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Effectiveness of an interventional program on nursing staff's practices about aseptic technique in operation room

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Abstract--The study aimed to evaluate the effectiveness of an interventional program on nurses' practices about aseptic technique in operation room. A quasi experimental design was carried out at Al-Diwaniya Teaching Hospital for the period from 15th October, 2021 to 28th April, 2022. Purposive sample comprised of (60) nurses who have been actually working in the operation room. Those nurses are divided into two groups, study and control groups, the study group consisted of (30) nurses exposed to an interventional program and the control group consisted of (30) nurses who were not exposed to the program. The measurement of effectiveness of an interventional program through the use of practice checklist includes (20) items concerning aseptic technique in operation room. The instrument validity was determined through a panel of experts. Reliability of instrument was determined through the use of test and retest.

Keywords--program, nursing staff, aseptic technique, operation room.

Introduction

Surgical asepsis is a set of particular skills and actions implemented under cautiously controlled situations, with the aim of reducing the risk of health care associated infections. It intended to increase and keep asepsis (the absence of infectious material in the clinical location). Aseptic technique prevents the presence of pathogenic microorganisms and saves the patient from infection (Benson and Powers, 2011).

Aseptic technique intends to reach asepsis, and each healthcare facility has its own set of principles and criteria for attaining it (Pankaj et al., 2014). The purpose

of aseptic technique is to protect the patient by avoiding postoperative infection by creating the environment and following policies to avoid harmful microorganisms of sterile fields, sterile equipment, and the surgical site (Rothrock, 2011)

The operating theatre team utilizes aseptic procedures to prevent, remove, and destroy micro-organisms from living tissue, the operating theatre environment, and surgical instruments (Karma et al. 2016). For perioperative professionals, AORN has created standards and guidelines that can be used as criteria for assessing patient care quality. All sterile employees in the operating room must adhere to the principles of aseptic technique (Abraham et al. 2016).

Personal hygiene, hand washing, wearing personal protective equipment, donning a sterile surgical gown and gloves, preparing a surgical site, and creating and maintaining a sterile field with the assistance of sterile surgical drapes are all evidence-based recommendations in aseptic practices (Eske, 2018). A variety of practices and measurements can help to reduce the danger of SSI. These consist of patient preparation (e.g., nutritional assessment, surgical site hair removal, pre-operative showers); following good environmental cleaning techniques, wearing appropriate surgical clothing, and reducing movement; practicing hand washing, the surgical scrub, and antimicrobial prophylaxis; draping, ensuring non-contaminated equipment, and, of course, effective aseptic technique during the operation (Humphreys, 2009).

Surgical patients rely on OR nurses to provide effective care and to ensure the prevention of SSIs when they interact with a variety of health care specialists during their perioperative travels. That is, OR nurses are in charge of enforcing hygiene and aseptic principles in the operating room in order to prevent and restrict the spread of infections. Furthermore, OR nurses, in collaboration with other team members, are accountable for perioperative care (Nordström et al., 2019). Surgical Site Infection (SSI) is one of the most frequent type of healthcare-associated infections, accounting for 20 percent to 25 percent of all infections. It is an infection that develops within 30 days of a surgical procedure or can last up to a year in surgical patients who have had an implant placed in a part of the body (Owens & Stoessel, 2008).

Method

The Study Design: A quasi-experimental design study has been applied with the use of pre and post-test approach for two groups of samples (study and control) to evaluate the effectiveness of an interventional program on nursing staff's practices about aseptic techniques in operation room.

Administrative arrangements : After getting the approval of the Council of Nursing College for the study, the researcher submitted a detailed description including the objectives of the study to the Ministry of Health in Iraq (Department of Planning, Health Research Section) and the Ministry of Planning (Central Statistical Organization) in order to obtain official permission to carry out the study. Later the permission was presented to submitted Al-Diwaniya Health Directorate proven to get formal agreement to data collection the permission was

sent to Al-Diwaniya Teaching Hospital in order to ensure the agreement and cooperation.

Study Setting: The study had been conducted at operation room in Al-Diwaniya Teaching Hospital.

Study Samples: The sample of 60 nurses was purposive allocated into two groups of 30 nurses each. The group that was not participate to the program was considered the "control group". Thirty nurses who were participate to the program, the "study group".

Study instrument: to evaluate the effectiveness of an interventional program on the nurses' a self-administered questionnaire was constructed to evaluating nurses' practices about aseptic technique at operation room, it consisted of two parts:

Part I: The demographic and socio- demographic characteristics of the nurses This part is concerned with the collection of demographic data obtained from the nurses from interview questionnaire sheet such as (age, gender, educational level, years of experience, years of experience in operation room, and participation in educational/ training courses related aseptic technique,). The sixth questions offered response options of a fill in type.

Part II: Practice check list

To evaluate the nurse's practices with respect to aseptic technique at operation room, the researcher observed and checked for correct or not correct performance.

The practices checklist for nurses was composed of (20) items This part consists from four parts which include

First part: related to the hand washing, it consists of 5 items.

Second Part: related to the PPE, it consists of 5 items.

Third Part: related maintain sterile field and surgical skin disinfection, it consists of 5 items.

Fourth Part: related to environment control, it consists of 5 items.

These items (filed by researcher) were rated according to the Likers' scale ;always (3), sometimes (2), never (1).The level of scale which was scored as a total of three episodes of events was observed for each respondent .Three correct practices out of three episodes were rated as always, 2-1 correct practices out of (3) episodes were rated as sometimes and uncorrected practices were rated as never.

Validity of the questionnaire and the program :Content validity was determined by evaluation of observational checklist and an interventional program through a panel of (14) experts who had more than 10 years of professional experience in their fields, to investigate the content of an interventional program, observational checklist about aseptic technique

Statistical Data Analysis: the data were analyzed using Statistical Package for Social Sciences (SPSS) version 21 application of statistical analysis system. The

following statistical data analysis approaches were used for analyzing and evaluating the results of the study

Results

Findings revealed in table 1 ,the Mean age for the study group is (35.5 \pm 8.65) and for the control group is (34.5 \pm 4.47). most of their age both groups were within the age group (30-39 years) 11(36.7%) of participants in the study group and 14(46.7%) in the control group. the majority of gender were male presented 20(66.7%) of participants in the study group and 16(53.3%) of participants in the control group.

Concerning the level education, the more of the nurses in both groups were college of nursing graduate, 13(43.3%) in the study group, and the control group represented 12(40%). In relation to the years of experience in the nursing professional for both groups have them service (11-15 years), as they showed 8(27.7%) of the study and 9(30%) of the control, while the years of experience in the operating room both groups have most service (1-5 years) showed in the study group were 9(30%), and in the control were 10(33.3%). Statistically, there is no significant difference between study and control groups related to age group, gender, level education, years of experience in nursing profession, and years of experience in operation room, when analyzed by Fisher Exact Probability Test and t-test.

Table (1): Distribution of demographic data for nurses in the study and control groups for research sample (n=60)

Variables	Characteristics	Study Group (n=30)		Control Group (n=30)		C.S. P-value
		Freq.	%	Freq.	%	
Age (years)	20-29 yrs.	9	30.0	9	30.0	t-test p=0.61 1 NS
	30-39 yrs.	11	36.7	14	46.7	
	40-49 yrs.	8	26.7	5	16.7	
	\geq 50 yrs.	2	6.7	2	6.7	
	$\bar{x} \pm$ Std. Dev.	35.5 \pm 8.65		34.5 \pm 4.47		
Gender	Male	20	66.7	16	53.3	FEPT P=0.30 0 NS
	Female	10	33.3	14	46.7	
Educational Level	Secondary School Nursing	7	23.3	7	23.3	t-test P=0.88 2 NS
	Nursing institute	9	30.0	10	33.3	
	Nursing Bachelor	13	43.3	12	40.0	
	Postgraduate	1	3.3	1	3.3	
Years of Experience in Nursing Profession	1-5 years	7	23.3	7	23.3	t-test p=0.51 2 NS
	6-10 years	5	16.7	6	20.0	
	11-15 years	8	26.7	9	30.0	
	16-20years	3	10.0	3	10.0	
	\geq 21 years	7	23.3	5	16.7	
Years of	1-5 years	9	30.0	10	33.3	t-test

Experience in the Operating Room	6-10 years	8	26.7	9	30.0	p=0.61 1 NS
	11-15 years	4	13.3	5	16.7	
	16-20 years	6	20.0	3	10.0	
	≥ 21 years	3	10.0	3	10.0	

n=sample size, Freq.=Frequency, %=Percentages, C.S.: Comparison Significant, P=P-value, FEPT=Fisher Exact Probability Test N.S.= Non-Significant, ≥ = More than or Equal.

Findings revealed in table 2 there was highly statistically significant differences between pre and post-test for the study group (at $p < 0.001$), while showed that there were no statistically significant differences between pre and post-test for the control group (at $p > 0.05$).

Table (2): Comparisons significant between (pre & post) tests of the study and control groups

<i>Paired Samples Test</i>									
Groups	Pair test	Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Study	Pre & Post	-0.935	0.082	0.015	-0.966	-0.904	-62.333	29	0.000
Control	Pre & Post	0.010	0.072	0.013	-0.017	0.037	0.757	29	0.455

df= degree of freedom; Sig.=Significant; NS: Non Significant at ($P > 0.05$); S: Significant at ($P < 0.05$); HS: High Significant at ($P < 0.01$).

Table 3 shows that there is no statistical significant association between nurses' practices about aseptic techniques and their age group at (post-test) when p value > 0.05 .

Table (3): Association between nurses' practices with their age group for the study group for post-test

Nurses' practices Age(Years)	No.	Post- test Mean ± Std. Dev.
20-29yrs	9	2.81± 0.081
30-39yrs	11	2.75 ± 0.076
40-49yrs	8	2.79 ± 0.090
≥ 50yrs	2	2.83 ± 0.035
Total	30	2.78± 0.081
ANOVA		F =1.264 d.f= 26

	P = 0.307
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No. = Number of frequencies, Std. Dev. = Standard deviation, ANOVA: Analysis of variance; F = F-test, d.f. = degree of freedom, P = probability value; NS: Non-Significant at (P > 0.05); S: Significant at (P < 0.05); HS: High Significant at (P < 0.01).

Results of table 4 reveals that there is high statistical significant relationship between nurses' practices related to aseptic techniques in operation room for the study group and their level education in post -test at (P > 0.05)

Table 4. Association between nurses' practices with their level education for the study group for post - test

<i>Nurses' practices experience in nursing field</i>	<i>No.</i>	<i>Post- test Mean ± Std. Dev.</i>
1-5 years	7	2.81 ± 0.089
6-10 years	5	2.79 ± 0.065
11-15 years	8	2.73 ± 0.075
16-20 years	3	2.85 ± 0.132
≥ 21 years	7	2.78 ± 0.049
Total	30	2.78 ± 0.081
ANOVA		F = 1.604 d.f. = 25 P = 0.204

No. = Number of frequencies, Std. Dev. = Standard deviation, ANOVA: Analysis of variance; F = F-test, d.f. = degree of freedom, P = probability value; NS: Non Significant at (P > 0.05); S: Significant at (P < 0.05); HS: High Significant at (P < 0.01).

Findings of table 5 display that there is no statistical significant association between nurses' practices related to aseptic techniques in operation room and their years of experience in the operation room at post-test for the study group (p value > 0.05).

(Table 5) Association between nurses' practices with their years of experience in operating room for the study group

<i>Nurses' practices Years' experience in operating room</i>	<i>No.</i>	<i>Post-2 test Mean ± Std. Dev.</i>
1-5 years	9	2.82 ± 0.079
6-10 years	9	2.72 ± 0.056
11-15 years	3	2.82 ± 0.029
16-20 years	6	2.81 ± 0.097
≥ 21 years	3	2.78 ± 0.076
Total	30	2.78 ± 0.081
ANOVA		F = 2.631

No. = Number of frequencies, Std. Dev. = Standard deviation, ANOVA: Analysis of variance; F = F-test, d.f. = degree of freedom, P = probability value; NS: Non Significant at ($P > 0.05$); S: Significant at ($P < 0.05$); HS: High Significant at ($P < 0.01$).

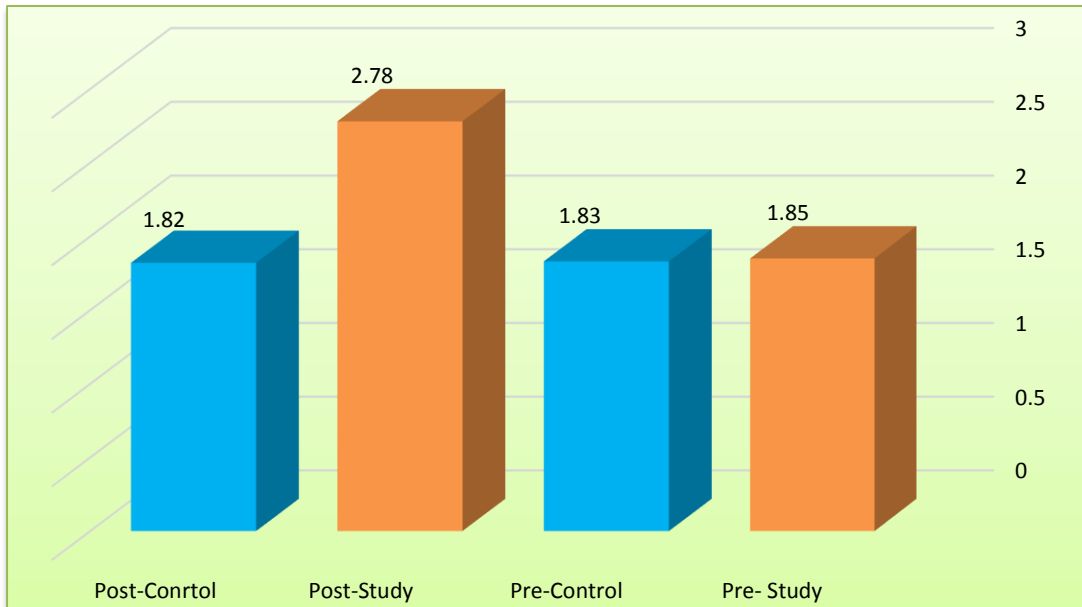


Figure (1): The effect of an interventional program of nurses' practices about aseptic techniques in operation room and the differences between Pre and Post – test for study Mean \pm SD 1.85 \mp 0.120 to 2.78 \mp 0.081 and control Mean \pm SD 1.83 \mp 0.130 to 1.82 \mp 0.160 groups by total mean score

Discussion

This study used a purposive clinical trial design to test the efficacy of an educational and skill building training program in nurse's practices about aseptic technique in operation room. The sample consistent of 60 nurses who were randomly allocated to either a Control Group (n=30) or a study Group (n=30). The Mean age for the study group is (35.5 \mp 8.65) and for the control group is (34.5 \mp 4.47). The higher percentage for study group was 11 (36.7%) for (30-39) years whereas for control group was 14 (46.7%) for (30-39) years. . This study consistent with study conducted by Christiana and Salawu (2020) in Lagos State, Nigeria. which reported that majority 28 (38.4%) and 17 (42.5%) of the participants that participated in the study were between the ages of 30 to 39 years in control and experimental group respectively. With somewhat more are male 20 (66.7%) than female for the study group while male 16 (53.3%) than female for the control group this sample assignment covered operation room. This results consistent with Singh et al., (2016) study, which reported that the most of the staff nurses (67.6%) were male and (32.4%) were female. Concerning to levels of education, the study results showed that the majority of nurses 13(43.3%) of

nurses in the study group and 12(40%). of nurses in the control group were nursing school. This study consistent with study conducted by Kareem& Ahmed (2021) in Iraq. which stated that, 50% of the participants were graduated from the College of Nursing. In relation to the years of experience in the nursing professional for both groups have them service (11-15 years), as they showed 8(27.7%) of the study and 9(30%) of the control. This result agrees with study conducted by Taher (2015) in Slemani city (Iraqi Kurdistan rejoin). which revealed that the findings show that (27%) of the sample have (11-15) years in employment in nursing field. Concerning to years of experience in in the operating room the study results showed that the majority of nurses 9 (30%)in the study group and 10(33.3%) in the control group were (1-5) years. This result concordant with study conducted by Dhakal et al., (2016) which revealed that the most of respondents 75% had working experience of five years and below.

The current study showed there is highly significant differences between (pre-test and post- test) of study group at (p value < 0.01) for overall total nurses' practices concerning aseptic techniques in operation room., this mean there are high level of improvement in nurses' practices for study group between pre and post an interventional program about aseptic technique in operation room. The result of the current study is concordant with a study conducted by Hussien et al., (2012) which reported that there is significant differences between (pre-test and post-test) in experimental group. Similarly, this result agreed with Hang and Jang (2016) which found that the experimental group showed significant increase in the attitude and performance of aseptic technique after the intervention.

The present study revealed that there are no significant differences between (pre-test and post-test) in control group of overall total nurses' practices when (p value > 0.05). This mean not clearly improvement in nurses' practices for control group between pre and post in all items of nurses' practices about aseptic technique in operation room (Table 4.9) This result is also consistent with study performed by Christiana and Salawu (2020) in Lagos State, Nigeria. which found that there is no significant differences between (pre-test and post-test) in control group. Also, this result is also consistent with study conducted by Hussein et al (2012) which reported that there is no significant differences between (pre-test and post-test) in control group.

As a result of the data analysis, there is no association between the nurse's practices of the study group with their age related to main domain about aseptic technique in operation room training post-test. these results are concordant with a study conducted by Taher (2015) in Slemani city (Iraqi Kurdistan rejoin). which stated that there is no significant association between nurses age their practices.

As a result of data analysis, there is significant differences between the nursing staffs 'practices of the study group at (post-test) with their level of education - related to the main domains bout aseptic technique in operation room ($P = 0.045$) The result of the current study is concordant with the study carried out by Nsekambabaye (2017) which revealed that there is statically significant difference between level of education and level of practice of sterile technique at operation room.

Through the course of the data analysis, it has been noted that there was no significant relation between nurse's practices of the study group with their years of experiences in operation room related to main domain in post-tests. The present study agrees with Benner (2004) who stated that without background knowledge, nurses risk using poor judgment and lack the tools necessary to learn from experience. The study may be confirmed that there was a significant positive correlation between years of experience and nurse's performance. Nurses with high experience reported more professional development knowledge and activities.

Conclusion

The study results accepted the Alternative hypotheses and an interventional program has a significant effect on nursing staffs' Practices about aseptic technique. The researcher stated these findings that indicate the program was highly effective in enhancing nursing staffs' overall practices about aseptic technique in operation room. The study shows that level of education of nurses in operation room have significant relationship on nurse's practices. while (age, gender, experience in nursing field and experience in operation room) for nurses have no significant relationship on nurse's practices about aseptic technique.

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There was no financial disclosure.

Conflict Of Interest

None to declare

Ethical Clearance

All experimental protocols were approved by the Al-Diwaniya Health Directorate in Iraq, and all experiments followed the permitted procedures

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