

Effectiveness of an Educational Program on Nurses' Knowledge and Practices toward Aseptic Technique in Managing Burn Patients at Teaching Hospitals Selected in Mosul City

Hanaa Hussein Mukhlif¹, Kalida Alwan Mansour²

¹M.Sc in Nursing, Department of Adult Nursing, Faculty of Nursing, University of Mosul, Iraq.
hana.hussein@uomosul.edu.iq

²Ph.D in Nursing, Department of Adult Nursing, Faculty of Nursing, University of Baghdad, Iraq

Abstract

Background and aim: The aim of this study to assess and evaluate the effect of an educational program on nurses' knowledge and practices toward aseptic technique in managing burn patients at Teaching Hospitals selected in Mosul city

Methodology: The study selected quasi-experimental design was conducted in two hospitals in Mosul city. Al-Jamhory teaching hospital, and Al-Salam teaching hospital. A selected a non-probability (Purposive) sample for the current study. The sample consists of (60) nurses participate, which divided into two groups, the control group included (30) nurses from Al-Salam teaching hospital, the study group included (30) nurses from Al-Jamhory teaching hospital. The questionnaire, which consisted of (26) questions related to knowledge and (7) items for nursing practices about aseptic technique in the management of burn patients. Data collected through a questionnaire and checklist where data was prepared, organized, and entered into a computer file and analyzed by SPSS, Version (24) is used for data analysis. The data were statistically significant at (P. value \leq 0.05).

Results: The present study found the highest percentage of age between (26-30 years). Most males were (56.7%) in the study group, and females in the control group were (53.3%). The maximum number of nurses participating are secondary school graduates. Among experience years in nursing and experience in burns were (1-5) years represent the highest percentage.

Conclusions: The study concluded that the educational program had an effect on nurses' knowledge and practices regarding aseptic technique in the management of burn patients. While there is no statistically significant relationship between nurses' knowledge and practices and their demographical variables'

Recommendations: The study recommended that educational facilities for nurses in burns wards in order to improve nurses' knowledge and practices.

Keywords: Educational program; nurses; knowledge; practices, Aseptic Technique

Introduction

A burn is an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction, or contact with chemicals (Kasenda, Mategula, Manda & Chokotho, 2018). The most common type of burn is a thermal burn caused by steam, scalds, contact with heat, and fire injuries. Contact burns are also common. The length of time the hot object is in contact with the skin determines the depth of injury (Urden, Stacy, & Lough, 2014). Infection in burns is still considered as the most important cause of disability and mortality in all ages and in both developed and developing countries. Despite considerable advances in the overall management of burn injuries, infection and the resultant sepsis continues to be a formidable foe the nurses' care of burn. Approximately 50-75% of mortality amongst burn patients is attributable to various infectious complications (Saaq, Ahmad & Zaib, 2015). Over the past decade, improvements and advancements in health care services have allowed more severely burned patients to survive (Seo, et.al, 2015). This would have been fatal in comparison with medical care over a century ago (Jeschke, et.al, 2015, Tan Chor Lip et.al, 2019). Most patients suffer from the severe effects of bacterial infection following a burn injury (Jasem, 2018), avoiding potential infection remains the goal in every clinical setting. Observation of medical aseptic practices will help to avoid nosocomial infections. The aseptic technique is used to achieve asepsis, which is required for many clinical interventions of burn such as dressing and the insertion of invasive devices, and also the maintenance of these devices (Denton & Hallam, 2020). Many factors influence the care that is able to provide when caring for a patient with a burn. In some cases, sophisticated products are available, but lack of clinical experience makes them difficult to use (Mussa & Abass, 2014). Assessment of the burn at the time of injury can be different in terms of size and depth to an assessment of the same injury 48 hours later (Douglas & Wood, 2017). Providing high-quality caring is the right of the patient that depends on the proper management and caring (Rafeey, Ghojzadeh, Sheikhi & Vahedi 2016). The nurses who provide care services for burn patients should obtain adequate knowledge and practices of aseptic technique and possess the rapid analysis and decision-making on changes that occurred in the patient status (Hazrati, Vahedi, Shirzadc, & Khanderooy, 2020).

Methodology

The quasi-experimental design to carry out at teaching hospitals in Mosul city to assess the effect of an educational program on nurses' knowledge and practices toward aseptic technique in the management of burns patients, the study started from 1st of June 2020 till 1st of April 2021, with the applied pre-test and post-test for study and control group, and get approved

of the study before started. The present study was conducted in two teaching hospitals in Mosul city. Al-Jamhory teaching hospital, and Al-Salam teaching hospital. A selected Purposive sample from (60) nurses, included (30) nurses from Al-Jamhory teaching hospital, and (30) nurses from Al-Salam teaching hospital. In order to collect the study information, the tool was constructed After an extensive review of literature and discussion with the experts, a structured questionnaire was developed for aseptic technique in the management of burns patients through using literature from published research studies (Hunt , 2018, Jerotich, 2016, Kalsoom, Tariq, Ali & Din, 2018). Each nurse took a period of time ranging between (20-25) minutes to answer the questions, while the time period for implementing a list of practices was (25-35) minutes. The first part represents the demographic variables of nurses participating in the current study, which include: age, gender, educational level, years of experience in the nursing field, years of experience in the burn's unit, and participated in the training course of aseptic technique. The second part was required to assess the nurses' knowledge of aseptic techniques in the management of patients with burns. It consisted of (26) Multiple-choice questions, the answer of the questions in part two is symbolized as (0) for the incorrect answer and (1) for the correct answer. Part three is related to nurses' practices applied the aseptic technique in managing patients of burns and measuring through an observation checklist. It involved (7) domains which were the following: preparing the equipment, and trolley (7) items, preparing of patient burn (5) items, aseptic technique during burns dressing (5) items, performing of dressing burns(7) items, nursing assessment of the burn's (6) items, accuracy in performing dressing, and execution(6) items. Finally, evaluating the nursing outcome (6) items. Scoring items: (3) for adequate practice, (2) for inadequate practice, and (1) for no-practice. The mean score for knowledge = (0.33), and the mean score for practices equal (0.66). The questionnaire validity has established through a panel of (10) experts chosen to examine the questionnaire in the field of nursing, and medicine. Assess the reliability of the items by using the Correlation coefficient ($r=0.75$). Nurses' practice evaluated by using a checklist of direct observation. The reliability of the instrument was established by a test-retest method. The data were collected from burns wards through the period from the 2nd of August until the 30th of December 2020. In data analysis used (SPSS, Version 25). The data were statistically significant at ($P. value \leq 0.05$).

The results

Table (1) Distribution of nurses' demographic variables as frequency, and percentage between study group (n=30) and control group (n=30)

Demographic variables	Items	Study group		Control group	
		F.	%	F.	%
Age group (Years)	21-25 years	7	23.3	7	23.3
	26-30 years	11	36.7	14	46.7
	31-35 years	8	26.7	5	16.7
	36 years and more	4	13.3	4	13.3
	Mean (SD)	30.07 (5.11)		28.80 (4.35)	
Gender	Male	17	56.7	14	46.7
	Female	13	43.3	16	53.3
Educational levels	Secondary School	21	70.0	15	50.0
	Institutes	7	23.3	13	43.3
	University	2	6.7	2	6.7
The experience years in nursing field	1-5 years	13	43.3	17	56.7
	6-10 years	7	23.3	8	26.7
	11-15 years	7	23.3	2	6.7
	16 years and more	3	10.0	3	10.0
	Mean (SD)	8.37 (5.68)		6.80 (5.91)	
The experience years in burns wards	1-5 years	22	73.3	23	76.7
	6-10 years	5	16.7	6	20.0
	11-15 years	3	10.0	1	3.3
	16 years and more	0	0.0	0	0.0
	Mean (SD)	4.80 (3.28)		4.07 (2.97)	
Training courses in aseptic technique	No training course	20	66.7	23	76.7
	One course	8	26.7	5	16.7
	Two courses	1	3.3	2	6.7
	Three courses and more	1	3.3	0	0.0

n: number of samples, **F:** frequency, **P:** percent, **M. :** mean, **S. D:** Standard Deviation

Table (1) display the high percentage between the age group (26-30 years) for each group was 36.7%, and 46.7% respectively, with males 56.7% were in the study group. As for the control group, the highest percentage for females was 53.3% and the lowest for males, and it was 46.7%. Most of the nurses participating in the study group are secondary school graduates with 70.0% and the control group was 50.0%. Among the years of experience in the nursing field (1-5 years) was 43.3%, 56.7 % respectively for each group. The years of experiences in burns wards associated with the highest percentage between groups (1-5 years), which symbolize 73.3% for the study group, and 76.7% for the control group.

Table (2) Comparisons differences among alteration in the nurses' knowledge domains in management of burns patients in the pre-test, and post-test at (the study group and the control group)

Group s	Knowledge domains	Test period	Pre-test	Post-test	Paired t test	
			M. (S.D)	M. (S.D)	P.	sig.
Stud y	Aseptic technique	Pre-post test	1.36(0.16)	1.86(0.06)	0.000	H.S
	Burns	Pre-post test	1.38(0.18)	1.88(0.06)	0.000	H.S
Cont rol	Aseptic technique	Pre-post test	1.32(0.12)	1.30(0.14)	0.484	N.S
	Burns	Pre-post test	1.33(0.16)	1.41(0.19)	0.095	N.S

M. : mean, S. D: Standard Deviation, t: Paired-Samples t test, P: probability value, sig.: a significant, N.S: not a significant at $P \geq 0.05$, S: a significant at $P \leq 0.05$, H.S: a significant at $P \leq 0.01$.

This table shows the existence of high a statistically significant difference between the pre-test and the post-test in the study group. As for the control group, the results showed that there was no statistically significant relationship between the tests.

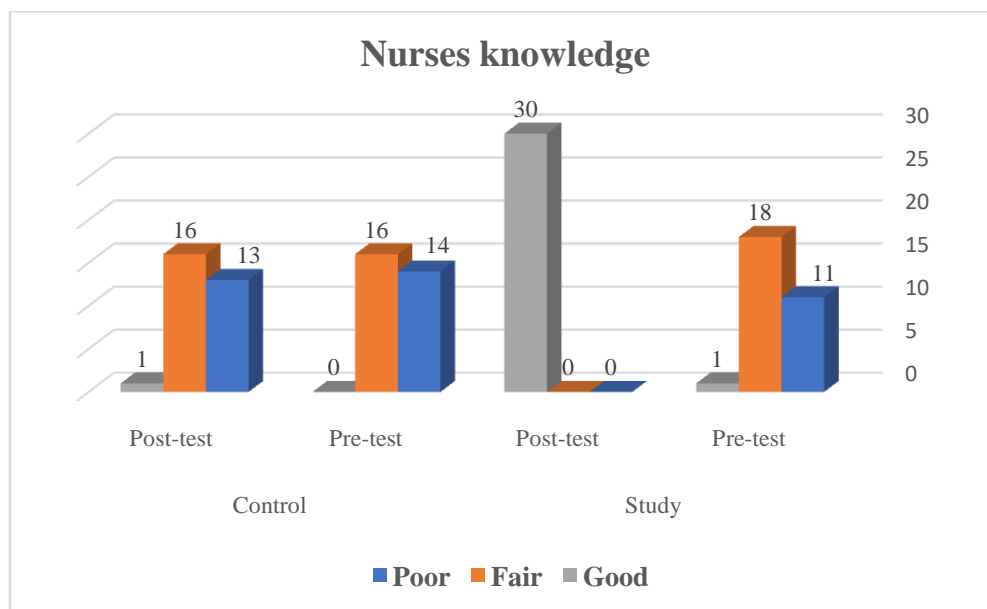


Figure (1) Shows variations in the nurses' overall knowledge toward management of burns patients at Teaching Hospitals in Mosul City for the study and control group throughout the period test

Table (3) Comparisons differences alteration in the nurses' knowledge domains in management of burns patients in the study group and the control group at (pre-test, post-test).

Knowledge domains	Test period	Study group		Control group		Independent t Test	
		M.	SD	M.	SD	P.	sig.
Aseptic technique	Pre-test	1.36	0.16	1.32	0.12	0.301	N.S
	Post-test	1.86	0.06	1.30	0.14	0.000	H.S
Burns	Pre-test	1.38	0.18	1.34	0.15	0.362	N.S
	Post-test	1.89	0.06	1.41	0.19	0.000	H.S

M.: mean, S. D: Standard Deviation, t: independent t test statistics, P: probability value, sig.: a significant, N.S: not a significant at $P \geq 0.05$, S: a significant at $P \leq 0.05$, H.S: a significant at $P \leq 0.01$.

The above table demonstrates a statistically significant relationship between the study group and the control group in (the post-test).

Table (4) Comparisons differences among alteration in the nurse's practices domains toward aseptic technique for management of burns patients in a pre-test, and post-test.

G r o u p s	Practices domains	Test period	Pre-test	Post-test	Paired t test	
			M.(S.D)	M.(S.D)	P.	sig.
S t u d y	1. Preparing the equipment, and trolley	Pre-post test	1.67(0.23)	2.81(0.14)	0.000	H.S
	2. Preparing of patient burn	Pre-post test	1.67(0.25)	2.75(0.19)	0.000	H.S
	3. Aseptic technique during burns dressing	Pre-post test	1.53(0.29)	2.67(0.21)	0.000	H.S
	4. Performing of dressing burns	Pre-post test	1.68(0.22)	2.69(0.15)	0.000	H.S
	5. Nursing assessment of the burn's	Pre-post test	1.76(0.26)	2.74(0.15)	0.000	H.S
	6. Accuracy in performing dressing, and execution	Pre-post test	1.69 (0.24)	2.77(0.12)	0.000	H.S
	7. Evaluating nursing outcome	Pre-post test	1.61 (0.27)	2.74(0.13)	0.000	H.S
C o	1. Preparing the equipment, and trolley	Pre-post test	1.77 (0.32)	1.78(0.22)	0.861	N.S

n t r o l	2. Preparing of patient burn	Pre-post test	1.70(0.32)	1.70(0.29)	1.000	N.S
	3. Aseptic technique during burns dressing	Pre-post test	1.66(0.35)	1.67(0.33)	0.856	N.S
	4. Performing of dressing burns	Pre-post test	1.62(0.23)	1.65(0.22)	0.644	N.S
	5. Nursing assessment of the burn's	Pre-post test	1.75(0.25)	1.81(0.22)	0.100	N.S
	6. Accuracy in performing dressing, and execution	Pre-post test	1.68(0.22)	1.81(0.24)	0.310	N.S
	7. Evaluating nursing outcome	Pre-post test	1.66(0.27)	1.77(0.33)	0.085	N.S

M. : mean, **S. D:** Standard Deviation, **t:** paired t test statistics, **P:** probability value, **sig.:** a significant, **N.S:** not a significant at $P \geq 0.05$, **S:** a significant at $P \leq 0.05$, **H.S:** a significant at $P \leq 0.01$.

The table shows highly statistically significant differences between the pre-test and post-test in the study group for nursing practices domains.

Table (5) Comparisons differences alteration in the nurses' practices domains toward aseptic technique in management of burns patients in the study group and the control group.

Nurses practices domains	Test period	Study group		Control group		Independent t Test	
		M.	S.D	M.	S.D	P.	sig.
1. Preparing the equipment, and trolley	Pre-test	1.67	0.23	1.77	0.32	0.165	N.S
	Post-test	2.81	0.14	1.78	0.22	0.000	H.S
2. Preparing of patient burn	Pre-test	1.67	0.25	1.70	0.32	0.658	N.S
	Post-test	2.75	0.19	1.70	0.29	0.000	H.S
3. Aseptic technique during burns dressing	Pre-test	1.53	0.29	1.66	0.35	0.134	N.S
	Post-test	2.67	0.21	1.67	0.33	0.000	H.S
4. Performing of dressing burns	Pre-test	1.68	0.22	1.62	0.23	0.372	N.S
	Post-test	2.69	0.15	1.65	0.22	0.000	H.S
5. Nursing assessment of the burn's	Pre-test	1.76	0.26	1.75	0.25	0.867	N.S
	Post-test	2.74	0.15	1.81	0.22	0.000	H.S

6. Accuracy in performing dressing, and execution	Pre-test	1.6 9	0.24	1.6 8	0.22	0.899	N.S
	Post-test	2.7 7	0.12	1.8 1	0.24	0.000	H.S
7. Evaluating nursing outcome	Pre-test	1.6 1	0.27	1.6 6	0.27	0.428	N.S
	Post-test	2.7 4	0.13	1.7 7	0.33	0.000	H.S

M. : mean, S. D: Standard Deviation, t: independent t test statistics, P: probability value, sig.: a significant, N.S: not a significant at $P \geq 0.05$, S: a significant at $P \leq 0.05$, H.S: a significant at $P \leq 0.01$.

At the post-test, the statistical analysis reveals highly significant differences between the study and control group.

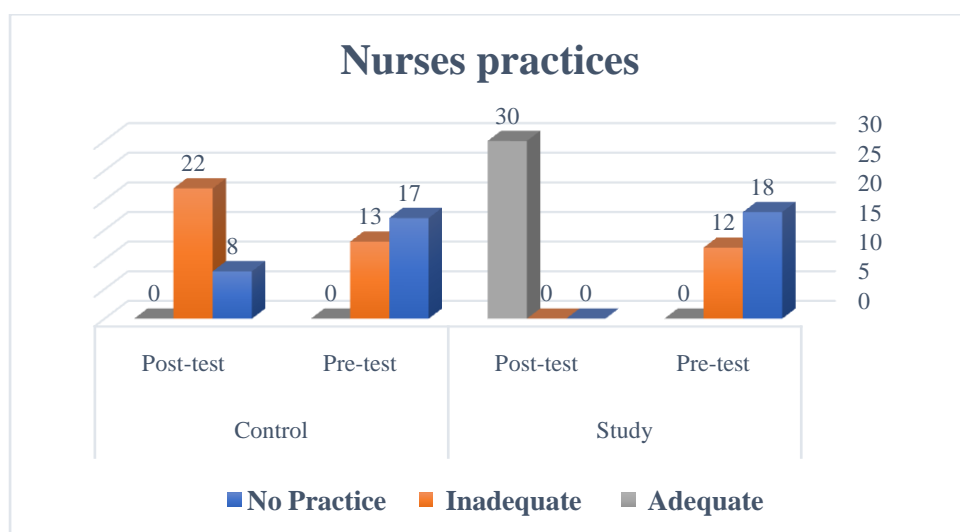


Figure (2) Described differences in nurses' whole practices toward burns patient management at Mosul City Teaching Hospitals for the study and control group throughout the test period.

Table (6) Statistical differences between nurses' knowledge and practices with their gender

Gender	F.	%	Nurses knowledge		Nurses practices	
			T-test	P.	T-test	P.
Male	17	56.7	0.745	0.462	1.256	0.219
Female	13	43.3		N.S		N.S

F: Frequency, %: Percent, M: Mean, SD: Standard deviation, T: t test, P: probability value, N.S: not a significant at $P \geq 0.05$

In this table no significance between nurses' knowledge and practices with their gender

Table (7) Relationship between nurses' knowledge and practices(post-test) with their demographic variables

Demographic	Items	Study group	Nurses	Nurses
-------------	-------	-------------	--------	--------

variables				knowledge		practices	
		F.	%	P	Sig.	P.	Sig.
Age group (Years)	21-25 years	7	23.3	2.63 2	0.07 1 N.S	2.571	0.07 6 N.S
	26-30 years	11	36.7				
	31-35 years	8	26.7				
	36 years and more	4	13.3				
Educational levels	Secondary School	21	70	0.59	0.53 8 N.S	0.316	1.20 3 N.S
	Institutes	7	23.3				
	University	2	6.7				
The experience years in nursing field	1-5 years	13	43.3	0.67 7	0.57 4 N.S	1.784	0.17 5 N.S
	6-10 years	7	23.3				
	11-15 years	7	23.3				
	16 years and more	3	10				
The experience years in burns wards	1-5 years	22	73.3	0.28 9	0.75 1 N.S	0.106	0.9 N.S
	6-10 years	5	16.7				
	11-15 years	3	10				
	16 years and more	0	0				
Training courses in aseptic technique	No training course	20	66.7	0.51	0.67 9 N.S	1.286	0.3 N.S
	One course	8	26.7				
	Two courses	1	3.3				
	Three courses and more	1	3.3				

F: Frequency, %: Percent, M: Mean, SD: Standard deviation, P: probability value, N.S: not a significant at $P \geq 0.05$,

The table below shows that there is no significant relationship between nurses' knowledge and practices with their demographic variables.

Discussion

Table (1) indicates the high percentage between the age group (26-30 years) for the study group and the control sample was 36.7%, and 46.7% respectively. Most participants in the study group were males 56.7 %, and lower percent for females 43.3 %. In contrast, the females had the highest percentage 53.3% than males in the control group. Regard with education level of the nurses the secondary school graduates represented a higher percent in both groups, as well as the lower percentage of Bachelor's graduates in nursing, as it reached 6.7% for each group. With respect to experience years in nursing were 43.3% for the study group, and the control group was 56.7 % for experience between (1-5) years. While the experiences from 16 years and more represent the minimum years of experience for nurses. In addition, the experienced years in burns wards were the same results between (1-5 years), which symbolize 73.3% for the study group, and 76.7% for the control group. The Majority of nurses no have participated in course training, the percentage of aseptic technique was 66.7% for the study group and 76.6% for the

control group. Inconsistent with the study by Kadhim& Hamza (2020) which revealed that the statistical distribution and difference of study and control groups by their sociodemographic data. Explains that the majority of the nurses in both groups are those ages between (21-30) years old. In addition, shows that the high percentages of a participant in the study group are males. About the level of education is graduated from the nursing institute and nursing college for study and control groups. In regard to the years of experience in nursing have (1-9) years in both groups. The findings of this study are supported by concerning years of experience in the burn wards have (1-4) for both groups. In relation to training, most nurses not have a training course. The study by Singh, Rani & Kumari (2016) agree with the majority of nurses (89.78) had (0-5) years of experience, and the highest percentage of nurses did not attend aseptic technique in hospital. Table (2) shows that there is an association between the pre-test and post-test in the study group, and revealed no statistically significant relationship between the tests in the control group. The findings of this study are supported by Kadhim& Hamza (2020) which demonstrate differences in knowledge assessment between pretest and posttest study groups; it demonstrates a significant difference between pretest and posttest assessment in the study group. This means that the nurses' knowledge has improved as a result of the program. the differences in knowledge assessment between the pretest and posttest control groups; demonstrate that no significant difference between pretest and posttest assessment in the control group. Figure (1) Shows the highest percentage of nurses' knowledge in the pre-test was (18) fair knowledge, whereas in the post-test were (30) good knowledge for the study group. While in pre test and post-test were (16) fair knowledge in the control group. Singh, Rani & Kumari (2016) findings related to knowledge of nurses regarding aseptic technique Results revealed that the maximum nurses having average knowledge whereas (36.76%) having knowledge poor, none of the nurses was having adequate knowledge regarding aseptic techniques. Table (3) demonstrate the statistical differences in the nurses' knowledge toward aseptic technique and burn in management of patients between the study group and the control group at pre-test, and post-test. The study by AL-Sudani and Ali (2014) the findings of this study are contrary to nurses' practices, it has been a good practice was (37.1%), the acceptable practice was (37.1%) and only (25.7%) was poor practices. Furthermore, nurses in burn wards indicated that high grades in practices are for preparing sterile equipment for changing burns dressing, disinfection used to sterilize and wearing a face mask, and wearing sterile gloves for each patient. Table (4) found highly significant differences between the pre-test and post-test in the study group for nursing practices domains. While in control group shows no significant relationship between Pre-test, and post-test. Table (5) shows the differences at the post-test, the statistical analysis between the study and control group. And reveals no significant

relationship between pre-tests. Figure (2) explain the high percentage was (18) nurses have no practices in the pre-test of the study group, and in the control, group were (17) nurses have no practices, in whole practices toward burns patient management. Table (6) demonstrates that there is no positive relationship between nurses' knowledge and practices and their gender. Table (7) demonstrates that there is no significant relationship between nurses' knowledge and practices and their demographic variables. Also, Singh, Rani & Kumari (2016) mention the data showed that on the computation of chi-square, it was found that there was no significant association of the knowledge score of the nurses with any demographic variables at 0.05 level of significance. This indicated that the demographic characteristics of staff nurses and their knowledge scores did not have the significant association and were independent of each other. The findings of this study are contrary to Niazy (2014) indicated that there were highly significant between practices and gender of nurses at $P \leq 0.05$ level. Also, presented that there were statistical differences between nursing practices and years of experience for nurses. And supported by the same study which revealed that and shows that there were no significant differences between nurses' training courses with practices. The finding of this study is supported by Mohammed (2016) revealed there are no statistically significant relations between education, experience, and knowledge, and practice. While contrast with a significant correlation between knowledge and practice with age pre-test and post-test

Conclusions

The study shows the effect of the educational program on nurses' knowledge and practices toward aseptic technique in managing burn patients. While there is no significant relationship between nurses' knowledge and practices with their demographical variables' education and their practices. The level of nurses' knowledge was fair in the pre-test, also practices were inadequate.

Recommendations

1. Uses posters, guidelines, pamphlets, and manuals with educational content at burns wards.
2. Provide educational facilities for nurses working in burns wards to improve nurses' knowledge and practices.

References

1. AL-Sudani, A. A., & Ali, E. G. (2014). Assessment of Quality of Nursing Care for Children with Burns Injuries in Baghdad City Hospitals. *Kufa Journal for Nursing Sciences*.2(3).

2. Denton, A., & Hallam, C. (2020). Principles of asepsis 1: the rationale for using aseptic technique. *Nursing Times*. 116(5). 38, 40 <https://www.nursingtimes.net/>
3. Douglas, H. E., & Wood, F. (2017). Burns dressings. *Australian family physician*. 46(3). 94, 95.
4. Hazrati, H., Vahedi, L., Shirzadc, F., &Khanderooy, R. (2020). Effectiveness of the educational interventions on improvement of the performance of burning ward nurses. *Russian Open Medical Journal*. 9(1).1,4. DOI: 10.15275/rusomj.2020.0103. [Www.romj.org](http://www.romj.org)
5. Hunt, J., (2018). *aseptic technique and clean technique procedure*, NHS southern health, version 4. . 7- 11, 13
6. Jasem, M. A, Alia E. Mahmood, A. E, Shanyoor, Gh. J, Al-Newani, H. R, & Al-Bahadly, A. B. (2018). The most frequent bacterial infections in burn injuries at burn units of two hospitals in Baghdad. *Iraqi Journal of Public Health* .2(1). 12
7. Jerotich, C. J. (2016). Assessment of aseptic technique among nurses in management of burns patients at kenyatta national hospital (Doctoral dissertation, University of Nairobi).
8. Jeschke, M. G., Pinto, R., Kraft, R., Nathens, A. B., Finnerty, C. C., Gamelli, R. L., & Herndon, D. N. (2015). Morbidity and survival probability in burn patients in modern burn care. *Critical care medicine*. 43(4). 808.
9. Kadhim, H. R., & Hamza, R. A. H. (2020). Effectiveness of an Educational Program on Nurses' Knowledge toward Burn Management. *Medico Legal Update*. 20(4). 1944-1945
10. Kalsoom, B. , Tariq, N., Ali, A. Noor, N. (2018). Assessment of Nurses Practices Related to Aseptic Techniques in Managing Burn Patients. *Saudi Journal of Nursing and Health Care*. 1(3). 110. Website: <http://saudijournals.com/>
11. Kasenda, S., Mategula, D., Manda, G. E., &Chokotho, T. K. (2018). Risk Factors of Mortality of Hospitalised Adult Burn Patients a Malawian Tertiary Hospital Burns Unit. *BioRxiv*. 2.<https://doi.org/10.1101/421982>;
12. Mohammed S. (2016). Nursing Guidelines and Its Effects on Nurses' Knowledge and Patient Safety Regarding Nosocomial Infection Control Measures in Burn Unit. 5(4).16. www.iosrjournals.org. DOI: 10.9790/1959-0505040616
13. Mussa, Y. M., Abass, K. S. (2014). Assessment of nurses knowledge regarding nursing care for patients with burn. *Journal of Natural Sciences Research*.4(7). 83-85. ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
14. Niazy, S. M. (2014). Evaluation of Nursing Practices for Patients with Burns in Emergency Units. *kufa Journal for Nursing sciences*. 4(3). 79-81.

15. Rafeey M, Ghojazadeh M, Sheikhi S, Vahedi L. (2016). Caustic ingestion in children: a systematic review and meta-analysis. *J Caring Sci*; 5(3): 251-265. <https://doi.org/10.15171/jcs.2016.027>.
16. Saaiq, M., Ahmad, S., & Zaib, M. S. (2015). Burn wound infections and antibiotic susceptibility patterns at Pakistan Institute of Medical Sciences, Islamabad, Pakistan. *World journal of plastic surgery*. 4(1). 10 www.wjps.ir
17. Seo, D. K., Kym, D., Yim, H., Yang, H. T., Cho, Y. S., Kim, J. H., & Chun, W. (2015). Epidemiological trends and risk factors in major burns patients in South Korea: a 10-year experience. *Burns*. 41(1). 181.
18. Singh, N., Rani, M., & Kumari, P. (2016). Assessment of Knowledge of Staff Nurses Regarding Aseptic Techniques at Selected Hospital-A Descriptive Survey Study. *International Journal of Health Sciences & Research*. 6(9). 292-293. www.ijhsr.org
19. Tan Chor Lip, H., Tan, J. H., Thomas, M., Imran, F. H., & Azmah Tuan Mat, T. N. (2019). Survival analysis and mortality predictors of hospitalized severe burn victims in a Malaysian burns intensive care unit. *Burns & trauma*. 7. 2 <https://doi.org/10.1186/s41038-018-0140-1>
20. Urden, L. D., Stacy, K. M., & Lough, M. E. (2014). *Critical care nursing: diagnosis and management*. St. Louis, Mo.: Elsevier/Mosby. 931