



# INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES



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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v12-i7/14325>

DOI:10.6007/IJARBSS/v12-i7/14325

**Received:** 11 May 2022, **Revised:** 15 June 2022, **Accepted:** 27 June 2022

**Published Online:** 13 July 2022

**In-Text Citation:** (Bakar et al., 2022)

**To Cite this Article:** Bakar, N., Shohor, N. A., Ab Latif, R., Abdul Wahab, S. M., Zakim, M. A. A., & Kasim, M. M. (2022). The Effects of SSKIN Care Bundle on Nurses' Practice in Prevention of Pressure Ulcer. *International Journal of Academic Research in Business and Social Sciences*. 12(7), 958 – 968.

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Vol. 12, No. 7, 2022, Pg. 958 – 968

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[www.hrmar.com](http://www.hrmar.com)

ISSN: 2222-6990

## The Effects of SSKIN Care Bundle on Nurses' Practice in Prevention of Pressure Ulcer

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### Abstract

Pressure ulcers are a circumscribed area in which subcutaneous tissue has been destroyed. The pressure ulcer will adverse patient outcomes and contribute to patient pain, also cause depression. The objective of this study is to determine Practice of nurse's pre and post teaching session in using SSKIN Care Bundle. This study was used a quasi-experimental method. It was involved 60 nurses working in Intensive Care Unit which comprise of 30 in the experimental and another 30 in the control group. Sample size was 60 staff nurses working in Intensive Care Unit (ICU) from Taiping Hospital. The data were analyzed using statistical package for social science (SPSS) version 22.0. It's before and after implementation of SSKIN Care Bundle. This study shows satisfactory nurses' level of practices in prevention of pressure ulcer. The study result found that what nurses mostly practiced preventing pressure ulcers. But the results in attending seminars to prevent pressure ulcer (53.3%) and give advice to the patient or care giver regarding prevention of pressure ulcer is unsatisfactory. The results similarly before and after implementation of SSKIN Care Bundle programmed. This study was helping the nurses' increased practices regarding prevention pressure ulcer. The incident of pressure ulcer will be decrease and the quality of patient's life will be increase.

**Keywords:** Nurses, Care Bundle, Pressure Ulcer, Practices, Prevention.

### Introduction

The pressure injury or pressure ulcer defined by localized damage to the skin and underlying soft tissue. The damage or injury of skin is usually over a bony prominence. It also related to a medical or other device such as obesity patients and old ages. The pressure ulcer presents as intact skin or an open ulcer. The open ulcer may be painful and cause infection. The ulcer occurs because of intense or prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities, and condition of the soft tissue. In Malaysia the term of pressure ulcers still used to describe the incident of sores during lying in beds.

The classification of pressure ulcer staging is described as follows; Stage one, pressure ulcer in stage one characterized by intact skin with localized redness. Stage one of pressure ulcer does not blanch when light pressure is applied specifically over a bony prominence. When skin is darkly pigmented, blanching might not be visible, but the ulcer color may appear different from the surrounding area. The stage two of pressure ulcer is characterized by a partial loss of thickness of the dermis. A stage two pressure ulcer is shallow and open, with a red or pink wound bed, and has no slough. It may also manifest as an intact or ruptured serum filled blister. The stage three, pressure ulcers are characterized by a loss of the full thickness of tissue. The subcutaneous fat may be visible, but bone, tendon, or muscles are not exposed and undermining or tunneling may be present. The stage four pressure ulcers are characterized by a full thickness of tissue was loss, its exposed bone, tendon, or muscle. The stage four of pressure ulcer, patient might in deep pain. The stage four of pressure ulcer is undermining, tunneling, or both are often present (Estilo, 2012).

Pressure ulcer can cause considerable harm to patients, hindering recovery, frequently causing pain, development of serious infections (Bhattacharya, 2015). Pressure ulcer also can cause morbid conditions and increased mortality. Patients with pressure ulcers have hospital stays a mean of 4.31 days longer than other patients (Graves, 2016). In Malaysia the average length of Intensive Care Unit stay was 4.7 days while the median length of stay was 2.5 days. The incidence of pressure ulcers ranged from 0.5 to 21.1 per 1000 Intensive care units' days with a mean of 6.6 (Ling, 2017).

The guidelines of benefits care bundle to improving the patients care especially in Critical Care Unit including infection, falls, stroke care and pressure ulcers (Mcelduff, 2014). A care bundle is a small set of evidence-based interventions for a defined patient segment or population and care setting that, when implemented together, will result in significantly better outcomes than when implemented individually (Fleming, 2015).

SSKIN care bundle is a set of straightforward practices, simple interventions that when combined, lead to positive patient outcomes. The components of bundle include "S" for surface, "S" Skin inspection, "K" Keep moving (repositioning), "I" incontinence and moisture, "N" Nutrition and hydration. SSKIN Care Bundle is a group of evidence-based interventions for patients, who are at risk of developing pressure ulcer, when implement together result in better outcomes than when implemented individually (Thorpe, 2015). The SKIN Bundle was developed in 2004 at St Vincent's Medical Centre, a 528-bed hospital in Florida, United State of America. It was introduced in Wales in 2009 through Transforming Care, a ward-based program for Wales that aimed to improve patient care by reducing pressure ulcers, among other things (Whitlock, 2013).

## Literature Review

### *i. Pressure Ulcer*

Pressure ulcers are common in acute and long-term care. However, critically ill patients usually have multiple risk factors for pressure ulcers (Shahin, 2009). Preventing pressure ulcers has been a nursing concern for many years. In fact, Florence Nightingale in 1859 wrote, "If he has a bedsore, it's generally not the fault of the disease, but of the nursing (Barton, 2009).

### *ii. Pressure Ulcer Statistic among patients in Critical Care Unit*

World stop pressure ulcer day report in 2014 showed that nearly 700, 000 patients were affected by pressure ulcers each year. Around patients develop a new pressure ulcer in acute

care each year. This has shown that in the year January 2012 to December 2013 between 4% and 6% of patients in acute care settings and more than 5 to 10 % of patients in non-acute care had pressure ulcers. Pressure ulcers are accountable for 2% of preventable deaths Ethiopia (Dillie, 2015).

### *iii. Pressure Ulcer among critically ill patients*

Intensive Care Unit patients are at high risk of Pressure Ulcers development, and the development of pus can significantly extend the length of time a patient must remain in the Intensive Care unit. Patients with Pressure Ulcers experience significantly increased morbidity, mortality, and financial burden (Zuo, 2015). Patients admitted to the Intensive Care Unit are the most disadvantaged when it comes to maintaining intact skin, starting from day one of their stay. Critically ill patients may be sedated, receiving mechanical ventilation, and confined to bed for long periods. Prolonged pressure on areas where bony prominences are located predisposes these patients to pressure ulcers (Estilo, 2012).

### *iv. The practice level of nurses in prevention of pressure ulcer*

To describe nurses' perceptions of evidence-based recommendations to prevent complications in a Malaysian intensive care unit, ventilator-associated pneumonia, catheter-related blood stream infection and pressure ulcer are three frequent adverse events in the Intensive Care Unit (Soh, 2011). Pressure ulcer best practice guideline recommendations are integrated into daily nursing patient care. There was a significant reduction in prevalence of hospital acquired pressure ulcers and high levels of nurse compliance with use of a validated pressure ulcer risk assessment and intervention checklist. Use of the pressure ulcer risk assessment tool and application of prevention strategies could further be improved (Barker, 2012). Critical care nurses have the unique challenge of identifying the appropriate interventions to prevent pressure ulcer development and ensuring that they are knowledgeable about the manufacturer's recommendations for devices used in the care of the patient (Cooper, 2013).

## **Method**

This study was used a quasi-experimental method. Quasi-experimental research designs, like experimental designs, test causal hypotheses. In both experimental and quasi-experimental designs, the programmed and policy is viewed as an intervention in which a treatment and comprising the elements of the programmed or policy being evaluated. It was involved 60 nurses working in ICU which comprise of 30 in the experimental and another 30 in the control group. A quasi-experimental research design was used in the current study (pre-test and post-test design).

### *Section 1: Demographic Questionnaire*

This questionnaire consisted of seven items based on demographic data including age, gender, marital status, basic education, formal training on pressure ulcer, post basic and length of services.

### *Section 2: Nurses' Practice of pressure Ulcer Prevention Questionnaire*

It was consisted of a 22 items structured questionnaire developed based on level of imitation, manipulation, and precision. Questionnaire using a 3-point numerical rating scale.

Ranged from 1 to 3; 3 = always, 2 = sometimes, and 1 = never. Each item asked subjects to indicate the frequency of their practice of pressure ulcer prevention using SSKIN care bundle.

### **Sampling**

The researcher expects the proportion to increase by 20% point after the intervention. By using PS software with power of the study 80% and  $\alpha$  0.05, the required sample size is 57. The researcher was recruited 60 staff nurses who meet inclusion criteria into this study. They were divided to two groups (30 per group). Based on sample size calculation, researcher needs at least 30 nurses in each group to detect the different of knowledge, attitude and practical. The questionnaire was distributed to all who fulfil the inclusion and exclusion criteria and those who are consented will be recruited. A total of 60 subjects from ICU Hospital Taiping were participating in this study.

This study was used simple random sampling. The population is the 104 nurses the Intensive Care Unit, Hospital Taiping. The population is expressed as N. Researcher are interested in all nurses in Intensive Care Unit. Researchers exclude sisters, Matrons and working in an office hour. Sample sizes were 60 which comprise of 30 in the experimental and another 30 in the control group.

### **Data Collection**

Prior to the data collection, the proposal of this study was approved by the Ethics Committee of Universiti Teknologi MARA (UiTM) and register under National Medical Research Register (NMRR) through Clinical Research Centre (CRC). Then, a permission letter to the director of Taiping Hospital was given for approval. The researcher was asked nursing matron and sister to assist the selecting nurses as a subject in this study. The purpose of this study was explained by researcher to the subjects (nurses).

### **Data Analysis**

The data will be analyzed using statistical package for social science (SPSS) version 22.0. Upon completion of data collection each sheet was manually scored. The background data sheet was coded and listed into numbers for calculation. Calculations were made manually. The following tests for significance were used: Means and standard deviation as well percentage, frequency, correlation coefficient, and t-test. Probability level of 0.05 was adopted as the level of significance for testing hypothesis, based on previous study by Taha (Taha, 2014).

### **Instrument**

This research was adapted and adopts a Guidelines Pressure ulcer Bundle by (Nursing Health Services Midlands and East, 2012). Pressure ulcer care bundle, The SSKIN care bundle is based on work previously developed in Wales and Scotland NHS Quality Improvement Scotland and is in line with the key components of the pressure ulcer reduction programme in New Jersey. The components of the bundle are Surface Skin inspection Keep moving (repositioning) Incontinence and moisture Nutrition and hydration. The Cronbach Alpha of this tool is 0.80.

The demographic data include age, education level, gender, tenure, and post basic tanning. This tool was used English the convenience of the sample. A Pilot study was tested to approve the reliability and validity. Pilot study was done in the difference department of critical care unit. It was conducted at Coronary Care Unit, Hospital Taiping. The pilot study was carried out on ten of staff nurses. The pilot study was done to test clarity, applicability,

feasibility, and relevance of the tools was used and to estimate the length of the required time for data collection (Islam, 2010). Pilot study sample was excluded from the final sample.

## Results

### Demographic Data of Nurses

As reflected in table 1, majority of nurses (46.7%) in both groups were at the range 21 to 30 years. Majority of them are female (96.7%) in intervention group meanwhile 86.7% in control group. All of them had a diploma in nursing, in intervention group only 4 (13.3%) had an Intensive Care Nursing Post Basic course, meanwhile control group had a 6 (20%) had an Intensive Care Nursing Post Basic course. The highest percentage is 76.7% of in intervention group and 66.7% in control group of nurses had a working experience of 1 to 10 years in Intensive Care Unit Hospital Taiping. 16.6% in intervention group 16.7% in control group had working experience of 11 to 20 years while the least 3.3% in each group had a working experience more than 21 years. Most of them had a forming training in pressure ulcer prevention, 86.6% in intervention group and 83.3% in control group.

Table 1

#### *Frequency and Percentage of Nurse in Demographic Data (N=60)*

	Intervention group		Control Group	
	n	%	n	%
Age				
21 – 30	14	46.7	14	46.7
31 – 40	12	40	10	33.3
41 – 50	4	13.3	6	20
Gender				
Female	29	96.7	26	86.7
Male	1	3.3	4	13.3
Educational status				
Diploma	26	86.7	24	80
Post Basic	4	13.3	6	20
Experiences (years)				
Less than 1 year	1	3.3	4	13.3
1 – 5	14	46.7	9	30
6 – 10	9	30	11	36.7
11 – 15	1	3.3	2	6.7
16 – 20	4	13.3	3	10
21 and above	1	3.3	1	3.3
Formal training				
Yes	26	86.6	25	83.3
No	4	13.3	5	16.6

### Nurses' Practice Regarding Pressure Ulcer Prevention

Table 2 were assessing each dimension of the practices regarding pressure ulcer prevention before implementation of SSKIN Care Bundle and education program. The results showed nurses in both groups always practices on pressure ulcer prevention. But nurses not always pay attention to pressure ulcer points (3.3%).

Table 2

*Frequency and percentage distribution of nurses' practice on prevention of pressure Ulcer before implementation (n=30 in each group)*

Nurses practice on pressure ulcer Prevention	Rate of nurse's practice (%)					
	Control Group			Intervention Group		
	Always (%)	Sometimes (%)	Never (%)	Always (%)	Sometimes (%)	Never (%)
Observe nurses	80	20	0	66.7	33.3	0
Contributing factors	76.7	20	3.3	63.3	36.7	0
Skin assessment	86.7	10	3.3	86.7	13.3	0
Risk assessment	86.7	10	3.3	86.7	6.7	6.7
Document all data	93.3	6.7	0	96.7	3.3	0
Management of pain	70	30	0	66.7	33.3	0
Skin care	93.3	3.3	3.3	90	10	0
Pillow	93.3	6.7	0	93.3	6.7	0
Advice caregiver	93.3	6.7	0	76.7	23.3	0
Pressure points	3.3	90	6.7	3.3	93.3	3.3
Lab tests	33.3	60	6.7	33.3	43	0
Vitamin and food	50	46.7	3.3	50	50	0
Protein and calorie	36.7	53.3	10	50	43.3	6.7
Avoid dragging	90	10	0	86.7	13.3	0
Special mattress	73.3	26.7	0	73.3	26.7	0
Avoid massage	66.7	30	3.3	53.3	43.3	3.3
Avoid ring cushion	23.3	60	16.7	43.3	26.7	30
Patient position	96.7	3.3	0	96.7	3.3	0
Attend seminars	53.3	40	6.7	43.3	53.3	3.3
Advice Patient's	63.3	33.3	3.3	43.3	56.7	0

Table 3 were assessing each dimension of the practices regarding pressure ulcer prevention after implementation of SSKIN Care Bundle. The results show increasing the levels of practices in prevention of pressure ulcers among ICU patients. Especially in skin assessment and monitor a protein and calorie diet.

Table 3

*Frequency and percentage distribution of nurses' practice on prevention of pressure ulcer after implementation (n=30 in each group).*

Rate of nurse's practice (%)

Nurses practice on pressure ulcer Prevention	Control Group			Intervention Group		
	Always (%)	Sometimes (%)	Never (%)	Always (%)	Sometimes (%)	Never (%)
Observe nurses	80	20	0	80	20	0
Contributing factors	76.7	20	3.3	70	26.7	3.3
Skin assessment	86.7	10	3.3	93.3	3.3	3.3
Risk assessment	86.7	10	3.3	93.3	6.7	0
Document all data	93.3	6.7	0	96.7	3.3	3.3
Management of pain	70	30	0	66.7	33.3	0
Skin care	93.3	3.3	3.3	96.7	3.3	0
Pillow	93.3	6.7	0	90	10	0
Advice caregiver	93.3	6.7	0	60	40	0
Pressure points	3.3	90	6.7	93.3	6.7	0
Lab tests	33.3	60	6.7	6.7	90	3.3
Vitamin and food	50	46.7	3.3	20	50	30
Protein and calorie	36.7	53.3	10	30	63.3	6.7
Avoid dragging	90	10	0	73.3	26.7	0
Special mattress	73.3	26.7	0	56.7	30	13.3
Avoid massage	66.7	30	3.3	33.3	23.3	43.3
Avoid ring cushion	23.3	60	16.7	43.3	33.3	23.3
Patient position	96.7	3.3	0	96.7	3.3	0
Attend seminars	93.3	3.3	3.3	90	10	0
Advice Patient's	53.3	40	6.7	40	53.3	6.7

## Discussion

### *i. Regarding socio demographic characteristics of nurses*

Findings of this study indicated that majority of nurses (46.7%) in both group age less than 30 years old. This might be due to almost of nurses were newly graduates from college of nursing and working together at intensive care unit. Meanwhile, the age of nurses' range between 31 to 40 years old is below than 40%. In comparison with the findings by Islam (2010) who studied "Nurse's knowledge, attitude and practice regarding pressure ulcer prevention for hospitalized patients at Rajshahi Medical College Hospital in Bangladesh", revealed that, the age range of most nurses was between 30 to 40 years old (56%).

### *ii. Nurses' Practice Regarding Pressure Ulcer Prevention*

This study shows satisfactory nurses' level of practices in prevention of pressure ulcer. The study result found that what nurses mostly practiced preventing pressure ulcers. But the



results in attending seminars to prevent pressure ulcer (53.3%) and give advice to the patient or care giver regarding prevention of pressure ulcer is unsatisfactory. The results similarly before and after implementation of SSKIN Care Bundle programmed. In comparison with study done by Taha (2013) who revealed that the majority of nurses who participated in the study had unsatisfactory practice level regarding the pressure ulcers management. A possible reason for explaining this unsatisfactory level of practice may be due to certain factors. First, the shortage of nursing staff and the limited working time available for direct patient care in preventing pressure ulcers. In agreement with this study, the finding by Langemo (2008), who indicated that a majority of nurses reported lack of staff and lack of time as barriers to carry out pressure ulcer prevention care into effective practice. These results disagree with Islam, finding that before program implementation the majority of nurse's practices related to pressure ulcer were at moderate level an increasing after program.

The current study showed that increases in nurses' practices immediately post skin care guidelines protocol implementation and there is a highly statistically significant difference. With a decrement after one- and two-months post skin care guidelines protocol implementation. Supporting to this study findings of Chaboyer (2016), reported improvement in nurses' practice after the attendance at continuing nursing education sessions. On the same line with Banerjee (2016), finding the educational program for prevention of pressure ulcers should be implemented through evaluating nurses' effectiveness in preventing pressure ulcers as quality assurance standards and Health care providers should be functioning as a team, the incidence rates of pressure ulcers can decrease. Thus, pressure ulcers and their prevention implementation considered as important goal to provide as safety measures in patient care.

## **Conclusions and Recommendations**

### **Conclusions**

This study using a quasi-experimental method to explore the level of nurses' practice regarding prevention of pressure ulcers in Critical Care Unit. It can be concluded from this study that the designed SSKIN care bundle protocol could be beneficial in improving the practices of the critical care nurses working in critical care unit as well on patient's outcome in relation to prevention of pressure ulcer at the intensive care unit. Critical care nurses have the unique challenge of identifying the appropriate interventions to prevent pressure ulcer development and ensuring that they are knowledgeable about the manufacturer's recommendations for devices used in the care of the patient.

### **Recommendations**

The SSKIN Care Bundle is a simple and holistic approach to ensuring all patients receive the appropriate care to prevent pressure ulcer. The development of hospital acquired pressure ulcer is a great concern in health care today. Pressure ulcer treatment is costly, and the development of pressure ulcers can be prevented by the use of evidence-based nursing practice.

Health service managers should identify the perceived barriers of care and then minimize these barriers as much as possible to prevent pressure ulcer. The health service managers also should recruit nurses to balance their numbers with the respective patient in order to provide interventions such as pressure ulcer prevention. Hospital policies and guideline are needed to promote nurses' attitude in relation to pressure ulcer prevention.

The guidelines or policy should be prepared to prevent pressure ulcer in hospitals especially for intensive care patients in critically illness.

A training program on pressure ulcer prevention using SSKIN Care Bundle should also be conducted for nursing leader and to nurses in general ward. In service training and refresher courses about pressure ulcer prevention using SSKIN Care Bundle should be continue and refresher course should be given at least six monthlies. Nurses should be given further trainings to enhance their knowledge on pressure ulcer prevention practice. Nurses need to enhance their attitude and knowledge on pressure ulcer prevention to further improve nursing practice in this area. Nurses, who had better knowledge, should also teach their respective colleagues who had deficits for the betterment of nursing care. Further interventions studies should be initiated to examine the level of knowledge, attitude, and practice.

Replication study is recommended in other settings to promote the generalizability of the findings above. The results of this study should be shared with stake holders such as nurse administrators, nurse researchers, nurse clinicians, hospital administrators and the public. This should make the problem of pressure ulcers a public concern.

### **Acknowledgments**

We would like to express our sincere appreciation to UiTM Penang Branch and UiTM Selangor Branch for the financial support and their encouragement to publish this paper. Secondly, to the Director of Hospital Taiping, CRC Committee members of Hospital Taiping, Head of Department Anesthesiology, and Intensive Care Hospital Taiping. Matrons, sisters and all the nurses in Intensive Care Unit Hospital Taiping for their encouragement motivation, emotional support, and never-ending support during entire of this project.

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