KRISTIANSTAD UNIVERSITY

Klinisk Patientnära Forskning 11

Pressure Ulcers – Prevalence and prevention at Akureyri hospital, Iceland, 2005 and 2007

Christina Lindholm, Professor Clinical Nursing
Ólina Torfadóttir, Director of Nursing
Carolina Axelsson, Coordinator
Kerstin Ulander, Senior Lecturer Clinical Nursing

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Klinisk Patientnära Forskning

The research team "Patient Focused Clinical Research" is located at Kristianstad University and performs research and development within the area of patient-safety.

Overall objective of the group:
To enhance patient security by focussing on prevalence of certain indicators such as pressure ulcers, malnutrition/eating difficulties, hospital hygiene and wound microbiology and ulcer-related pain.
To implement interventions and to measure the potential effects on prevalence and prevention of these interventions.

HÖGSKOLAN KRISTIANSTAD

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Christina Lindholm, Professor Clinical Nursing
Ólina Torfadóttir, Director for Nursing
Carolina Axelsson, Coordinator
Kerstin Ulander, Senior Lecturer Clinical Nursing

* Kristianstad University, Department of Health Sciences
SE-291 88 Kristianstad, Sweden
christina.lindholm@hkr.se
044 – 20 85 50

Contact research team:
carolina.axelsson@hkr.se
Kristianstad University, Department of Health Sciences
291 88 Kristianstad +46 (0) 44 - 20 85 70 – Sweden

Klinisk Patientnära Forskning

Summary

Objectives:The overall aim of the two pointprevalence studies in 2005 and 2007 regarding pressure ulcers were to investigate if standards leading to decreased prevalence of pressure ulcers, increased frequency of risk assessment and increased prevention activities were obtainable.

Method:
Prevalence, risk assessment and prevention were registered according to a well validated form developed by European Pressure Ulcer Advisory panel (EPUAP). All patients admitted to the hospital on a preset study day who gave their informed consent were investigated and the skin was inspected. Two research nurses per ward performed the study after careful instructions and training.
The intervention which took place between the years was education, provision of pressure ulcer cards and a 5-point programme.

Results:
The prevalence of pressure ulcers was 17% in 2005 and 20% in 2007. However, in 2005 88% and in 2007 96% of the pressure ulcers were Grade 1.Grade 2 pressure ulcers were 12% in 2005 and 4% in 2007. The majority of the pressure ulcers were in 2007 located to the feet, particularly toes. Sacral pressure ulcers decreased from 18-6%. The routine use of Modified Norton Scale showed a significant increase from 0% 2005 to 46% in 2007 (p=.000). The prevention activities in chair/wheelchair decreased from 34% to 5% (p=.023), whilst turning/moving scheme increased from 2% to 5% (p=.003)

Conclusion: The slight increase of prevalence between 2005 and 2007 was outruled by the increase in number of Grade 1 pressure damage. No grade 3 or 4 pressure ulcers were recorded neither in 2005 nor in 2007. Most pressure ulcers in 2007 were located to feet, particularly to the toes. A remarkable decrease of sacral pressure ulcers was noted. Risk assessment performance was significantly improved. Prevention in chair/wheelchair might be improved.
The intervention seems to have had effects on most parameters studied.

Key words
Improvement, intervention, Pressure ulcers, prevalence, prevention, risk assessment

Content

Acknowledgement

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Christina Lindholm
Professor

Kerstin Ulander
Senior Clinical Lecturer

Pressure Ulcers – Prevalence and prevention in Akureyri hospital 2005 and 2007

Pressure ulcer is a complication to illness, hospital care and treatment and is believed to increase during the following years because of the "demographic winter" and described as a "ticking bomb". Patients in somatic care, geriatric care and nursing homes are exposed to the risk. By the measurement of prevalence, risk scores and prevention, by implementing interventions and by re-measuring potential effects of these interventions, the numbers of particularly pressure ulcers of more severe grades are likely to decrease.

Background

In a recently published Swedish prevalence study performed in one university hospital, one region hospital and one nursing home, the prevalence of pressure ulcers where 23,9 %, 13% respectively 20% (1). Pressure ulcers are found to be more common amongst elderly (2), but are also present to a large extent amongst for example spinal injured patients (3) and in connection to surgery (4).

Pressure ulcers are costly and have been described as the third highest cost for healthcare in Holland (5). In another study from Holland, the estimated costs for patients with pressure ulcers were at least 1% of the budget for health services (6).

For the patient, the existence of a pressure ulcer is a serious hazard to the health. In a follow up study from Uppsala, 35% of all patients with pressure ulcers were dead three months after the primary study (7). Infections, sepsis, pain (8) and decreased quality of life have been reported to complicate the pressure ulcer diagnosis.

The frequency of pressure ulcers can be measured either as the prevalence (amount of pressure ulcers at a given time) or as the incidence (amount of pressure ulcers developed during a given time). The prevalence of pressure ulcers gives an instant frequency that does not answer any questions of when or how the pressure ulcer developed. The study of prevalence can be used to plan resources for health care and to measure the effects of interventions. These studies can be carried out with a minimum of costs. The European Pressure Ulcer Advisory Panel (EPUAP) have developed and tested in larger studies, a simple questionnaire for the registration of prevalence, risk assessment of patients and what prevention is in use (attachment 1). This questionnaire can be used in conjunction with a pressure ulcer card (Lindholm) (attachments 2a and 2b), and can contribute to a standardized registration and classification of pressure ulcers. On the backside of this card, the modified Norton scale is shown.

Studies where the effects of interventions and education have been compared have shown different results. In a Canadian study during three years, an education programme has shown to be effective in reducing the incidence of pressure ulcers (10). The feedback of the results from repeated point prevalence studies have also showed to significantly decrease the incidence of pressure ulcers (11). In a study (12), repeated education led to a decrease in the incidence of pressure ulcers with 10%-20%. In one paper, the effects of different strategies to reduce the pressure ulcers are questioned and the author claims that no intervention strategy has to this point proven to lead to reproducible reduction of the incidence of pressure ulcers (13).

Pressure ulcers is regarding to European standards categorized into four grades (European Pressure Ulcer Advisory Panel):

Grade 1: Non-blanchable erythema of intact skin. Discoloration of the skin, warmth, oedema, induration or hardness may also be used as indicators, particularly on individuals with darker skin.

Grade 2: Partial thickness skin loss involving epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion or blister.

Grade 3: Full thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through underlying fascia.

Grade 4: Extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures with or without full thickness skin loss.

(European Pressure Ulcer Advisory Pane, EPUAP)

Rationale for the study

Pressure ulcers is an indicator of quality of care. Since data regarding prevalence, grades and localization of pressure ulcers as well as frequency of preventive actions was missing at Fjordungssjukrahusid, Akureyri, Iceland, the decision was taken by the Management to perform a prevalence study. The intention was also to give feedback of the results to the wards, to discuss suggested prevention actions, to train the staff in pressure ulcer development mechanisms and classification of pressure ulcers and to implement a 5-point program. The study was repeated after one and a half year.

Aim

To study differences in prevalence, localization, grades of pressure ulcers as well as patient-related risk factors and preventive actions available for patients with pressure ulcers or at risk for developing such ulcers.

Questions

* What is the prevalence of pressure ulcers?
* Into which grades are these pressure ulcers classified?
* Is the risk of developing pressure ulcers measured with the Norton-scale and to what extent?
* Is the modified Norton scale recorded in the patient records?
* What proportion of the patients have Norton scores $\leq$20 (high risk of developing pressure ulcers?
* Is there a correlation between low Norton score $\leq$20 and pressure ulcers?
* How frequent is the preventions for patients at risk of developing pressure ulcers respectively those with established pressure ulcers?
    A. In bed
    B. In chair/wheelchair
* What are the locations of the pressure ulcers?
* Are there any changes in prevalence, risk assessment, risk scores and preventive activities in between the two years studied?

Methods

Prior to the study, information was given to the Management and all departments of Fjordungssjukrahusid (Ólína Torfadóttir).

Two responsible nurses/ward were allocated to perform the data collection during one pre-set day each year. These nurses were carefully instructed, and forms were test-filled in and questions answered by representatives from Kristianstad University and by the director of Nursing in Fjordungssjukrahusid (Ólína Torfadóttir).

A patient information was developed and given to patients well in time for the actual study. If the patients gave their informed consent, they were included in the study.

All of the in- patients admitted to the wards on the 19th of October 2005 and the 20th of April 2007, between 07.00 and 21.00 at the Fjordungssjukrahusid were assessed for risk of developing pressure ulcers according to the Modified Norton scale. The total score was recorded.

The skin of each patient was inspected according to a scheme, illustrated by front and back picture of a human.

Preventive actions in bed and chair/wheelchair were recorded on the form.

During the day of the study, the researchers were available for solving potential problems. The questionnaires were collected and distributed to the research coordinator at the University of Kristianstad for data-analysis.

Data and statistical analysis

The data was recorded and analyzed by Carolina Axelsson, Kristianstad University. The data entry and analysis where conducted using a Statistical Product and Service Solutions Software for Windows version 15.0 (SPSS, Chicago, IL).

The prevalence was calculated as percentage of patients with pressure ulcers of the total number of patients admitted to the hospital on the same wards participating both years on the days of the studies.

Results

Year 1 (2005) a total of 119 patients were included, year 2 (2007) a total of 118 patients. When correcting for participation both years, the number of patients were reduced year one to a total of 106 patients. One ward did not participate in the study 2007, and the results are excluded in the comparison study. Out of these patients, 107 (year 1) respectively 110 (year 2) patients participated in the study, which gives an external loss of 13% (year 1) respectively 7% (year 2).

I. Comparing year 1 and 2

This descriptive statistics shows the wards/units that participated in the study both years (2005 and 2007).

II. Prevalence, Norton scale and prevention

Number of patients on every ward and the participation in the study is shown in table 1a. Gender and age is shown in table 1b. Table 2 shows the prevalence of pressure ulcers.

Table 1. Amount of patients year 1 (N= 106) and year 2 (N=118)

Year of study	Unit/Ward	Number of inpatients at the unit/ward that's participating in the study	Not participating	Total
2005	KO/HO (surgery & ortopead)	20	2	22
	L1 (medicine)	13		13
	L2 (medicine)	8		8
	Gg (intensive care)	1	3	4
	Endurhafingardeild (Rehabilitation younger)	12	3	15
	Oldrunarlakningadeil (Rehabilitation older)	19		19
	SEL (nursing home)	25		25
2005 Total		98	8	106
2007	KO/HO (surgery & ortopead)	21	2	23
	L1 (medicine)	23	1	24
	L2 (medicine)	7	1	8
	Gg (intensive care)	3		3
	Endurhafingardeild (Rehabilitation younger)	19	4	23
	Oldrunarlakningadeil (Rehabilitation older)	18		18
	SEL (nursing home)	19		19
2007 Total		110	8	118
Total 2005 + 2007		208	16	224

Table 2. Gender and age in the study

		Female				Female Total
Year of study	Unit	<=20 Years	21-64 Years	65-79 Years	>=80 Years	
2005	KO/HO *		5	2		7
(n=98)	L1		1	2	1	4
	L2		2	3	2	7
	Gg			1		1
	Endurhafingardeild		5	1		6
	Oldrunarlakningadeild			4	8	12
	SEL		1	2	11	14
2005 Female			14	15	22	51
2007	KO/HO		6	5	1	12
(n=110)	L1		3	9	4	16
	L2 *		1	1		2
	Gg		2			2
	Endurhafingardeild *		11	1		13
	Oldrunarlakningadeild **			5	5	10
	SEL	1	1	1	7	10
2007 Female		1	24	22	17	65
Total Female		1	38	37	39	116

		Male			Male Total
Year of study	Unit corrected	21-64 Years	65-79 Years	>=80 Years	
2005	KO/HO * ^^	4	5	2	11
(n=98)	L1 ^	3	2	3	8
	L2	1			1
	Endurhafingardeild	5	1		6
	Oldrunarlakningadeild		4	3	7
	SEL		4	7	11
2005 Male		13	16	15	44
2007	KO/HO	6	3		9
(n=110)	L1	5		2	7
	L2	3	1		5
	Gg	1			1
	Endurhafingardeild *	6			6
	Oldrunarlakningadeild ** ^^		3	3	6
	SEL		1	8	9
2007 Male		21	8	13	43
Total Male		34	24	28	87

* Internal loss, age, 1 patient
** Internal loss, age, 2 patients
^ Internal loss, gender, 1 patient
^^ Internal loss, gender, 2 patients

Table 3. Percentage of pressure ulcers at the different wards

	2005 (n=98)	2007 (n=110)
L1	23%	22%
L2	13%	14%
KO/HO	5%	5%
Gg	0%	0%
Endurhafingardeild	17%	16%
Oldrunarlakningadeild	26%	44%
SEL	16%	21%
Total	16%	20%

Differences year 1 and year 2

Analysis used χ^2 and the significance level was set to 5%.
The use of and documentation of a risk assessment tool (the modified Norton scale), increased significantly (p=.000) from 0% to 46% (51 patients).
The amount of patients with pressure preventions used in the chair/wheelchair decreased significantly (p=.023) from 34% to 5%, whilst turning/moving scheme used in the chair/wheelchair increased significantly (p=.003) from 2% to 5%.

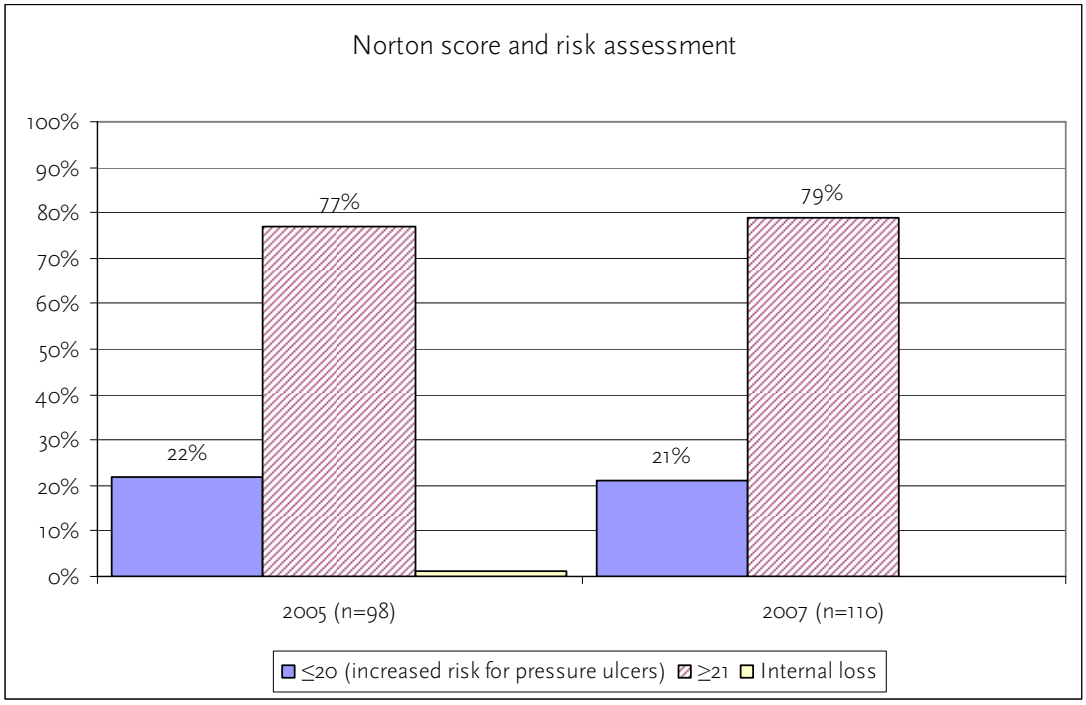


Figure 1. Percentage of patients grouped in Norton score ≤20 and >21 (Norton score ≤ 20 have an increased risk of developing pressure ulcers)

Table 4. Percentage of patients with pressure ulcers 2005 respectively 2007

Pressure Ulcers	2005	2007
Yes	17%	20%
No	82%	80%
Internal loss	1%	0%
n=	98	110

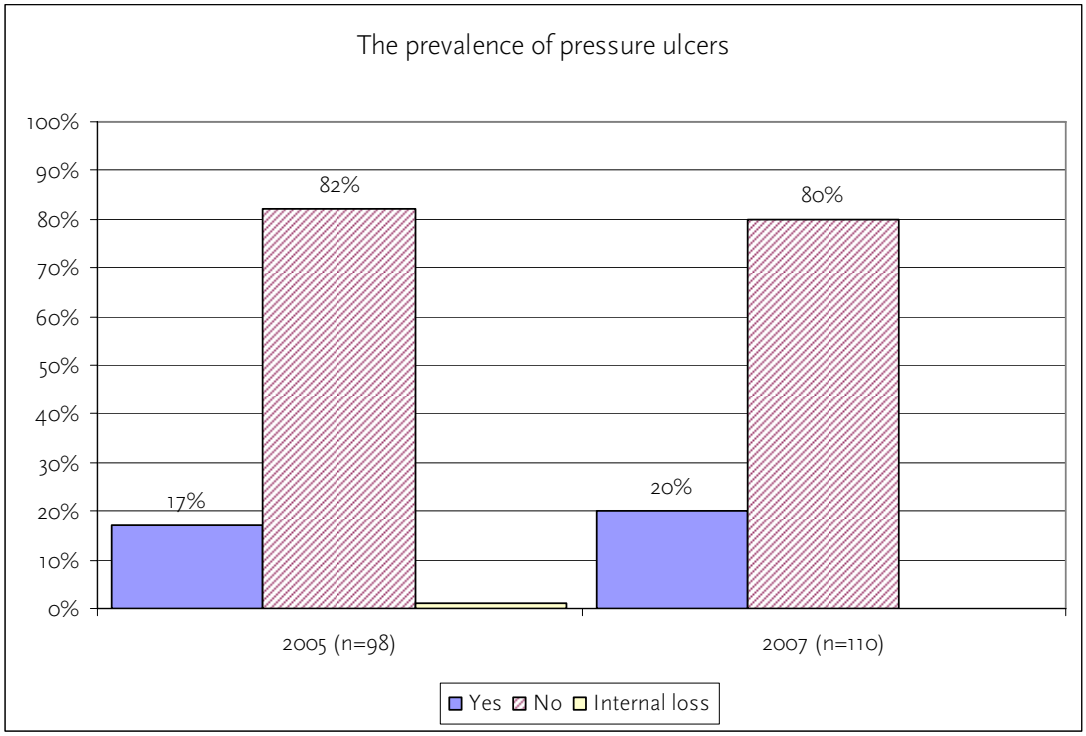


Figure 2. The prevalence of pressure ulcers

Table 5. Patients with pressure ulcers and number of pressure ulcers

	2005	2007
Number of pressure ulcers	34	48
Patients with pressure ulcers	16	22

Table 6. Percentage of grade 2-4-ulcers, comparison between 2005 and 2007

Pressure ulcer grade	2005 (n=18)	2007 (n=22)
Grade 1	88%	96%
Grade 2 (no grade 3-4)	12%	4%
Pressure ulcers (n=)	34	48

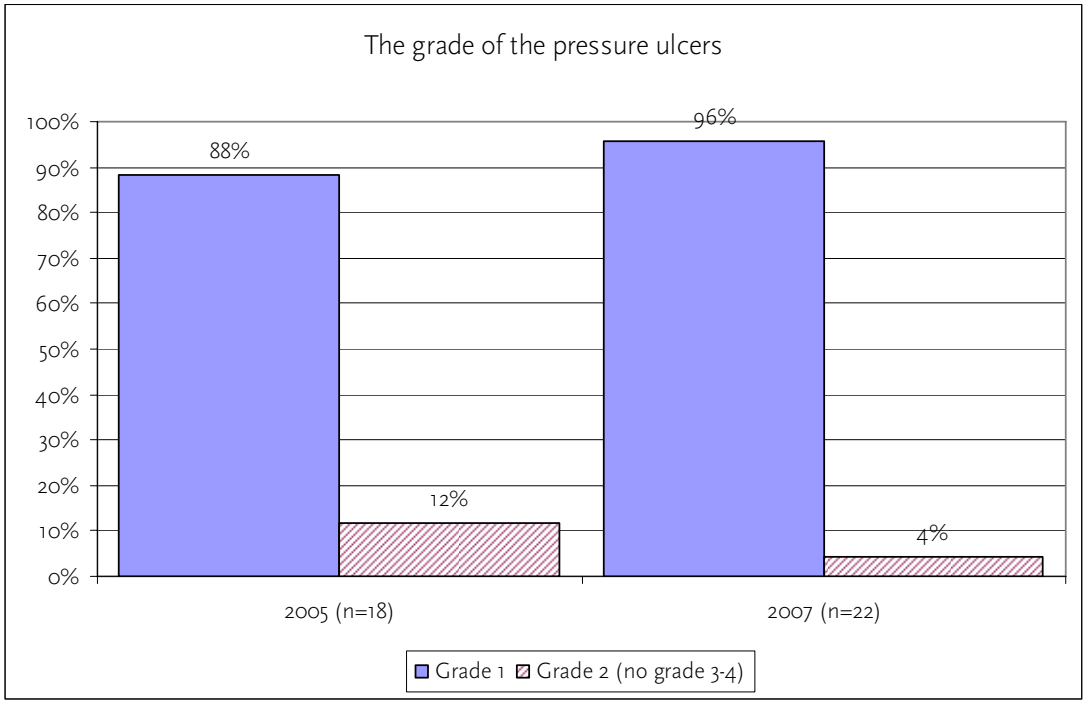


Figure 3. The grade of the pressure ulcers

Table 7. Percentage of patients that had prevention equipments in bed

	2005	2007	Total
Equipment in bed	76%	75%	75%
No equipment in bed	22%	24%	23%
Internal loss	2%	1%	1%
n=	98	110	208

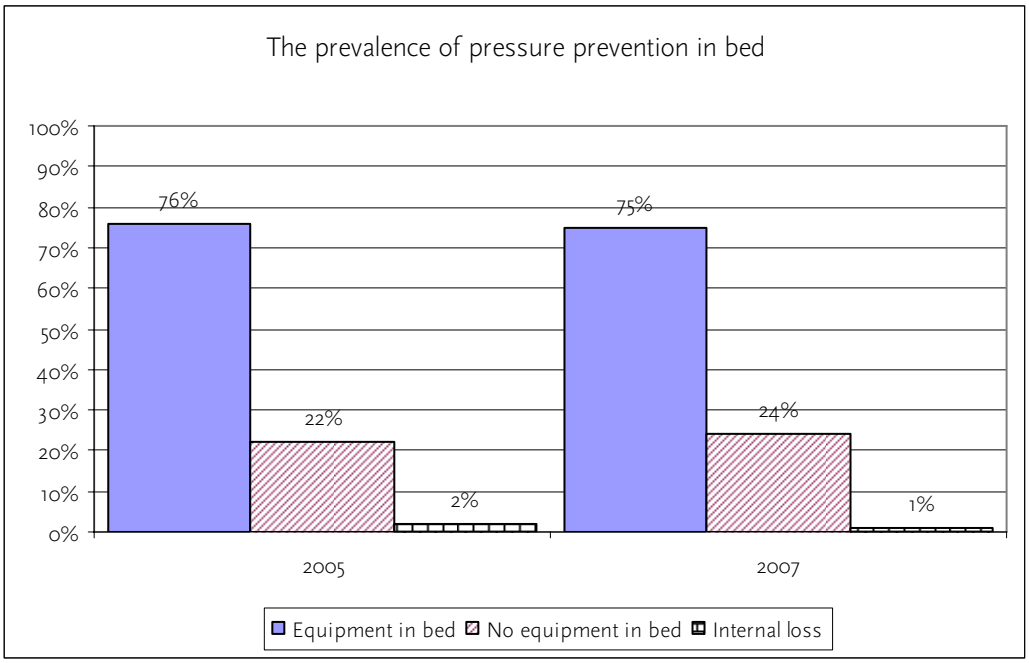


Figure 4. Percentage of patients with prevention equipment in bed year 2005 respectively 2007. All patients in the wards participating in the studies were included

Table 8. Pressure prevention in chair/wheelchair

	2005	2007
Chair/wheelchair	31%	5%
No equipment in chair/wheelchair	30%	17%
Internal loss	40%	77%
Total	107	110

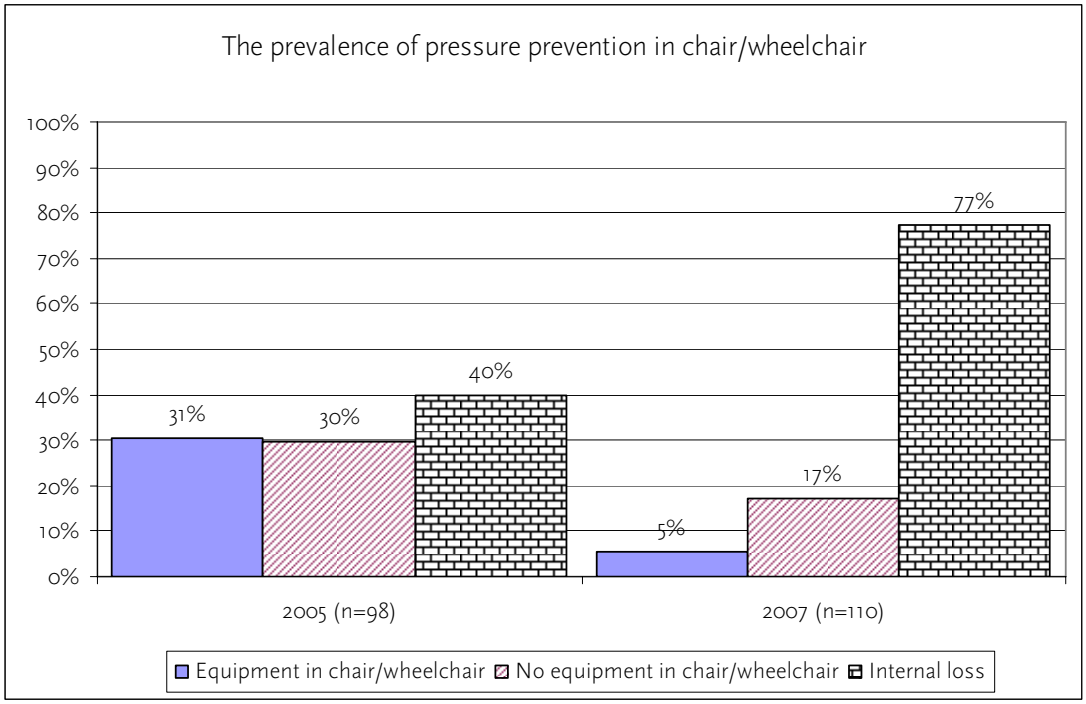


Figure 5. Pressure ulcer prevention in chair/wheelchair

Table 9. Turning/moving scheme used in chair/wheelchair

	2005	2007
Turning, moving scheme in chair/wheelchair	2%	5%
No turning, moving scheme in chair/wheelchair	55%	15%
Internal loss	43%	79%
Totalt	98	110

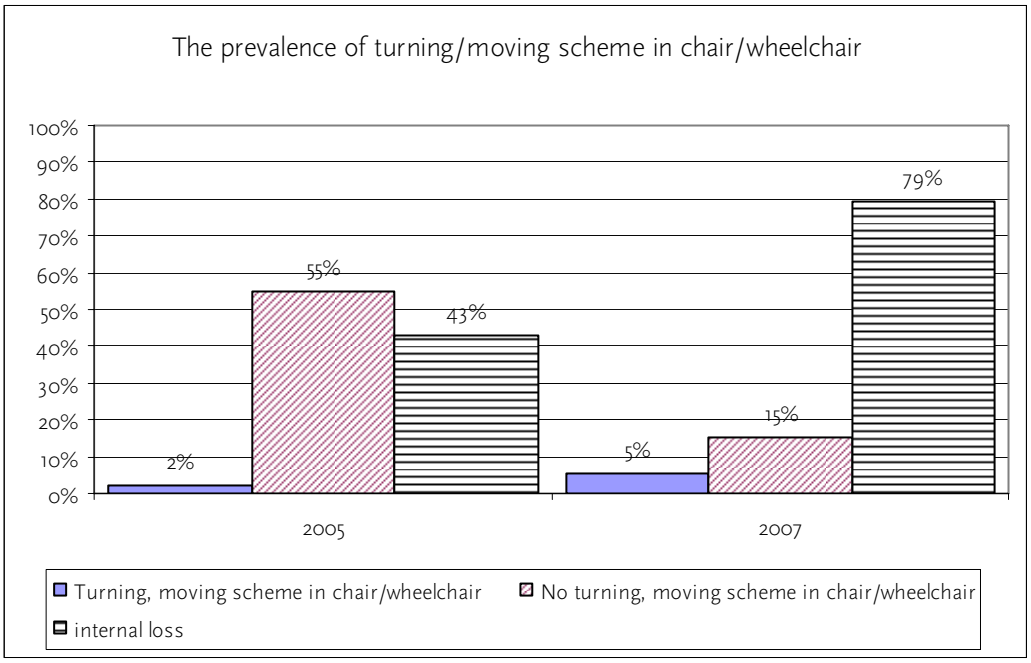


Figure 6. The prevalence of turning/moving scheme used in chair/wheelchair

Table 10. The location of the pressure ulcers

	2005	2007
Feet	41%	77%
Sacrum	18%	6%
Other location	41%	17%
n=	34	48

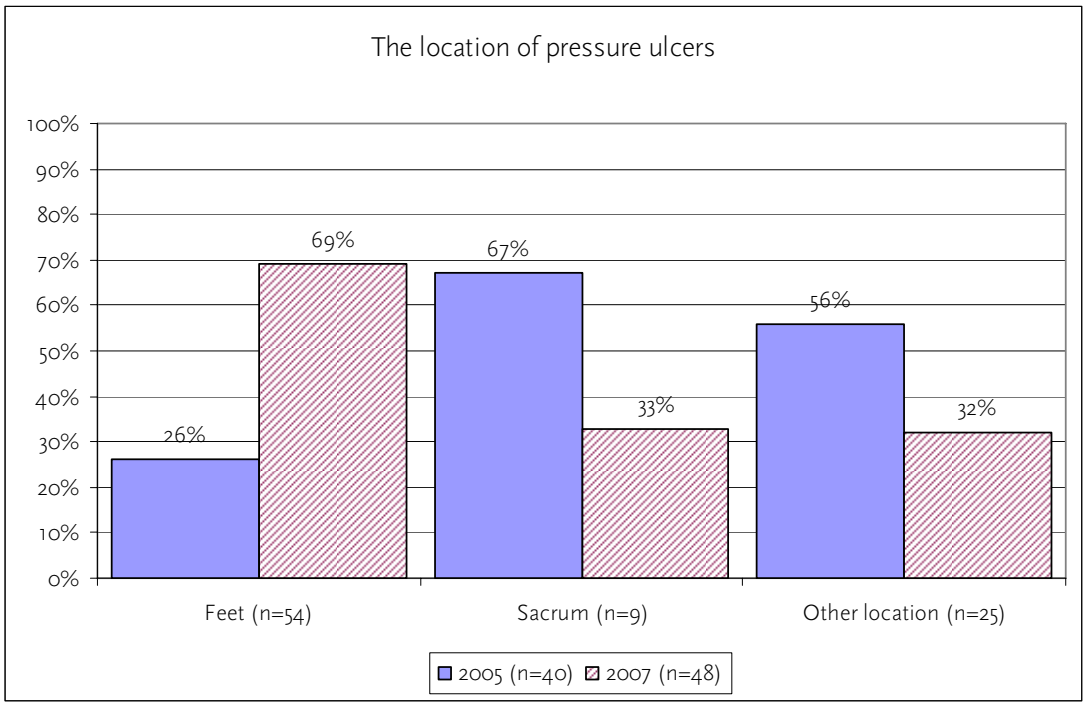


Figure 7. The location of the pressure ulcers

Table 11. Mean Modified Norton Sacle Score

Mean score Nortonscale	2005	2007
Tot	23,9	23,7
With Pressure Ulcers	22,2	21,1
Without Pressure Ulcers	24,3	24,4

Table 12. Prevention used and Norton ≤20

Patients with a Norton score ≤20	2005	2007
Any prevention	21	19
No prevention recorded	1	4
% with prevention and a Norton score ≤20	95%	83%

	2005	2007
Amount of Pressure Ulcers:	34	48

2007	2005			
		Other	10,8%	4,2%
0,0%	0,0%		0,0%	0,0%
0,0%	5,4%		2,7%	0,0%
8,3%	0,0%		2,7%	4,2%
14,6%	2,7%		2,7%	12,5%

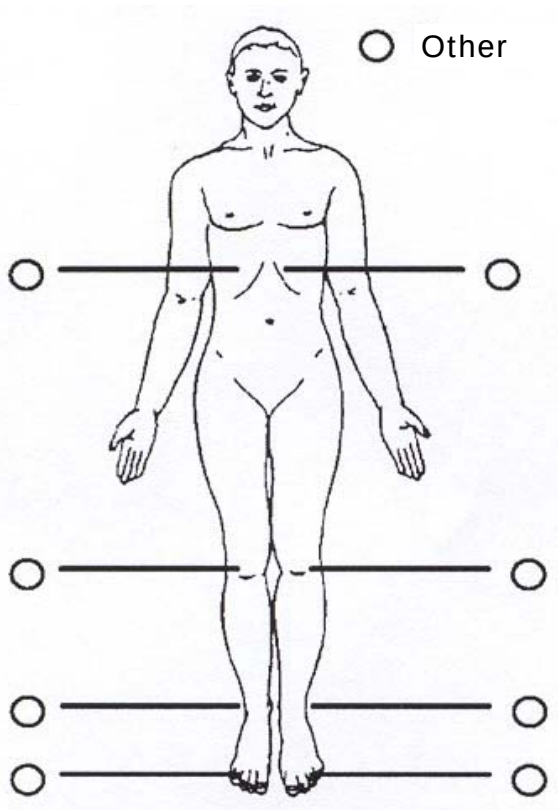
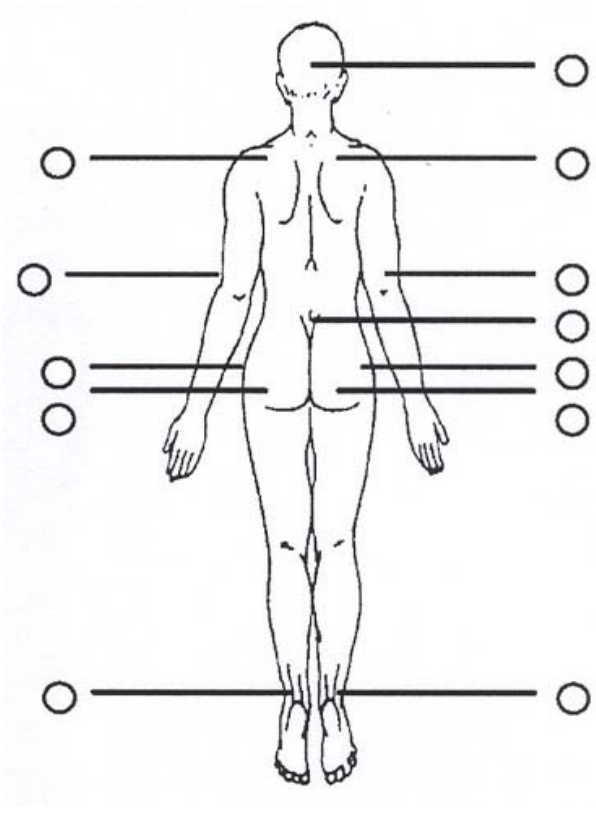


Figure 8. The location of the pressure ulcers in detail (front)

2007	2005
0,0%	2,7%
4,2%	2,7%
0,0%	0,0%
2,1%	5,4%
18,8%	18,9%



2005	2007
0%	0,0%
2,7%	0,0%
2,7%	2,1%
16,2%	6,3%
0,0%	0,0%
5,4%	4,2%
16,2%	18,8%

Figure 9. The location of the pressure ulcers in detail (back)

Discussions

Methodological discussion

The prevalence studies year 2005 respectively 2007 was carried out with no major difficulties. An extensive information was given prior to the studies, where the nurses responsible for the data collecting where present. The recording and the grading of the pressure ulcers had one (1%) internal loss 2005, none in 2007. The same internal loss where recorded for the Norton Score. The patient participation was 92% respectively 93% in 2005 and 2007.In most cases, the same researchers recorded the data both in 2005 and 2006.The questionnaires were in general very well filled in. In 2005, the study was also carried out in an acute and emergency-ward (13 patients). The year of 2007, this ward was not included in the data collection, and for this reason, the data has been excluded from all calculations and statistics in this report.

Result discussion

The prevalence of pressure ulcers in Fjordungssjukrahusid 17% (2005) respectively 20% (2007) can be compared with the prevalence from hospitals in Belgium, Great Britain and Sweden, who (measured with the same method) varied between 21.1% and 22.9% (15). In Italy and Portugal, the prevalence have been reported to be 8,3% respectively 12,5%. The location of the pressure ulcers varied significantly between the years studied, in so that the study in 2007 included more pressure ulcers on the feet, particularly on the toes. This might be explained by an even more careful scrutinizing of the foot in the year 2007. A remarkable decrease in sacral pressure ulcers between 2005 and 2007 could be noted. This is in most cases attributable to good nursing and high standard of pressure distributing mattresses.
Eighty-eight respectively ninety-six percent of all the pressure ulcers were grade 1 ulcers, and only a few (12% respectively 4%) with grade 2 were observed. No pressure ulcers of grade 3 and 4 were detected. These results could be compared with the study in Uppsala (1), were 66% of the ulcers were grade 1 ulcers. In the Skåne study (14), the percentage of grade 1-ulcers was mean=63%, grade 2=20%, grade 3=6% and grade 4=4%.In one study in the Azores, the prevalence of pressure ulcers was only 14 %, but 70% of these pressure ulcers were grade 3-4.
The majority of the pressure ulcers in the present study were localized to the feet. These findings are in accordance with findings in other studies (1, 14, 15).

The fact that the patients with pressure preventions used in the chair/wheelchair decreased significantly (p=.023) from 34% to 5% is surprising. Yet, the question is if the same number of patients were bed-bound both years. If a patient is in bed all day and not able to sit at all, the answer will be that no prevention in the chair/wheelchair is in use.

Surprisingly though, the patients with turning/moving scheme used in the chair/wheelchair increased significantly (p=.003) from 2% to 5%. The total prevention activities in chair/wheelchair might be focus of further activities.

In the hospitals in Skåne (14, 15), the mean Norton score for patients with pressure ulcers was 20,4% respectively 19,7%, whilst in Fjordungssjukrahusid the mean score was 22,2% respectively 21,1% which is high, and which indicates a high number of patients with relatively good health status. Even if the score was >20 for patients with pressure ulcers in the present study, 20 has proven to be a safe cut off point for high risk patients in other studies (1, 14-17).The pressure ulcers identified in Fjordungssjukrahusid were all superficial, and it is likely that in more severely ill patients (low Norton score) there would have been more severe pressure ulcers. The lack of correlation between low Norton score and presence of pressure ulcers might have been balanced by the fact that the mattress in Fjordungssjukrahusid were of extraordinary good quality and thickness compared to mattresses in the Skåne hospitals. These excellent mattresses might also contribute to the absence of grade 3 and 4-ulcers.

Another explanation of the absence of severe pressure ulcers might be the high outcome of prevention actions in the present study. In Fjordungssjukrahusid, 95% and 83% of the patients (n=21 and n=19) with Norton score ≤20 (n=22 and n=23) had some prevention (no significant changes).

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Attachment 1. Questionnaire for pressure ulcers prevalence, Swedish version

HÖGSKOLAN KRISTIANSTAD

Enkät avseende kvalitetsuppföljning av trycksår / Sjukhus

Skåne 9/2 2005

Bedömarens namn .....

Sjukhus ..... Verksamhetsområde .....

Avdelning..... Antal patienter totalt på avdelningen .....

Data patient

Ålder:
- ☐ ≤ 20 år
- ☐ 21-64 år
- ☐ 65-79 år
- ☐ ≥ 80 år

Kön:
- ☐ Kvinna
- ☐ Man

Dokumentation sista månaden

Längd ..... ☐ Uppgift saknas

Vikt..... ☐ Uppgift saknas

Riskbedömning enligt Modifierad Nortonskala, se trycksårskort * (fyll i på baksidan)

Patientens totala riskpoäng enligt Norton .....

Finns tidigare riskbedömning enligt Nortonskalan av patienten i journalen? ☐ Ja ☐ Nej

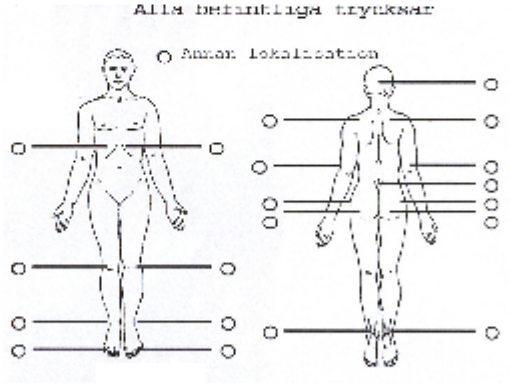
Patienten har trycksår
- ☐ Ja
- ☐ Nej

Hudbedömning och gradering av tryckskada. Använd trycksårskortet.

Grad 1 Kvarstående missfärgning, hel hud (bleknar ej vid tryck)
Grad 2 Blåsa eller ytlig epitelskada
Grad 3 Fullhudsskada utan sårkavitet
Grad 4 Fullhudsskada med sårkavitet (eventuellt med nekros)

Inspektera huden enligt bifogade mallar och fyll i graden i respektive ring.

Markera och gradera patientens tryckskada på figuren till höger
Sätt ett kryss i ringen på figuren till höger och skriv graden av tryckskadan, 1, 2, 3 eller 4 vid ringen



Preventiva åtgärder

Utrustning: I säng
- ☐ Ingen tryckavlastande/-utjämnande dyna
- ☐ Tryckavlastande dyna
- ☐ Eldriven tryckavlastande dyna
- ☐ Annat

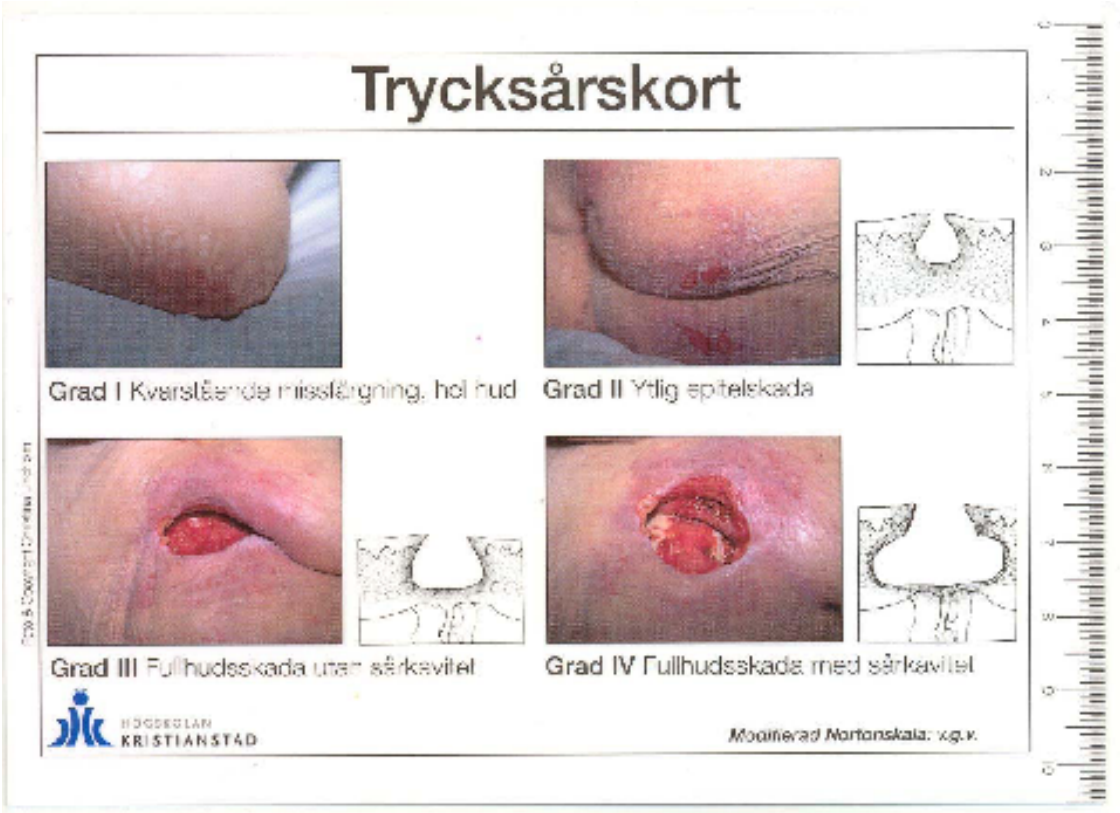
Lägesändring: I säng
- ☐ Inte planerat/oregelbundet
- ☐ Varannan timme
- ☐ Var tredje timme
- ☐ Var fjärde timme

Utrustning: I stol/rullstol
- ☐ Ingen tryckavlastande/-utjämnande dyna
- ☐ Tryckavlastande dyna
- ☐ Eldriven tryckavlastande dyna
- ☐ Annat

Lägesändring: I stol/rullstol:
- ☐ Inte planerat/oregelbundet
- ☐ Varannan timme
- ☐ Var tredje timme
- ☐ Var fjärde timme

* Trycksårskortet distribueras separat

Attachment 2. Pressure ulcer card, Christina Lindholm ®, Swedisch version



Modifierad Nortonskala

A. Psykisk status
- 4 Helt orienterad till tid och rum
- 3 Stundtals förvirrad
- 2 Svarar ej adekvat på tilltal
- 1 Okontaktbar

B. Fysisk aktivitet
- 4 Går med eller utan hjälpmedel
- 3 Går med hjälp av personal (ev rullstol för oberoende förflyttning)
- 2 Rullstolsburen (hela dagar)
- 1 Sängliggande

C. Rörelseförmåga
- 4 Full
- 3 Något begränsad (assistans vid lägesändring)
- 2 Mycket begränsad (behöver fullt hjälp vid lägesändring men kan bidraga)
- 1 Orörlig (kan ej alls bidraga vid lägesändring)

D. Födointag
- 4 Normal portion (eller fullständig parenteralt)
- 3 3/4 av normal portion (eller motsvarande parenteralt)
- 2 Halv portion (eller motsvarande parenteralt)
- 1 Mindre än halv portion (eller motsvarande parenteralt)

E. Vätskeintag
- 4 Mer än 1 000 ml/dag
- 3 700 – 1 000 ml/dag
- 2 500 – 700 ml/dag
- 1 Mindre än 500 ml/dag

F. Inkontinens
- 4 Nej
- 3 Tillfällig (vanligen kontinent men ej just nu)
- 2 Urin- eller tarminkontinent (KAD)
- 1 Urin- och tarminkontinent

G. Allmäntillstånd
- 4 Gott (afebril, normal andning, fräsch, nyrakad, normal puls, blodtr ej smärtpåverkad, normal hudfärg, utseende motsv åldern)
- 3 Ganska gott (afebril subfebril, normal andning, puls och blodtr ev lätt tachycardi, latent hypo-hypertoni, ingen el lätt smärtpåverkan, pat vaken, hud ev blekhet, lätta ödem)
- 2 Dåligt (ev feber, påverkad andning, tecken på cirk insuff tachycardi, ödem, hypo- eller hypertoni, smärtpåverkad, somnolent eller vaken men apatisk. Huden ev blek, el cyanotisk, varm fuktig el kall fuktig, e nedsatt turgor el ödem).
- 1 Mycket dålig: (ev feber, påverkad andning, utpräglade tecken på cirk insuff ev chock, stark smärtpåverkad, somnolent, stuporös, comatös. Huden blek el cyanotisk, varm och fuktig el kall och fuktig, el nedsatt turgor el ödem.

Total poäng.....

Ek AC, Unosson M, Bjurulf P.
The modified Norton scale and the nutritional intake.
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20 p eller lägre = ökad risk för trycksår.
Mycket aktiv trycksårsprofylax/skärpt totalomvårdnad!