

Possible Contributing Factors for Differences in Pressure Ulcer Prevalence Rates:

A Pilot Study of Two Medical Units

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Background

Skin care and maintenance of skin integrity is an important indicator of quality care in hospitals. The Ottawa Hospital (TOH), an acute tertiary care hospital composed of five sites, has over the past 10 years developed a comprehensive data set from our annual Pressure Ulcer Prevalence (PUP) studies.^{1,2,3,4} Specifically, the PUP data from the past several years have revealed significant differences in prevalence rates between the medical units on different campuses. Prevalence data provide a "snapshot" of pressure ulcers at a given point in time. They do not provide information helpful in understanding the reasons for these differences in prevalence rates. Thus, we conducted a pilot incidence study to

identify unit and patient characteristics that might uncover contributing factors for the differences in prevalence rates on the units.

Study Methodology

Comparable medical units (identified as Unit A and Unit B) from the two large inpatient campuses participated in this pilot study. The study underwent review and received approval from the Ottawa Health Research Institute Ethics Board. The two main objectives were to document the occurrence of pressure ulcers over the 10-week study period and to profile the study units and their populations. Two of the study questions were as follows:

1. What is the prevalence and incidence of pressure ulcers on the study units?

2. What patient-related or unit-related factors are associated with the difference of prevalence and incidence of pressure ulcers on the units?

A prospective point prevalence (12 hours) was conducted followed by a cumulative incidence survey over 10 weeks. A Pressure Ulcer Incidence Data Collection Tool was developed from our standard prevalence tool that included admission data, the presence, site, and stage of all pressure ulcers, a daily record of skin and Braden Scale risk assessments.^{5,6} Nurses completed this tool for each patient admitted to the study units on a daily basis. The indicators for the ulcer outcome measures are detailed in Table 1.

Data were entered, verified and

TABLE 1

Outcome Indicators

Point prevalence	$\frac{\text{Patients with a pressure ulcer on day one}}{\text{All patients present on the units on day one}} \times 100$
Cumulative incidence—defined as the proportion of people who develop a pressure ulcer during a specified period. ⁷	$\frac{\text{All patients who developed a pressure ulcer during the study period}}{\text{All patients who were ulcer-free on day one and all patients who were admitted during the study period who were ulcer-free on admission}} \times 100$

analyzed using the SPSS-PC version 11.0 statistical software package. Descriptive statistics (means, medians and frequency distributions) were calculated to report both clinical and unit data; T tests (for continuous variables) and Chi square (for categorical variables) were used to determine if there were differences between the groups. A Braden Scale deficit was defined as a loss of one point or more on any of the subscales. This study was not intended (nor powered) to detect differences on which to base conclusions, but rather to generate hypotheses for future study.

Findings

Prevalence Estimates and Cumulative Incidence.

During the 10-week study period, 19 per cent of patients (128 of the 669) on the two medical units were found to have ulcers. The point prevalence on day one for both medical units combined was 33 per cent (all stages). The incidence rate over the 10-week period for both units combined was nine per cent for all stages and four per cent for Stage II and greater ulcers.

Comparison of Unit A and B.

The two units were similar in staffing characteristics except that Unit A was composed of registered nurses (RNs) and aides and Unit B had all professional staff consisting of RNs and registered practical nurses (RPNs). Their patient populations were significantly different,

	Unit A	Unit B	Significance
Pressure Prevalence and Incidence Rates (All Stages)			
Point prevalence	47%	21%	.014
Cumulative incidence	12%	6%	.008
Unit Characteristics			
Daily RN staff	82%	89%	.482
Full-time RN staff	55%	63%	.430
Unit staff mix	RN & PCA	RN & RPN	—
Professional staff	82%	100%	.021
Occupancy rate	95%	97%	.402
Absenteeism	4.8%	4.4%	.620
Patient Population Characteristics			
Study population number	335	334	—
Age > 70	63%	56%	.066
Admitting service general and family medicine	93%	71%	.000
Emergency/Non-elective admission	99%	90%	.000
Co-Morbidities			
Renal disease	19%	9%	.000
Diabetes	27%	18%	.006
Cardiac disease	41%	31%	.009
Pulmonary disease	25%	31%	.068
Hypertension	36%	33%	.343
Braden Scale deficit on admission	94%	89%	.024
5-6 Braden Subscale deficits	47%	32%	.001
Number of co-morbidities	4.2	3.8	.039

with the type of conditions and the admitting service with Unit A having more emergency or non-elective admissions and patients with higher numbers of co-morbidities. Unit A also had patients at greater risk of pressure ulcers. The characteristics of the units, the patient populations, prevalence estimates and incidence rates are presented in Table 2.

In comparing the population who developed pressure ulcers with those who remained ulcer-free on the units, several factors appeared to be important (Table 3). Patients who devel-

oped ulcers were older, had a greater number of co-morbid conditions, were more likely to be diabetic, and were more likely to have deficits in five to six of the subscales of the Braden Risk Assessment. No significant differences were noted between those patients with ulcers and those without in terms of gender, time in the emergency room and admitting diagnosis. A greater proportion of the patients on Unit A were noted to have the characteristics of the population likely to develop ulcers.

A small proportion (17 per

cent) of the ulcers that were first identified as being Stage I ulcers deteriorated to a more serious stage during the study. Although the average time from admission to ulcer development was longer on Unit A (mean 16 days, median seven days) than on Unit B (mean 11 days, median five days), this difference was not statistically significant.

Discussion

The incidence rate (nine per cent for all stages) on these two units is in the lower range found in the literature where studies have reported incidence rates

TABLE 3

Profile of Patients with Pressure Ulcers and Characteristics of Unit Populations

Profile of Patients with Pressure Ulcers	Factor	Unit A	Unit B
Older	Mean age (years)	71	68
Have more co-morbidities	Mean number of co-morbidities	4.2	3.8
Have been in hospital longer	Average length of stay	11	11
Have a co-morbidity of diabetes	% diabetic	27%	18%
Have deficits in each of the Braden Subscales	% with six subscale deficits	29%	17%

between 1.1 and 21 per cent in acute-care settings^{8,9,10,11} and 9.7 per cent for patients over 65.¹² Significant differences were found in the incidence rates for pressure ulcers (all stages) on the two units (Unit A with 12 per cent and Unit B with six per cent). Organizational characteristics, patient demographics and clinical factors differed on the units, which may help to explain the variation in pressure ulcer occurrence. Although this study was not set up to test the association between unit and population characteristics on the occurrence of pressure ulcers, there were some interesting findings relevant for further study. Unit A had a lower proportion of full-time staff as well as a lower proportion of RN staff than Unit B. A recent Ontario study¹³ found that patients in hospital units where there were more RNs and RPNs had better outcomes on discharge. U.S. studies^{14,15} have also documented that staffing mix and staffing levels make a difference in achieving positive patient outcomes. This relationship deserves more attention given the preliminary findings of this pilot study.

Patient population characteris-

tics also appear to be important in terms of understanding varying rates of pressure ulcers on generically described "medical" units. The significant differences in Unit A's patient population, mean age, number of co-morbidities, and the number of Braden deficits likely are contributing factors for the development of more pressure ulcers compared with Unit B.

Conclusion

This descriptive cohort study provided preliminary information to explain to decision-makers how seemingly similar units may be quite different for the purposes of understanding pressure ulcer development. Findings from this study suggest that patients who have deficits in five to six of the Braden Scale subscales and four or more co-morbidities are at higher risk to develop pressure ulcers. Unit staffing mix and levels of staff appear to be an important unit characteristic worthy of further study with regard to pressure ulcer development. A large-scale prospective cohort over a longer period of time would contribute to understanding this relationship more. Other variables/

factors that may also play a role in the disparity of prevalence and incidence rates on these units were not explored in this study. Factors to consider for future research include nursing skin-care practices, nurses' knowledge and attitudes regarding skin care, and more specific patient data such as illness acuity, nutritional status, activity levels and skin conditions. ☹

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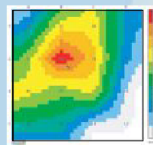
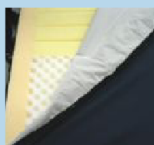
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Variation coefficient	63.7%
Standard deviation	1.47
Average pressure	2.3
Maximum pressure	5.9
Center of pressure	2.7, 2.5



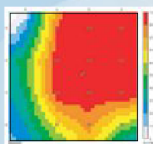
Pressure Reduction Mattress

Sensors included	16
Variation coefficient	59.7%
Standard deviation	26.8
Average pressure	44.8
Maximum pressure	100
Center of pressure	2.2, 2.2



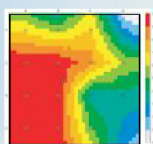
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Sensors included	16
Variation coefficient	36.4%
Standard deviation	28.2
Average pressure	77.5
Maximum pressure	100
Center of pressure	2.8, 2.4



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Maximum pressure	100
Center of pressure	2.1, 2.5



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