

Effect of Implementing Standardized Preventive Guidelines for Pressure Ulcer on Nurses' Performance

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Abstract Background: The occurrence of pressure ulcers is an indicator of the quality of nursing care that patients receive. It is an issue that affects the quality of life of patients and raises the pressure on healthcare workers and the families of patients. Inadequate levels of awareness and performance may lead to the development of pressure ulcer. So, Nurses need to keep up to date on Pressure ulcer prevention. **Aim:** The study aimed to evaluate the effect of implementing standardized preventive guidelines for pressure ulcer on nurses' performance. **Subjects and method:** A quasi-experimental design was conducted on all available nurses provide direct care to patients at the time of data collection (99) in Port Said governmental hospitals. The data were collected using three tools; Nurses' Knowledge questionnaire, Nurses' attitude scale, and nurses' observational checklist. **Results:** The findings of the present study showed that there was a statistically significant difference in nurses' knowledge, attitude, and practice pre and post implementing standardized preventive guidelines for pressure ulcer at $p < 0.001$. **Conclusion:** The study concluded that there were improvements in nurses' performance regarding the care of patients at risk for pressure ulcer after implementing standardized preventive guidelines for pressure ulcer. **So, the study recommended that** there are specific demands for structured recommendations for the prevention of ulcer pressure given to nurses caring for high-risk patients on simple media. Efforts should be made to design and implement educational programs that match institutions and hospitals with field evidence, enhanced facilities and nurses' educational approach of caring strategies for the patient's pressure ulcer risk.

Keywords: nurses' performance, pressure ulcer, preventive, guidelines, standardized

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1. Introduction

Pressure ulcers remain the key complications of prolonged hospitalization, especially in poor nutritional conditions, increased moisture on the skin, prolonged pressure, and sensory stimulation compromised. [1]. Pressure ulcers are a major problem, but the implementation of best practice guidelines can prevent ulcers from occurring [2]. Pressure ulcers are widespread in many areas of care, with adverse health effects and high cost of treatment [3].

The 2014 World Stop Pressure Ulcer Report showed that almost 700,000 patients were affected by pressure ulcers each year. Every year, approximately 186,617 patients develop new acute ulcers [4]. Also, 60,000 people have died as a result of global pressure ulcer complications, according to the 2014 Coloplast Pressure ulcer summit survey [5].

According to the National Pressure Ulcer Advisory Panel (NPUAP), Pressure ulcers are skin wounds on bony prominent areas resulting from prolonged pressure on the

skin. Pressure ulcer causes painful conditions, takes a long time to heal and is often a precursor to life-threatening complications such as skin and bone infections. Circulation is stopped when blood flow slows or ceases between the bone and the bed or wheelchair surface in the enclosed region. The skin may die in as little as half a day when the tissue is deprived of oxygen and nutrients, although the evidence may not be apparent for days or even weeks [6].

Preventing pressure ulcers is one of the biggest health problems in terms of reducing patient damage [7]. Pressure ulcer control requires both sores prevention and treatment. This ensures that the nurse uses the standard tools that are approved [8]. On a goal-oriented and cost-effective evaluation, classification and required action. It includes evaluating a patient for the production of intrinsic and extrinsic factors in a pressure ulcer using specific risk assessment scales such as Braden, Waterlow or Norton's Scales as well as bed mobility requirements, adequate tissue perfusion, and adequate nutritional status. Once the patient's risk level is determined (diagnosis of nursing), nurses and colleagues, together with the patient where possible, can create a prevention and care plan that is appropriate to their level of risk [9].

Preventing pressure ulcers (PU) is therefore important for nursing care and is defined as early as in the 19th-century writings of Florence Nightingale. Avoiding PUs is, therefore, a priority for the acute care environment as the cost of treating a pressure ulcer is projected to be 2.5 times the cost of avoiding, a PU avoidance is still an erroneous method. Recent international recommendations point to the lack of rigorous, high-quality research to guide practice. [10].

1.1. Significance of the Study

A pressure ulcer is a preventable medical immobility complication. It has a psychological, economic and social impact on individuals and families. Its cost of treatment is more than twice the cost of prevention. It is primarily the responsibility of nurses to prevent ulcers of pressure [11]. The cost of treating pressure ulcers rose in proportion to the rise in the area and the growth of the PU group [12]. The treatment cost per patient per day ranged from €2.65 to €87.57 in all settings and ranged from €1.71 to €470.49 in different settings [13]. Pressure ulcers have been known as a disease agent for decades. Pressure sores have been discovered in Egyptian mummies, some of which are over 5,000 years old [14].

Some PUs are preventable by using the PU guidelines, which can be used to correctly identify at-risk populations [15]. There are many specific and widely accepted PU prevention guidelines currently available. Sadly, adhere to the PU Guideline has not been consistently applied [16]. So, nurses' understanding of ulcer pressure detection, prevention and treatment plays a very important role in the occurrence and prevalence of ulcer pressure in health care systems as The knowledge level and performance are significant in ensuring high-quality care [17].

1.2. Aim of the Study

Evaluate the effect of implementing standardized preventive guidelines for pressure ulcer on nurses' performance through:

- Assess nurses' knowledge regarding standardized preventive guidelines for pressure ulcer.
- Assess nurses' practice regarding standardized preventive guidelines for pressure ulcer.
- Assess nurses' attitude regarding standardized preventive guidelines for pressure ulcer.
- Design and implement standardized preventive guidelines for pressure ulcer.
- Evaluate nurses' performance after implementing standardized preventive guidelines for pressure ulcer.

1.3. Hypotheses of Research

H 1: Nurses who have been exposed to standardized preventive pressure ulcer guidelines will have better knowledge compared to their pre-intervention.

H 2: Nurses who have been exposed to standardized preventive pressure ulcer guidelines will have a better attitude compared to their pre-intervention.

H3: Nurses who have been exposed to standardized preventive pressure ulcer guidelines will have better practice compared to their pre-intervention.

2. Methodology

2.1. Design

In this study, a quasi-experimental research design was used

2.2. Setting

This study was carried out on the orthopedic, medical, coronary care and intensive care departments at Port Said general hospital, Elzohour hospital and Port-Fouad hospital affiliated to the ministry of health at port said governorate.

2.3. Sample

A convenient sample of all available (99) nurses who work as a full-time nurse in the study settings mentioned above has been taken.

2.4. Instrumentation

Data was collected using three tools:

2.4.1. Tool I: Nurses' Knowledge Questionnaire

It was developed by the researcher based on reviewing recent related literature and guided by [18,19,20], to assess nurses' knowledge regarding the care of patients at risk for pressure ulcers and then translated into the Arabic language. It consists of two parts, Part I includes sociodemographic characteristics as age, sex, social status, level of education, and residence. Part II consists of 31 multiple-choice questions (MCQ) in the following areas, knowledge about skincare (9 Questions), Braden scale (8 Questions), patients' position (5 Questions), nutrition (5 Questions), and exercises (4 Questions). Each question has four options for answering. Nurses who answered the item correctly scored one point, but who could not respond correctly scored zero. It results in a final score of between 0 and 31. Zero (0) and 31 scores reflect nurses who have incorrectly and correctly answered all nurses' PU information test items for a total of 31 items, respectively.

2.4.2. Tool II: Nurses' Attitude Scale

It was developed by the researcher after reviewing the previously mentioned recent related literature to evaluate the attitude of nurses towards the prevention of pressure ulcers and consists of 13 statements. In this section, the response option used the Likert 3 point scale which is ranging from correct, false, and I don't know. Highness of total scores (more than 60%) refers to a better attitude.

2.4.3. Tool III: Nurses' Observational Checklist

This tool adopted from [20] to assess nurses' practice regarding the care of patients at risk for pressure ulcers. It includes the practice of risk factors and risk assessment, skin and tissue assessment, preventive skincare, nutrition in pressure ulcer prevention, repositioning and early mobilization, repositioning to prevent heel pressure ulcers, support surfaces, assessment of pressure ulcer, prevention of medical device-related pressure ulcers. Each object has

been scored as follows (Zero) = Not done or not done correctly and (1) = Done correctly.

2.5. Validity of the Tool

A jury of five experts in the above-mentioned department ascertained it. Ten nursing experts in medical, surgical nursing for each resource were also identified. Many improvements of items were made based on expert suggestions.

2.6. Reliability of the Tool

The reliability of the knowledge questionnaire, attitude scale, and observational checklist was measured using the Alpha test from Cronbach to calculate the internal consistency of the instruments ($r = 0.81, 0.72, \text{ and } 0.83$) respectively.

2.7. The Pilot Study

To check the effectiveness, consistency, and applicability of the tools, the pilot study was carried out on ten nurses. Based on the results of the pilot study, some specifics were changed and omitted, and the final forms were created. Nurses that were included in the research pilot study were disqualified.

2.8. The Procedure for Collecting Data

The study was conducted through four sequential phases: assessment, planning, implementation, and evaluation. Before and after the implementation of the guidelines from March to August 2018 data collection was carried out.

The phase of assessment (Pre-test Phase): This phase aimed to assess the performance of nurses before the implementation of standardized preventive guidelines by using tool I, tool II & tool III. The studied nurses filled tool I & tool II in about 30 to 45 minutes. The researcher evaluated nurses' practice by using tool III three times during actual clinical practice and the main average is taken. The researcher also measured the available space, time, equipment, resources, training materials for the implementation of standardized preventive guidelines.

The phase of planning: the content of the standardized preventive guidelines was prepared based on [21]. Guidelines for content validity and adjustments after revision are reviewed by a group of ten experts in the medical-surgical nursing department at the faculty of nursing at Port Said university. Illustrative organized pamphlets were prepared and written in a clear Arabic language, accompanied by illustrative photos as a reference for nurses, and different methods were used as video, group discussion, and PowerPoint for the theoretical part, and demonstration and re-demonstration for the practical part.

The phase of the implementation (Post-test phase):
 • This phase was performed through the nurses' assessment data sheet that was fulfilled as baseline pre guidelines data implemented. Data collected every two days per week in that study setting on Monday and Thursday from 9 a.m. to 1 p.m. For all nurses in these units, the implementation phase of the guideline lasted three months. At the beginning of the standardized preventive pressure ulcer

guidelines implementation, introduction to the standardized preventive pressure ulcer guidelines and its importance, the guidelines plan and learning objectives of standardized preventive pressure ulcer guidelines were explained to each group separately. It was appropriate, at the beginning of each session, to begin with, a brief revision of what had been given before. This was followed by a statement of the objectives of the current session. During the sessions, pamphlets were given to each nurse to refresh their knowledge. The educational guidelines were conducted in (4) sessions (two sessions of theoretical knowledge and two sessions of practical demonstration) for all nurses. Each session for each group of nurses took 30-45 minutes in addition to 15-20 minutes to answer any issues for nurses to provide guidelines. Each group consists of 8-10 nurses. The first and second session was given to nurses regarding knowledge about the definition, risk factors, international NPUAP/EPUAP pressure ulcer classification system, skincare, Braden scale, patients' position, nutrition, and exercises while the third and fourth part was given to nurses regarding practice the care of patients at risk for pressure ulcers. All the procedure steps are demonstrated by the researcher in front of the nurses while the rationale and the precaution for each step is discussed with them. At the end of the researcher's demonstration nurses were asked about any unclear steps which needed repetitions or explanation before re-demonstration. The demonstrator (the nurse who performed the procedure) was asked to measure her success (self-assessment). The researcher stressed that this session was done for teaching purposes, not for evaluation so that errors and forgetfulness were permitted and immediately corrected by the researcher. Feedback on the success of the procedure was given to each nurse immediately after re-demonstration. For example, the nurse was asked to give her feedback on her performance (tell me about your feeling after performing the procedure, was that exactly what you planned to do? Was it a good or bad procedure and tell me why? What was the phase you missed, do you think you'll miss it again the next time you perform the procedure). Each nurse was allowed to demonstrate the procedure more than once to different patients under the supervision and encouragement of the researcher until she mastered it. Finally, the researcher gave her feedback starting with positive points, then negative ones and any missed points or errors were immediately corrected to discourage other nurses from making the same mistakes. Nurses were also asked to give their feedback about the researcher.

The phase of evaluation: The evaluation process underscored the assessment of the efficacy of the nurse's success guidance in the post-guideline check for nurses after one month of the implementation period by using the tools used in the assessment phase.

2.9. Ethical Considerations

The research study obtained ethical approval from the Research Ethics Committee of the Faculty of Nursing, Port said university. Permission to perform the study was obtained from the director of the Port Said General Hospital before the data collection and informed consent was obtained from the nurses after clarification of the

research objectives and procedures. Ensure the anonymity and confidentiality of the information gathered. Nurses have the right to withdraw from the research at any time without providing any excuse.

2.10. Analysis of Data

The raw data has been handled, encoded and inserted into the SPSS framework (SPSS package version 19). The data were presented in summary tables and statistics, the Chi-2 was used to measure the relationship between two qualitative variables and the t-test / Mcnemar test was used to compare two or more proportions. Statistical significance at P-value was regarded as P-value < 0.05.

3. Results

Table 1 shows that most of the studied nurses (78.8%) were in age from 40 to less than 50 years and majorities (93.9%) of them were married. Regarding education, the highest percentage of them (83.8%) had a diploma level of education. Concerning units of work, more than one third (35.4%) work in ICU. Finally, the majority of the study nurses (92.9%) haven't received a training course regarding the care of patients with pressure ulcers.

Table 2 displays that there was a highly statistically significant difference between nurses' knowledge in all items and total nurses' knowledge pre and post implementing standardized preventive guidelines regarding the care of high-risk patients for pressure ulcers.

Table 3 demonstrates total nurses' attitude pre and post standardized preventive guidelines regarding the care of high-risk patients for pressure ulcers. It showed that a statistically significant difference was found between the overall pre-and-post standardized preventive guidelines implementation.

Table 4 from this table, it can find that there was a statistically significant difference between total nurses' practice pre and post implementing standardized

preventive guidelines regarding the care of high-risk patients for pressure ulcers.

Table 5 displays correlation between total nurses' knowledge, practice and attitude pre and post implementing standardized guidelines regarding the care of high-risk patients for pressure ulcers, it can show that there were negative relation between nurses knowledge and attitude in pre and post implementing standardized guidelines regarding the care of high-risk patients for pressure ulcers, while there were positive relation between nurses practically with Knowledge and Attitude.

Table 1. The studied nurses' socio-demographic characteristic of (n=99)

	Frequency	%
1 –Age		
20 -	2	2.0
30-	8	8.1
40 -	78	78.8
50-	10	10.1
Above 50	1	1.0
2 - Marital status		
Married	93	93.9
Single	4	4.0
Widow	1	1.0
Divorced	1	1.0
3 – Education		
Diploma	83	83.8
Higher institute of nursing	9	9.1
University	7	7.1
4-Units of work		
Orthopedics	19	19.2
CCU	17	17.2
ICU	35	35.4
Medical	28	28.3
5 – Residence		
Rural	4	4.0
Urban	95	96.0
6 – Training course		
Yes	7	7.1
No	92	92.9

Table 2. Nurses' knowledge pre and post implementing standardized preventive guidelines regarding the care of patients with high risk for pressure ulcers (n = 99)

Total score	No. items	Scores	Pre	Post	t	p ₁
Knowledge about skincare						
Min. – Max			0.0 – 7.0	3.0 – 7.0		
Mean ± SD	8	0 – 8	1.24 ± 1.68	6.61 ± 0.82	27.657*	<0.001*
Braden Scale						
Min. – Max			0.0 – 8.0	3.0 – 8.0		
Mean ± SD	8	0 – 8	1.03 ± 1.59	7.29 ± 1.44	30.875	<0.001*
Patients 'position						
Min. – Max			0.0 – 5.0	3.0 – 5.0		
Mean ± SD	5	0 – 5	0.71 ± 1.06	4.74 ± 0.51	35.239*	<0.001*
Nutrition						
Min. – Max			0.0 – 5.0	2.0 – 5.0		
Mean ± SD	5	0 - 5	0.87 ± 1.31	4.81 ± 0.58	28.177*	<0.001*
Exercises						
Min. – Max			0.0 – 4.0	2.0 – 4.0		
Mean ± SD	4	0 - 4	0.72 ± 0.97	3.86 ± 0.38	30.635*	<0.001*
Total knowledge						
Min. – Max			0.0 – 29.0	17.0 – 29.0		
Mean ± SD	30	0 - 30	4.57±5.59	27.30±3.01	6.496*	<0.001*

t: t-test

p ≤ 0.05 is *Statistically significant.

Table 3. Nurses' total attitude pre and post implementing standardized preventive guidelines regarding the care of patients with high risk for pressure ulcers (n = 99)

Attitude	No. items	Scores	Pre	Post	T	p ₁
Total score	13	0 - 26	11.0 – 22.0	0.0 – 26.0	6.147*	<0.001*
Min. – Max			13.17±1.49	17.42 ± 6.91		
Mean ± SD						
Mean % score			42.31 – 84.62	0.0 – 100.0		
Min. – Max			50.66 ± 5.74	67.02 ± 26.56		
Mean ± SD						

t: t-test

p ≤ 0.05 is *Statistically significant.

Table 4. Nurses' total practice pre and post implementing standardized preventive guidelines regarding the care of patients with high risk for pressure ulcers (checklist) (n = 99)

Practice (checklist)	No. items	Scores	Pre	Post	T	p ₁
Total score	4	0 - 8	0.0 – 8.0	4.0 – 8.0	20.885*	<0.001*
Min. – Max			3.21 ± 2.29	7.95 ± 0.41		
Mean ± SD						
Mean % score			0.0 – 100.0	50.0 – 100.0		
Min. – Max			40.15±28.59	99.37 ± 5.17		
Mean ± SD						

t: t-test

P ≤ 0.05 is *Statistically significant.

Table 5. Correlation between nurses' knowledge, practice and attitude pre and post implementing standardized preventive guidelines regarding the care of patients with high risk for pressure ulcers (n=99)

	Pre		Post	
	r	P	R	P
Knowledge vs attitude	-0.141	0.163	-0.170	0.093
Knowledge vs practice	0.142	0.161	0.176	0.081
Attitude vs practice	0.046	0.651	0.059	0.563

r: Pearson coefficient.

4. Discussion

Pressure ulcers are a complex, multi-factorial condition that is often overlooked by medical staff [22]. These are complicated wounds requiring an overabundance of management skills and knowledge and treatment [23]. There are several policies and recommendations for the prevention and treatment of ulcer pressure [20]. Unfortunately, studies have shown that many trained nurses do not obey such recommendations or evidence-based procedures, leading to inadequate pressure ulcer prevention practices [24]. Also, Avruscio, Tocco-Trussardi, Bordignon, & Vindigni [25] Stressed the importance of education and collaboration to achieve successful clinical management through the standardization of practice and maintaining a culture of ulcer prevention as a significant task.

The results of the current study showed that most of the studied nurses were in age from 40 to less than 50 years and the majority of them were married. Regarding education; the highest percent of them had a diploma level of education. Concerning units of work, more than one-third works in ICU. Also, majorities of the studied nurses not received training course regarding the care of patients with pressure ulcers

As regards nurses' knowledge, results of the current study displayed that there was a highly statistically significant difference between nurses' knowledge in all items (Knowledge about skincare, Braden Scale, patient' position, nutrition, and exercises) and total nurses'

knowledge between pre and post implementing standardized preventive guidelines for pressure ulcers. The response to questions about the patient's condition and the Braden scale was the biggest improvement. From the researcher's point of view, these results are related to the effectiveness of the pressure ulcer educational guidelines. This also reflects the fact that nurses need educational guidance to help them provide high-quality care. These result is in agreement with Awali, Al Nagshabandi& Elgmail [26] who observed that the level of nurses' knowledge increased and continued through the study period relative to the pre-test period and stated that the findings of their study also support the validity of the PU educational procedure as the pre-test result was lower than all post-test results.

Moreover, this result is consistent with Schubert [27] who indicated that the program improved the nurses' awareness of pressure ulcers and the biggest improvement was the response to skin tests and the avoidance of skin problems. The present study result is in the same line with Cano et al., [28] reported that average post-test results following implementation of the guideline increased by 14 percent among nurses and 23 percent among certified nurse assistants. Furthermore, Nuru et al., [29] reported that nurses who took formal ulcer prevention training were found to have good knowledge of ulcer prevention than those who did not. Moreover, Paquay et al., [30] found that the adherence of nurses to the PU guidelines was significantly improved following the introduction of the education program and stated that such results have

provided a clear advantage to such a program and have been accompanied by a growing level of knowledge and application of PU prevention and treatment. The previous findings are supporting the first research hypothesis.

Concerning the attitude of the nurses, this study showed that there was a statistically significant difference between the overall pre-and-post- standardized preventive guidelines implementation attitude of the nurses. This result in our study might be because the improved behavioral intent post-implementation of standardized preventive guidelines affects the nurses' attitude. Also, Islam, Sae-Sia & Khupantavee [31] having recommended that nurses' attitude towards preventive ulcer pressure care needs to be improved. This result was in agreement with Saleh, Qaddumi & Anthony [32] who found that the disparity in PU attitudes between the study and control groups after the introduction of the PU education program was statistically significant at $P = 0.03$. These findings are supporting the second research hypothesis.

From this study, it can be noted that there was a statistically significant difference between nurses' practice pre-and post-implementation of standardized preventive guidelines among total nurses. This result may be due to education by implementing standardized preventive guidelines that help nurses improve their skills with the latest evidence and strengthen their competence and trust. From another point of view, Hoviattalab et al., [34] pointed out that preventive interventions were insufficient for patients at high risk of ulcer pressure. Where nurses' procedures in some areas do not comply with the national standards include performing risk assessments as well as assessments of nutrition, use of support surfaces, while patients are either in bed or in a chair and patient education. In this respect Hefnawy & El-Monem [34] who studied the prevalence of pressure ulcers with the study of the impact of pressure ulcer educational program on registered nurses' knowledge and practice in Prince Miteb Bin Abdulaziz Hospital, Sakaka City reported that regarding nurses' practice, there was a highly statistically significant difference between pre and post pressure ulcer educational program on nurses' practice and mentioned that many pressure ulcers can be avoided. Bedsores are easier to prevent than to handle. Through taking certain simple steps based on best practice, a health professional can collaborate with the patient and other providers to create an environment where pressure ulcers are reduced or eliminated. These findings are supporting the third research hypothesis.

As regards the correlation between total nurses' knowledge, practice and attitude pre and post implementing standardized guidelines regarding the prevention of pressure ulcers, it can show that there was a negative relation between nurses' knowledge and attitude in pre and post implementing standardized guidelines regarding preventive measures of pressure ulcers. Another study [32] revealed a significant correlation between PU education awareness and attitudes towards PU prevention and treatment. While there was positive relation in the current study between nurses' practice with knowledge and attitude, this finding is explained by Ayello & Meaney [35] who stressed that the individual's ability to act can be influenced by a certain experience and that the individual's attitude to action is affected. From another point of view,

Islam et al., [31] concluded that there was a strong, moderate relationship between the attitude of nurses and their practice, while there was no relationship between knowledge and attitudes, and between knowledge and practice on the prevention of ulcer pressure among nurses.

On the other hand, In Uganda, *Mwebaza et al.*, [1] mentioned that there is little or no evidence of the capacity of nurses concerning best practices in the field of ulcer pressure and prevention. Although nurses make up the largest number of health care workers (852) in Mulago Hospital, nurses working in this hospital are from various training institutions with different levels of education (Diploma and Bachelor level) and all of them registered with the Uganda Nurses Council.

Finally, strengthening nurses' clinical skills through nurses' awareness of standardized preventive guidelines for ulcer pressure is mandatory. These guidelines may help to enhance the attitudes of nurses towards PU prevention and treatment by applying updated knowledge of PU care and by demonstrating better adherence to the PU clinical guideline [32].

5. Conclusion & Recommendations

The present study concluded that there were remarkable improvements in nurses' performance regarding preventive measures of pressure ulcers after implementing standardized preventive guidelines. Therefore, based on the findings of the current study, there are obvious needs for standardized preventive pressure ulcer guidelines offered on simple media to those nurses who provide care to high-risk patients. Efforts should be made to design and implement educational guidelines that fit institutions and hospitals with field evidence, improved services and nurses' educational approach to the management of patients with risk for ulcer pressure. Policies should be developed to prevent pressure ulcers in hospitals. Additionally, manual guidelines should be present in all critical settings and medical units that include bedridden and high-risk patients for a pressure ulcer to improve nurse's performance and prevent the occurrence of pressure ulcers in these units.

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