

Using the Braden Scale and NICE Pressure Ulcer Guidelines to Reduce the Burden and Costs of Pressure Ulcers

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Abstract

Background: Home Health Care services (HHC), provided by the Family and Community Medicine Department at Prince Sultan Military Medical City (PSMMC) is one of the largest home health care organizations in Saudi Arabia. Pressure ulcers were selected in 2017 as one of the top priority areas for quality improvement in relation to its cost and reoccurrence among the patients and health care services.

Aim: The goal of this quality improvement project is to evaluate the effectiveness of risk assessment and preventive management plan for pressure ulcers prevention among patients admitted to HHC, PSMMC.

Methods: We used the Braden Scale to assess patient risk for possible development of pressure ulcers, and from this a preventive action plan was adopted from Nice Guideline 2018 according to the patient level of risk.

Results: Over the 6-month duration of the study in which we used the Braden Scale, we saw a six percent decrease in the incidence of pressure ulcers. As for the duration of care, this study saw a reduction from 4 months of care per ulcer to only 1.67 months of care per ulcer. We estimate PSMMC would save more than \$22 million annually using these measures.

Conclusion: The incidence rate of pressure ulcer development improved compared to patients without implementation of the program. Overall burdens, including time and financial costs, are reduced.

Recommendations: This quality improvement program emphasizes proactive risk assessment, management plan, staff development, and patient care education to help in the active prevention of pressure ulcers. Further assessment of the outcomes of this program is advised in relation to cost benefit outcome of these care programs on a longer timeline.

Keywords: Bed Ulcers; Quality Improvement; Reduction

Introduction

All people are potentially at risk of developing a pressure ulcer. However, they are more likely to occur in people who are seriously ill, have a neurological condition, impaired mobility, poor posture, poor nutrition or a deformity (NICE 2018).

As pressure ulcers arise in number, interventions for preventive treatment need to be applied across a wide range of settings

including the community, care homes, and hospitals [2]. These interventions may require organizational and individual change and a commitment to ensure effective delivery. A review of death and severe harm incidents reported to the National Reporting and Learning System; found that pressure ulcers were the largest proportion of patient safety incidents in 2011/2012, accounting for 19% of all reports. It has been acknowledged that a significant proportion of pressure ulcers are avoidable (NHS Stop the Pressure).

The prevalence of pressure ulcers is 1 of the 4 most common harms recorded in the NHS Safety. One out of every 30 hospitalized patients will develop a pressure ulcer in the United States [2]. Annual treatment costs for hospital acquired pressure ulcers are over \$9 billion. This study discusses four financial reasons to reduce pressure ulcers.

One prospective study conducted in 2006 and 2007 at Prince Sultan Military Medical Center in Riyadh, Saudi Arabia reported a pressure ulcer prevalence of 44.4% and incidence of 38.6% in hospitalized ICU patients [3]. The National Pressure Ulcer Advisory Panel (NPUAP) estimates that PU prevalence in acute care is 15%, with incidence of 7%. In the home healthcare (HHC) setting, the prevalence of pressure ulcers was 29% and incidence was 17% [1].

PSMMC was accredited by the Joint Commission International three times; in 2014, 2018 and 2021. HHC at PSMMC received over 3000 patients in 2017 with a total of 1358 pressure ulcers – an average of 113 wounds per month. At PSMMC, HHC, the total number of patients 2017 was 3163. 86.3% are bed bound, and patients' prevalence for the year 2017 was (42.1%). In January 2017, the number of patients with pressure ulcers was 130 and remained at over 100 for the next four months. The situation was not satisfactory, therefore, as a multidisciplinary team we began to look at different methods to reduce pressure ulcers in home healthcare (HHC) patients.

Within home healthcare at PSMMC, pressure ulcer was not one of the top five diagnoses for the year 2017. However, it was still selected as a top priority area for quality improvement due to its cost and problem prone to the patient and health care service. One of the key criteria to be admitted to HHC is that the patient is bed or housebound. While pressure ulcers can generally be avoided, they tend to be prevalent in older populations and those confined to a bed or chair.

The National Institute for Health and Care Excellence in 2014 indicated that the burden of pressure injuries on health care services “may require organizational and individual change” with an obligation to deliver effective care. The use of management through proactive risk assessment and care plan tools is needed to bring care up to date with current research and the drive to improve patient experiences while in care. We chose a combination of these

options as an approach; using the proactive risk assessment tool (Braden Scale) with caregiver competencies to create a proactive management plan to help with prevention of avoidable pressure ulcers.

Pressure ulcers are a common problem across all health care settings. In a recently published monograph, “Pressure Ulcers in America: Prevalence, Incidence, and Implications for the Future”, [1]. The National Pressure Ulcer Advisory Panel estimates that pressure ulcer prevalence in acute care is 15%, with incidence of 7%. Although methodological issues require caution in interpreting the data, the estimates are based on several large studies conducted from 1990 to 2000 (table below). The data represent the percentage of patients with pressure ulcers among those surveyed in a setting (prevalence) and the percentage of patients who developed PUs after admission to the setting (incidence).

Identifying individuals at risk for pressure ulcers and initiating preventive measures is an important part of reducing pressure ulcer prevalence and incidence. This concept has taken on even greater urgency now that the Healthy People 2010 initiative lists reducing PU incidence as an important objective for health care providers [2].

Rationale

We have identified four reasons to intervene with pressure ulcer development [4].

The first reason is the cost to patients. Each year, approximately 60,000 patients die as a direct result of pressure ulcers. Patients living with pressure ulcers tend to have a decreased quality of life and increased pain.

Second are the direct costs associated with treating a pressure ulcer. While it depends on the severity of the ulcer, estimates generally range from \$2,000 - \$20,000 per ulcer.

A third reason for reducing pressure ulcers is the threat of litigation. According to the Agency for Healthcare Research and Quality, there are more than 17,000 pressure ulcer related lawsuits filed annually - second only to wrongful death lawsuits.

The fourth reason is the risk of penalties: as mandated in the Patient Protection and Affordable Care Act, the bottom quartile of hospitals with the highest overall hospital-acquired condition

score - which includes hospital-acquired pressure ulcer rates - are penalized 1 percent of reimbursement for Medicare patients [4].

Pressure ulcer occurrence is recognized as a quality-of-care metric by many organizations including the Joint Commission International. Prevention has become a key focus of many health-care institutions worldwide [5,6].

Specific aims

The quality improvement projects aims are:

- To reduce the prevalence of pressure ulcers in patients admitted to home health services.
- Improve pressure ulcer care.

The specific objectives are:

- Assess the proactive risk reduction program outcomes on pressure ulcer prevention. 2. Identify the interventions necessary for each patient based on their Braden Scale result.

Methods

Two risk assessment scales-the Norton and the Braden Scales-are mentioned in the AHCPR guideline as being appropriate clinical tools for determining pressure ulcer risk. The remainder of this discussion focuses on the Braden Scale, the most commonly used pressure ulcer assessment scale in the United States.

Assessment frequency

Home Health Care patients are assessed for PU's upon admission, then reassessed each visit.

The Braden Scale is used internationally and has been translated into many languages, including Arabic, Japanese, Croatian, and Indonesian. The Braden Scale offers health care professionals a straightforward method to obtain information for predicting pressure sore risk, and its appropriate use in any setting for the prevention of pressure ulcers.

A systematic review by Pancorbo-Hidalgo et al (2006) examined several risk assessments tools of pressure ulcers. They compared the Waterlow Scale, Norton Scale, and the Braden Scale, concluding that the Braden Scale is the best predictor of pressure ulcers. However, another study found that the Braden Scale is inferior to a nurse's clinical judgment for assessing pressure ulcer risk [3]. De-

spite this, many studies indicate that using a risk assessment tool to predict pressure injuries is more effective than relying solely on clinical judgement.

As the Braden Scale scores become lower, predicted risk increases. The Braden Scale identifies incremental changes in risk, based on the percentage of patients who can be expected to develop pressure ulcers at the following scores: 15 to 18, (at risk) 13 to 14, (moderate risk) 10 to 12, (high risk) and 9 or below. (Very high risk). These levels of risk are also helpful in determining how aggressive preventive efforts should be and how to evaluate the success of these efforts.

There is a pressure ulcer prevention plan which takes into account a given patient's risk score. This plan is described in: (nice pressure ulcer management guidelines).

Nice pressure ulcer management guidelines are a preventative tool based on a given patient's Braden Risk Assessment score. (Management program attached).

Intervention(s)

For our interventions, we used the Braden Scale to assess the home health care patient risk score for pressure ulcer development. (Attached). The patient's case manager (a senior staff nurse) assessed the patient's wound and assigned the appropriate level as per the Braden Scale. Using this information, the patient was placed on a care plan using NICE guideline. The nurse case manager utilized this plan to educate the patient, family members, and other caregivers. In addition to this, the patient was treated by a team of different medical professionals such as dietitians, social services, occupational and physical therapists to help ensure the care plan was followed correctly. Wounds were assessed and documented by the nurse case manager each visit.

The stages of a pressure ulcer

- **Stage I:** Non-blanchable Erythema: Intact skin with non-blanchable redness of a localized area usually appears over a bony prominence. Darkly pigmented skin may not have visible blanching, but its color may differ from the surrounding area. The area may be painful, firm, soft, and have temperature changes as compared to adjacent tissue.
- **Stage II:** Partial Thickness Skin Loss: Partial thickness loss of dermis presents as a shallow, open ulcer with a

red-pink wound bed, but no slough. It may also present as an intact or open/ruptured serum-filled blister.

- **Stage III:** Full Thickness Skin Loss: Full-thickness tissue loss occurs. Subcutaneous fat may be visible, but bone, tendon, or muscle is not exposed. Slough may be present but does not obscure the depth of tissue loss. There may be undermining and tunneling.
- **Stage IV:** Full Thickness Tissue Loss: Full-thickness tissue loss occurs with exposed bone, tendon, or muscle. Slough or eschar may be present on some parts of the wound bed. Undermining and tunneling are often present. These pressure ulcers may extend into muscle and supporting structures.

Unstageable: Depth Unknown: Full-thickness tissue loss is apparent with slough (yellow, tan, gray, green, or brown) and/or eschar (tan, brown, or black) in the bottom of the wound bed.

Suspected Deep Tissue Injury: Depth Unknown: 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, and have temperature variations/changes as compared to adjacent tissue.

A Pressure ulcer management team has been developed by the Home Health Care administration.

The team consists of two senior nurses who will succeed the wound care competencies. The responsibility of this team is to assess the pressure ulcer wound care and supervise the implementation of the proactive management plan. This team will assist patients who have already developed pressure ulcers, their objective being to mitigate future ulcers, as well as care for existing ulcers.

Patients who do not have pressure ulcers will be assessed by the case manager, whose responsibility is to update the caregiver and ensure proper implementation of the patient's plan.

Relevant care activities covered:

- Safe environment
- Prevention of infection
- Breathing maintenance
- Nutrition
- Medication Administration
- Hygiene

- Elimination
- Mobility
- Wound care
- Others: Any other specific activity of care that was required. The caregiver signed the competency form that the information had been given and understood.

Informal or formal frameworks, models, concepts, and/or theories used to explain the problem, any reasons or assumptions that were used to develop the intervention(s), and reasons why the intervention(s) were expected to work.

Study of the Intervention(s)

To establish the effectiveness to the new program, a control group was studied for the same duration using the conventional method of assessment and treatment. The results were compared for statistical significance.

- Approach chosen for assessing the impact of the intervention(s)
- Approach used to establish whether the observed outcomes were due to the intervention(s).

Measures

- Wound improvement, stalled, regressed, closed
- Incident rate for pressure ulcer development
- Cost reduction for care of pressure ulcers
- Time of care reduction per ulcer.

Analysis

We compared the data on pressure ulcers during 2017 (1358) with the total number of admissions to home healthcare, FCM, PSMC (3182). Data on month of June 2017 and follow up for 6 months as before application of Braden Scale Risk Assessment were 41 during which we had incident 2 cases of pressure ulcers. In January 2018 we started to use the Braden Scale Risk Assessment, during this time we received 35 patients and there were no new pressure ulcers during the 6 month follow up period. Of note, we did receive two old pressure ulcers which relieved in two and six months.

Ethical considerations

No harm to our patients for the implementation of the proactive prevention of pressure ulcers development. There are no conflicts of interest to report.

Ethical aspects of implementing and studying the intervention(s) and how they were addressed, including, but not limited to, formal ethics review and potential conflict(s) of interest.

Results

	Before Using the Braden Scale	Using the Braden Scale
Total Number of Patients	35	41
Number of New Pressure Ulcers	2	0
Incidence	6%	0/41=0%

Table 1: Risk reduction of pressure ulcers by implementing the braden scale.

Risk Reduction: $6\% - 0\% = 6\%$

	Before Using the Braden Scale	Using the Braden Scale
Number of Old Pressure Ulcers	2	6
Follow-up	1 x 2 Months care	4 x 1 Months care
	1 x 6 Months care	1 x 3 Months care
		1 x 6 Months care
Total Follow-up	8 Months care	10 Months care
Average length of care per patient	$8/2=4$ Months care/ Ulcer	$10/6=1.67$ Months care/ Ulcer

Table 2: Time Saved by Implementing the Braden Scale.

	Before Implementing the Braden Scale	After Implementing the Braden Scale
Total number of Ulcers in 2017 is	1358x5000\$	1276x5000\$
6% reduction		82 x5000\$ = 410000\$
Time to care	1358x4 Month care	1276x1.67 month care
Direct costs of ulcer care	1354x4=5432x2000\$	1276x1.67 = 2131x2000\$
	27160000\$	4264000\$
Estimated costs reduction	$27160000-4264000 = 22896000$$	

Table 3: Estimated annual cost reduction with application of the Braden Scale [7].

Figure 1: Before using the Braden Scale, two pressure ulcers developed, the first after 1 month, and the second after 2 months. Unfortunately, they both persisted and did not resolve by the end of the 6-month period. On the other hand, after implementation of the Braden Scale, no pressure ulcers developed during the 6-month period among the patient cohort.

Figure 2: On the other hand, after implementation of the BST the patient cohort were received with already 6 pressure ulcers, 4 improved after 1 month and one improved after 3 month and, only 1 persisted for 6 months.

Discussion

This study shows the importance of implementing quality improvement measures in the care of pressure ulcers, such as the Braden Scale. By using the Braden Scale, we saw a reduction in the of occurrence of pressure ulcers by six percent. Additionally, there was a reduction of time spent treating these pressure ulcers from 4 months to 1.67 months. Most importantly, we estimate an expected savings of more than \$ 22 million should Prince Sultan Military

Medical Center (PSMMC) implement such measures for pressure ulcer care. Implementation of the Braden scale will lead to reduced rates of pressure ulcers, as well as much less time spent on care and reduced costs. Overall, it will reduce the burden of pressure ulcers on the health care system and its expenditures at PSMMC.

The availability of resources needed to implement the Braden Scale at PSMMC poses a limitation on the scale's use. Additionally, there could be a resistance to change which creates a time delay and increases the efforts needed to implement these new precautions. Also, it is difficult to monitor the appropriate implementation of the pressure ulcer care plan regularly and accurately. Additional to care giver differences; some care givers are the patients' relatives, some others are nurses, others are regular help with no previous experience. And definitely due to Cultural and socioeconomic background issues.

There are many interventions for prevention of Hospital Bed Ulcer [8-10], when coupled with such quality intervention, there would be definitely better outcome for hospitalized patients at risk of bed ulcers and its complication and consequent health care burden and costs.

Conclusion

Pressure ulcers are a major health care problem and a burden on the health care system; however this costly medical issue is preventable. Risk reduction by Braden Scale was successful to reduce incidence and cut off time of care per ulcer. Use of Braden Scale is helpful to reduce rates and costs of care of pressure ulcers.

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