Hospital-acquired pressure ulcers in two Swedish County Councils: cross-sectional data as the foundation for future quality improvement

Lena Gunningberg, Nancy A Stotts, Ewa Idvall

Gunningberg L, Stotts NA, Idvall E. Hospital-acquired pressure ulcers in two Swedish County Councils: cross-sectional data as the foundation for future quality improvement. Int Wound J 2011; 8:465–473

ABSTRACT

The objectives of the study were to examine the prevalence of pressure ulcers and hospital-acquired pressure ulcers (HAPU) and identify modifiable factors in patients who develop HAPU as the basis for subsequent quality assurance studies and improvement in hospital care. The study was conducted in five hospitals in two Swedish County Councils. A 1-day prevalence study ($n = 1192$) using the standards of the European Pressure Ulcer Advisory Panel and Collaborative Alliance for Nursing Outcomes was conducted. The prevalence of ulcers was 14·9% and 11·6% were HAPU. Older age, more days of hospitalisation, less activity, problems with shear and friction and reduced sensory perception contributed significantly to HAPU. Pressure ulcer prevention strategies used more often in those with HAPU were risk assessment at admission, provision of a pressure relief mattress, having a turning schedule and using a heel or chair cushion. The prevalence of pressure ulcers continues to be a significant issue in acute care and the prevalence of HAPU is high. There is significant room for quality improvement in pressure ulcer prevention in Swedish hospitals. Future research needs to address both HAPU and community-acquired pressure ulcers and focus on preventive strategies, including when they are initiated and which are effective in mitigating the high HAPU rate.

Key words: Hospital-acquired pressure ulcers • Prevalence • Prevention • Risk assessment

INTRODUCTION

Pressure ulcers are a serious negative outcome of hospitalisation. They cause pain and suffering, are associated with impaired quality of life, are expensive and require prolonged time for healing (1–3). Pressure ulcer prevalence is high, estimated to be about 13·5% in 2008 and 12·3% in 2009 in a series of international cross-sectional studies (4).

Clinicians have focused on the prevalence of pressure ulcers to understand the magnitude of the problem (5,6). Prevalence indicates the total number of persons in a given population with an ulcer, regardless whether the ulcer developed during that hospitalisation, at home or while the person was in another facility (7). Prevalence is often used to estimate the cost of care for the person with an ulcer, for example, number of specialised beds, dressing supplies. A typical prevalence study is where all adults in a given hospital are examined on a given

Authors: L Gunningberg, PhD, Department of Public Health and Caring Sciences, Section of Caring Sciences, Uppsala University, Uppsala, Sweden and School of Nursing, University of California, San Francisco, CA, USA; NA Stotts, PhD, School of Nursing, University of California, San Francisco, CA, USA; E Idvall, PhD, Faculty of Health and Society, Malmö University and Skåne University Hospital, Malmö, Sweden

Address for correspondence: L Gunningberg, PhD, Associate Professor, Department of Public Health and Caring Sciences, Section of Caring Sciences, Uppsala University, Box 564, SE-751 22 Uppsala, Sweden

E-mail: lena.gunningberg@pubcare.uu.se

Key Points

- HAPUs are a significant iatrogenic problem in acute care hospitals in Sweden
- the HAPU rate is a more accurate quality indicator than pressure ulcer prevalence
- lack of admission skin assessment as well as pressure ulcer risk assessment is a serious omission in identifying HAPU; patient safety is jeopardised by this omission
- this article documents a tested method to measure both HAPU and pressure ulcers present on hospital admission. Understanding the rate of HAPU provides a strong incentive to administrators and registered nurses to aggressively initiate pressure ulcer prevention and mitigate the rate of HAPU

day to determine whether a pressure ulcer is present. The unit of analysis in this type of study is the person, regardless of how many pressure ulcers are present.

In Sweden, the focus has been on conducting prevalence studies (8) and the European Pressure Ulcer Advisory Panel (EPUAP) recommended methodology has been widely used for the studies. This standardised and accepted approach has brought consistency to the data collection and facilitated comparison of data across studies (9). The prevalence of pressure ulcers in Swedish hospitals is 19–27%, when all categories of ulcers (categories 1–4) are considered (10,11). Follow-up is needed as the prevalence remains high and above that seen in other countries (4).

There is recognition that prevalence provides data only on the presence of an ulcer, not on whether it developed during the current hospitalisation. While pressure ulcers have long been recognised as a nurse-sensitive indicator of quality of care (12), there is increased concern that the prevalence alone does not provide direction for approaches to quality improvement (13). Passage of the Deficit Reduction Act in the USA eliminated additional reimbursement to care for patients who developed a pressure ulcer during hospitalisation (14). This law, implement in October 2008, stimulated increased interest by hospitals in the prevention of hospital-acquired pressure ulcers (HAPU). While not a new issue, the financial cost renewed appreciation of the importance of identifying and reducing the number of HAPU.

Yet the measurement of the number of HAPU is more complicated and costly than evaluating only prevalence. To quantify the number of HAPU, the presence of ulcers at the time of hospital admission must be evaluated and documented. Pressure ulcers also need to be differentiated from other type of wounds that may be present, for example, venous ulcers. Staff must be educated to know how to categorise pressure ulcers, determine whether skin disruptions identified are pressure ulcers or other conditions and understand the criteria for identification of prevention strategies being evaluated. We developed a working collaborative with the Collaborative Alliance for Nursing Outcomes (CALNOC) to increase the precision in evaluation of quality of pressure ulcer care provided in Swedish hospitals. CALNOC was established in California more than a decade ago and is an extensive voluntary network of over 250 hospitals drawn from five states in the USA (12). It functions as a nursing quality database, benchmarking and research enterprise and includes nurse-sensitive indicators. CALNOC has a methodology that reliably differentiates HAPU from pressure ulcers that are already present on admission to the hospital (community acquired) (15). HAPU is clearly a more accurate indicator of the quality of care in hospitals than prevalence, but has not been used routinely in Europe. The CALNOC methodology expands on the EPUAP prevalence procedures to allow the hospital to differentiate between overall pressure ulcer prevalence and HAPU.

The overall aim of this study was to understand the rate of HAPU in two Swedish County Councils and identify modifiable factors in patients who develop HAPU as the basis for subsequent quality assurance studies and improvement in patient care. The specific aims of the study were to determine the (1) overall prevalence of pressure ulcers and the proportion that are community-acquired pressure ulcers and HAPU; (2) characteristics of patients with and without HAPU and (3) preventive strategies used for patients with and without HAPU.

METHODS

Design

A cross-sectional study design was used. Pressure ulcer data were collected on a single day at each site through inspection of the patients' skin, evaluation of pressure ulcer risk, identification of prevention strategies currently used and audit of the electronic health record (EHR).

Setting

The study was conducted in two County Councils in Sweden. County Council A was a university setting, consisting of a large university hospital (1100 beds) and a small general hospital (90 beds). County Council B was a non university setting, consisting of three general hospitals with a total of 565 beds. There were no significant differences between the two County Councils in the number of patients on each ward or the number of admitted and discharged patients per day (10). Furthermore, the skill mix of registered nurses (RNs)

and assistant nurses (ANs) in the two County Councils was similar. However, RNs in County Council A had significantly longer work experience than the RNs in County Council B ($P = 0{\cdot}002$). As the context of the two hospitals was homogeneous on most major variables, data from the two Councils were merged and considered as a single group for the study analyses.

Sample

Participants included a total of 1192 patients. Inclusion criteria were patients ≥18 years admitted to one of the County Council hospitals before midnight the day of the study and hospitalised on medical-surgical, critical care, geriatric or gero-psychiatric units. Excluded were patients on psychiatric units, maternity units, day care and hospice units. There were 112 patients (8·6%) who declined participation. Statistical evaluation showed no significant difference in gender ($P = 0{\cdot}159$) between those who did and did not participate. However, patients participating in the study were significantly older than those who refused (68·7 versus 61·2 years, $t = 3{\cdot}79$, df = 1302, $P < 0{\cdot}05$).

In the sample ($n = 1192$), most patients were women (52·2%). The mean age was 67·8 years (SD = 16·4, range = 18–99) and 59·5% were admitted for medical reasons. The mean length of stay from admission until the study day was 12·4 days (SD = 23·7, range = 0–262, Md = 5, interquartile range = 11). The mean Braden score assessed on the study day was 19·7 (SD = 3·6, range = 8–23); however, of those assessed ($n = 1173$), 19·9% were at risk.

Variables and measures

Pressure ulcer category was determined using the International Pressure ulcer classification system (7).

> *Category 1*. Non blanchable erythema.
> *Category 2*. Partial thickness skin loss involving epidermis, dermis or both.
> *Category 3*. Full-thickness skin loss. Subcutaneous fat may be visible but bone, tendon or muscle is not exposed.
> *Category 4*. Full-thickness tissue loss with exposed bone, tendon or muscle. Necrotic ulcer was classified as category 4.

Pressure ulcer location and number per patient was evaluated by inspection.

Moisture lesion was recorded according to the criteria of Beeckman *et al*.(15).

Pressure ulcer prevalence was defined as the number of patients with a pressure ulcer divided by total number of patients evaluated.

HAPU prevalence was defined as the number of patients with pressure ulcers that developed during the hospital stay divided by total number of patients evaluated. All patients with pressure ulcers identified and documented 24 hours after admission to the hospital were defined as HAPU (16).

Community-acquired pressure ulcers were those documented in the EHR at the time of admission to the hospital or within the first 24 hours after admission.

Patient characteristics included gender, age, reason for admission (medical/surgical), length of stay until study day, estimated weight, pressure ulcer risk and incontinence. Pressure ulcer risk was measured with the Braden Pressure Sore scale that consists of six subscales (sensory perception, activity, mobility, nutrition, moisture, shear and friction) (17,18). Scoring ranges from 6 to 23 and a score <17 was considered risk status (19). The Braden Pressure Sore scale has well-established validity and reliability (20). Incontinence was measured using the Norton scale subscale incontinence (9).

Pressure ulcer prevention strategies included documentation of pressure ulcer risk assessment and skin assessment within 24 hours of admission to the hospital, risk status at admission and at the time of the survey and implementation of a prevention protocol for at-risk patients. Risk assessment was based on a risk assessment tool or clinical judgement or a combination of both. Evidence that a prevention protocol was implemented was a clinical judgement based on nursing documentation that indicated the patient actually received the interventions to address specific identified areas of risk (16). These data were abstracted from the EHR. Other strategies were observed at the bedside by the nurses who conducted the skin assessment and included mattress type (standard, non powered or powered), turning schedule, heel cushion, chair cushion and chair repositioning.

Procedure

The study was preplanned and conducted on 30 September 2009. The EPUAP prevalence methodology modified with the CALNOC prevalence procedure was used (9,16). Specifically, a team of two RNs (one data collector

and one ward nurse) visited each patient. Skin inspection, risk assessment and data on prevention strategies that were visible in the patient's unit were recorded. The EHR was audited to collect data on documented preventive strategies during the care episode and to determine whether existing pressure ulcers were community or hospital acquired.

Before the study, the RNs participating in the data collection attended a half-day seminar on the survey procedure. They also completed a 1-hour e-learning session that addressed classification of pressure ulcers and the differentiation from moisture lesions (15). Before the study, the feasibility of identifying the variables from the EHR was pilot tested and it was confirmed that accurate data could be obtained.

Data analysis

Descriptive statistics were completed on all study variables, including means, standard deviations, ranges and percentages. If the patient had more than one pressure ulcer, the most severe pressure ulcer, that is, the highest category, was used as reference ulcer in the calculation of prevalence. Patients with community-acquired pressure ulcers were excluded from the analysis related to HAPU. For comparison of patients with and without HAPU, the Student's *t*-test was performed for continuous variables, Mann–Whitney *U*-test for ordinal scale variables and the Chi-square test for categorical variables. A logistic regression was used to analyse patient characteristics associated with HAPU. The outcome evaluated was the presence of an HAPU (categories 1–4) or no HAPU. In these analyses, patients with community-acquired pressure ulcers were excluded. Statistical significance was preset at $<0{\cdot}05$.

Ethical considerations

The study was approved by the hospital directors and followed the principles of the Declaration of Helsinki, as well as national and local ethical guidelines for research (21). Patients received verbal and written information about the study and gave verbal consent to participate. Participation in the study was voluntary and patients were free to withdraw at any time. All data were treated confidentially and processed anonymously.

RESULTS

HAPU and community-acquired pressure ulcers versus overall prevalence

The overall pressure ulcer prevalence was 14·9%. There were 11·6% of patients with HAPU and 3·3% with community-acquired pressure ulcers. Most of the pressure ulcers were hospital acquired (78%) and most were category 1 (55%) (Table 1). There were a mean number of 1·3 HAPU per patients (SD = 0·61, range 1 – 4). The locations of the most severe HAPU were sacrum ($n = 44$, 32·6%), heel ($n = 50$, 37·0%), hip ($n = 4$, 3·0%) and other locations ($n = 37$, 27·4%) (Table 2). Of the 11 category 4 HAPUs, nine were heel ulcers. There were 4·8% ($n = 57$) of the patients who had moisture lesions but no pressure ulcers.

Differences in patient characteristics between patients with and without HAPU

Patient characteristics associated with developing pressure ulcers during the hospital stay are displayed in Table 3. Patients with HAPU were significantly older (75·5 versus

Table 1 Most severe pressure ulcer per subject by category by whether hospital- or community acquired, and overall pressure ulcer prevalence ($n = 1192$)

	Hospital-acquired pressure ulcers	Community-acquired pressure ulcers	Overall pressure ulcer prevalence
	n (%)	*n* (%)	*n* (%)
Category 1	83 (7·2)	15 (1·3)	98 (8·2)
Category 2	26 (2·3)	13 (1·1)	39 (3·3)
Category 3	18 (1·6)	6 (0·4)	24 (2·0)
Category 4	11 (1·0)	5 (0·4)	16 (1·3)
Total*	138 (11·6)	39 (3·3)	177 (14·9)

*Percentage may not add up to totals as a result of rounding.

Table 2 Hospital-acquired pressure ulcer category by ulcer location ($n = 135$)

	Category 1	Category 2	Category 3	Category 4	Total
Sacrum	26	13	4	1	44
Heel	34	3	4	9	50
Hip	1	1	1	1	4
Other	20	9	8	0	37
Total	81*	26	17*	11	135

*Missing data on ulcer location for three patients.

67·6 years; $P < 0·001$), had lower Braden scores (16·6 versus 20·3; $P < 0·001$), were incontinent ($P < 0·001$), weighed less ($P < 0·016$) and had a longer length of stay in the hospital (26·7 versus 10·5 days; $P < 0·001$) compared with patients without HAPU. All Braden subscales were significantly lower in the HAPU group ($P < 0·001$).

Age, weight, days of hospitalisation and the subscales from the Braden scale score were inserted into the logistic regression. The logistic regression analysis ($\chi^2 = 177·4$, df = 9, $P < 0·001$) showed that older age ($P = 0·004$), more days of hospitalisation ($P < 0·001$), as well as low scores on sensory perception ($P = 0·002$), activity ($P = 0·001$) and friction and shear ($P = 0·003$) were significantly associated with HAPU (Table 4).

Differences in preventive strategies between patients with and without HAPU

Preventive strategies, documented or observed at the bedside, associated with HAPU are displayed in Table 5. About 40% of patients were assessed within 24 hours after admission and less than 20% of risk patients had a pressure ulcer prevention protocol present at the time of the survey. Patients with HAPU were significantly more often risk assessed at admission ($P = 0·045$) and had a prevention protocol in place ($P < 0·001$) than those without an HAPU.

Specialised pressure-reducing mattresses were used in 32·8% of all subjects. They were used significantly more often in those with HAPU than in those without HAPU. A turning schedule was used sparsely (9·6%); however, a turning schedule was present more often in those with an HAPU than those without an HAPU ($P = 0·001$). Heel cushions were used in only 11% of patients and chair cushions in 8·2%. They were also used more often in those with HAPU than those with no HAPU (heel cushions $P < 0·001$; chair cushions $P < 0·001$). A repositioning schedule for those up in a chair was infrequently used (5·4%); there was no difference in the frequency of the chair repositioning schedule in those with HAPU and those without an HAPU ($P = 0·131$).

DISCUSSION

The overall prevalence of pressure ulcers in two County Councils in Sweden was 14·9%, slightly higher than the average pressure ulcer prevalence reported in large studies from the USA (4). We found that as many as 11·6% of patients developed HAPU, compared with 5–6% in the studies by VanGlider *et al*. (4).

It is important to understand what types of preventive strategies can be used to improve

Table 3 Patient characteristics by no hospital-acquired pressure ulcers (HAPU) versus HAPU ($n = 1153$)*

	No HAPU ($n = 1015$)	HAPU ($n = 138$)	Total* ($n = 1153$)	Statistical signficance
	n (%)	*n* (%)	*n* (%)	*P* value
Men	486 (47·9)	63 (45·7)	549 (47·7)	0·615
Women	528 (52·1)	75 (54·3)	603 (52·3)	
Medical	602 (59·3)	81 (58·7)	683 (59·2)	0·890
Surgical	413 (40·7)	57 (41·3)	470 (40·8)	
At risk – Braden score <17 at time of survey	139 (13·9)	63 (47·0)	202 (17·8)	<0·001
	M (SD)	M (SD)	M (SD)	
Age (years)	67·6 (16·8)	75·5 (11·6)	68·5 (16·4)	<0·001
Length of stay until survey (days)	10·5 (19·5)	26·7 (42·1)	12·4 (23·9)	<0·001

*Patients with community-acquired pressure ulcers ($n = 39$) are excluded. Missing data on some variables.

Table 4 Patient with hospital-acquired pressure ulcers and odds ratio (OR) for patient characteristics ($n = 1060$) (missing data for 93 cases)*

	OR	95% Confidence intervals	Statistical significance *P* value
Age	1·03	1·01–1·04	0·004
Weight	0·77	0·49–1·23	0·281
Days of hospitalisation	1·02	1·01–1·03	<0·001
Sensory perception	1·76	1·23–2·50	0·002
Activity	0·59	0·43–0·81	0·001
Mobility	0·75	0·51–1·10	0·144
Nutrition	0·95	0·74–1·32	0·990
Moisture	0·74	0·54–1·01	0·061
Shear and friction	0·54	0·36–0·81	0·003

*Patients with community-acquired pressure ulcers ($n = 39$) are excluded.

the quality of care provided, as well as what quality improvement strategies are most effective in the hospital organisation. The regression analysis shows that older age, more days of hospitalisation, less activity, problems with shear and friction and reduced sensory perception contributed significantly to HAPU, which confirms the results of Wann Hansson *et al*. (11). Most ulcers (78·9%) were partial thickness (categories 1 and 2) but more than one in five (21·1%) were full thickness (categories 3 and 4). Full-thickness injuries are a very serious issue as they may require months to years to heal (22).

There is much room for improvement in nursing care in that 60% of patients did not have pressure ulcer risk assessment performed at hospital admission nor did they have documented nursing assessment of their skin. Failure to perform and record a complete nursing history and patient status undermines the ability of the nurse to develop a meaningful individualised care plan for the patient. Pressure ulcer prevention care planning was documented in only about 20% of patients. Lack of skin assessment at admission also threatens the accuracy of identifying the actual number of HAPU. Risk assessment and skin assessment are fundamental to target pressure ulcer prevention strategies and monitor their success. Continual reassessment is needed to keep pace with changes in the patient's condition (7). On the other hand, data from a systematic review indicate that performance of risk assessment, regardless of the scale used, does not decrease the incidence of pressure ulcers (20). This is not surprising as one would not expect assessment *alone* to prevent anything. Risk assessment is, however, important in that it does allow those who need the care to receive it and prevent waste from unnecessary use of preventive measures. Yet there are limited systematic evaluations of the relationship between preventive interventions and pressure ulcer development (23). Of the available scales, the Braden scale has the best balance between sensitivity and specificity and is a good pressure ulcer risk predictor (odds ratio 4·08) (20).

Admission pressure ulcer risk assessment and skin assessment were more often performed in those who developed ulcers. This suggests that the nurses were not routinely evaluating patients, but rather were using clinical judgement to determine who to assess for pressure ulcer risk and skin disruption. Clinical judgement has moderate sensitivity and specificity but has not been studied extensively and is not a consistent predictor of pressure ulcer development (20). International guidelines for pressure ulcer prevention suggest a structured holistic approach through the use of a risk assessment scale in combination with a comprehensive skin assessment and clinical judgement, allowing patient experience and specialty-specific factors to be considered (7).

Specialised mattresses were used more often in those who developed HAPU, but our methodology did not allow us to determine whether they were used prospectively to prevent HAPU or if their use was triggered by the development of a pressure ulcer. Also, the specialised mattresses were used more often than risk assessment was performed, suggesting some other criterion than systematic risk assessment had been used to facilitate the decision to use the beds.

Furthermore, turning schedules, heel cushions and seat cushions were used more often in those with HAPU than in those without HAPU. But not all patients with an HAPU received these treatments. These data also suggest clinical judgement, rather than data-driven intervention being used. Limited evidence supports the use of a specific turning or repositioning schedule (24–26), yet off-loading pressure has been and remains the mainstay in prevention and treatment of pressure ulcers (7). A systematic review of pressure ulcer seating cushions

Table 5 Pressure ulcer prevention strategies by no hospital-acquired pressure ulcers (HAPU) versus HAPU

	No HAPU ($n = 1015$)	HAPU ($n = 138$)	Total* ($n = 1153$)	Statistical significance
	n (%)	*n* (%)	*n* (%)	*P* value
Nursing documentation				
Risk assessment within 24 hours after admission ($n = 1099$)†	377 (39·1)	65 (48·1)	442 (40·5)	0·045
Skin assessment within 24 hours after admission ($n = 1098$)†	388 (40·2)	64 (47·8)	452 (41·2)	0·098
Prevention protocol for patient at risk at time for survey ($n = 524$)	63 (14·9)	38 (37·3)	101 (19·3)	<0·001
Bedside observation				
Equipment				
Standard foam mattress	706 (69·8)	66 (47·8)	772 (67·1)	<0·001
Pressure reducing foam mattress	286 (28·3)	56 (40·6)	342 (29·7)	
Powered pressure reducing mattress	20 (2·0)	16 (11·6)	36 (3·1)	
Heel cushion	83 (8·2)	44 (31·9)	127 (11·0)	<0·001
Chair cushion	54 (5·3)	41 (29·7)	95 (8·2)	<0·001
Turning schedule in bed				
Not planned	928 (91·4)	114 (82·6)	1042 (90·4)	0·001
Every 2 hours	34 (3·3)	9 (6·5)	43 (3·7)	
Every 3 hours	43 (4·2)	9 (6·5)	52 (4·5)	
Every 4 hours	10 (1·0)	6 (4·3)	16 (1·4)	
Repositioning schedule in chair				
Not planned (occasionally)	964 (95·0)	127 (92·0)	1091 (94·6)	0·131
Every 2 hours	19 (1·9)	5 (3·6)	24 (2·1)	
Every 3 hours	22 (2·2)	6 (4·3)	28 (2·4)	
Every 4 hours	10 (1·0)	0 (0)	10 (0·9)	

*Patients with community-acquired pressure ulcers ($n = 39$) are excluded.
†Fifty-four patients had been in the hospital less than 24 hours.

for pressure ulcer prevention suggests that offloading using specific cushions is effective and indicated (24).

To summarise, it seems obvious that assessments of patients, as well as initiating and implementing prevention strategies, should be a mandatory task for the RN. In Sweden, these assessments are often delegated to the ANs. A recent study in the same County Councils as the this study showed that the prevalence of pressure ulcers (categories 2–4) was significantly lower in the County Council where more RNs were responsible for pressure ulcer prevention and clinical pressure ulcer guidelines were used to a higher extent (10). However, the same study indicated that hospital context should be improved to support evidence-based practice and the nurse managers need to take more responsibility to develop prerequisite for quality improvement. One approach could be to invest in Clinical Nurse Specialists with professional knowledge, as well as quality improvement knowledge, in order to accelerate pressure ulcer prevention. Pressure ulcers are recognised as a nurse-sensitive indicator of the quality of care, meaning that nurses can have an impact of the outcomes. Changes in practice that support reduced rate of HAPU require support from administration. Fiscal support needs to be provided for periodic studies of HAPU and prevalence as well as the resources needed for prevention, for example, advocating for admission pressure ulcer risk assessment as well as skin assessment and specialised mattresses. However, change cannot occur at the bedside without RNs who champion pressure ulcer prevention and take pride in establishing and maintaining lower rates of HAPU.

Methodological consideration

Pressure ulcer prevalence methodology is widely used in Europe and is similar to that used in pressure ulcer prevalence surveys across the globe. These data were based on the examination of the patient by two RNs,

which increase the reliability of the observations and strengthens the accuracy of the findings. The combination of the EPUAP and CALNOC methodologies provides a way to determine the number of patients who developed HAPU. Lack of admission documentation of skin assessment in many patients might (60%) have led to failure of the nurses to record community-acquired admission (present at the time of admission), leading to false-positive HAPU. Nonetheless, the definition of HAPU with documentation within 24 hours is generous and the hospital should be accountable for pressure ulcers that were not detected and documented within this time limit.

CONCLUSION

Swedish hospitals continue to have a high prevalence of pressure ulcers and nearly 80% of them are HAPU. Focusing pressure ulcer prevention on those who are older and have limited activity and sensory perception is not a new idea but is supported by data that indicate these are significant contributors of HAPU in these settings. Disappointingly, risk and skin assessments were not conducted in a sufficient proportion of patients nor were pressure ulcer prevention protocols implemented when needed. These study findings illuminate clear direction for future quality improvement in pressure ulcer prevention in Sweden.

CLINICAL IMPLICATIONS

More focused skin assessment and pressure ulcer risk assessment at admission as well as during hospitalisation are needed. If we are to move to evidence-based pressure ulcer prevention, nurses will need to use risk data and early skin changes (category 1 ulcers) as the basis for implementing prevention. A prevention protocol is expensive in terms of the cost of equipment and nurse time for turning and positioning patients and such a protocol needs to be used judiciously to support prevention of HAPU but not wasted on those who lack documented risk. As a significant number of HAPU are full thickness and may require months to years to heal, the costs are high to the individual patients in pain and suffering and to the system in fiscal costs. Nurses on different levels in the organisation need to be accountable for the outcome of nursing care.

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