



Original article

Variation in pressure ulcer prevalence and prevention in nursing homes: A multicenter study

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ABSTRACT

Aim: To estimate the prevalence of pressure ulcers in nursing homes and its variability, the frequency of use of preventive measures and treatment.

Background: Pressure ulcer is a frequent pathology across healthcare settings. Most pressure ulcers are preventable and are considered an important quality of care indicator.

Methods: Assessments were done on a single day of November 2015 in nursing homes in Geneva, Switzerland. Of the 51 institutions (3824 patients) eligible, 33 homes agreed to participate, representing 2671 patients (69.8%).

One referent nurse per nursing home received training on pressure ulcer detection. To estimate the residual variability in prevalence and in number of prevention measures, adjusted multilevel logistic regressions were used.

Results: Patients were on average 85.6 years old, with a median length of stay of 2.1 years. The overall prevalence was 5.7% but varied considerably, from 0% to 19.6%.

The variability across nursing homes decreased slightly when taking into account patient-level and institution-level characteristics.

In the adjusted models, pressure ulcers prevalence was significantly associated with Braden risk; number of preventive measures was significantly associated with nursing home size, and Braden risk, and marginally associated with length of stay.

Conclusions: Overall prevalence of pressure ulcers was relatively low. While several prevention measures for patients at risk were taken, the correct use of all of them was rare.

The variability in prevalence and in number of preventive measures across nursing homes was very high. Programmes focusing on the correct use of all recommended prevention measures could help reducing pressure ulcers prevalence.

1. Background

Pressure ulcer (“PU”), pressure injury in the United States (U.S.), is a frequent pathology across healthcare settings, defined as a localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear (NPUAP EPUAP PPIA, 2014).

Although risk assessment scales and preventive measures are known, the prevalence of PU varies significantly between facilities: for instance, PU prevalence varied between 2.2% and 23.9% in nursing homes (Lyder, 2003) and between 3% and 33% for high-risk chronic-care residents (Flynn, Liang, Dickson, & Aiken, 2010). Variability is

inherent in health processes and reflects patients' characteristics but also differences in health care delivery (how the health facility is organised and works and how professionals provide health care).

Most PU are preventable and are considered an important quality of care indicator, related to patients' quality of life (Reddy, Keast, Fowler, & Sibbald, 2003) and to increased mortality (Department of Health and Human Services Centers for Medicare & Medicaid Services, 2007).

Prevention is essential to reduce PU and several recently published quality improvement articles indicate that different strategies may be helpful and effective (Blenman & Marks-Maran, 2017; Hunter, Kelly, Stanley, Stille, & Anderson, 2014; Morehead & Blain, 2014). These strategies often rely on several preventive measures and literature

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Table 1
Sample characteristics by Braden risk score.

	None Braden > 18	Low Braden 15–18	Moderate Braden 13–14	High Braden < 13	Total
N (%)	1341 (50.2%)	749 (28.0%)	315 (11.8%)	266 (10.0%)	2671
Age, mean(SD)	86.2 (7.9)	87.0 (7.8)	86.3 (9.0)	86.8 (9.2)	86.5 (8.1)
Length of stay [years], mean(SD)	2.7 (3.1)	3.1 (3.2)	3.8 (3.1)	4.2 (4.1)	3.1 (3.3)
Gender, N(%)					
Female	974 (72.7%)	552 (73.7%)	235 (74.5%)	223 (83.8%)	1984 (74.3%)
Male	367 (27.3%)	197 (26.3%)	80 (25.5%)	43 (16.2%)	687 (25.7%)
Hospitalized in last 3 months, N(%)	106 (7.9%)	80 (10.7%)	30 (9.5%)	22 (8.3%)	238 (8.9%)
Pressure ulcer					
Overall	27 (2.0%)	37 (4.9%)	38 (12.1%)	49 (18.4%)	151 (5.7%)
Min-Max by center	0%–11.6%	0%–26.7%	0%–50.0%	0%–50.0%	0%–19.6%
Developed during stay	15 (1.1%)	23 (3.1%)	32 (10.2%)	42 (15.8%)	112 (4.2%)
Min-Max by center	0%–7.0%	0%–21.7%	0%–50.0%	0%–50.0%	0%–14.1%
Prevention (not recommended for Braden score > 18)					
Oral nutrition supplement		105 (14.0%)	62 (19.7%)	83 (31.2%)	250 (18.8%)
Relieving pressure		294 (39.3%)	193 (61.3%)	200 (75.2%)	687 (51.7%)
Repositioning ^a					
every 2–3 h		34 (4.5%)	16 (5.1%)	47 (17.7%) ^a	97 (7.3%)
every 4 h		92 (12.3%)	101 (32.0%) ^a	102 (38.3%)	295 (22.2%)
every 6 h		86 (11.5%)	42 (13.3%)	37 (13.9%)	165 (12.4%)
No		531 (70.9%) ^a	151 (47.9%)	70 (26.3%)	752 (56.5%)
Patient cannot be moved		6 (0.1%)	5 (1.6%)	10 (3.8%)	21 (1.6%)
Mattress and bed support surfaces		460 (61.4%)	226 (71.7%)	232 (87.2%)	918 (69.0%)
Positioning devices		136 (18.2%)	114 (36.2%)	136 (51.1%)	386 (29.0%)
Seating support surfaces		349 (46.6%)	216 (68.6%)	192 (72.2%)	757 (56.9%)
Mean number of prevention measures used (SD)		1.8 (1.3)	2.3 (1.5)	3.4 (1.3)	2.4 (1.5)
Use of all appropriate preventive measures ^b			8 (2.5%)	10 (3.8%)	18 (3.1%)

^a A star indicates the guidelines for repositioning according to risk level.

^b Only required for moderate and high risk patients.

shows that the correct use of all of them can help reduce PU prevalence (Anderson et al., 2015; Baldelli & Paciella, 2008; Tayyib, Coyer, & Lewis, 2016).

PU are also very expensive, with costs estimated in 2012 to £1214 for category (stage) 1 (low severity) PU to £14,108 for category 4 (highest severity) PU in the UK (Dealey, Posnett, & Walker, 2012), and estimated in 2007 to \$43,180 for categories 3 and 4 in the USA (Department of Health and Human Services Centers for Medicare & Medicaid Services, 2007).

While preventing PU is obviously a sign of better quality of care and is also cheaper than treating them, the preventive process is not easy.

PU risk factors can be conceptually grouped as follows. First, patient-related risk factors, besides sex and age, primarily belong in the following categories: functional (activity and mobility) impairment, moisture and (faecal and urinary) incontinence, abnormalities in nutritional status, deficit in sensory perception, tendency to skin friction and hemodynamic related risk factors (Coleman et al., 2013; Park-Lee & Caffrey, 2009). Length of stay is certainly another important risk factor though it is often only considered as an inclusion criterion, selecting patients with a minimum length of stay (Coleman et al., 2013). Second, institution-related risk factors are less well studied. The most frequently considered are: staff number, though the literature is discordant about its impact (Backhaus, Verbeek, van Rossum, Capezuti, & Hamers, 2014), staff training and turnover, profit status, facility size and work environment characteristics (Backhaus et al., 2017; Flynn, Liang, Dickson, & Aiken, 2010; Johnson-Pawlson & Infeld, 1996; Lerner, Johantgen, Trinkoff, Storr, & Han, 2014; Twigg, Gelder, & Myers, 2015). Third, care-related risk factors are: difficulties associated with changing patient's position and getting patient to be more mobile, inadequate-quality bed and mattress, insufficient skin care and inadequate nutrition (Reddy, Gill, & Rochon, 2006). For patients without PU, a risk score, such as the Braden (Ayello & Braden, 2002; Bergstrom, Braden, Laguzza, & Holman, 1987; Bergstrom, Demuth, & Braden, 1987), which evaluates the majority of the above mentioned conditions, should be used to determine their level of risk and implement appropriate preventive measures. For patients with PU, the presence and

severity of the PU should be detected as soon as possible, and treated.

1.1. Objectives

The aim of this project is two-fold. The first goal is to estimate the prevalence of PU in nursing homes and its variability, the frequency of use of preventive measures for patients at risk to develop PU, and treatment for patients having PU. The second goal is to determine the remaining variability across nursing homes, when characteristics not related to patient care have been taken into account.

2. Methods

2.1. Study design

Cross-sectional prevalence study in nursing homes in Geneva, Switzerland. Assessments were done on a single day of November 2015.

2.2. Participants and recruitment

All nursing homes in the canton of Geneva were offered the opportunity to participate in the study. All patients of the recruited nursing homes were assessed.

2.3. Nurse training and patient assessment

One referent nurse per nursing home received a two-hour training on data collection and PU detection with the main aim of standardizing practices, then, for each patient, collected information on socio-demographic and clinical characteristics, nutrition, Braden score, prevention practices, presence, severity and treatment of PU. Skin and Braden Scale assessment were completed on the day of the investigation. Treatment and all other variables were assessed using patient documentation.

Because the study focuses on prevalence in nursing homes patients, if several PU were found on the same patient, only the most severe was

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