

A comparison of pressure ulcer prevalence: concerted data collection in the Netherlands and Germany

Antje Tannen^{a,*}, Theo Dassen^a, Gerrie Bours^b, Ruud Halfens^b

^a Department of Nursing Science, Humboldt Universität Berlin, Campus Mitte, Schumannstraße 20/21, 10117, Germany

^b Department of Nursing Science, Universiteit Maastricht, Postbus 616, 6200 MD Maastricht, Netherlands

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Abstract

Objectives: Because of a lack of epidemiological data of pressure ulcer (PU) among care dependent patients yearly prevalence measurements are held in the Netherlands and in Germany with identical methods. A comparison shows remarkable differences in the PU prevalence so that further analysis is needed to enlighten the reasons.

Design: With a standardized questionnaire all patients were examined by trained nurses of the participating facilities.

Setting: In-patients in 42 Dutch and 10 German acute care Hospitals.

Participants: All patients who handed in their informed consent were included. In the Netherlands $n = 8734$, and in Germany $n = 2832$.

Main outcome measures: For calculating the PU prevalence the sample was divided inpatients at risk and not at risk for PU in accordance to the Bradenscale. Comparisons between the Netherlands and Germany refer to population details, quota of patients at risk for PU and PU prevalence. Finally the impact of eight controlled variables on the PU occurrence was calculated in a logistic regression.

Results: Both samples showed the same sex distribution, the same mean age and the same distribution among the medical specialties. The share of patients at risk for PU is higher in the Netherlands (55%) than in Germany (38%). The frequency of PU is higher in the Dutch population (22%) than in the German one (12%). Regarding only the risk-patients the differences reduce. The prevalence in the Netherlands was 33%, in Germany it was 28%. The highest impact on PU occurrence had the age and the length of stay in hospital. The Country ranges on third position.

Conclusions: The Dutch sample had a higher share of risk-patients and a higher PU frequency. A standardization appropriate to a risk assessment reduce the differences. For enlightening the remaining differences further research is needed.

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1. Introduction

Epidemiological data of pressure ulcers among care dependent patients are not unambiguous. Pressure ulcers according to the ICD-10 (diagnosis L89) are seldom documented in national health statistics (Leffmann et al., 2003). Some of the incidence and prevalence measurement is conducted within individual institutes, with different populations, different methods and

instruments (Bours et al., 2002b). Since 1998, prevalence has been annually measured in the Netherlands using one specific method and instrument in currently more than 150 health care institutions. Since 2001, the same instrument has been used to measure the prevalence of pressure ulcers in Germany. It is remarkable that the prevalence in hospitals of both countries seems to differ enormously. In 2002, Bours et al. found a prevalence rate of 33% in nursing homes and 22% in acute hospitals (Bours et al., 2002a) in the Netherlands, while in Germany Dassen et al. found a prevalence of 12% in nursing homes and 11% in acute hospitals (Dassen, 2002) using the same method and instrument and measured in the same week as in the Netherlands.

*Corresponding author.

E-mail addresses: antje.tannen@charite.de (A. Tannen), theo.dassen@charite.de (T. Dassen), g.bours@zw.unimaas.nl (G. Bours), r.halfens@zw.unimaas.nl (R. Halfens).

It is unclear whether these differences were results of different health condition of the patients, different supply structures in the health care facilities or other causes. Therefore, in this study further analysis will be made of the available data of the pressure ulcer prevalence in relation of the individual risk for pressure ulcer and other clinical features of the patients.

2. Background

Several differences between the Dutch and the German health care systems in general and concerning pressure ulcer in particular are already known. One difference between both health systems is the amount of hospital admissions and hospital beds per inhabitant in Germany which is twice as high as in the Netherlands (Zee, 2000). On average, patients stayed 9 days in the Dutch hospitals (CBS, 2000) and 10 days in the German hospitals (Arnold et al., 2003) in the year 2000. Another difference is the development and implementation of national guidelines. In the Netherlands, national guidelines for prevention and treatment of pressure ulcer were developed by the Dutch Institute for Health Care Improvement in 1985 and revised in 1992 and in 2002 (CBO, 2002). In Germany, several professional study groups are working on guidelines (Fachgesellschaften, 1999; Assenheimer and Schröder, 2000; Brüggemann, 2001; Deutsche Gesellschaft für physikalische Therapie, 2000). Among others a network group for quality development in nursing developed a national expert standard for the prevention of pressure ulcer in 2000 (Bienstein, 2000). In both countries, the degree of implementation and application of the guidelines in the health care facilities is almost unknown.

As mentioned above a comparison of prevalence figures is difficult and requires identical research methods. These conditions are fulfilled by the close cooperation between the Department of Nursing Science of the Universiteit Maastricht that started annual studies of pressure ulcer prevalence in 1998, and the Department of Nursing Science of the Humboldt-Universität zu Berlin which started in 2001 using the same instrument. The purpose of further analysis of gathered data is to describe the differences and similarities of the two samples of acute hospitals and to explore reasons for the differences of the pressure ulcer prevalences of the two samples.

3. Methods

The same instrument was used for the data collection in both countries in the same way and during the same week in 2001.

By using a standardized questionnaire all patients who handed in their informed consent to the study were examined by trained nurses of the respective facilities to find out whether they were suffering from pressure ulcer. Details of localization, duration, stage, place of origin and treatment were asked in cases of existing pressure ulcers. In addition, by applying the Braden scale an assessment of the pressure ulcer risk was carried out. This scale determines a value, which reveals the individual risk for pressure ulcer by means of six risk factors. The lower the Braden score the higher the risk for pressure ulcer. For this study a cut of point of 20 was chosen to determine whether a patient is at risk or not at risk (Halfens et al., 2000).

The Braden scale is intensively tested in various settings. The reliability and predictive validity are proved by several researchers (Bergquist et al., 2001; Bergstrom et al., 1998; Halfens et al., 2000; Lewicki et al., 2000; Pang and Wong, 1998; VandenBosch et al., 1996).

Furthermore, patient relevant details, like age, sex, medical diagnosis, operation (incl. duration of the operation), date of admission were asked for as well.

The data analysis allows the description of the share of the risk for pressure ulcer and prevalence of pressure ulcers within the population in hospitals and nursing homes. It also allows analysing trends in facilities having taken part repeatedly.

4. Sample

All health care institutes were invited by leaflets, by telephone and by Internet to participate voluntary in the measuring of pressure ulcer prevalence. In the Netherlands institutes were invited nation-wide whereas in Germany it was limited mainly to Berlin and surrounding areas.

5. Analyses

Data from all participating acute hospitals in both countries are used. The prevalence rates of each country were calculated by using the formula: all patients with pressure ulcers divided by patients at risk for pressure ulcer (Braden score ≤ 20) multiplied with 100.

6. Results

Population: The Dutch sample consisted of 42 hospitals with 8734 patients, the German sample consisted of 10 hospitals with 2832 patients. Both samples showed the same sex distribution (44–46% female) and the same mean age (63–66). The distribution

over the various medical disciplines was similar in both samples as well. Most of the examined patients were treated in internal medicine wards (30–31%) and surgery, including the orthopaedics (30–33%). Due to the similar diagnoses and age structure neurological and geriatric wards were combined. The neurological–geriatric wards were the third- largest groups (12–14%).

Table 1 shows the mean age of patients in the various medical disciplines. Significant differences were found with the neurological–geriatric patients. German male patients treated in neurological–geriatric wards were 6 years younger than the Dutch, while the German female patients were 4 years older. Age structure also differed with patients of internal and surgical wards.

Patients at risk for pressure ulcer: The mean Braden score of the Dutch sample (18.9) was significantly lower ($p < 0.005$) than it was in the German sample (19.9). Especially the neurological–geriatric patients and male patients on intensive care units showed a significantly higher risk for pressure ulcer development in the Dutch sample.

The mean Braden score in the age-groups was similar for both populations. For patients older than 60 years of age the mean Braden score was in the range of risk for pressure ulcer (≤ 20). With increasing age the Braden scores decreased in both countries.

The quota of patients with risk for pressure ulcer (Braden scale score ≤ 20) in both samples differed: Among the Dutch sample 55% of the patients had a pressure ulcer risk compared to the German group with 38% at risk (Table 2). The highest share of risk-patients was found in the intensive care units (NL: 86%, GER: 83%) and in neurological-geriatrics wards (NL: 67%, GER: 47%). Significant differences between Dutch and German sample groups were found in all medical disciplines except the ICU. Especially in the neurology–geriatrics (odds ratio: 2.3) the quotas varied.

Pressure ulcers: Regarding the frequency of patients with pressure ulcers (including stage one) in the sample the Dutch sample showed almost twice the frequency as the German one (odds ratio: 1.9). Great differences were found in surgery (odds ratio: 2.1) and intensive care units (odds ratio: 1.8) (Table 3).

Due to the difficulties to diagnosing pressure ulcer stage one (Halfens et al., 2001) the frequency of pressure ulcers excluding stage one were also compared (Table 3). Again the Dutch sample (11%) displayed pressure ulcer twice as often than the German group (6%). Surgery (odds ratio: 2.6) and the intensive care units (odds ratio: 1.7) showed particularly great differences.

For a more detailed comparison the two populations are divided into six groups with different Braden scores levels (Table 4). Significant differences regarding the

Table 1
Mean age in the medical disciplines (years (SD))

	Country				Differences (Ger = ...years)		Sign ($p < 0.005$)	
	Netherlands		Germany		Men	Women	Men	Women
	Men	Women	Men	Women				
Internal medicine	65 (16.3)	68 (17.3)	64 (16.1)	72 (14.8)	-1	+4	-	+
Surgery	63 (19.9)	65 (18.5)	59 (16.4)	66 (17.7)	-4	+1	+	-
Intensive care	64 (15.6)	65 (15.5)	65 (10.6)	68 (15.5)	+1	+3	-	-
Neurology/geriatrics	69 (15.7)	73 (16.5)	63 (18.0)	77 (16.2)	-6	+4	+	+
Others	67 (14.9)	61 (19.9)	56 (18.5)	57 (19.4)	-11	-4	+	+
Total	65 (16.3)	66 (18.3)	58 (20.0)	67 (19.6)	-7	+1	+	-

Table 2
Quota (%) of patients at risk (AR) for pressure ulcer across the medical disciplines

	Country		OR (in NL = ...)	Sign ($p < 0.005$)
	Netherlands (AR)	Germany (AR)		
Internal medicine	51	38	1.7	+
Surgery	59	44	1.8	+
Intensive care	86	83	1.2	-
Neurology/geriatrics	67	47	2.3	+
Others	41	17	3.4	+
Total	55% ($n = 4839$)	38% ($n = 1048$)	2.0	+

100% = AR + NAR (NAR = not at risk).

Table 3
Percentage of Patients with PU including (and excluding) stage 1° across the medical disciplines

	Country		OR (in NL = ...)	Sign ($p < 0.005$)
	Netherlands (PU yes)	Germany (PU yes)		
Internal medicine	20 (10)	13 (6)	1.6 (1.6)	+ (+)
Surgery	24 (12)	13 (5)	2.1 (2.6)	+ (+)
Intensive care	35 (23)	23 (15)	1.8 (1.7)	- (-)
Neurology/geriatrics	25 (13)	16 (10)	1.6 (1.4)	+ (-)
Others	15 (7)	6 (2)	3.0 (4.5)	+ (+)
Total incl.1°	22% ($n = 1892$)	12% ($n = 355$)	1.9	+
Total excl.1°	11% ($n = 955$)	6% ($n = 165$)	2.0	+

100% = PU yes + PU no.

Table 4
Percentage (%) of Patients with PU (including stage 1°) in different levels of Bradenscore

Bradenscore	Country		OR (in NL = ...)	Sign ($p < 0.005$)
	Netherlands (PU yes)	Germany (PU yes)		
6–8	65	48	2.0	-
9–11	60	42	2.1	+
12–14	47	38	1.4	-
15–17	34	30	1.2	-
18–20	22	16	1.5	+
21–23	7	4	2.0	+
Total	22% ($n = 1892$)	12% ($n = 355$)	1.9	+

100% = PU yes + PU no.

Table 5
Prevalence (%) of PU including (and excluding) stage 1° across the medical disciplines

	Country		OR (in NL = ...)	Sign ($p < 0.005$)
	Netherlands (PU yes)	Germany (PU yes)		
Internal medicine	33 (17)	30 (15)	1.2 (1.2)	- (-)
Surgery	35 (19)	25 (12)	1.4 (1.7)	- (-)
Intensive care	41 (26)	28 (17)	1.8 (1.7)	- (-)
Neurology/geriatrics	32 (17)	31 (18)	1.1 (0.9)	- (-)
Others	29 (14)	24 (8)	1.3 (1.8)	- (-)
Total incl.1°	33% ($n = 1614$)	28% ($n = 290$)	1.3	+
Total excl.1°	18% ($n = 860$)	14% ($n = 147$)	1.3	+

100% = PU yes + PU no.

frequency of patients with pressure ulcer were found in the groups with Braden scores ≥ 18 and in the group with Braden scores 9–11. In all Braden score groups the frequency of pressure ulcers was higher in the Dutch sample than it was in the German one.

Prevalence: In accordance with the above definition of prevalence (NPUAP, 2002) similar prevalences were calculated in the Dutch (33%) and the German sample (28%). The Dutch study showed the highest prevalences in the intensive care units (41%), in surgery wards (35%)

and in the internal medicine wards (33%). In the German study, the highest rates were found in the neurological–geriatric wards (31%) and in internal medicine (30%).

Excluding pressure ulcers stage one, a prevalence of 18% was calculated in the Netherlands and 14% in Germany (Table 5). All specialities revealed a higher prevalence in the Dutch sample.

The prevalence grew with increasing age and almost all age groups showed higher figures for the Dutch

Table 6
Sex (%) of patients with PU (pressure ulcers in the risk-group, including stage 1°)

	Country		OR (woman = ...)		Sign ($p < 0.005$)	
	Netherlands PU (yes)	Germany PU (yes)	NL PU (yes)	GER PU (yes)	NL PU (yes)	GER PU (yes)
Man	21	11	1.1	1.4	—	—
Woman	23	14				

100% = PU yes + PU no.

Table 7
Impact (β -coefficient) on Pressure ulcer occurrence among patients at risk for pressure ulcer

Ranking	Factor	Regression coefficient β	Exp B (95% CI)	Significance
1	Age	0.899	2.5 (2.2–2.8)	0.001
2	Stay on intensive-care-unit	0.584	1.8 (1.4–2.3)	0.001
3	Country (NL or GER)	0.295	1.3 (1.2–1.6)	0.001
4	Stay on surgical ward	0.278	1.3 (1.1–1.6)	0.003
5	Stay on medical ward	0.164	1.2 (1.0–1.4)	0.090
6	Stay on neurological–geriatric ward	0.077	1.1 (0.9–1.3)	0.481
7	Sex	0.017	1.0 (0.9–1.1)	0.774

sample. Only among German patients between 50 and 59 years of age the prevalence was higher than that of the Dutch comparative group.

When describing the patients with pressure ulcer it can be noted that more women than men suffer from pressure ulcer. 23% of all Dutch female patients suffered from pressure ulcer and 14% of all German female patients showed pressure ulcers (Table 6).

The mean age of patients with pressure ulcers was 73 years (SD: 14.1) in the Netherlands and 74 years (SD: 14.7) in Germany.

Finally, the influence of seven controlled variables on pressure ulcer occurrence was calculated by a logistic regression. The logistic function ranges between 0 and 1 and describes the probability or individual risk getting a disease (Kleinbaum, 1994), respectively pressure ulcer. The extent to which age, sex, and kind of ward are associated with pressure ulcer is evaluated (Table 7). Because of the high standard deviation at the mean age the median was calculated (age: median = 69 years) and dichotomous variables (higher or lower the median) were built. Due to the well-known impact of the Braden score the latter was not included in the logistic regression, only the risk-patients were based.

Age (0.866) had the highest impact on the pressure ulcer occurrence. The country had still an impact on the pressure ulcer occurrence (0.351). Among the category “kind of ward” the stay on intensive care unit associated well with the pressure ulcer occurrence (0.584). The impact of gender is low (0.017).

7. Discussion

Because of identical methods the gathered data of the two studies were comparable. The two samples were similar regarding the mean age, the sex distribution and the distribution over the various medical disciplines. However the samples are neither representative for the Netherlands nor for Germany, because the participation in the study was voluntary and did not comply with random selection or quotas. Furthermore the German facilities were summarized to represent Germany. But the country is large and heterogeneous so it might be informative to compare the federal states of Germany instead of the whole country.

Differences were found concerning sample size and the share of patients at risk for pressure ulcer which was higher in the Dutch sample than in German one. High share of risk patients were especially found in the Dutch neurological–geriatric wards. Furthermore, the frequency of pressure ulcer is higher in the Dutch population than in the German population, the same applies to the frequency of pressure ulcer stage 2 or higher. Regarding the risk-patients only the differences between the two countries decrease. The risk for and the prevalence of pressure ulcers increased with increasing age. In both samples the majority of pressure ulcer patients are female, the mean age of pressure ulcer patients is similar.

When comparing all influence factors on the pressure ulcer occurrence, age had the highest impact, followed by the stay on intensive care unit.

Records for Germany show twice as many hospital admissions and twice as many hospital beds per inhabitant as for the Netherlands. Therefore, probability for a patient to be admitted and treated as an in-patient, even with “minor diseases”, is higher in Germany. Hence, the constitution of the Dutch hospital patients may be more serious. This is also reflected by the higher mean Braden score. For an interpretation of these findings comparable basic data about the health status or the general care dependency of the patients would be helpful. The meaningfulness of the study could be improved also by comparing the facilities regarding the support structure, number and knowledge of the staff or other quality features.

For a comparison of prevalence rates the division into risk groups is important. The differences between the two study populations concerning pressure ulcer occurrence only decrease with regard the risk patients. Nevertheless, pressure ulcer prevalence is still higher in the Dutch sample than it is in German sample and further research is needed to detect the reasons.

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