

Marta Muszalik<sup>1</sup>, Kornelia Kędziora-Kornatowska<sup>1</sup>, Halina Zielińska-Więczkowska<sup>2</sup>,  
Tomasz Kornatowski<sup>3</sup>, Ate Dijkstra<sup>4</sup>

<sup>1</sup>Department of Geriatric Medicine, Nicolaus Copernicus University, Collegium Medicum in Bydgoszcz, Poland

<sup>2</sup>Department of Pedagogy and Nursing Didactics, Nicolaus Copernicus University, Collegium Medicum in Bydgoszcz, Poland

<sup>3</sup>Department of Pharmacology and Therapy, Nicolaus Copernicus University, Collegium Medicum in Bydgoszcz, Poland

<sup>4</sup>Institute of Care and Welfare, NHL University of Applied Sciences in Leeuwarden, The Netherlands

# The global risk of pressure ulcers among elderly patients: initial diagnosis

## Corresponding author:

Marta Muszalik,  
Department of Geriatrics  
Nicolaus Copernicus University,  
Collegium Medicum  
Skłodowskiej-Curie Street No 9,  
85-094 Bydgoszcz, Poland  
E-mail: muszalik@cm.umk.pl

Folia Medica Copernicana 2013;  
Volume 1, Number 1, 31–36  
Copyright © 2013 Via Medica  
ISSN 2300–5432

## ABSTRACT

**Background.** Prevention is the most effective method of reducing the risk of pressure ulcers. Prophylaxis involves several actions and procedures that can decrease the risk and aid implementation of rapid treatment if pressure ulcers develop.

**Aim.** To evaluate the risk of pressure ulcers in elderly patients.

**Material and methods.** The study group involved patients hospitalized at the Department and Clinic of Geriatric Medicine in Bydgoszcz: 82 females and 34 males (116 in total). The study used a diagnostic poll method with the application of an ADL (Activities of Daily Living) questionnaire to assess daily efficiency on the basis of the Katz Scale, CDS (Care Dependency Scale) questionnaire to measure the level of care dependency and human needs, and a risk scale for pressure ulcer development devised by D. Norton.

**Results.** The risk of pressure ulcers was observed in approximately one third of the study subjects (30.2%). Almost a half of the patient group had multiple morbidities. Problems concerning the care of patients with a high risk of pressure ulcers were usually connected with a lack of independence in changing body position, movement, dressing, and sphincter dysfunction.

**Conclusion.** There is a correlation between the level of functional capability and the risk of pressure ulcers. The accumulation of problems related to the lack of independence in fulfilling the patients' own needs significantly increased the risk of pressure ulcers in the study group.

**Key words:** functional capability, elderly patients, chronic illness, pressure ulcer

Folia Medica Copernicana 2013; 1 (1): 31–36

## Introduction

Human ageing involves numerous changes, while the process of structural and functional alterations of the cells, tissues and organs reduces the ability to maintain homeostasis. The consequences of ageing include appetite disorders, weight loss, difficulty in movement, falls, impaired motor skills, sphincter dysfunction, pain, and sleep disorders. These factors contribute to an increased risk of pressure ulcers, which means that elderly patients are the most vulnerable to the development of pressure ulcers [1–3].

The risk of pressure ulcers should be assessed in all patients who are bedridden, are confined to a wheelchair, have disturbances to consciousness, have had surgical procedures lasting for more than two hours, or have health levels that have deteriorated. Prevention is the most effective method of reducing the risk of pressure ulcers, and it is a crucial issue for nurses

taking care of such patients. Prophylaxis involves several actions and procedures that can decrease the risk and aid implementation of rapid treatment leading to recovery if pressure ulcers develop [4, 5].

Pressure ulcers mainly appear in cachectic patients having a poor general condition with considerably impaired immunity. From the pathophysiological point of view, a pressure ulcer is a local necrosis of the tissue caused by the blockage of circulation due to direct pressure on the blood vessels. Pressure on the arterial capillaries exceeding 32 mm Hg and pressure on the venous capillaries exceeding 16 mm Hg result in the closure of the capillary lumen and, consequently, in local ischaemia. Pressure that lasts longer than 2–3 hours leads to irreversible changes and tissue necrosis. Skin condition plays a very important role in the development of pressure ulcers. Pressure ulcers often form an extra complication for various conditions that require the prolonged immobilisation of a patient [4].

Four main factors have a cardinal influence on the development of pressure ulcers: pressure, rubbing, stretching and maceration [6].

Pressure ulcers may develop in different areas of the body. The problem appears in those sites where bony rims are close to the skin integuments. Prolonged contact of the skin or mucous membranes with hard materials (e.g. plaster casts, catheters, or probes) may lead to the development of pressure ulcers. In approximately 75% of cases, pressure ulcers appear in the area of the sacral bone, trochanter of the femur, heel and ankle, and 25% in the area of the shoulder blade, knee, elbow, occiput and auricle [4, 7–8]. There are about 30 different scales used to assess factors important for the development of pressure ulcers, and there are several classifications of the level of pressure ulcer severity based on ulcer appearance, depth or size [5].

One of the scales used to assess the risk of pressure ulcers was developed in 1962 by Doreen Norton. In this commonly used scale, a score below 14 points indicates a risk of pressure ulcer development [4].

The aim of this study was to evaluate the risk of pressure ulcers in elderly patients.

The following questions were formulated to achieve the objective of the study:

- What is the risk of pressure ulcers in patients?
- What care problems appear in patients with a high risk of pressure ulcers?
- Is there a correlation between the level of functional capability and the risk of pressure ulcers?
- What is the usefulness of care problem analysis in the study group for the assessment of pressure ulcer risk?

## Material and methods

The study was carried out in 2012 at the Department and Chair of Geriatric Medicine (Antoni Jurasz University Hospital in Bydgoszcz); permission to carry out the study was given by the *Bioethics Committee* of Ludwik Rydygier Collegium Medicum in Bydgoszcz at the *Nicolaus Copernicus University in Torun*.

Statistical analysis of community structure indicates that of 116 patients surveyed, 82 (70.7%) were women, and 34 (29.3%) men. The majority of patients were urban residents (71.6%), with primary education (26.7%), vocational (38.8%) and secondary education (29.3%), or higher education (5.2%). 84.5% described their material conditions as good, 9.5% as bad. Mean age in the surveyed group was 75.9 years. Widows and widowers constituted 50.9%, 3.5% were single, and the remainder of the group were married.

The study involved a short anamnesis concerning sociodemographic data, observation and a health assessment. Throughout the study, selected parameters of functional capability were evaluated by means of stan-

dardized research tools: ADL, a questionnaire to assess fulfilment of human needs (CDS), and the Norton Scale.

The research was carried out using a diagnostic poll method with application of ADL and CDS. In this study, we took advantage of the ADL questionnaire, a tool that allows us to determine physical capability, and is often used in geriatrics [1, 9].

### The ADL scale

The ADL scale assesses six daily living functions: bathing, getting (un)dressed, physiological needs, continence, eating and drinking, and mobility. The eventual score results are summarised as being in one of three categories: High independence: 4.5–6.0 points, where the patients are almost independent of nursing care (6 points) or only dependent to a limited extent on nursing care. Medium independence is 2.5–4.0 points, where the patients are partially dependent on nursing care. Low level of independence: 2 points and below indicates that the patients in this group are completely dependent on nursing care. The ADL scale consists of six items each of which has three criteria relating to the aspect of dependency being graded, as follows: 1 point: almost independent on nursing care; 0.5 point: partially dependent on nursing care, and 0 point: completely dependent on nursing care.

### The CDS questionnaire

The CDS measures 15 human needs, with each need having an item description and five dependency criteria. Patients or nurses are able to rate each item by selecting which criterion fits best for each human need. In practice, the CDS is intended to be used in the first stage of the assessment process as a case finding and needs assessment tool. The 15-item scale measures a person's care dependency with regard to eating and drinking, continence, body posture, mobility, day and night patterns, getting dressed and undressed, body temperature, hygiene, danger avoidance, communication, contact with others, sense of rules and values, daily activities, recreational activities, and learning abilities. Each item has a brief description, and every criterion is explained in the CDS instruction guide. CDS has a 5-point Likert scale running from completely dependent to completely independent. Accordingly, values of between 15 and 75 points can be obtained; the lower the value, the more the patient depends on others for his or her care [10]. The CDS items have proven to be related to what Henderson calls fundamental human needs that appear in every patient-nurse relationship, regardless of cultural background. CDS is the standardized tool and has been localised and validated in many countries [10–15].

Additionally, the health state of patients was evaluated using Norton's bedsores risk assessment scale.

#### The Norton scale

Norton's bed sores risk assessment scale is a standard used for all patients of the Chair and Clinic of Geriatrics. It includes the following items: physical state, state of awareness, ability to walk, level of independence while changing position in bed as well as constrictor functioning. A patient is evaluated on a 1–4 point scale in each category. The total number of points is therefore 20 and the lowest possible score is 5. A score of 5–14 points means a high risk of bed sores, whereas 15–20 points means a low risk.

#### Procedure and ethical considerations

Permission to use the CDS questionnaire was given by Professor Ate Dijkstra. The permission to do this research was given by the Bio-Ethical Committee at the university on condition that the patients were chosen randomly, that the patients gave their written consent for this research, and that the research was voluntary. All research subjects were anonymous. All the patients received an oral invitation to participate in this research.

#### Statistical analysis

The following methods of statistical analysis for countable data were used: (1) basic descriptive statistics providing basic information such as the mean, minimum and maximum values, different measures of variations; (2) the  $\chi^2$  test — a method that performs a hypothesis test to determine whether or not to reject the notion that two variables are independent; (3) C. Cramer's coefficient to determine the strength of correlation; (4) Student t test to calculate the confidence level for mean; (5) level of significance  $p < 0.05$  was used. The statistical program STATISTICA Data Miner + SAL 9 was used for calculations.

## Results

In the group of 116 subjects, the commonest abnormalities were circulatory system diseases and polypathology. The risk of pressure ulcers was observed in more than a third of the study group. The results are presented in Table 1.

The daily living activities of the study subjects were evaluated, and the results demonstrated that half of the patients needed some assistance to perform these activities. The ADL score showed a limited functional capability, and dependence on other people. The study results are presented in Table 2.

**Table 1.** Health problems in the studied group according to systems (n = 116)

Diseases	Number	(%)
Diseases of circulatory system	19	16.4
Diseases of respiratory system	12	10.3
Diseases of digestive system	6	5.2
Diseases of skeletal system	7	6.0
Polypathology (diabetes mellitus and hypertension or coronary heart disease)	60	51.7
Diseases of urinary system	3	2.6
Oncological diseases	9	7.8
Norton scale 5–14 points	35	30.2
Norton scale > 15 points	81	69.8

**Table 2.** Results of ADL scores in the study group

ADL score classes	Number	(%)
High: 6.0–4.5 points	58	50.0%
Medium: 4.0–2.5 points	37	31.9%
Low: 2 ≤ points	21	18.1%

In the study group, the most significant problems were: difficulties in assuming an adequate body position, movement limitations, incontinence, inability to dress without assistance, difficulties in maintaining body hygiene and a safe environment, lack of independence in daily living activities and limited participation in recreational activities. The other needs were fulfilled at a medium level. The mean and high level of care dependency in the CDS scale balanced the low level (Table 3).

A correlation was observed between low scores from the ADL and CDS scales (Fig. 1).

A low score for the scale of pressure ulcer risk correlates with a low score for the *capability* to perform daily living activities (Fig. 2).

Figure 3 shows the effect of selected CDS items below 3p. on the increased risk of pressure ulcers as assessed using the Norton scale.

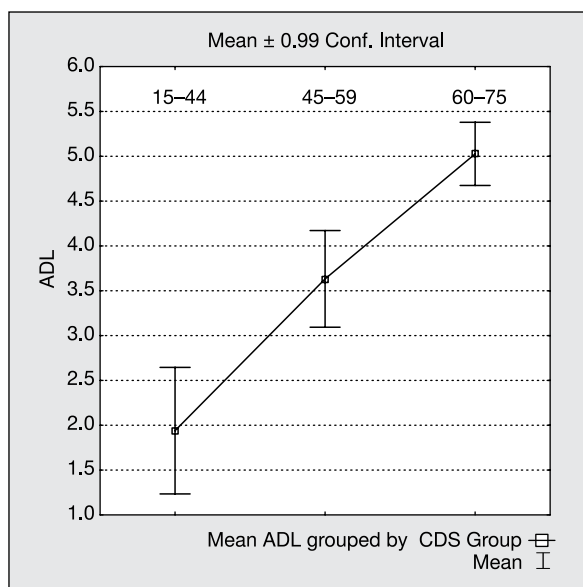
## Discussion

The available publications demonstrate that pressure ulcers affect approximately 60% of chronically ill patients who are over 70 years old [4, 16].

The aim of our study was to assess the risk of pressure ulcers in geriatric patients. The study involved 116 subjects over 60 years old, hospitalized at the Department and Clinic of Geriatric Medicine (Antoni Jurasz University Hospital) in Bydgoszcz.

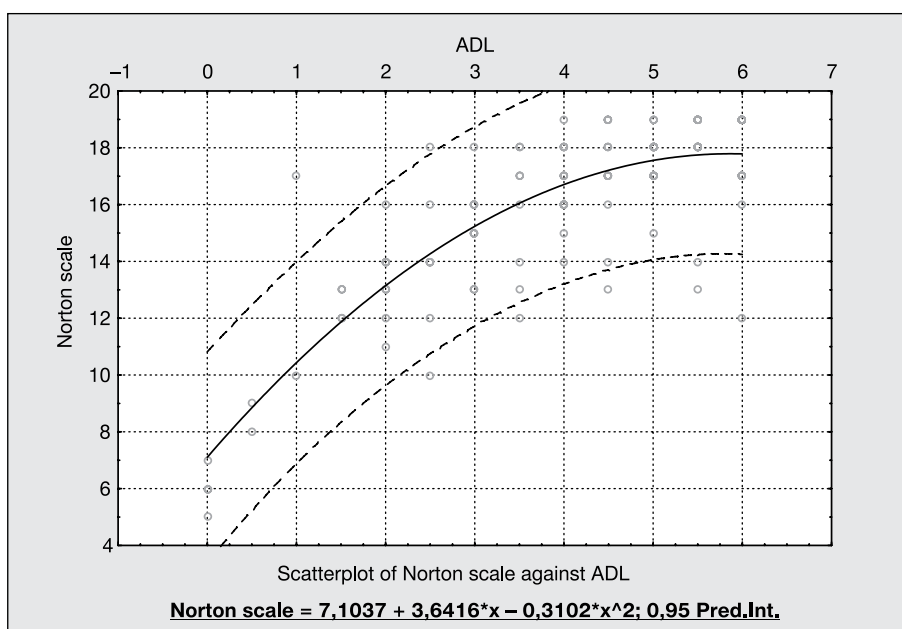
**Table 3.** Means and standard deviation of CDS for the study group (n = 109)

Items of CDS	Means	± S.D.
1. Eating and drinking	3.99	1.25
2. Incontinence	3.92	1.33
3. Body posture	3.53	1.09
4. Mobility	3.07	1.20
5. Day/Night pattern	4.03	1.20
6. Getting dressed and undressed	3.78	1.26
7. Body temperature	3.87	1.21
8. Hygiene	3.49	1.25
9. Avoidance of danger	3.59	1.20
10. Communication	4.34	1.01
11. Contact with others	3.91	1.17
12. Sense of rules and values	4.08	1.29
13. Daily activities	3.46	1.27
14. Recreational activities	2.71	1.38
15. Learning ability	3.41	1.19
16. Total	3.42	1.20
CDSUM-score (points)		
High level of dependency — 15–44	25	21.6%
Medium level of dependency — 45–59	34	29.3%
Low level of dependency — 60–75	57	49.1%

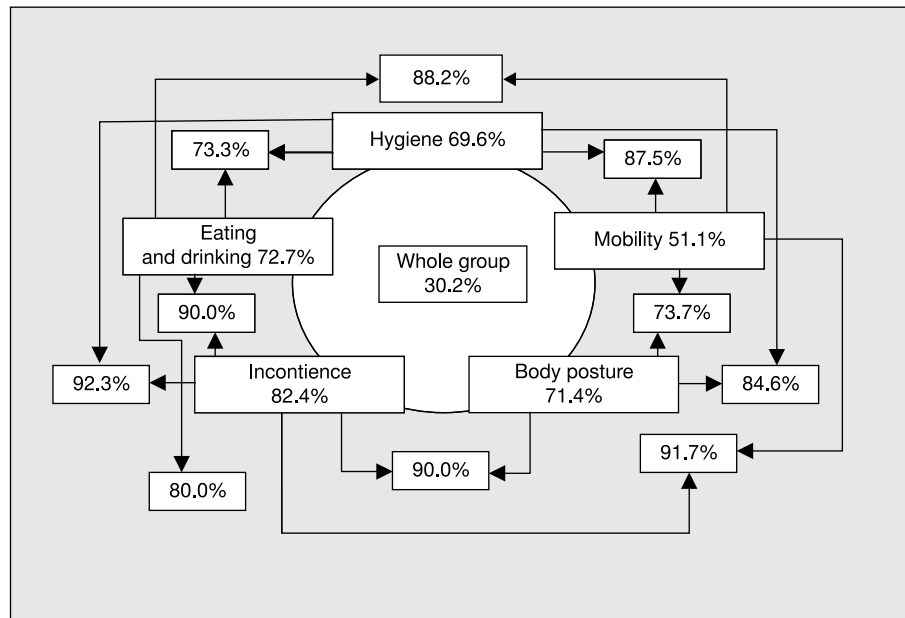


**Figure 1.** Correlation between ADL and CDSSUM in the study group

According to the demographic analysis, the majority of the study subjects were women (70.7%), with men accounting for 29.3% of the group. The mean age of the study subjects was 75.9 years. With regards to marital status, widows and widowers accounted for 50.9% of the group. The majority of the study group had secondary general or vocational education; most of them were retired. Almost half of the group had multiple morbidities, whereas the rest of the group suffered from diseases affecting the cardiovascular or respiratory



**Figure 2.** Correlation between ADL and Norton scale in the study group



**Figure 3.** Correlation between CDS and Norton scale in the study group

system; the commonest conditions were: pneumonia, diabetes, dementia, dehydration, arterial hypertension and urinary tract infections.

Studies carried out by Muszalik et al. have demonstrated that a patient's functional capability and ability to fulfill biopsychosocial needs without any assistance deteriorate with age. Limitations and multisystem diseases impair performance of the basic activities required for daily living [17].

According to Płaszewska-Żywko, the intellectual ability of elderly people deteriorates with age, which is related to decreased independence in daily living activities [18].

The main risk factors for pressure ulcers in the elderly patients were determined by low scores in the Norton, ADL and CDS scales. The study demonstrated a low level of independence, especially movement limitations, and impaired fulfillment of basic needs related to the activities of daily living, leading to an increased risk of pressure ulcers.

At the Department of Geriatric Medicine, the risk of pressure ulcers was evaluated on the basis of the Norton scale. The risk assessment was performed on the admission of the patient to the Department, and continued if the risk persisted. Our study demonstrated that such a risk occurred in 30.2% of the study subjects.

A detailed analysis of the study results for care dependency in the CDS and comparison with the score in the Norton scale provided evidence to support its usefulness in the evaluation of the risk of pressure ulcers in the study subjects. In most of the patients (72.7%) who had problems with food intake, the risk was below 14 p., according to the Norton scale. Similarly, incontinence,

problems with movement and difficulties in changing body position significantly increased the risk of pressure ulcers. The accumulation of problems related to the lack of independence and fulfillment of the patient's needs increased this risk in an arithmetic manner.

According to many authors, the risk factors related to the development of pressure ulcers include: decreased motor activity, advanced age, and bone fractures. In elderly patients, one of the main problems is immobilisation (bedridden patients), which is also connected to a deficit in hygiene activities [4].

Some authors have studied the risk of pressure ulcers, comparing the Braden and Norton scales. They have observed that both scales provided similar results; however, the Braden scale offered a better balance between specificity and sensitivity, and also a better assessment. Both the Braden and the Norton scales are more accurate than a nurse's clinical judgment in predicting the pressure ulcer risk [18].

## Conclusions

There is a correlation between the level of functional capability and the risk of pressure ulcers. The accumulation of problems related to the lack of independence in fulfilling patients' own needs significantly increased the risk of pressure ulcers in the study group.

## Conflict of interest:

The authors report no conflicts of interest in this work.

## Acknowledgements

We express our sincere appreciation to patients and nurses who volunteered to participate in this study, and nurse managers for their support.

## References

1. Abrams WB, Mark H, Beers MH, Berkow R. Textbook of Geriatric Medicine. Urban & Partner, Wrocław 1999;168–183, 461–478 (in Polish).
2. Biercewicz M., Kędziora-Kornatowska K, Ślusarz R. Specyfika problemów zdrowotnych pacjentów w starszym wieku. *Am Acad Med Siles* 2005; 59: 349–353 (in Polish).
3. Gryglewski A. Odleżyny — profilaktyka i leczenie. *Farmaceutyczny Przegląd Naukowy* 2007; 11–12: 2–8.
4. Kózka M. Odleżyny — występowanie, profilaktyka i leczenie. *Rehab Med* 2004; 8: 29–37.
5. Lewko J, Sierakowska M, Krajewska-Kulak E. Problem odleżyn w praktyce pielęgniarskiej. *Dermat Klin* 2004; 6: 37–40.
6. Rosińczuk-Tenderys J, Uchmanowicz I, Arendarczyk M. Profilaktyka i leczenie odleżyn. Wydawnictwo Centrinio, Wrocław 2005; 12–35.
7. Zbarańska K. Odleżyny — patogeneza, profilaktyka i leczenie. *Nowa Medycyna* 2004; 1: 2–8.
8. Szewczyk MT, Cwajda J, Cierzniańska K, Stodolska A, Ślusarz R. Narzędzia oceny ryzyka rozwoju odleżyn. *Przewodnik Lekarza* 2005; 1: 92–97.
9. Grodzicki T, Kocemba J, Skalska A (eds.). *Geriatrics with Elements of General Gerontology*. Via Medica, Gdańsk 2006; 6–12 (in Polish).
10. Dijkstra A. Care Dependency. An Assessment Instrument for Use in Long-Term Care Facilities. Academic thesis. De Regenboog, Groningen 1998; 15–24.
11. Dijkstra A, Buist G, Moorer P, Dassen ThWN. Construct validity of the Nursing Care Dependency scale. *J Clin Nurs* 1999;8: 380–388.
12. Dijkstra A, Buist G, Dassen ThWN., Moorer P A reliability and utility study of the Care Dependency Scale. *Scand J Car Sci* 2000; 14: 155–161.
13. Dijkstra A, Buist G, Brown L, Haven B, Romoren T, Zanotti R et al. An international psychometric testing of the Nursing-Care Dependency (NCD) scale. *J Adv Nurs* 2000; 4: 944–952.
14. Dijkstra A, Coleman M, Tomas C, Välimäki M, Dassen ThWN. Cross-cultural psychometric testing of the Care Dependency Scale with data gathered in three countries. *J Adv Nurs* 2003; 43: 181–187.
15. Dijkstra A, Muszalik M, Kędziora-Kornatowska K, Kornatowski T. Care Dependency Scale — psychometric testing of the Polish version. *Scand J Car Sci* 2010; 24: 62–66.
16. Kózka M. Odleżyny — częste powikłanie u pacjentów w starszym wieku. *Rehab Med* 2001; 1: 41–50.
17. Muszalik M, Œwikła A, Kędziora-Kornatowska K, Kornatowski T. Ocena wpływu czynników socjodemograficznych i medycznych na poziom sprawności funkcjonalnej pacjentów geriatrycznych. *Pielęgn XXI Wieku* 2010; 1–2: 9–15.
18. Pancorbo-Hidalgo P, Pedro Garcia-Fernandez F, Ma Lopez-Medina M, Alvarez-Nieto C. Risk assessment scales for pressure ulcer prevention: a systematic review. *J Adv Nurs* 2006; 54: 94–110.