Vitro Fertilization in the fertility center.
- Fertility nurses should be provided a continuous education program and training to keep their performance up to date in order to improve their quality of care and enhance the success of In Vitro Fertilization.
- Fertility Nurses' knowledge and practice must be evaluated on a regular basis in order to identify nurses' requirements and variables impacting their performance regarding In Vitro Fertilization in the fertility center.
- Developing and making available an instructional guideline for fertility nurses in the fertility center with simple and comprehensive and guidebook on nursing management.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Practice
Vol. 4, Issue 10, Month: June 2025, Available at: https://hijnrp.journals.ekb.eg/

- An in-service training program for newly hired fertility nurses to keep up to speed on In vitro Fertilization care and enhance their practice.

Further studies:

The study should be replicated on different In vitro Fertilization centers in order to generalize the results.

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