

Effectiveness of an Interventional Program on Nurses Practices about Prevention of Pressure Ulcer at the Intensive Care Unit

Ali M. Noor ¹

Hakima Shaker Hassan ²

* MSc adult nursing, College of Nursing, University of Baghdad, Iraq.

** Ph.D., Professor, Department of Adult Nursing, College of Nursing, University of Baghdad, Iraq.

Corresponding author: Ali M. Noor; MSc adult nursing, College of Nursing, University of Baghdad, Iraq. E-mail: drhakimashakir@gmail.com.

ABSTRACT

Background: Pressure ulcer (PU) is a localized injury induced by prolonged pressure for a longer period to the skin and underlying soft tissue that leads to tissue ischemia, which in turn, decreases the supply of oxygen, essential nutrients, and ultimately tissue necrosis and can lead to serious complications including death.

Objectives: to evaluate the effectiveness of an interventional program on nurses practices regarding pressure ulcer prevention at the intensive care unit in

الخلاصة:

خلفية البحث: قرحة الضغط هي إصابة موضعية ناتجة عن الضغط المستمر لفترة زمنية معينة على الجلد والأنسجة الرخوة التي تؤدي إلى نقص التروية للأنسجة، والذي بدوره يقلل من وصول الأكسجين، ويمكن أن تؤدي قرحة الضغط إلى مضاعفات خطيرة بما في ذلك الوفاة.

الهدف: تهدف هذه الدراسة الى تقييم فاعلية البرنامج التداخلي على ممارسات الممرضين فيما يتعلق بالوقاية من قرحة الضغط، وايجاد العلاقة بين ممارسات الممرضين وخصائصهم الاجتماعية والديموغرافية (العمر، ومستوى التعليم، وسنوات الخبرة في وحدة العناية المركزة، والمشاركة في الدورات التدريبية).

المنهجية: تم إجراء تصميم قبل التجريبي (الاختبار القبلي والبعدى لمجموعة واحدة) في وحدة العناية المركزة بمستشفى الديوانية التعليمي للفترة من 5 / تشرين الأول / 2020 إلى 6 / نيسان / 2021. إن عينة الدراسة هي عينة غير احتمالية (غرضية) تكونت من (27) ممرضًا يعملون في وحدة العناية المركزة الذين تعرضوا للبرنامج التداخلي. فقد استعمل الباحث استمارة رصد الممارسات المتضمنة (28) فقرة. لقد تم تحديد مصداقية الأداة من خلال عرضها على (15) خبير في مجال التخصص.

النتائج: لقد أظهرت نتائج هذه الدراسة وجود فروق ذات دلالة إحصائية في درجات ممارسات الملاك التمريضي في الاختبار البعدى لمجموعة الدراسة مقارنة بدرجات الاختبار القبلي (المتوسط الحسابي في الاختبار البعدى 2.89 في حين في الاختبار القبلي 1.04). وأظهرت النتائج أيضًا عدم وجود علاقة إحصائية بين ممارسات الممرضين وخصائصهم الديموغرافية.

الاستنتاجات: استنتجت الدراسة بأن فاعلية البرنامج التداخلي في ممارسات الملاك التمريضي المتعلقة بالوقاية من قرحة الضغط كانت إيجابية وعلى مستوى عالي.

التوصيات: أوصت الدراسة بضرورة توفير برنامج تداخلي بشكل دوري للملاك التمريضي الذي يعمل بوحدة العناية المركزة من أجل تعزيز مستوى معارفهم وممارساتهم فيما يتعلق بالوقاية من قرحة الضغط.

Al-Diwaniyah Teaching Hospital, and to find out the relationships between nurse's practices and their socio-demographic characteristics (age, level of education, years of experience in intensive care unit, and participation in training courses).

Methodology: A pre-experimental design (one group: pre and post-test) was carried out at the Intensive Care Unit in Al-Diwaniyah Teaching Hospital from October 5th 2020, to April 6th 2021. A non-probability (purposive) sampling has been performed during a selection of (27) nurses who

works at the intensive care unit were exposed to the interventional program. The researcher used observational practices checklist which included (28) items. The validity of the study instrument was determined through the (15) of experts in the specialty field.

Results: The results of this study revealed that there were significant differences in nursing staff practices scores in the post-test for the study group compared with scores in pre-test (in the posttest $M = 2.89$ versus in the pre-test $M = 1.04$). The findings also showed that there is no statistical relationship between

nursing staff practices and their demographic characteristics.

Conclusion: The study concludes that the effectiveness of an interventional program on nursing staff practices regarding pressure ulcer prevention is positive at a high rate.

Recommendations: The study recommended providing an interventional program periodically to the nursing staff who working at ICU in order to enhance their knowledge and practices level regarding PU prevention.

INTRODUCTION

Pressure ulcer (PU), they have been called pressure sore, bedsore, pressure injury, and decubitus ulcer is a localized injury induced by prolonged pressure for a longer period to the skin and underlying soft tissue that leads to tissue ischemia, which in turn, decreases the supply of oxygen, essential nutrients, and ultimately tissue necrosis and can lead to serious complications including death ⁽¹⁾. Thus, the single most significant factor is pressure. Tiny blood vessels provide the skin with oxygen-rich blood and drain deoxygenated blood out; at the arterial end, the pressure in a capillary is (32mmHg), and at the venous end (12mmHg). So, unrelieved pressure shuts down the supply of capillaries and prevents oxygen and a nutrient from being obtained by the skin, the result is tissue death, and pressure ulcers develop ⁽²⁾. Moreover, PU prevention is considered a priority for nurses and an important indicator for the quality of the nursing services and care. As a result of this, in order to achieve the best care for patients, nursing officials should make efforts to improve nurses' knowledge regarding the prevention of pressure ulcers based on the most recent scientific evidence and recommendations ⁽³⁾. In addition, due to invasive nature of intensive care unit (ICU), the majority of critically ill patients who are vulnerable populations, are subject to a high risk of PU, on the area with bony prominences, sacrum, coccyx, heels, and ear. In addition to pressure,

moisture, friction, and shear contribute to the development of pressure ulcers, as well as, intubated patients with the endotracheal tubing; for example, can cause pressure ulcers on the lips of a patient, causing tissue ischemia in the skin ⁽⁴⁾.

Professionals in the medical field have always known that pressure ulcer prevention is a series of assessments and interventions. In this regard, Risk Assessment Scales (RASs) are classified as instruments that determine a point scale based on a collection of parameters that are considered risk factors for the development of PUs; they are designed to classify those patients at risk of PU development, allowing tailored intervention measures to minimize the occurrence of PUs to be enforced on the basis of the risk assessment scale that the nurse becomes aware of any patients at risk of developing a pressure injury ⁽⁵⁾. Every year in the United States, (2.5) million people are prone to a high risk of developing PUs, among them (60,000) people who die due to its complications such as osteomyelitis and sepsis. PUs can also adversely impact health institutions', communities and service providers, impose therapeutic burdens on family and medical centers. The health system costs (18.5) billion in America to treat them, of which (\$129,000) is spent to treating patients whose entire skin thickness has been compromised by the ulcer ⁽⁶⁾.

In this regard, education and/or training programs in the prevention of pressure ulcers performed for nurses in hospitals have been shown that are effective at increasing the pressure ulcer knowledge and/or skills of the nursing staff or at increasing their knowledge and decreasing the incidence of pressure ulcers (7). Due to the use of mechanical ventilation, vasopressors, and hemodynamic dysfunction resulting in bedridden patients, patients in the ICUs vulnerable to the risk of developing PUs; the ongoing prevalence of PUs in the environment of critical care that results from constant exposure to pressure or pressure in combination with shearing forces that put multiple bony prominences vulnerable to such injuries across the body, and therefore adds the challenge to patients and caregivers (8, 9). According to international literature, the level of knowledge of the nurses regarding the prevention of pressure ulcers has been described as poor, and this reflects negatively on their practices in this field because they do not meet with guidelines for best practices. So, poor nurses' knowledge and practice contribute greatly to the higher incidence of pressure ulcers (10, 11).

In the Arab world, PUs in hospitalized patients is a major health problem; there is a lack of sufficient PU documentation, risk assessment, education, and preventive protocols for PUs. So, improving knowledge of PU prevention by nurses increases the outcomes of patients in terms of decreased hospital stay, decreased pain, and decreased human suffering (12, 13). Essentially, immobility is considered the chief cause of pressure sores, but poor skin integrity also is a risk factor; damaged skin lose their elasticity, thickness, and strength to resist pressure and shear force. Therefore, effective care of skin and the preservation of healthy skin considered critical in avoiding pressure sores (14). In this context, repositioning (supine and lateral position) is considered one method that is used to relieve pressure and thereby avoid PUs among other defensive techniques. Repositioning schedules are used to dispense pressure between the body and

support surfaces; where standard care for immobilized patients is (2-hourly) repositioning schedules that must be applied to immobilize patients (15). In this context, it is important to provide education and increase awareness among healthcare professionals about the effective use and implementation of risk assessment scales to ensure that patients are adequately treated. Therefore, the causes, grading of pressure ulcers and prevention strategies to reduce their occurrence should be known to nurses (16, 17).

AIMS OF THE STUDY

To evaluate the effectiveness of an interventional program on nurses practices regarding pressure ulcer prevention at the intensive care unit in Al-Diwaniyah Teaching Hospital, and to find out the relationships between nurse's practices and their socio-demographic characteristics (age, level of education, years of experience in intensive care unit, and participation in training courses).

METHODOLOGY

A pre-experimental design (one group) used to guide this study; it was applied by use of pre-posttest approach, from the October 5h 2020, to April 6th 2021. The study was conducted at Intensive Care Unit in Al-Diwaniyah Teaching Hospital. A purposive (Non-probability) sampling has been performed for all nursing staff who works in the intensive care unit, the total number of nurses who participated in the study was (27) nurses exposed to the interventional program. An interventional program was constructed based on the results of the preliminary needs assessment, and on information gained from reviewing the relative scientific literature and previous studies. The contents of the interventional program are evaluated by experts that have more than (8 years) of experience in their field, revision made on the contents of the program form based on these experts' recommendations and suggestions. The interventional program was designed to improve nursing staffs' practices related to skin anatomy and physiology of the skin, skin assessment techniques,

risk skin assessment, knowing pressure ulcer definition, risk factors, causation, common site, and grades of pressure ulcer, and preventive measures of pressure ulcer which includes skin care, repositioning the patient, using support surfaces and nutritional requirements.

To evaluate the effectiveness of the interventional program, the researcher constructed an observational check list format in order to reach the aims of the study. The instruments consist of (2) parts:

- **Part 1: Self-administered questionnaire sheet related to demographic characteristics of the nurses.**

This part is concerned with the collection of basic socio-demographic data obtained from the nurse's by interview questionnaire sheet that involved (age, gender, level of education, and years of experience in nursing, years of experience in the intensive care unit, and participation in training courses regarding pressure ulcer prevention).

- **Part II: Observational checklist concerning pressure ulcer prevention.**

The observational checklist consisted of (28) responses distributed into two parts that include:

- First part: Nurse's practices regarding skin assessment for developing pressure ulcer. This part was consisted of (16) items.
- Second part: Nurse's practices regarding preventative measure of pressure ulcer. This part consisted of (12) items.

The reliability of the observational checklist is statistically formed for testing the reliability coefficient of the instrument for the Inter-rater and Intra-rater, its shows ($r= 0.93$) of Pearson correlation coefficient value.

The post-test conducted for all study participants to determine the effectiveness of an interventional program on nurses' practices concerning pressure ulcer prevention, during this phase the same instruments (observational checklist) were used after three weeks from the application of the interventional program. Data have been analyzed through the use of Statistical Package for Social Science (SPSS version 25 application).

RESULTS

Table (1): Distribution of the participants (Study sample) according to their Demographic Characteristics

Demographic data	Rating and interval	Frequency	Percent
Age / years	21-25	10	37
	26-30	10	37
	31-35	6	22
	36-40	1	4
	Total	27	100
	Mean (27.96), S.D. (3.50)		
Gender	Male	16	59
	Female	11	41
	Total	27	100
Educational Level	Primary school	4	15
	Diploma	8	30
	Bachelors and higher	15	55
	Total	27	100
Years of Experience in Nursing	Less than or equal 5 year	16	59
	6-10	6	22
	11-15	5	19

	Total	27	100
Years of Experience in ICU	Less than or equal 5 year	18	67
	6-10	6	22
	11-15	3	11
	Total	27	100
Participate in Training Courses	No	23	85
	Yes	4	15
Number of Training session	Total	27	100
	Inside Iraq	4	100
	Total	4	100

S.D. =standard deviation; ICU=intensive care unit

Table (1) demonstrate the frequency count for selected demographic data of the study sample relative to intensive care unit nursing staff, the study results show that the predominant age sample of nursing staff were within thirty years old (74%); gender, (59%) of the sample is male; (52%) of them was married; (55%) were have a bachelor's degree. The highest percentage (59% and 67%) concerning years of experience in the nursing field and years of experience in ICU respectively have less than or equal five years; (85%) of nurses had not participated in training courses regarding PU prevention.

Table (2): Comparison between Nurses Practices in Study Sample for Pre and Post-test Regarding Overall Domains

Practice Parts	Nurses Practices domains	Periods	Study sample n=27		t- test	P. Value & Sig.
			Mean	S.D		
First part	Nursing Staff practices regarding skin assessment for developing PU	Pre	1.000	0.000	90.226	.0001 HS
		Post	2.878	0.108		
Second part	Nursing Staff practices regarding preventative measures of PU	Pre	1.080	0.099	58.663	.0001 HS
		Post	2.901	0.103		
Overall nursing staff Practices		Pre	1.040	0.050	79.537	.0001 HS
		Post	2.890	0.095		

PU= pressure ulcer; n=Number of sample, S.D= Standard deviation, t= paired sample t-test, degree of freedom=26, Sig.: Significance, N.S: Non-Significant at $p>0.05$, S: Significant at $p<0.05$, H.S: high Significant at $p<0.001$.

Table (2) shows that there is highly statistically significant differences between pre and post-test of all practices domains regarding pressure ulcer prevention for the study sample (study sample) at (P less than 0.001); participants practices level has increased positively at post-test when analyzed by Paired-sample t-test.

Table (3): Association Between demographic characteristic with nursing staff knowledge and practices for the study sample at post test

Socio-demographic variables	Practice level		
	Statistical test	P value	Sig.

Age groups/years	F=0.453	0.718	N.S
Educational level	F=1.559	0.231	N.S
Years of Experience in ICU	F=0.118	0.889	N.S
Training courses in PU prevention	t=2.018	0.054	N.S

PU= pressure ulcer prevention; t= independent t-test; F= analysis of variance; Degree of freedom=25; Sig.: Significance; N.S: Non-Significant at $p>0.05$; S: Significant at $p<0.05$; H.S: high Significant at $p<0.001$.

Table (3) show there is no statistically significant association between nursing staff practices at post-test and their socio-demographic characteristic (age, educational level, year of experience in ICU, and training courses in pressure ulcer prevention), when analyzed by one way ANOVA and independent sample t-test.

DISCUSSION

Pressure ulcer (PU) arises with a lengthy hospital stay and therefore a financial burden on the health care system, patients, and family; PU also contribute to the mortality and psychosocial effects. Although PU prevention remains a challenge for all healthcare practitioners, it is specifically the task of nurses to maintain skin integrity and PU prevention that results in PU avoidance.

Regarding post-test practice, data analysis showed the effectiveness of an interventional program regarding nursing staff practices concerning pressure ulcer prevention is positive at a high rate. The result showed that the change in the practices level of poor in pre-application of an interventional program to a good level after its implementation; showed there is high statistical significant differences between the pre and post-test of all practice domains regarding pressure ulcer prevention for all the study sample at (P less than 0.001); participants practices in the study sample has increased significantly at the post-test score when analyzed by Paired-sample t-test, with a statistical mean equal to (2.890) for study sample nurses at post-test as shown in (Table 2).

The result of the current study concordant with a study conducted by Ibrahim and Qalawa (2020) in Egypt, to evaluate effectiveness of implementing guidelines concerning a PU prevention on nursing staffs' practices; which revealed that there were a statistically significant difference in nursing staffs' practices concerning PU prevention at ($p < 0.001$) (18). Similarly, this result agreed with a pre-experimental study design in Egypt by Awad and Hewi (2020); that showed the total mean post-test were significantly higher than total mean pre-test scores concerning pressure ulcer prevention

regarding nurses' practice (19). Also, the results of the current study supported with a study performed in Syria by Hallaj (2017); which showed that the interventions applied had a positive effect on the prevention of the development of PUs in patients in the study sample (20), where after implementation of the nursing interventional program, the majority of patients had no pressure ulcers or no evidence of pressure ulcer. Additionally, the result of the current study also concordant with a study performed in Egypt by Mohamed and Weheida (2015), which revealed that immediately following the implementation of the training curriculum, the mean total practice scores of nursing practitioners were higher with a higher statistical significant differential relative to pre-implementation (21).

The present study confirmed that the differences in pre-post-tests indicate the effectiveness of an educational program regarding nursing staff practices concerning prevention of pressure ulcer.

The results of the current study revealed that there is no statistically relevant association between the practices of nursing staff and their demographic characteristics at post-test when analyzed by one way ANOVA and independent sample t-test in (Tables 3).

These result concordant with a study conducted by Mwiseneza (2017) in Rwanda, which revealed there was no statistical significant association between the nurses' practices and their age, their participating in training sessions regarding PU prevention, their educational level and years of experience (22). These results also agree with a study undertaken in Iran by Khojastehfar et al. (2020), which revealed there was no statistical significance

between nursing staffs` practices and their educational level and their participating in training sessions regarding PU prevention ⁽⁶⁾.

While this result inconsistent with a study performed by Getie, Baylie, Bante, Geda, and Mesfin (2020) in Ethiopia, that stated there is a significant association between educational qualification level of the nurses, years of experience, training on PU prevention and their practices regarding pressure ulcer preventive measures ⁽²³⁾.

CONCLUSION

The majority of ICU nursing staff had poor practices regarding pressure ulcer prevention when assessed at the pre-test period. The present study revealed that an interventional program demonstrated a highly statistically significance of all practices parts

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for the study sample regarding pressure ulcer prevention at the post-test period, and the study revealed there was no statistically significant association between nursing staffs practices and their selected socio-demographic characteristics.

RECOMMENDATIONS

The nurses in the ICU should have sufficient updated knowledge about prevention of pressure ulcer. The necessity of conducting further studies in the different settings with consideration to a wide-range sample to be representative; Special training should be constructed for nurses to reinforce their skills and enhance their experience in the prevention of pressure ulcers.

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