

Effect of On -Job Training Program on Nurses' Compliance and Satisfaction with Infection Control Measures at Obstetric Operating Room

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Abstract

Background: Infection control is the most important field of concern at obstetric operating room. Infection control is defined as measures practiced by nurses to reduce the risks of transmission of infectious agents to women. Aim of the study: The study was to investigate effect of on- job training program on nurses' compliance and satisfaction with infection control measures at obstetric operating room. Design: A quasi- experimental design was utilized to conduct the study. Setting: The study was conducted at Obstetrics operating room in Benha university hospital. Sample: A Convenient sample All nurses at obstetric operating room will be included: (70) nurses. Tools: The tools of data collection were structured-interviewing questionnaire, An observation checklist and Nurses' satisfaction after on-job training program. Results: (reveals that there was a highly statistically significant improvement in wearing protective clothing, surgical hand washing, gloving, gowning, masking, handling sharp instruments and cleaning and sterilization 91.4%, 92.9%, 97.1, 88.6%, 91.4, 92.9 and 88.6% in post on job training program compared to 28.6%, 31.4%, 54.3%, 28.6%, 40.0%, 31.4% and 28.6% at pre on-job training program respectively and reveals that all of the studied nurses (100%) were satisfied to the on-job training program. Conclusion: there was highly statistical significant improvement in nurses' total knowledge, compliance and satisfaction post on-job training program compared to pre Recommendations: Updating nurses' knowledge and compliance through continuing on-job training programs.

Key words: infection control measures, nurses' compliance, satisfaction, on-job training program.

Introduction

Infection means an invasion and multiplication of microorganisms in body tissues that result in cellular injury. These microorganisms are called infectious agents, and considered a common cause of maternal mortality and morbidity. Infection control is the most important field of concern at obstetrics operating room. Infection control is defined as measures practiced by nurses to reduce the risks of transmission of infectious agents to women [1]. Many infection control measures, such as appropriate hand hygiene and the correct application of basic precautions during invasive procedures are simple and of low-cost [2].

Infection prevention and control is defined as all technical means and material intended to prevent pathogens from penetrating and developing into the body [3].

Nurses have professional and legal responsibilities to integrate infection control practice into period care. Hand hygiene is the single most important intervention to prevent transmission of infection and should be a quality standard in all health institutions. An attitude of not washing hands among individuals involved in the provision of health care can increase the rate of hospital-acquired infections [4].

Job training sessions is defined as the most common approach for learning at work in which learning how to perform a job is conducted in work setting. Such kind of training can be considered an effective way for transferring tacit skills to new nurses as well as more Formal information [5].

Compliance has been recognized as an efficient and effective means to prevent and control health care-associated infection in women and nurse. While compliance is the reflection of rules, policies, standard and knowledge that leads to action. Thus, right knowledge, positive attitude, and good compliance are imperative to guide health care professionals in treating and serving women [6].

Operating room is a complex workshop and the most important facility of the surgical department. Cleanliness must be kept and the safety of facilities, equipment and devices must be maintained at all times. Nowadays, modular operation theatres are becoming more popular in use, so it is necessary to control operation theatre air in respect of temperature, humidity and particulate matter content of air, micro-organism i.e. bacteria, viruses, fungi etc. Air handling systems process air through various stages [7].

Nurse satisfaction as "a positive emotional state resulting from the appraisal of one's job or job experiences." nurse satisfaction is positively and mutually related to life satisfaction. Nurse satisfaction is affected by desire to use their skills and abilities. Job satisfaction can be assessed at the global level or at the individual level [8].

Significance of the study

Infection in operating room is one of the common problems and difficulties faced by hospitals in all countries around the world. Infection is a major health problem in all societies. According to the WHO, 7.1 million women of infection in

operation occur every year. One in every 20 women is suffering from a hospital infection. This leads to 99,000 women of death per year, which imposes an annual cost to society of \$32million [9].

In Africa, the prevalence of infection varied between 10.0% and 60.0% and represented the 3rd cause of maternal mortality, the 2nd cause of early neonatal mortality, and the 1st cause of postoperative morbidity [10].

Aim of the study

This study aimed to investigate effect of on- job training program on nurses' compliance and satisfaction with infection control measures at obstetric operating room.

Research Hypothesis

Obstetrical operating nurses' compliance regarding infection control measures will be improved after receiving on-job training program than before.

Obstetrical operating nurses' satisfaction level regarding infection control measures will be higher after receiving on-job training program than before.

Subject and methods

Study design

A quasi- experimental research design was utilized to fulfill the aim of the present study.

Setting

The study was conducted at The study was conducted at obstetrics operating room at Benha university hospital.

Sampling

- **Sample type:** A convenient sample.
- **Sample size:** The sample consisted of 70 obstetrical operating nurses. **Tools of data collection**

Three tools were utilized for data collection:

Tool I: A structured interviewing questionnaire:

It was designed by researcher after reviewing related literatures regarding the study (11), it included the following:

- **Part (1):** included general characteristics of studied nurses. It included (age, educational level, years of experience, residence, attended any training program regarding infection control measures).

Part (2): Nurses' knowledge about infection control measures at obstetric operating room, consisted of (8) sections.

- **Part (3):** Barriers and hinder factors that affect nurses' compliance with infection control measures at obstetric operating room
- **An observation checklist:** this tool was adapted from (12) to assess of nurses' compliance with infection control measures at obstetrics operating room. This tool examines the adherence to personal protective equipment, disposal of sharps and waste products, decontamination and prevention of cross-infection between women.

Each item will be scored as comply [2] and not comply [1].

Tool (III): Nurses' satisfaction with infection control measures scale adapted from [13].

This tool will examine nurses satisfaction regarding on-job training program, which will be used to assess each nurse respond (satisfied, dissatisfied). This tool will be used only after implementing the program.

Tools validity and reliability

Tools of data collection were reviewed by three panel expertises of Obstetrics and gynecology nursing, Faculty of nursing Benha University to assess content validity. Modifications were done in the light of valuable comments such as modify some words to give the most appropriate meaning for the phrases which were not clear. Reliability was done by Cranach's alpha to test internal consistency for knowledge was equal 0.929, for nurses' compliance about infection control measures at obstetric operating room was equal 0.803 and for nurses' satisfaction with infection control measures was equal 0.756.

Ethical considerations

Ethical aspects were considered before implementation of the study as the following: The aim of the study was explained to each nurse before applying the study. An oral consent was obtained from each nurse to participate in the study. The study would not cause any physical, social or psychological risks on the participant. Maintain confidentiality, self-esteem and dignity of nurses. The data was collected and treated confidentially. Keep privacy. As well as freedom to withdraw from participation in the study at any time and the data was collected and treated confidentially

Pilot study

The pilot study was carried out on 10% of the total number (7nurses) to assess the clarity, feasibility and applicability of the tools. In addition, the estimation of the time needed to fill the questionnaire. Based on the pilot study, no modifications were done. So nurses involved in the pilot study were included in the main study sample.

Field work

To fulfill the aim of the present study, the following phases were adopted, interviewing and assessment phase, planning phase, implementation phase and evaluation phase. These phases were carried out from the beginning of June 2021 to the end of march 2022 covered nine months, the researcher visited the previously mentioned setting three days per week (Tuesday, Wednesday and Thursday) from 9.00 Am, to 2.00 pm.

Interviewing and assessment phase:

After reviewing national and international literature about infection control measures design and prepare tools for data collection then conduct pilot study.

Planning phase

Based on the results obtained from the pretest of assessment nurses' knowledge, and nurses' compliance about infection control measures. The researcher designed the educational booklet in an Arabic language supported by figures after reviewing related literature.

Implementation phase:

The researcher will visit the pre mentioned setting for three days/week from 9 am to 2 pm. The researcher will introduce herself and explain the purpose of the study. on job training program will be conducted through eight sessions (two sessions for theoretical session and six sessions for practical sessions), The researcher will prepare the different methods for theoretical part as lecture, group discussion, brain storming and data show presentation. While practical part will be conducted using demonstration and re-demonstration for nurses. Duration of each session will be 30-45 min. Number of participant of each session will be five. A period of discussion will be will be offered to all participants to give them a chance to ask questions and clarified by the researcher, at the end of session booklet prepared by the researcher will be distributed among all nurses. The researcher will clarify difficult parts and stress on major contents in educational booklet. Content of the educational booklet will be used as a guide for nurses.

Evaluation phase:

Immediately of on job training program implementation, the researcher will use the same format of the pretest to evaluate effect of on-job training program on nurses' knowledge (tool I), compliance (tool II) and satisfaction with infection control measures using tool (III). All tools will be used (as posttest).

Statistical analysis:

Data was verified prior to computerized entry. The statistical package for social sciences (SPSS version 25) was used followed by the data analysis and tabulation. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Also tests of significance (Chi-square test, Fisher Exact Test) were applied to test the study hypothesis, Pearson correlation coefficients were used to investigate the relationship between study variables. A significant level value

was considered when $P \leq 0.05$. And A highly significant level value was considered when $p \leq 0.001$.

Study limitations:

Sometimes interviewing nurses and implementation of sessions were postponed; as many nurses were busy with working duties.

Results

Table (1): indicates that 55.7% of studied nurses were in the age group $25 < 30$ years with mean age was 30.2 ± 7.27 years, 62.8% of the studied nurses were technical institute of nursing and 48.6% had $5 < 10$ years of experience with mean year of experience 8.92 ± 4.66 years. As regard residence, 52.9% of the studied nurses living in rural area and 58.6% didn't attend any infection control training program.

Table (2): reveals that that there was highly statistical significant improvement in all nurses 'knowledge about infection in general, general measures of infection control, hand washing, wearing protective clothes, safe injection and handling of sharp instruments, waste disposable, disinfection and sterilization 91.4%, 92.9%, 92.9%, 88.6%, 88.6%, 88.6%, 87.1% and 91.4% in post on-job training program compared to pre on-job training program 34.3%, 50%, 68.6%, 64.3%, 57.1%, 45.7%, 42.9% and 50.0% respectively ($p \leq 0.001$).

Table (3): reveals that 94.3%, 90.0%, 85.7%, 70.0%, 68.6%, 65.7% and 64.3% of studied nurses reported that numerous of nursing tasks, the lack of tools and capabilities and the lack of regular maintenance of sterilizers, there isn't cooperation and assistance from others, the lack of nursing staff, there aren't policies to implement the infection control system inside the obstetrical operating room and lack of experienced personnel in the infection control unit in the hospital are considered the most barriers that affect nurses 'compliance with infection control measures at obstetric operating room respectively.

Table (4): reveals that all of the studied nurses (100%) were satisfied to the training content is sufficient, the objectives of the program are clear, all program objectives have been implemented, the content of the practical training is identical to the objective of the current study, the training schedule is appropriate, sufficient time was given to each session, additional time was given to ask questions to the researcher and the training program positively contributed to the nurses' compliance to apply infection control measures at the obstetric room after on-job training program

Table (1) Distribution of the studied nurses according to general characteristics (n=70)

General characteristics	NO.	%
Age (year)		
20-<25	5	7.1
25-<30	39	55.7
30-<35	13	18.6
≥ 35	13	18.6
Mean ± SD	30.2 ± 7.27	
Educational level		
Diploma in nursing	20	28.6
Technical institute of nursing	44	62.8
Bachelor of nursing	6	8.6
Years of experience		
1-<5	14	20.0
5-<10	34	48.6
10-<15	10	14.3
≥ 15	12	17.1
Mean ± SD	8.92 ± 4.66	
Residence		
Rural	37	52.9
Urban	33	47.1
Attending any training program related to infection control		
Yes	29	41.4
No	41	58.6

Table (2) Distribution of the studied nurses according to subtotal knowledge regarding infection control measures at obstetric operating room pre and post on-job training program (n=70)

Phases	Pre on-job training program				Post on-job training program				X ²	p-value
	Correct		Incorrect		Correct		Incorrect			
	NO.	%	NO.	%	NO.	%	NO.	%		
Knowledge about										
Infection in general	24	34.3	46	65.7	64	91.4	6	8.6	24.97	0.000**
General measures of infection control	35	50.0	35	50.0	65	92.9	5	7.1	21.52	0.000**
Hand washing	48	68.6	22	31.4	65	92.9	5	7.1	14.36	0.005*
Wearing protective clothing	45	64.3	25	35.7	62	88.6	8	11.4	15.01	0.005*
Safe injection and handling of sharp instruments	40	57.1	30	42.9	62	88.6	8	11.4	16.99	0.003*
Waste disposable	32	45.7	38	54.3	62	88.6	8	11.4	20.01	0.001**
Disinfection	30	42.9	40	57.1	61	87.1	9	12.9	23.64	0.000**
Sterilization	35	50.0	35	50.0	64	91.4	6	8.6	20.91	0.001**

Table (3) Distribution of the studied nurses according to barriers and hinder factors that affect compliance of nurses with infection control measures (n=70)

Items	Yes		No	
	No.	%	No.	%
There aren't policies to implement the infection control system inside the obstetrical operating room.	46	65.7	24	34.3
There isn't cooperation and assistance from others.	49	70.0	21	30.0
Numerous of nursing tasks.	66	94.3	4	5.7
Lack of continuous training on infection control policies in the operating room using modern methods	38	54.3	32	45.7
There is a continuous evaluation from the infection control unit for the nurses during the nursing operations.	20	28.6	50	71.4
Working of sick nurses.	32	45.7	38	54.3
The lack of nursing staff	48	68.6	22	31.4
The lack of regular maintenance of sterilizers.	60	85.7	10	14.3
The lack of tools ,capabilities and disinfectants	63	90.0	7	10.0
Lack of accountability by the infection control unit for the health team to adhere to infection control methods in the obstetric operating room	34	51.4	36	48.6
Lack of experienced personnel in the infection control unit in the hospital.	25	64.3	45	35.7

Table (4) Distribution of the studied nurse according to satisfaction after the on-the-job training program regarding infection control at the obstetric operating room (n=70).

Items	Satisfied		Unsatisfied	
	NO.	%	NO.	%
The training content is sufficient.	70	100.0	0	0.0
The objectives of the program are clear.	70	100.0	0	0.0
All program objectives have been implemented.	70	100.0	0	0.0
The content of the practical training is identical to the objective of the current study.	70	100.0	0	0.0
The methods used in on-the-job training are varied and easy.	70	100.0	0	0.0
A suitable environment has been created for the program. Good pressure, well-ventilated space and comfortable seating.	70	100.0	0	0.0
The training schedule is appropriate.	70	100.0	0	0.0
Sufficient time was given to each session.	70	100.0	0	0.0
Additional time was given to ask questions to the researcher.	70	100.0	0	0.0
The on-job training program helped in good communication between the nurses and the trainer.	61	87.1	9	12.9
On-the-job training does not overburden the nursing care assigned to it.	62	88.6	8	11.4
The training program positively contributed to the nurses' compliance toward infection control measures at the obstetric operating room.	70	100.0	0	0.0

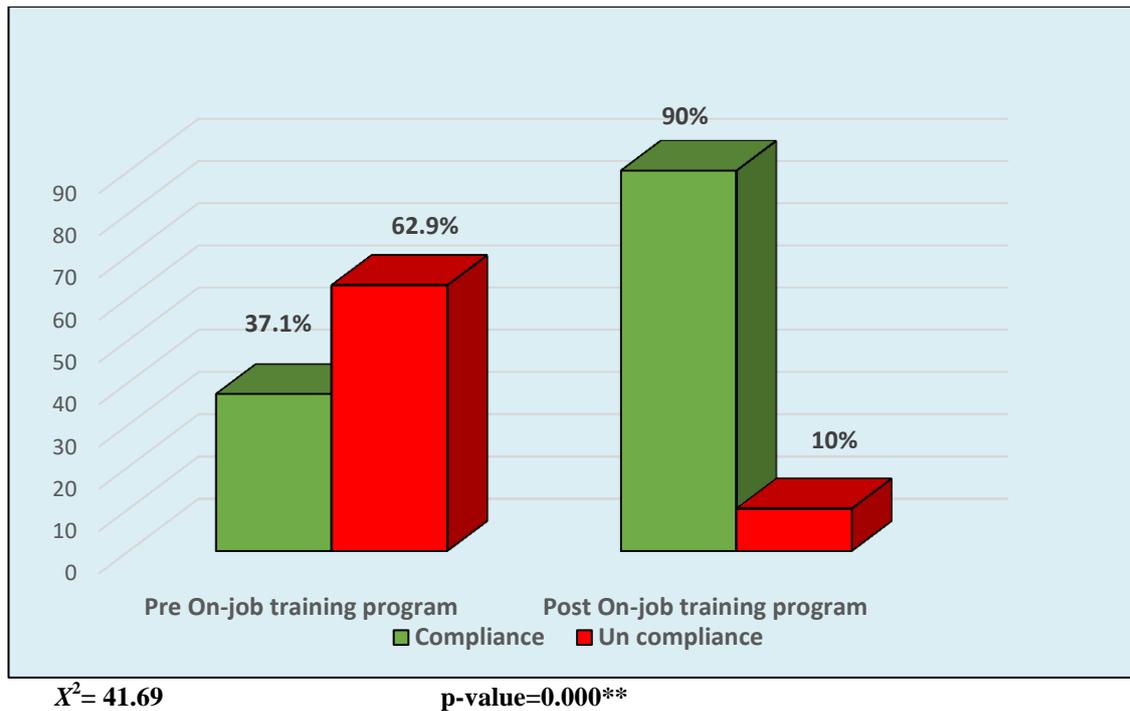


Fig.(1) Distribution of the studied nurses according to level of total compliance regarding infection control measures at obstetric operating room pre and post on-job training program (n=70).

Discussion

The findings of present study revealed that more than half of nurses' ages were ranged between (20<30) years old, with mean \pm SD 30.2 ± 7.27 years. The results were in agreement with [14] who studied "Effectiveness of Educational Program on Nurses' Knowledge regarding Pre and Post-Operation Nursing Management" and found that more than of two thirds of the studied nurses 70% were at age groups (20-29) years. Also these findings similar to the study done by [15] who studied "Nurse's Knowledge and Performance regarding Infection Control in Labor room in Omdurman Military Hospital, Khartoum State, Sudan" and found that more than half of participants ages were under 30 years old. While, these results were disagreement with the study done by [16] who studied " Factors Affecting Nurse interns' Compliance with Standard Precautions for Preventing Stick Injury: and found that about two thirds of aged <21 years old

the present study revealed that reveals that that there was highly statistical improvement in all items related to nurses' knowledge about infection in general, general measures of infection control, hand washing, wearing protective clothes, safe injection and handling of sharp instruments, waste disposable, disinfection and sterilization in post on-job training program compared to pre on-job training program. on the same line with study [17] who found in a study about " hospital acquired infections; knowledge about it and its prevention" who mentioned that, the majority of nurses had

correct knowledge about nosocomial infection after intervention with significant difference.

The improvement in the knowledge related to receive enough knowledge related to infection and infection control measures during the on-job training program as (continuous in education, workshop, role model, demonstration, visible guideline and written hand

Regarding nurses' compliance about wearing personal protective equipment, the current study reported that less than half of studied nurses' adherent with tacking hair and cover it completely pre on-job training program. While, more than half of studied nurses not adherent with putting on the boot in the restricted once. This result is agreement with the study done by, [18] who studied be "assessment of knowledge and practices of health team regarding infection control" and found that majority of the participants didn't maintain the personal protective equipment sufficient time and didn't wear it in correct manner.

Regarding nurses' compliance with surgical hand washing procedure, the current study showed that there were there statistically significant improvements regarding all items of nurses' compliance regarding surgical hand washing except in lather fingertips with sponge-side of the brush; then using bristle side of brush; scrub the spaces under the fingernails of the right and left hands at obstetric operating room in post on job training program compared to pre on job training program post on-job training program as compared to pre on-job training program phase. The finding supported with [19] who found in a studied about

"improving surgical hand hygiene compliance in woman care" that knowledge and compliance with hand washing. These results were disagreeing with [20], who reported that, the hand hygiene compliance among nurses is low.

the present study reveals that all of the studied nurses were satisfied to the training content is sufficient, the objectives of the program are clear, all program objectives have been implemented, the content of the practical training is identical to the objective of the current study, the training schedule is appropriate, sufficient time was given to each session, additional time was given to ask questions to the researcher and the training program positively contributed to the nurses' compliance to apply infection control measures at the obstetric room after on-job training program, this agree with [21], who stated that majority of the nurses had moderate level of satisfaction regarding program.

Conclusion

Based on results of the present study, the following can be concluded that: there was highly statistical significant improvement in nurses' total knowledge, compliance and satisfaction post on-job training program compared to pre p-value= (0.000) and also, There was significant positive correlation between total knowledge scores with total compliance and total satisfaction score toward infection control measures post on-job training program which achieved the present study hypotheses

Recommendation

- Provide Educational programs for nurses periodically regarding infection control measures.
- professional development booklet for nurses about infection control measures at obstetric operating room and continuous up dated.
- Availability of all required facilities and equipment for compliance infection control measures.
- Recommended for the nurses working in obstetrics and gynecology department.

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