Effect of Structured Based Training on Nurses' knowledge and practices regarding the Modern Contraceptive Methods

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Abstract:

Family planning is still a crucial public health intervention, thus nurses should play a bigger role in filling the gap by offering training that will increase their ability to satisfy women's health demands. **This study** aimed to determine the effect of structured-based training on nurses' knowledge and practices regarding modern contraceptive methods. **Study design**: A quasi-experimental one group pre-immediate and post-test design was utilized. **Study setting:** A family planning clinics of Tanta University Hospital, El-Menshawy General Hospital, Doctor Mohamed Mashally Medical Center, Segar Medical Center, Kohafa Medical Center, Satouta Medical Center, and El-Agezy Medical Center. **Study Subjects:** All available nurses (50) who were working in previously mentioned settings. **Study Tools:** Two tools were used for data collection**,** nurses' knowledge regarding modern contraceptives questionnaire, and nurses' practices regarding modern contraceptive methods by using observational checklist. **Results:** Following the implementation of the structured-based training, nurses' mean knowledge and mean practices scores about current contraceptive methods increased both immediately and one month later, with a statistically significant difference. **Conclusion:** The implementation of structured-based training has led to a statistically significant positive improvement in knowledge and practices of the studied nurses about modern contraceptive methods, hence fulfilling the research hypothesis. **Recommendations:** Nurses should have access to clear, ongoing education and in-service training programs to remain up-to-date on modern contraceptive methods and enhance their practices.

Key words: Structured based training, nurses, modern contraceptive methods.

Introduction:

For enhancing mother and child health, the health care providers need to improve the prevalence of modern contraceptive methods (MCMs) and lowering unmet family planning needs. Modern contraceptive methods are products or medical procedures that stop fertilization or the implantation of the fertilized ovum in order to avoid pregnancy, which consist of oral and emergency contraceptive pills, injectable contraceptive methods, subdermal implantable methods, and the intrauterine contraceptive device (IUCD) **(Dingeta et al., M'rinkanya et al., 2021, and Shaharo et al., 2022).**

Worldwide, the inability of many women of reproductive age to obtain contraceptive services results in millions of unintended pregnancies and unsafe abortions every year. (**Roga et al., 2023)**. Also, approximately half of the 208 million pregnancies that occur each year are abortions, accounting for roughly 41% of unwanted pregnancies. Furthermore, **in developing nations,** 214 million women of reproductive age do not have access to modern contraceptive methods. **(Adane et al., 2020; Utomo et al., 2021)**. The percentage of Egyptian women who used MCMs in 2021 was 65%. Additionally, a recent study predicts that 10% of women who have ever been married and are between the ages of 15 and 49 use injectable contraceptives, 20% use oral contraceptive pills (OCP), and 29% use IUCD**. (Aziz and El-Gazzar 2023)**.

Recently, modern contraceptive methods are becoming more widely available, as their use will lower maternal morbidity and mortality rates by 32% and childhood deaths by around 10%, promote economic development, protect against STDs like HIV/AIDS, decline unsafe abortions, and determine the spacing and number of children that can be desired. In addition, they limit the number of women exposed to pregnancy-related health hazards and lengthen the time between pregnancies, both of which reduce the number of unintended pregnancies and deliveries. Additionally, it's predicted that using effective modern contraceptive methods can prevent 20% of pregnancy-related morbidity and mortality and 90% of abortion **(WHO 2023; Asiedu et al., 2020; Unicef and Kawuki et al., 2022).**

The third goal of the Sustainable Development Goals (SDG) is to guarantee universal access to sexual and reproductive health (SRH) care services, including family planning (FP). By 2030, all citizens should have access to family planning counseling, sexual and reproductive health information should be incorporated into national policies and initiatives. This responsibility falls on government stakeholders and health care professionals. Actually, in order to achieve this goal, we desperately need to emphasize the value of using MCMs and spreading awareness of them. **(United Nations 2024 and Angdembe et al., 2022)**.

Nurses are one of the healthcare providers who need to have the necessary knowledge and professional practice. They can help women understand and use current forms of contraceptive methods by providing direct client care, support, education, and advocacy. **So,** the training and competency of nurses are vital to provide women with MCMs and sexual and reproductive health care. Women may feel more comfortable talking about their medical histories or concerning symptoms with nurses at family planning clinics than they do with doctors since they have a stronger rapport with them. Nurses use visual aids to illustrate the various MCMs. The nurses' role is complementary to that of the rest of the health team, not distinct from it **(Swatrz A et al., 2024; Naidoo K et al., 2023).**

Significance of the study:

Modern contraceptive methods (MCMs) serve as significant measures of fertility control. One of the most beneficial aspects of family planning (FP) programs is their utilization, which helps lower rates of mother and newborn mortality by preventing undesired pregnancies and by spacing out subsequent pregnancies by at least two years. Furthermore, this can support education of girls and provide opportunities for women to participate fully in society, especially through paid jobs. **(WHO 2023)**. About 15 million teenagers utilize MCMs, whereas 23 million are at increased risk of becoming pregnant unintentionally because their need for MCMs is not being satisfied **(Yoness et al., 2023)**. In a family planning center, nurses are essential because they give clients care, provide comfort and nursing counseling. Therefore, the study's aim was to improve performance of the nurses about modern contraceptive methods.

Study Aim of the study:

The aim of the current study was to investigate the effect of structured-based training on nurses' knowledge and practices regarding modern contraceptive methods.

Study Hypothesis:

Studied nurses who receive structured-based training sessions their knowledge and nurses' practices regarding modern contraceptive methods will be improved.

Operational definition:

Modern contraceptive methods: are a products or medical procedure that prevents sexual activity from causing reproduction that includes oral contraceptive pills, injectable contraceptive methods, implantable contraceptive method and intrauterine contraceptive device.

Subjects and Method

Study Design: This study adopted a quasi-experimental one group pre-immediate-post-test design to examine the effect of the independent variables (structured-based training) on the dependent variables (knowledge and practices).

Study Setting:

The study was conducted at family planning clinics of Tanta University Hospital affiliated with the Ministry of Higher Education and Scientific Research, El-Menshawy General Hospital affiliated with the Ministry of Health and Population, Doctor Mohamed Mashally Medical Center, Segar Medical Center, Kohafa Medical Center, Satouta Medical Center, and El-Agezy Medical Center located in Egypt' delta region.

Study Sampling:

For the current study, all available nurses (50) were consented to participate as a study sample.

Study Tools:

Two tools were used for data collection.

Tool I: Nurses' knowledge questionnaire regarding modern contraceptives methods:

This tool was developed by the researchers after reviewing the relevant literatures **(WHO 2022; a Mulatu et al. (2020).** It included two main parts:

Part (1): Demographic data of the studied nurses included age, marital status, education level, years of experience, attendance of FP training courses, and types of educational aids that support nurses' explanations of modern contraceptive methods for women from a nurses' point of view.

Part (2): Assessment of nurses' knowledge regarding modern contraceptives methods: it included 10 open questions covering the following knowledge regarding different types of modern contraceptives; oral contraceptive pills, injectable contraceptive methods, implantable contraceptive method, and intrauterine contraceptive device.

Scoring system:

The cumulative score for all knowledge-related questions amounted to 20 marks, which represented 100% of the total possible score. Each question had "correct and complete response" or correct and incomplete response" or "incorrect or don't know response". Incorrect & don't know response were marked (zero), correct and incomplete response was marked (one), whereas correct and complete response was marked (two). The range of the total knowledge score was 0 to 20. The overall score was divided into three categories: high knowledge equal or above 75 percent, moderate knowledge between 50 and less than 75 percent, and low knowledge below 50 percent.

Tool II: Nurses' Practices regarding Modern Contraceptive Methods:

This tool was developed by the researchers after reviewing the relevant literature through observational checklist **(WHO (2022) & Abo El-Enen et al. (2019).** It included 14 steps across the following domain: initial assessment, family planning counseling, and pre-during & post-injection care of injectable contraceptive methods, pre-insertion, insertion, and post-insertion tasks of implantable contraceptive method, and assistance in intrauterine contraceptive device insertion.

Scoring system:

Each step was done correctly and completely assigned a score of two, step done correctly and incompletely assigned a score of one, whereas step done incorrectly not done assign a score of zero. The total practices score ranged from 0 to 28. Based on the overall practices score, two categories were established**:** satisfactory practice which was defined as a score equal or above 80 percent and unsatisfactory practice which was defined as a score below 80 percent.

Content Validity and Reliability

Five expert panels with substantial experience in maternal and neonatal health nursing provided feedback on the tools' content validity. The experts assessed the tools to improve their clarity, relevance, completeness, simplicity, and applicability; there was no major modification. The test revealed that the validity index was 94% for Tool I and 95% for Tool II. The reliability of the translated Arabic tools was tested by the pilot subjects at the first interview and retested after two weeks as test-retest reliability, which was 0.875 and 0.880, respectively.

Study Method:

Study preparation

Ethical Considerations:

Prior to the study, the Research Ethics Committee of the Faculty of Nursing, Tanta University was obtained with a code number (275-6-2023). All studied nurses provided formal consent after being informed of the study's nature and goal. Participants were informed that their participation in the study was voluntary and that they might withdraw at any moment. Anonymity, safety, and confidentiality were guaranteed during the study. The findings were used as part of the necessary research as well as for publication and education.

Preparation of Study Tools

After conducting a thorough assessment of relevant and contemporary literature, the researchers designed Tools I and II and translated them into Arabic to better align with the Egyptian language.

Pilot Study:

A pilot study of five nurses (10% of the sample) was conducted to assess the applicability and relevance of the study tools, as well as the clarity of the structured based training sessions and an educational booklet that were created. The necessary revisions were implemented, and these nurses were included in the study sample.

Study Procedure:

Over the course of six months, from the beginning of June 2023 to the end of November 2023. The researchers visited the family planning clinics three days per week (Saturday, Monday, and Wednesday) from 9 a.m. to 1 p.m. Following a detailed description of the study's aim, the relevant authority in the study setting approved the official data collection.

The structured based training sessions consisted of four phases: engaging, focusing, implementation phase, and planning action.

Phase 1: Engaging phase

The researchers interviewed the studied nurses in their room for obtaining informed consent to their participation in the study and gathering their demographic data. In the engaging process, the researchers gave the nurses' panel discussion of their knowledge and current practices regarding MCM, and baseline assessment pre- structured based training sessions were obtained through interview questionnaire for knowledge and through observational checklist for practices. Each nurse took approximately 15-20 minutes for filling out the sheet with total numbers of five nurses per day. This phase took about 3 weeks to finished assessment pre-structured based training sessions for all studied nurses.

Phase 2: Focusing phase

The researchers prepared the training based on the assessment phase. The planning phase included preparing the training content, method of teaching, training environment, and sessions. In addition, the researchers prepared an Arabic educational booklet to be used as a guide for nurses during the training. The structured based training sessions were developed based on the identified needs and objectives. It consisted of five sessions; two theoretical and three practical. The training was conducted using a variety of teaching techniques, such as group discussions, PowerPoint, posters, video scenarios, demonstrations, and re-demonstrations. This phase lasted about two weeks.

Implementation phase:

The implementation phase lasted about 12 weeks. The researchers divided the total of 50 studied nurses into 10 groups and implemented the structured based training sessions with 5 nurses in ten groups. Three days a week, morning shifts were used for the training sessions. Each session lasted between thirty and forty minutes, including discussion time. The

researchers implement the structured-based training through sessions, which were as follows: five sessions; two theoretical sessions that entailed knowledge regarding modern contraceptive methods; and three practical sessions to train nurses regarding their role in different types of modern contraceptive methods.

- The first session: This theoretical session included definitions, types, and the nursing instructions given to women for oral contraceptives, pills, and injectable contraceptive methods.
- The second session: This theoretical session included definitions, types, and the nursing instructions given to women for implantable contraceptive method and intrauterine contraceptive device IUCD.
- The third session: This practical session consisted of training regarding initial assessment and family planning counseling.
- The fourth session: This practical session included training regarding pre-injection, injection, and post-injection care of injectable contraceptive methods.
- The fifth session: This practical session included training regarding pre-insertion, insertion, and post-insertion tasks of implantable contraceptive method and assistance in intrauterine contraceptive device insertion.

III. Evaluation phase (posttest):

The performance of nurses was evaluated twice; the first post-test was given to each group right after the structured-based training program was put into place. Using Tool I Part (2) and Tool II, the second post-test was administered to each group immediately after finishing the training sessions, and third post-test was administered to each group one month of applying the structured based training sessions, the researchers met studied nurses based on their working schedule and a posttest evaluation was done. A comparison was made between pre- and post-training sessions to determine the effectiveness of training sessions in improving nurses' performance. This phase lasted about three weeks to finished assessment post- structured based training sessions for all studied nurses.

Limitation of the study:

Waiting for nurses until finish their work.

Statistical analysis:

Data Analysis: Data entry and analysis were carried out using IBM Statistical Package for Social Science (SPSS) Statistics for Windows (Version 25.0). Chi-square test (^{2}) was used for qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done. Z value of Mann-whitney test was used for comparison between means of two groups of non-parametric data of independent samples. ^{2} value of Friedman test was used for comparison between means of three related groups (before, immediately after and one month after structured based training) about modern contraceptive methods, ^{2} value of Friedman test was calculated for non-parametric data. Correlation between variables was evaluated using Pearson's correlation coefficient (r).

Results:

Table (1): Demonstrates that 50.0% of the nurses under study were more than forty years old, with a 46.24±6.60 mean age ± SD. Regarding their educational level, It was noted that 68.0 percent, or two thirds, of the nurses in the study had completed secondary nursing education, 26.0% of them had completed Institute of Technical Nursing, and only 6.0% of them had a Bachelor of Nursing. Also, it was revealed that 50% the nurses in the study had ≥ 15 years of experience, 32.0% of the nurses in the study did not participate in any training sessions concerning modern contraceptive methods, and 52% of them only went to one training session on modern methods of contraception. Additionally, the table shows that every the training courses regarding modern contraceptive methods were organized by the Population and Health Ministry.

Table (2): Shows that 6.0% of the nurses under the study answered correctly and completely regarding types of oral contraceptive pills before implementation of the structured-based training, compared to 92% immediately after sessions, and that decreased to 68% one month following implementation of the structured-based training. A statistically significant difference was observed ($\chi 2$ = 88.513, P = 0.0001*). Regarding nursing instructions about combined contraceptive pills, before the beginning of the structured-based training, 4.0% of the nurses who were studied provided accurate and comprehensive answers, compared to 60% immediately after sessions, and that decreased to 54% a month following the start of the training that is structured. Moreover, it was noted that 8.0 percent of the nurses undergoing study answered correctly and completely regarding nursing instructions related to progestin only pills and health instructions regarding emergency contraceptives before to the structured-based training's adoption, as opposed to 84% and 62%, respectively, right after the sessions, and that decreased to 54% one month following the training's organized implementation. In addition, it was

revealed that the percentage of nurses who correctly and completely answered the questionnaire were 38.0% & 40.0%, respectively regarding types and time of injectable contraceptive methods before implementation of the structured-based training, with respect to 92% and 94%, respectively, right away after the sessions, and that decreased to 88% and 84.0% respectively, a month following the implementation of the structured training program. Furthermore, it was discovered that 14.0% of the nurses who were studied answered correctly and completely regarding types of IUCD and nursing instructions after their insertion before implementation of the structured-based training, compared to 90% and 54%, respectively, immediately after the sessions, and that decreased to 72% and 52.0%, respectively, one month after implementation of the structured-based training.

Table (3): Illustrates the average score for all nurses under study in relation to all the knowledge sub-items of the different modern contraceptive methods were 8.30±3.30 before implementation of structured based training, while statistically increased to 16.80±3.10 immediately after and 14.32±2.02 one month after implementation of structured based training. P = 0.0001* and $\chi 2 = 95.650$ indicated that the difference was statistically significant.

Figure (1): Indicates just 2.0% of the nurses under study had a high level of overall knowledge relating modern contraceptive methods prior to the structured-based training's implementation, while it was significantly improved to 86.0% immediately after the sessions and 70% one month after implementation of the structured-based training. With $\chi 2 = 65.254$ and P = 0.0001*, the difference was statistically significant.

Table (4): Shows that total mean scores of the nurses under study with reference to all the practices sub-items of the different modern contraceptive methods were 9.86±3.37 before implementation of structured based training, while statistically increased to 25.74±2.66 immediately after and 21.46±2.99 one month after implementation of structured based training. A difference of statistical significance was observed ($\chi 2 = 116.330$, P = 0.0001*).

Figure (2): Reveals that prior to the implementation of the structured-based training, only 2.0% of the studied nurses had satisfactory scores for their practice with modern contraceptive methods. However, the score significantly improved to 94.0% immediately following the session and 76.0% one month later. P = 0.0001* indicates that the difference was statistically significant.

Table (5): Displays that both immediately following and one month after the implementation of the structured-based training, there was a definite positive correlation between the investigated nurses' overall scores for knowledge and practices about modern contraceptive methods. (P = 0.001* and r = 0.460, respectively; r = 0.640 and P = 0.0001*).

Figure (3): Indicates that one month after the structured-based training was implemented, there was a significant positive correlation (r = 0.460 and P = 0.001) between the overall score of practices and knowledge of modern contraceptive methods among the investigated nurses.

Table (1): Socio-demographic characteristics of the studied nurses. (N=50).

Socio-demographic data	The studied nurses	
	N	%
Age (years)		
30-35	12	24.0
36-40	13	26.0
>40	25	50.0
Mean±SD	46.24±6.60	
Marital Status		
Married	46	92.0
Divorced	4	8.0
Educational level		
Secondary Nursing	34	68.0
Institute of Technical Nursing	13	26.0
Nursing Bachelor's Degree	3	6.0
Years of experience		
Less than 5 years	4	8.0
5-<15	21	42.0
≥ 15	25	50.0
Number of attended training courses regarding modern contraceptives methods		
None	16	32.0
One	26	52.0
Two	1	2.0
More than two	7	14.0
Organization that managed the training session	(n=34)	
Population and Health Ministry	*34*	*100*
#Types of educational aids that help in explanation of modern contraceptive methods for women from nurses' point of view		
Posters	*26*	*34.0*
Brochures	*38*	*76.0*
Display Screens	*6*	*52.0*
Books	*17*	*12.0*

 # More than one answer

Table (2): knowledge of the studied nurses regarding modern contraceptive methods before, immediate, and one month after structured-based training. (n=50).

Knowledge regarding modern contraceptive methods	The studied nurses' knowledge response						χ^2 test P value
	Before implementation		Immediately after		One month after		
	N	%	N	%	N	%	
Types of Oral Contraceptive Pills							
Incorrect or don't know	1	2.0	3	6.0	1	2.0	88.513
Correct and incomplete	46	92.0	1	2.0	15	30.0	0.0001*
Correct and complete	3	6.0	46	92.0	34	68.0	
Nursing instructions regarding combined contraceptive Pills							
Incorrect or don't know	16	32.0	1	2.0	7	14.0	42.058
Correct and incomplete	32	64.0	19	38.0	16	32.0	0.0001*
Correct and complete	2	4.0	30	60.0	27	54.0	
Nursing instructions regarding progestin only Pills							
Incorrect or don't know	18	36.0	1	2.0	4	8.0	55.219
Correct and incomplete	28	56.0	7	14.0	19	38.0	0.0001*
Correct and complete	4	8.0	42	84.0	27	54.0	
Nursing instructions regarding emergency contraceptives							
Incorrect or don't know	36	72.0	1	2.0	1	2.0	108.200
Correct and incomplete	10	20.0	18	36.0	22	44.0	0.0001*
Correct and complete	4	8.0	31	62.0	27	54.0	
Types of injectable contraceptive methods.							
Incorrect or don't know	9	18.0	1	2.0	0	0	47.252
Correct and incomplete	22	44.0	3	6.0	6	12.0	0.0001*
Correct and complete	19	38.0	46	92.0	44	88.0	
Time of injection.							
Incorrect or don't know	3	6.0	2	4.0	1	2.0	99.445
Correct and incomplete	27	54.0	1	2.0	7	14.0	0.0001*
Correct and complete	20	40.0	47	94.0	42	84.0	
Definition of sub-dermal implantable method							
Incorrect or don't know	27	54.0	1	2.0	3	6.0	52.626
Correct and incomplete	22	44.0	23	46.0	22	44.0	0.0001*
Correct and complete	1	2.0	26	52.0	25	50.0	

Table (2): Continue.

Knowledge regarding modern contraceptive methods	The studied nurses' knowledge response						χ^2 test P value
	Before implementation		Immediately after		One month after		
	N	%	N	%	N	%	
Types of IUCD							
Incorrect or don't know	22	44.0	2	4.0	3	6.0	69.051
Correct and incomplete	21	42.0	3	6.0	11	22.0	0.0001*
Correct and complete	7	14.0	45	90.0	36	72.0	
Nursing instructions after insertion of IUCD							
Incorrect or don't know	17	34.0	5	10.0	0	0	34.681
Correct and incomplete	26	52.0	18	36.0	24	48.0	0.0001*
Correct and complete	7	14.0	27	54.0	26	52.0	

***Statistically significant (P< 0.05)**

Table (3): Sub-items mean scores of the nurses in the study's knowledge of modern contraceptive methods prior to, throughout, and one month following the implementation of structured-based training. (n=50).

Knowledge sub items (Each item was scored 0-2)	No. of questions (Score)	Knowledge mean scores of the studied nurses before and after structured based training (n=50)			χ^2 value P value
		Before	Immediately after	One month after	
		Range Mean±SD	Range Mean±SD	Range Mean±SD	
A-Oral contraceptive pills	4 (0-8)	0-6 2.68±1.33	0-8 6.42±1.68	3-8 5.30±1.28	88.233 0.0001*
B-Injectable contraceptive method	2 (0-4)	0-4 1.86±0.99	0-4 3.80±0.73	2-4 3.70±0.68	90.584 0.0001*
C-Sub-dermal Implantable method	2 (0-4)	0-4 2.26±0.80	2-4 3.28±0.70	0-4 2.18±0.94	42.605 0.0001*
D-Intrauterine contraceptive device (IUCD)	2 (0-4)	0-4 1.50±1.34	0-4 3.30±0.91	1-4 3.14±0.90	49.537 0.0001*
Total mean score of knowledge	**10 (0-20)**	**0-15 8.30±3.30**	**2-20 16.80±3.10**	**10-19 14.32±2.02**	**95.650 0.0001***

***Statistically significant (P< 0.05)** **χ^2 value of Friedman test**

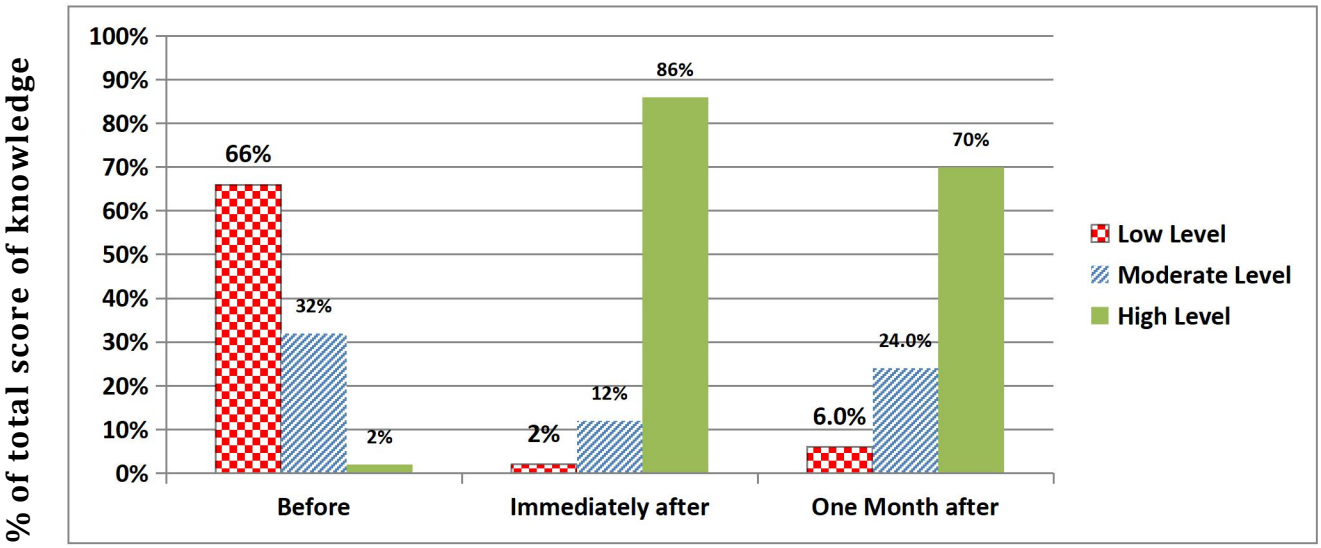

Figure (1): Total score of the studied nurses' knowledge concerning modern contraceptive methods prior to, throughout, and a month following implementation of the structured-based training. (n=50).

Table (4): Practice mean scores of the studied nurses regarding modern contraceptive methods before, immediate and one month after implementation of the structured based training.

Nurses' practice subitems (Each item was scored 0-2)	No. of questions (Score)	Mean scores of the studied nurses before and after structured based training (n=50)			χ^2 value P value
		Before	Immediately after	One month after	
		Range Mean±SD	Range Mean±SD	Range Mean±SD	
Initial assessment	4 (0-8)	1-7 2.64±1.30	4-8 7.12±1.02	4-8 6.96±1.18	97.064 0.0001*
Family planning Counseling	1 (0-2)	0-1 0.52±0.50	1-2 1.76±0.43	1-2 1.68±0.47	86.865 0.0001*
Injectable contraceptive method	3 (0-6)	0-4 2.10±1.16	3-6 5.54±0.70	3-6 4.26±1.14	98.060 0.0001*
Sub-dermal implantable method	3 (0-6)	1-4 1.88±0.87	3-6 5.60±0.67	3-6 4.14±0.93	115.261 0.0001*
Assistance in IUCD insertion	3 (0-6)	1-5 2.72±1.16	3-6 5.72±0.67	3-6 5.60±0.67	96.251 0.0001*
Total mean scores of practice	**14 (0-28)**	**4-21 9.86±3.37**	**14-28 25.74±2.66**	**14-27 21.46±2.99**	**116.330 0.0001***

***Statistically significant (P< 0.05)** **IUCD= Intrauterine Contraceptive Device**

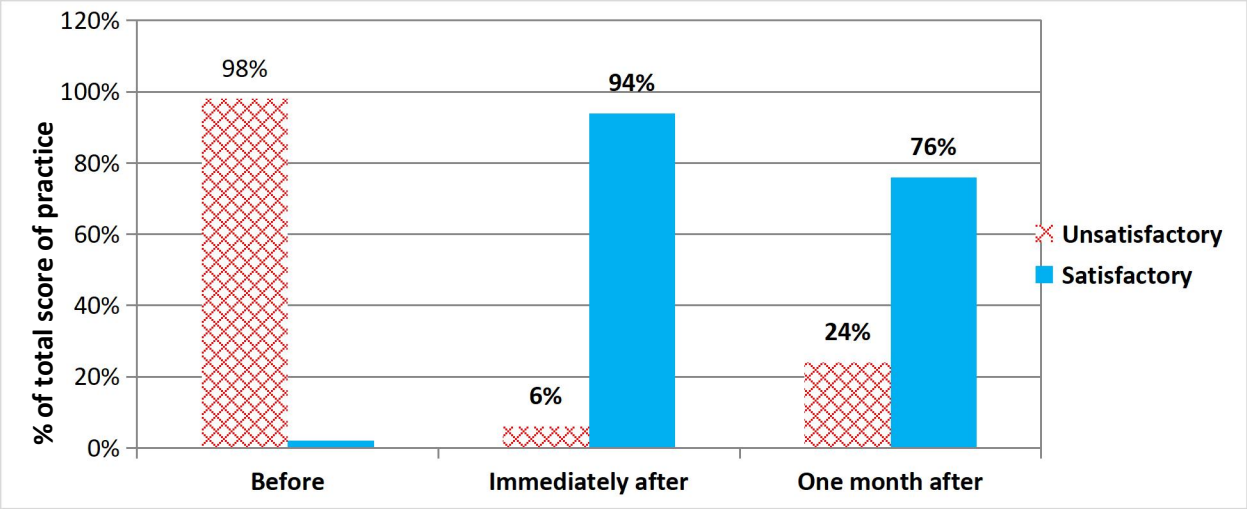

Figure (2): Total score of the nurses' practice under study relating modern contraceptive methods before, immediate, and one month after implementation of the structured-based training. (n=50).

Table (5): Correlation between the study nurses' overall knowledge and practice score before to, during, and one month following structured-based training regarding modern contraceptive methods.

Nurses' practice sub-items scores	Total knowledge scores of the studied nurses before and after structured based training (n=50)					
	Before		Immediately after		One month after	
	r	P value	r	P value	R	P Value
Initial assessment	0.139	0.335	0.620	0.0001*	0.451	0.001*
Family planning Counseling	0.108	0.456	0.390	0.005*	0.323	0.022*
Injectable contraceptive method	0.056	0.701	0.501	0.0001*	0.326	0.021*
Sub-dermal implantable method	0.041	0.777	0.472	0.001*	0.161	0.265
Assistance in IUCD insertion	0.092	0.527	0.346	0.014*	0.172	0.232
Total mean scores of practice	**0.099**	**0.493**	**0.640**	**0.0001***	**0.460**	**0.001***

***Statistically significant (P < 0.05)** **r=Correlation Coefficient**

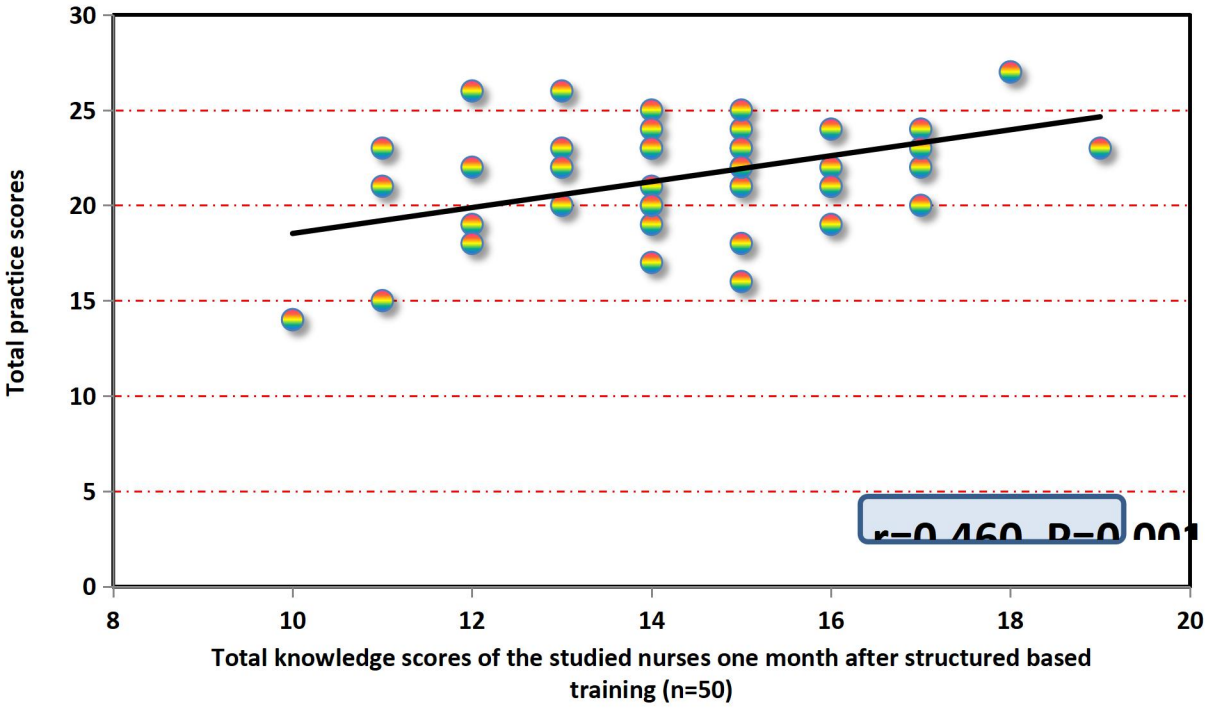

Figure (3): correlation between the study nurses' overall knowledge and practice scores one month following implementation of the structured-based training.

Discussion:

The health of women and children can benefit greatly from contraception; however, many women's needs for contraception remain unmet. **(Perinpanathan et al., 2023).** The present study intended to determine the effect of structured-based training on nurses' knowledge and practices in relation to modern contraceptive methods. The results showed that nurses' knowledge and practices had improved about modern contraceptive methods. The study hypothesis is supported by this result, "The implementation of structured-based training is anticipated to improve the knowledge of nurses and enhance nurses' practices regarding modern contraceptive methods." Half of the nurses in the study were over 40 years old, with a mean age of 46.24±6.60. Approximately one quarter of the nurses was between the 30-35 age range, and most of them were married. Also, just minority of the nurses in the study held a bachelor's degree in nursing, whereas over one quarter had graduated from the Technical Nursing Institute. About half of the nurses had ≥ 15 years of experience, and almost two fifths of them possessed five years of experience Furthermore, a third of the nurses in the study did not participate in any training course regarding modern contraceptive methods, and more than half of them attended just one training session concerning modern contraceptive methods provided by the Ministry of Health and Population.

The current study's findings has shown that the study's nurses had a low overall knowledge score on modern methods of contraception at the initial assessment before implementation of the structured-based training, where over two-thirds of the nurses in the study knew very little about modern contraceptive methods, and only small minority of them had good knowledge about it.

The baseline assessment of the current study is consistent with a study conducted by **Karvande et al. (2018)** that identified a knowledge gap about FP auxiliary nurse midwives. The study's baseline assessment also showed concordance with **Shahid et al. (2018)** findings. Furthermore, **Gupta et al. (2019)** assessed the nurses' and medical interns' knowledge and skills in relation to FP services in India's teaching hospitals. They revealed that interns' and nurses' knowledge of FP services was insufficient. Also, **Htay et al. (2018)** discovered that university health care students had a low level of knowledge. However, in contrast, the baseline assessment for this study disagrees with two studies carried out in Ghana. According to studies, tertiary students in Ghana's middle belt and students enrolling in the Nalerigu College of Nursing and Midwifery had a high level of knowledge on FP. Also, **[Hallidu and Sumaila (2022); Sulemana et al. (2024)]** contradict **Segergren and Svensson (2016)**, who conducted a small-scale field study in the Tanzanian district of

Rufiji and discovered that nurses have extensive knowledge of FP.

Conversely, the vast majority of nurses in the study had good knowledge immediately following the sessions, and one month later, less than three quarters of them knew enough. However, following the implementation of the structured-based training, the total score of knowledge regarding modern contraceptive methods dramatically improved.

The findings of this study are in line with those of **Sanz-Martos et al. (2021)**, who found that university nursing students at the University of Jaén improved their knowledge of contraceptive methods following a peer-educational intervention in which they were actively involved in their own training. Also, **Sanz-Martos et al. (2020)** discovered in a prior study that students' level of knowledge regarding contraceptive methods was statistically boosted upon receiving training during the nursing course. In addition**, Scarano-Pereira et al. (2023)** found that all study participants had a good level of knowledge following specific training they got as part of their university education. According to **Praxedes et al. (2019)**, the educational game was successful in raising teenagers' knowledge of contraceptive methods**.** They continued by saying that as health professionals are among the best-suited to deal with the variety of contraceptive-related issues, they must collaborate with the community and the school to promote healthy behaviors. Furthermore, **Abdo et al. (2024)** demonstrated in a fairly recent study that the educational intervention improved the maternity knowledge and attitudes of nurses toward emergency contraception.

As stated by the researchers' point of view, the differences in participant characteristics between the present study and prior studies may have contributed to the disparity in findings between the initial assessments of nurses' knowledge on modern contraceptive methods. While, the reality of this study's findings and other studies coincide after the implementation of structured-based training may be because all of them were interventional nature. As well, it might be attributed to the interest of the nurses to acquire and refresh their knowledge about modern methods of contraception used in this research.

According to two studies conducted in Egypt found that there was no practical use of women's knowledge of FP and FP outcomes indicated that greater efforts are needed to reach women with FP services. (**Abo-Rahma et al., 2022; Atlam et al., 2022).** By applying evidence-based practice which is based on empirical study and integrated into clinical practice that takes into account a specific approach to providing nursing care in an appropriate and cost-effective manner, nurses can play a significant role in overcoming the obstacles presented by FP. (**Torrens et al., 2020)**.

Concerning the entire score of practices concerning modern contraceptive methods between the nurses under study, only tiny minority of them had satisfactory practices at the initial assessment before implementation of the structured-based training. The present study's baseline assessment corresponded with a study conducted by **Karvande et al. (2018)**, which emphasizes limited familiarity with FP skills. Additionally, **Gupta et al. (2019)** showed that interns' and nurses' skills were insufficient to deliver high-quality FP services both during their internship or post-graduation and on the job. In addition, **Trisolini et al. (2023)** highlight the need to clarify the necessity of making providers' roles in FP quality improvement clear. Conversely, though the baseline assessment of this study opposes **Abo El-Enen et al. (2019)**, who assessed the performance of nurses at FP clinics in Alexandria; they found that none of the nurses in their study performed poorly, and about three quarters of them had a fair overall performance grade at FP clinics in all study settings. Also, **Bayoumy (2017)** evaluated clients' satisfaction with the performance of nurses in rural community FP centers and found that the majority of nurses perform at a satisfactory level of performance. In addition, **Swartz et al. (2024)** results indicate that about half of the pediatric registered nurses in their study felt competent independently in providing contraceptive services.

On the other hand, after implementation of the structured-based training, Most of the nurses in the study saw a significant improvement in their overall practices score just after the training and among more than three halves of them one month later. The results of the study support those of **Bell et al. (2023),** whoever discovered that nurses who received hands-on training reported being comfortable in their contraceptive practice. They also indicated that increased knowledge and skills were a result of simulation and chances to reinforce learning through clinical placement in contraceptive practice. Also, **Ntabona et al. (2021)** indicated that Expanding access to contraception and bolstering the competence of the next generation of health care personnel in the Democratic Republic of the Congo has been made possible by including competency-based training on FP community-based services into the nursing curriculum. Moreover, **Gothwal et al. (2020)** concluded that appropriate training for FP practices should be integrated into the health workers' curricula. Furthermore, **El Weshahi et al. (2021)** stated that increasing the number of qualified FP providers and their redistribution is a must for

strengthening the health system's capabilities in the field of FP. According to **Abdel Tawab et al. (2021)**, there is potential for utilizing FP into worker health and livelihood initiatives in order to spread FP messages to Egyptian youth. However, when designing interventions, programmers and researchers must take sustainability, reach, and context into account.

As perceived by the researchers, in the initial assessment of nurses' practices about modern contraceptives, the discrepancy in results between this study and previous studies could be stem from the variations in socio-demographic characteristics. While, after implementation of the structured-based training, there was minimal research data available in the context of training impact on nurses' practice regarding modern contraceptive methods. Nevertheless, the improvement in nurses' practices regarding modern contraceptive methods in the present study could be related to the effect of the structured-based training and to the ability and desire of nurses to improve their practices regarding modern contraceptive methods.

Conclusion:

The majority of the nurses in the study had insufficient knowledge and unsatisfactory practices pertaining modern contraceptive methods before the structured-based training implementation. Meanwhile, their performance significantly improved after the structured-based training, whereas one month following the start of the structured-based education, this improvement decreased among the studied nurses at follow-up, which supported the study hypothesis.

The present study's findings propose the following recommendations:

I. Expanding the education program to other regions of Egypt in order to bring nurses' knowledge up to date and enhance their practices of modern contraceptive methods.
II. Provide periodic in-service training programs about modern contraceptive methods based on recent recommendations based on evidence for nurses who offer family planning services.
III. Additional studies to identify obstacles facing nurses' provision of modern contraceptive methods.

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