

A CHECKLIST FOR INTENSIVE CARE NURSES IN THE PREVENTION OF PRESSURE ULCERS IN HOSPITALIZED PATIENTS

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ABSTRACT

The study is designed to develop a pressure ulcer prevention checklist to decrease the incidence of pressure ulcers for patients admitted to the intensive care unit (ICU). The expected outcome of this project is to reduce pressure ulcers in the critical care unit by implementing best practice guidelines in wound care. A review of literature was focused on pressure ulcer, pressure ulcer prevention and guidelines for preventing pressure ulcer in the ICU. A checklist was developed to be used by ICU nurses and reviewed by three experts for content validity. The results were collected and analyzed. The researcher hopes that this will increase the importance of pressure ulcer prevention.

Key Words: *Intensive care, pressure ulcer, bed sores.*

ABOUT AUTHOR



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INTRODUCTION

Pressure ulcers remain a common problem in all health care settings. Pressure ulcers are areas of localized damage to the skin and underlying tissue due to pressure, shear or friction. Immobile patients are prone to develop pressure ulcers and these ulcers can predispose the patient to a variety of complications that include bacteremia, osteomyelitis, squamous cell carcinoma and sinus tracts. The three components of pressure ulcer prevention that must be included in any patient include management of incontinence, nutritional support and pressure relief (Courtney, 2006). The development of pressure ulcers in hospitalized patients is now considered a negative indicator of quality of nursing care and regarded as a feasible area of improvement because preventive actions are available. The prevalence of pressure ulcers is high in hospitalized patients and has been reported to vary between 14-25 % (Vander wee et al., 2007).

Pressure ulcers cause substantial harm to patients, limit their performance status, are painful and often lead to severe infections. Hospital acquired pressure ulcers are frequently associated with lengthy hospital stays and mortality. Nearly 60,000 hospitalized patients in the United States are estimated to die annually from complications due to hospital acquired pressure ulcers according to Courtney, Ruppman and Cooper, (2006).

Educated staff providing evidence-based wound assessment, prevention, and management in nursing practice, not only improves patient outcomes and satisfaction, but also saves health care dollars in nursing time and length of stay in hospital.

Statement of Purpose

The purpose of this study was to develop a checklist for nurses working in ICU settings to use for the prevention and treatment of pressure ulcers in hospitalized patients, special focus on the development of research based templates for risk assessment, pressure ulcer grading and standard care plans to facilitate adequate documentation in the health care record were suggested.

Objectives

The objectives of this project were to:

1. Conduct an in-depth review of risk assessment of bed sores, staging of pressure ulcer, prevention and treatment of pressure ulcer, and documentation of pressure ulcer.
2. Develop a checklist to raise the awareness about risk factors for bed sores.
3. Determine the content validity of the ulcer prevention checklist based on review by three content experts in the healthcare field.

Procedure for Data Collection

After permission was obtained from the D'Youville College Institutional Review Board (IRB) (see Appendix A), a letter of interest was hand delivered to 3 content experts, including a wound and skin nurse, a registered dietician and a nurse educator (see Appendix B). The wound and skin consultant is masters prepared and has more than 15 years of experience in bedside nursing and covers all areas of hospital as a consultant. The dietician has over 30 years of experience in critical care and holds a masters degree in dietetics. The dietician recommends nutritional supplements and is often involved in deciding the most effective dietary treatment choices for the patients. The third content expert is a nurse educator who is involved in teaching nursing students at a university. She is also primarily responsible for supervision of students in clinical and for the introduction of new policies. In the future she may help to launch this project.

Each of the experts was provided with a copy of the "Pressure Ulcer Prevention Checklist" (see Appendix C) and the "Pressure Ulcer Prevention Checklist Evaluation Tool" (see Appendix D) via hand delivery. Their consent to participate in the project was implied by the return of the completed evaluation tool in the self addressed envelope that was provided. Each participant was allowed 7 days to evaluate the Pressure Ulcer Prevention Checklist for readability, accuracy, and content validity. The evaluation tool contained five items in Likert format ranging from strongly disagree (1) to strongly agree (5). Two open ended questions were included to assess the need for additions and deletions from the checklist. Results are displayed as descriptive statistics based on the responses from the 3 content experts.

Responses to the open-ended questions were analyzed for common themes and a summary of the study results was provided to the experts via mail upon completion of the project.

Human Rights Protection

Following approval by the D'Youville College Institutional Review Board, three experts working in the field of intensive care were approached in person and asked to voluntarily participate in the review of the proposed checklist for content validity. The researcher has a collegial, professional relationship with the participants and has no supervisory or evaluative capacity. Participation or non-participation would have no effect on their employment or evaluative status.

Participants were guaranteed confidentiality as no identifying data was collected on the evaluation form and all data is reported in aggregate form. Return of the completed evaluation form would indicate the experts

implied consent to participate in reviewing the “Pressure Ulcer Prevention Checklist”. Participation was completely voluntary and participants would not be able to withdraw once the completed evaluation forms were returned as there would be no way to identify them. Completed evaluation forms and all data will be kept in a locked filing cabinet in the researcher’s home for 6 years and then destroyed.

Plan for the Evaluation of the Effectiveness of the Project.

The five items related to the readability, accuracy, and adherence to best practice guidelines on the Pressure Ulcer Prevention Checklist Evaluation tool will be rated on a five point Likert scale by the participants indicating whether they: strongly disagree (1), disagree (2), were undecided (3), agree (4), or strongly agree (5) with each statement.

REVIEW OF THE LITERATURE

The initial literature review was conducted using databases CINAHL, Pubmed, Scholar, Medline, and Cochrane. Key terms entered included pressure ulcer, prevention, treatment, hospital, and ICU. Areas of pressure ulcer review include incidence and prevalence, pressure ulcer staging, risk assessment, and the educational program’s impact on the nurse’s adherence to preventive interventions, treatment, and the involvement of health care team members to establish prevention measures beyond nursing interventions.

Epidemiology of Pressure Ulcer.

“Pressure ulcers identify those circumscribed areas of tissue necrosis which result when the blood supply to an area is diminished by external pressure” (Smith & Nephew, 2000, p. 1). This loss of skin integrity results in painful situations, prolonged stays in the hospital or extended care facilities, and an increased time to recover from ailments. According to the Agency for Health Care Policy & Research (AHCPR, 1992) most pressure ulcers are preventable, and when stage I pressure ulcers do occur, their severity level does not have to progress.

Incidence & Prevalence of Pressure Ulcer

The incidence of pressure ulcers in the intensive care unit is larger than in non-critical care areas. This is because patients are almost invariably limited in their overall physical activity and mobility, resulting in a decreased ability to actively change their position in bed. They often experience loss of sensory perception, which frequently is the result of anesthetics and sedative drugs, resulting in a lower level of consciousness and cutaneous sensation (Jiricka et al., 1995). In addition, intensive care patients are often in a poor nutritional state because of a change in metabolism as a result of a major trauma, burn, or sepsis or after major surgery (Shahin, Dassen & Halfens, 2008). Moreover, intensive care patients with impaired circulation or those using specific medication, such as vasoactive drugs, are also at a high risk of developing pressure ulcers (Shahin, et al., 2008).

Prevalence is the total number of existing cases among the whole population at a given time (Allock et al., 1994). In contrast, incidence measures the number of the number of persons developing new ulcers during a period of time. In the literature review conducted by Shahin (2008), the prevalence of pressure ulcers in intensive care settings in Netherlands, Britain, and United States of America are as follows. In the Netherlands (2001), a cross-sectional point prevalence study, conducted in 1998 and 1999 in all specialties of intensive care, established that 33% of intensive care patients suffered from pressure ulcers and that the most common sites were heels and sacrum (39% and 25%, respectively). In addition, the highest percentage (57%) of pressure ulcers was found in patients with an infection (including sepsis). Furthermore, the majority of factors that were significantly associated with the presence of pressure ulcers included infections, age, length of stay, and moisture and mobility. There is also a significant difference in the overall prevalence of grade I and grade II ulcers in patients who had undergone surgery and those who had not (Shahin, Dassen & Halfens, 2008). A study of pressure ulcer prevalence in four European countries established that pressure ulcer prevalence ranged from 4% in Denmark to 49% in Germany. A cohort study in Texas, conducted in neurological intensive care in 2001, revealed that all patients were at risk of developing pressure ulcers, but certain characteristics contributed to higher rates. The incidence of pressure ulcers in patients with incontinence (urine or stool) in contrast to continent patients was also significantly different. The incidence was 26.1% in incontinent patients and 10.4% in the continent group. Furthermore, the pressure ulcer incidence rates for patients with an albumin level of or below 35 g/L was 21.4%, whereas for the normal albumin group it was 7.7%. Forty-two per cent of the patients admitted to the ICU with multiple diagnoses developed a pressure ulcer within just three days. In addition, 50% of underweight patients developed a pressure ulcer, while only 5.7% of overweight patients developed a pressure ulcer. In the study, a body mass index of 19–24 was considered normal. However, no significant relationship was found between developing a pressure ulcer and age or gender, length of stay and Braden score (Fife, Otto, Capsuto, Brandt, Lyssy, Murphy, et al., 2001).

Medical Device Related Pressure Ulcers

Most pressure ulcers occur over bony prominences such as heels and the sacrum. However, the National Pressure Ulcer Advisory Panel recognizes that pressure ulcers can also occur on any tissue under pressure and

thereby can develop beneath medical devices. Findings indicate that if a patient had a medical device, they were 2.4 times more likely to develop a pressure ulcer of any kind. (Cuddigan, Walker, & Didier, 2010). Numerous risk factors for pressure ulcer development were identified; however, none differentiated between those with medical device related and traditional pressure ulcers.

Pressure ulcers of the upper lip developed in five very low birth weight infants due to fixation of the endotracheal tube. These ulcers left marked scars on the lip and patients require revision surgery (Fujioka, Oka & Yakabe, 2008).

Risk Assessment/Braden Scale

One strategy to reduce the number and severity of pressure ulcers is to perform risk assessment. The Braden Scale is internationally recognized for its high reliability in predicting patients at risk for pressure ulcers. The Braden Scale has six components: sensory perceptions, moisture, mobility, activity, nutrition, and friction/shear. Each component is defined and rate on a scale of 1 to 4, with the exception of friction/shear, which is rated on a 3 point scale. The total is added together for a maximum total score of 23. Lower scores equal higher risk for pressure ulcers. A score of 15 to 18 indicates at risk, 13 to 14 indicates moderate risk, 10 to 12 indicates high risk, and 9 or below indicates very high risk (Copeland & Hoshiko, 1989).

There are six distinct stages of pressure ulcer development as described by the National Pressure Ulcer Advisory Panel (National Pressure Ulcer Advisory Panel, 2007). The systematic, standardized staging methodology enables consistency with the diagnosis and treatment of pressure ulcers. Table 1 provides detailed clinical descriptions of the stages of pressure ulcer development.

Table 1

Pressure Ulcer Staging Descriptions.

Stage	Description
1	Intact skin with non-blanchable redness of a localized area usually over a bony prominence; may indicate "at risk" persons. Darkly pigmented skin may not have visible blanching.
11	Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed without slough. May also present as an intact or open/ruptured serum-filled blister
111	Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle is <i>not</i> exposed. Slough may be present but does not obscure the depth of tissue loss.
1V	Full thickness tissue loss with exposed bone, tendon or muscle. Exposed bone/tendon is visible or directly palpable. Slough or eschar may be present on some parts of the wound bed.
Unstageable	Full thickness tissue loss in which the base of the ulcer is covered by slough and/or eschar in the wound bed.
Deep Tissue Injury	Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue. May be difficult to detect in individuals with dark skin tones.

Adapted from: Update of Pressure Ulcer Staging System, National Pressure Ulcer Advisory Panel, 2007.

Risk Factors of Pressure Ulcers in Critical Care

According to Nijs, Toppets, Defloor, Bernaerts & Milisen (2009), the variables that were positively associated with pressure ulcers grade II - IV include history of vascular disease, treatment with dopamine, dobutamine, intermittent haemodialysis (IHD) or continuous veno-venous hemofiltration (CVVH), good mechanical ventilation. Preventive measures have been statistically positively associated with reducing pressure ulcers grade II - IV. The measures include turning, floating heels, alternating mattresses, and adequate prevention. The use of sedatives, body temperature above 38.5°C and sitting in chair were negatively associated with pressure ulcers. Pressure ulcers are statistically associated with different risk factors and preventive measures. The identified risk factors are eligible to be included in a new risk assessment scale for patients admitted to intensive care units. The new findings have implications for risk assessment for patients in intensive care units. Patients admitted to intensive care units have other risk factors for pressure ulcers which are eligible to be included in a new risk assessment scale.

Prevention of Pressure Ulcers

Application of the heel protectors led to a 50% reduction in prevalence of abnormal heel position. (Meyers, 2010). Despite their high risk, no patients using the heel protector device developed a heel pressure ulcer or plantar flexion contracture.

The performance improvement project by Wolverton et al (2005) heightened the ICU nurses awareness of the importance of turning their patients. Data analysis from this study shows 3 areas that required further emphasis with the nursing staff: daily assessment with the Braden scale, prevention of nosocomial pressure ulcer on the first day of admission, and the effect of sedation on patient mobility. Ongoing assessment, monitoring, and prevention of pressure ulcers in the hospitalized patient are required standards of care for the nursing profession as well as mandated by regulatory agencies.

The initial ulcer risk assessment should be done within 48 hours of admission and subsequent assessments should be made weekly for a month, then once every 3 months or more frequently with a change in mental or health status.

Up to 20% of hospital patients will have pressure ulcers; more than half will be nosocomial and are associated with high treatment cost, increased morbidity, complaints and litigation. Consequently, patient safety programs may include the provision of pressure-redistributing mattress replacements (PRM). However, despite the different functionality of PRMs, there is often little information to support clinical prescription. Some mattresses have been found to be potentially unsuitable for a busy acute care environment: this is particularly true for mattresses which require manual adjustment each time the patient changes position. PRM's automatically detects the angle of back rest, optimizes cell inflation. Outcomes reported after PRM usage are ulcer prevention, healing, usability.

Vacuum Assisted Closure (VAC) therapy was useful in the treatment of diabetic foot infection and pressure ulcers, which after debridement, may present with exposed tendon, fascia and/or bone. (Nather et al., 2010). These included ray amputation wounds, wounds post-debridement for necrotising fasciitis, wounds post-drainage for abscess, a heel ulcer and a sole ulcer. VAC therapy also provides a sterile, more controlled resting environment to large, exudating wound surfaces.

Zeller (2006) reports that prevention of pressure ulcers is key because treatment can be difficult. Prevention plans require the skin to be kept clean and moisturized, frequent careful changing of body position, use of special mattresses or supports, management of other contributing illnesses, and implementation of a healthy diet. Relieving or reducing the pressure on the area is essential. Once an ulcer appears, additional treatment options can include: local care, including maintaining proper moisture balance and use of anti-bacterial dressings, debridement, keeping unaffected tissue around the pressure ulcer clean and lightly moisturized, surgical intervention to provide muscle flaps and skin grafts for some patients.

METHODOLOGY

Setting

The study took place in a medical surgical intensive care unit in a community hospital in Greater Toronto, Canada.

Population and Sample

A convenience sample was selected from the healthcare providers working in the intensive care unit. Three English-speaking providers including a skin and wound consultant, a registered dietician, and a nurse educator who all have expert knowledge in the field of intensive care were recruited to participate in this project.

Data Collection Methods

After receiving the approval from the Institutional Review Board of D'Youville College (see Appendix A), the researcher wrote a letter of interest (see Appendix B) to three intensive care providers, outlining the project, and requesting their participation in evaluating the content of pressure ulcer prevention checklist. A package containing a letter of interest (see Appendix B), copy of the Pressure Ulcer Prevention Checklist (see Appendix C) and a copy of the Pressure Ulcer Prevention Checklist Evaluation Form (see Appendix D) were hand delivered to each of the participants. The letter of interest informed each of the participants that the evaluation was expected to take approximately 20 minutes to complete and they were asked to return the evaluation form within seven days in the self-addressed envelope provided. Returning the evaluation form signified implied consent to participate.

Plan for Protection of Human Subjects of the Participants

Guidelines set forth by the D'Youville College Institutional Review Board were followed. The researcher has a professional relationship with the project participants and holds no supervisory role with them. All participants were given a package, which included a letter of interest (see Appendix B), the Pressure Ulcer Prevention Checklist, and evaluation tool. The letter of interest addressed implied consent of participation in the project study, which would be verified by the researcher upon receiving the completed evaluation forms (see

Appendix D). Returned evaluation forms from all the requested participants were received. The content of the participant's responses was treated as confidential material. All data collected from the study will be stored in a locked filing cabinet in the researcher's home for six years and then destroyed.

Plan for Evaluation of the Effectiveness of the Pressure Ulcer

A researcher-developed evaluation tool consisting of five Likert questions, and two open ended questions to evaluate additional information that may have been beneficial to include and/or information needed of clarification on a particular point. The research wanted to assess the usefulness of the checklist, the ease of understanding, and the degree of accuracy of the information. The researcher intended to evaluate if the checklist would help to increase the awareness of pressure ulcer prevention. As well, it sought input as to whether the checklist information would be beneficial to the nurses in the prevention of pressure sores.

The individual responses from each content expert were analyzed and the results have been presented as raw scores and averages (see Appendix E). The researcher anticipates an increase in the knowledge level regarding the bed sore prevention in ICU patients, that the information is appropriate for the chosen field of work; the checklist would assist nurses in the delivery of the care to the patients with potential risk of developing a pressure sore.

RESULTS

Implementation of the Pressure Ulcer Prevention Checklist

After receiving the approval from the Institutional Review Board of D'Youville College (see Appendix A), the research project was implemented. The researcher wrote a letter of interest (see Appendix B) to three experts in the field of intensive care. A package containing a letter of interest (see Appendix B), copy of the pressure ulcer prevention checklist (see Appendix C) and a copy of the evaluation form (see Appendix D) were hand delivered by the researcher to the participant's office and/or workplace. The evaluation was expected to take 20 minutes to complete and responses obtained were requested within 7 business days in a stamped envelope, which were included in the package. The open-ended statements were analyzed for common themes. There were a total of three participants.

Results of the Evaluation of the Pressure Ulcer Prevention Checklist

This study used a researcher developed tool consisting of five Likert type questions, and two open-ended questions to assess if other areas should have been included or needed explanation in the checklist. The completed evaluation forms were tabulated with a raw score of each evaluator. A mean score was calculated from the scores on the Likert questions (see Appendix E). Table two displays the data collected as follows; Evaluator, Question number, and Mean score. The open-ended statements were summarized by identified common themes.

The overall findings relates that the pressure ulcer prevention checklist was appropriate for the chosen field of work, information was clear, concise, and accurate, and scores ranged from 4/5 to 5/5. Scores varied between the evaluators with the layout of the information presented, and all the evaluators felt it identifies the patients who are at risk of developing pressure ulcer. (See Table 2)

Table 2

Likert Test Results

Evaluator	Question	Raw Scores and Averages(n = 3)				
		#1	#2	#3	#4	#5
#1		5/5	5/5	5/5	5/5	5/5
#2		5/5	5/5	5/5	5/5	5/5
#3		4/5	5/5	4/5	4/5	4/5
Average Score		4.75/5	5/5	4.75/5	4.75/5	4.75

Open- ended statements suggested that the prevention checklist would be easily understood by the nurses and the information was clear and concise, covering all aspects of prevention. It was also described as a useful resource for the nurses. Additional areas that need to be included were that a diagram showing the location of wounds would easily help to identify the nature of the problem. Another comment was to include the co morbidities like diabetes mellitus, neurologic diseases and to distinguish pressure ulcers from ulcers that result from diabetic neuropathy or arterial or venous insufficiency, and with other conditions that cause erythema such as cellulitis. Content experts commented that the appearance, clarity and layout of the checklist were well organized, and easy to follow. In addition, they suggested that the information and statistical data be included in the checklist increase awareness and possibly develop a treatment plan that is appropriate to the location of bed sores. One of the content experts commented that the checklist should be available to the intranet service of the hospital.

Analysis of the Development of the Project

A pressure ulcer prevention checklist pertaining to the prevention

Of pressure ulcers was created due to the evidence suggesting that knowledge of identification of risk factors of bedsores will decrease the incidence of pressure ulcers in the hospital and as a result improve the quality of health care.

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