

## The impact of functional efficiency of ZOL patients on the workload of nurses

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### Abstract

The specificity of long-term care facilities is to take care of people who are unable to take care of their own existence for health reasons. Most often they are elderly people, with a significantly limited ability to function independently in terms of satisfying basic life needs, unable to self-care. The work of nursing staff is one of the most difficult ones with a high level of responsibility, which often requires constant and full availability, coping with ethical dilemmas and imperfections of work organization. An indispensable element of the work of nursing staff is a significant workload, often associated with functioning among the sick and suffering people. An elementary assessment of functional efficiency is a significant, though simplified diagnostic process for the patient. In Care and Treatment Facilities (ZOL), it is the basis for determining the patient's condition and its deficit of independence in everyday life.

### Purpose of research

The aim of the study was to assess the impact of the level of functional efficiency of Care and Treatment Facilities on the workload of the nurse.

### Material and methods

The research was conducted among 92 nurses employed in the Care and Treatment Facilities (ZOL) of the Podkarpackie Voivodeship from September to November 2017. The

questionnaire used in this paper was a survey, which contained 30 single and multiple-choice questions. The next stage of the study was the analysis and comparison on the Barthel scale of patients of ZOL, which were examined in this work. The research was done according to the Barthel scale. What is more, it covered 206 residents of Care and Treatment Facilities in the Podkarpackie region. For the purpose of this work, the following tests were used for questions on nominal scales to verify hypotheses: V Kramer (2x3, 4x5 tables etc.), Phi (2x2 tables) and Tb- or Tc-Kendall. During the statistical analysis of the collected material,  $p < 0.05$  was assumed as the level of significance of the obtained results.

## Results and conclusions

The assessment of the impact of the functional efficiency level of ZOL patients on nurse work is not as important as the number of medical personnel. Measurement of workload and determination of staff have a direct impact on the conditions and quality of nurses' work. The main causes of iatrogenic errors in ZOL are rush and fatigue (71%), which result from too many patients per nurse. Adjustment of human resources should be adequate to the needs of patients. Nurses due to everyday contact with lying patients are exposed to uncomfortable body position, which causes increased spine pain and joint pain (80.4%). Noteworthy is the fact that a small number of nurses use modern techniques to facilitate transport and raising patients.

**Keywords:** functional efficiency, patient, nurse, Care and Treatment Facility

## Introduction

The aging of the population is a huge challenge for all Member States of the European Union. Demographic changes are progressing very quickly, in 1990 in Europe the percentage of people over 65 was 13.9%, in 2030 - according to Eurostat forecasts (Europop 2013) - is to reach 23.8%, and in 2060 - up to 28 percent. The latest report of the European Commission "2015 Aging Report" predicts that by 2060 the average life expectancy of men in the European Union countries will increase compared to today's 84.8 years (more by 7.1 years), and women - up to 89.1 (more by 6 years). Importantly, increasing life expectancy will significantly affect the size of the oldest ones, over 80 years old (this group will increase from the current 5% of the EU population to 12% in 2060).<sup>1</sup> This will not be indifferent both to existing social security systems, which may prove to be ineffective, as well as health care services, moderately oriented to the needs of the elderly, and the public services sector, targeting their offer to this age group. In discussions about the aging of Europe, the term "100-" has recently started to replace the current 65+. Therefore, it will be necessary to develop facilities for the elderly and dependent people, including increasing the number of Care and Treatment Facilities.

Patients of long-term care facilities are a group of people who require special attention, care and nursing. Problems resulting from various disease entities as well as from aging are both a challenge and a vocation for nursing. Nursing care of the elderly should include a help to maintain independence from the others, promotion of well-being, care and support for difficult or chronic illness.<sup>2</sup> The majority of people covered by long-term care show functional problems, as a result of which they are disabled and dependent on the environment, performing simple tasks is often an impossible barrier for them to overcome.<sup>3</sup>

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<sup>1</sup>The 2015 Ageing Report Economic and budgetary projections for the 28 EU Member States (2013 - 2060).

<sup>2</sup>Plich T.: Człowiek stary. W:., Encyklopedia pedagogiczna XXI wie-ku., Wydawnictwo Akademickie Żak, Warszawa 2003, t.1, 581.

<sup>3</sup> Żak M.: Ocena sprawności funkcjonalnej w procesie rehabilitacji. Materiały konferencyjne. VII Międzynarodowa Konferencja Opieki Długoterminowej, I Międzynarodowe Sympozjum Rehabilitacji w Opiece

On the other hand, there are many factors hindering maintaining or regaining functional capacity, including lack of motivation, depression, anxiety, dementia, malnutrition, reduction of muscle strength, impairment of coordination and balance, and multi-organ diseases.<sup>4</sup> As a consequence, gradual limitation of physical activity is observed in some patients subject to long-term care, which increases the risk of diseases such as: diabetes, osteoarthritis, cardiovascular disease, atherosclerosis, exposure to injuries and fractures.<sup>5</sup>

### **Purpose of research**

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### **Material and methods**

The research was conducted among 92 nurses employed in the Care and Treatment Facilities (ZOL) of the Podkarpackie Voivodeship from September to November 2017. Each person was informed about the purpose of the examination and assured about anonymity. All respondents agreed and took part in them voluntarily. The questionnaire used in this paper was a survey, which contained 30 single and multiple-choice questions. The questions contained in the questionnaire were designed to determine the impact of the level of functional fitness of ZOL patients on the work of the nurse. The next stage of the study was the analysis and comparison on the Barthel scale of patients of ZOL, which were examined in this work. The research was done according to the Barthel scale. What is more, it covered 206 residents of Care and Treatment Facilities in the Podkarpackie Voivodeship. For the purpose of this work, the following tests were used for questions on nominal scales to verify hypotheses: V Kramer (2x3, 4x5 tables etc.), Phi (2x2 tables) and Tb- or Tc-Kendall - these are symmetric measures based on the chi-square test, informing about the strength of dependencies between variables in the cross tables. If the cross table consisted of nominal and ordinal scale, the statistics at the lower level were read. All measures of compound strength were normalized so that they took values from the interval (0-1). Respectively from 0-0.29 – weak dependency, 0.3-0.49 – moderate dependency, 0.5-1 – strong dependency. In the case of symmetric measures based on the chi-square test, it is necessary to remember about certain conditions of using this test, which concern the size of the theoretical numbers, or actually the numbers of the theoretical numbers that are valid for a given table, which have a value between 1 and 5. The value of the chi-square test is accurate when none of the theoretical numbers is less than one and when no more than 20% of the theoretical number is less than 5. During the statistical analysis of the collected material using SPSS program,  $p < 0.05$  was assumed as the level of significance of the obtained results.

### **Results**

The research was conducted among 92 nurses employed in the Care and Treatment Facilities of the Podkarpackie Voivodeship, 96.7% were women and 3.3% were men. Studies have shown that respondents aged 30-49 accounted for 60.9%, while the 50+ age group consisted of 23.9%, and from 22 to 29 years - 15.2% of respondents. The largest group were married women - 70.7%, then maids - 16.3%, divorced - 7.6%, and a minimum of 5.4% -

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Długoterminowej, 103 I Ogólnopolskie Sympozjum Profilaktyki, Edukacji i Leczenia Ran Przewlekłych, Toruń 2004, 25-26.

<sup>4</sup>Kujawa W., Biercewicz M., Ślusarz R., Kędziora - Kornatowska K.: Wpływ wybranych chorób wieku podeszłego na wydolność funkcjonalną osób starszych. *Pielęgniarstwo XXI wieku*, 2005; 1/2(10/11), 99-104.

<sup>5</sup>Podhorecka M., Kędziora- Kornatowska K., Sielski G.: Zmiany inwolucyjne w układzie ruchu oraz ich konsekwencje wpływające na zmniejszenie aktywności fizycznej osób starszych. *Pielęgniarstwo XXI wieku*, 2011, nr 1:34.

widows. The highest number of respondents taking part in the survey had incomplete higher education - 35.9%, then secondary - 34.8%, higher - 29.3%. In terms of the activity of the profession, the largest number of people participating in the study are those who only work for one employer - 59.8% and 40.2% who work more than one full-time job. 44.6% of respondents have been working in the nursery profession for 6 to 15 years, 25% of respondents over 21 years. 16.3% of respondents have a work experience of up to 5 years.

The next stage of the work was the analysis and comparison on the Barthel scale of patients of individual Care and Treatment Facilities, which were examined in this work. The research according to the Barthel scale covered 206 residents in the Care and Treatment Facilities in the Podkarpackie region. The percentage of patients with total reliance (0-20 pp. using Barthel scale) occurs in the number of 125 people (60.7%), including 30 patients (14.6%) in the vegetative state (Barthel 0 scale). In the Barthel point interval from 20 to 40 pts., which means that to some extent the patient needs help from other people, there is the remaining part of the residents, i.e. 81 people (39.3%).

**Table 1. Dependence of patients' physical fitness on Care and Treatment Facilities.**

		Group				Total
		ZOL 1	ZOL 2	ZOL 3	ZOL 4	
Please specify the physical fitness of verbally responsive patients	a large degree of functional efficiency	N 3	2	1	1	7
		% 10,7%	10,0%	4,5%	4,5%	7,6%
	the patient is able to move up the stairs with the help of another person	N 4	11	1	2	18
		% 14,3%	55,0%	4,5%	9,1%	19,6%
	the patient needs physical assistance and assurance in performing activities	N 15	2	5	11	33
		% 53,6%	10,0%	22,7%	50,0%	35,9%
	the patient needs a complete help of another person in all activities	N 6	5	15	8	34
		% 21,4%	25,0%	68,2%	36,4%	37,0%
Total		N 28	20	22	22	92
		% 100,0%	100,0%	100,0%	100,0%	100,0%

p<0,001, V Kramer=0,36

Source: own.

7.6% of all respondents answered that there were between 11 and 20 patients per day per nurse. 30.4% of respondents nurture from 20 or more patients, and 12% of respondents say that there is between 5 and 10 patients per one nurse. As a result of the statistical analysis, a moderate statistically significant relationship was found, which informs that the more patients nurse for servicing in a single day duty, the more often iatrogenic errors occur during work.

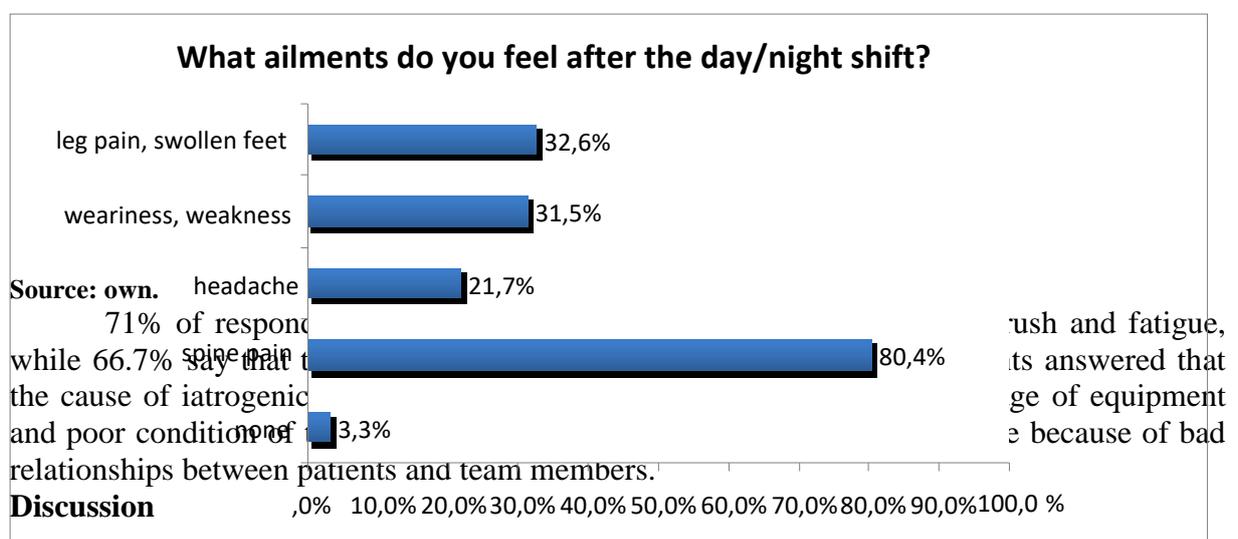
53.3% of all respondents claim that there is one nurse attributable to 11-20 people on night duty. 33.7% of respondents cares for 30 and more patients during night shift. 6.5% of nurses take care of 5 to 10 patients, and 6.5% of respondents care about 20 to 30 patients. 37% of respondents think that a verbally responsive patient requires a complete help of another person in all activities, 35.9% say that such a patient needs some physical help and

assurance in performing daily activities. 19.6% of the respondents indicated verbally responsive patients who are able to move up the stairs with the help of another person. 7.6% of nurses believe that such patients have a high degree of functional fitness. 55.4% of respondents spend between 11 and 20 minutes on the morning toilet with a completely disabled patient. 38% of nurses say that the morning toilet lasts 5-10 minutes with their participation. 6.5% of respondents need 21-30 minutes to do the morning toilet when the patient is completely inoperative. 43.5% of respondents spend 5-10 minutes to do the morning toilet with a patient in need of help. 41.3% of respondents need 11-20 minutes to do the toilet, and 15.2% need 21-30 minutes to perform nursing activities at the toilet in the morning.

The analysis shows that the average number of changes in the position of completely disabled patients is 4 to 5 times during the shift. 60.9% of respondents move patients 2-3 times during their working time. 34% of respondents from 4 to 5 times, and 4.3% of respondents 6 and more times. After analyzing the data, it appears that, on average, respondents move patients with moderate disability from 3 to 4 times per day. 56% of surveyed nurses claim that they do not lift weights over 20 kg during their shift, and 36% of respondents apply health and safety regulations. The statistical analysis showed no significant association between the correct application of the health and safety regulations as well as the age and seniority of the respondents. 30.4% of respondents transport the patient with the help of at least 2 persons. 28.3% use rollers and lifts. 13% of respondents use belts and ladders when moving the patient, and 10.9% do not use any auxiliary devices when lifting the patient. 4.3% do not use any equipment when changing patient's position. 2.2% of respondents support themselves with rollers while moving the patient. 53.3% of respondents say that they dedicate about 6 to 10 minutes to feed moderately ill patients. 23.9% need more than 10 minutes, and 22.8% between 1 to 5 minutes. 43.5% of respondents feed a patient who is completely disabled for more than 10 minutes, 39.1% need 6-10 minutes for feeding, and 17.4% feed a disabled patient for about 2-5 minutes.

63% of respondents believe that uncomfortable body position is the biggest problem in the course of their work with the patient. 15.2% of nurses indicated a problem with lighting, noise and temperature. 5.4% of respondents believe that the problem is contact with objects causing disgust; dirt, smell. 80.4% of respondents feel pain in the spine, while 32.6% feel leg pain and have swollen feet after duty. 31.5% of nurses feel tiredness and weakness after work, and 21.7% headaches. 3.3% of respondents do not feel any discomfort.

**Chart 1. Ailments experienced by nurses after working time.**



The work environment has an indisputable impact on the level of professional satisfaction and workload. The assessment of working conditions by the nursing staff results mainly from the specificity of the ward. It can significantly affect the level of provided nursing care.

The results of the conducted research confirm that the main cause of iatrogenic errors in Care and Treatment Facilities are rush and fatigue (71% of respondents), which results from too many patients per one nurse. They happen both during the day and night shift.

Lack of self-service ability and securing the needs for functioning in everyday life are the basic problems of patients in ZOLs. In the studied group of patients, there is a percentage of patients with total reliance (0-20 points in Barthel's) in the number of 125 people (60.7%), of which more than 14% of patients are in a vegetative state (Barthel scale 0), the remaining part of the residents, i.e. 81 people (39.3%) to a lesser extent need help from others. In a study conducted by Mojsa et al. it was shown that the lower the Barthel index value, the greater the number of medical procedures patients required.<sup>6</sup>

During the tests in the Care and Treatment Facilities there were wards with various diseases. According to the respondents, 66.3% of them were patients after stroke. The examined nurses in 43.5% stated that they were patients with dementia and 33.7% with diseases of motor organs. It is worth noting that 44.6% of surveyed nurses said that patients with the most difficulties are physically fit, but illogical and disoriented.

Time spent feeding patients in a severe condition is long. The morning toilet extends the working time of a patient in need of help, e.g. when dressing, transporting and moving a patient, so the time of patient care is approximate. There is no doubt that nurses working in ZOL often have contact with elderly patients in a vegetative state, not cooperating with the staff, whose weight is often greater than the actual body weight. Noteworthy is the fact that in recent years the problem of obesity in society has appeared, which translates into a stay in the ZOLs of overweight patients. 41.3% of respondents think that obesity is a major obstacle when working with the patient.

The state of unconsciousness and excessive body weight of patients additionally increases the burden on nurses, which consequently leads to pain complaints regarding the musculoskeletal system. Over time, these ailments may become chronic and degenerative diseases of the musculoskeletal system. The reason is also the failure to comply with the principles of ergonomics and the existence of architectural barriers in facilities.

Pain from musculoskeletal system is one of the major health problems occurring among health care workers. According to Józwiak, nurse staff is a professional group that is particularly burdened with a static and dynamic component of physical exertion.<sup>7</sup>

The obtained results prove that nurses, due to everyday contact with lying patients, are exposed to uncomfortable body position (above the patient's bed) and the need to maintain a specific position for a long time, which causes increased spine pain and joint pain (80.4%). Similar results were obtained in the studies of Bąk et al. published in 2005, where more than 69% of polled nurses mentioned the long-term forced body position as the cause of the aggravation of pain, and 62% weightlifting.<sup>8</sup> From research conducted by Kułagowska et al. it follows that 97% of nurses surveyed report a spine pain and 77% pain in the upper limbs.<sup>9</sup>

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<sup>6</sup>Mojsa W., Chlabicz S., Małyшко J.: Charakterystyka pacjentów pielęgniarstwa długoterminowego w latach 2004- 2008 w województwie podlaskim. *Gerontologia Polska*.2013(21)1, 18-24.

<sup>7</sup>Józwiak Z.: Obciążenie układu ruchu w praktyce pielęgniarstwa. Instytut Medycyny Pracy, Łódź 2000.

<sup>8</sup>Bąk S., Wyrażek M., Bliski B.: Ocena skuteczności ćwiczeń leczniczych w dolegliwościach bólowych dolnego odcinka kręgosłupa u pielęgniarek, *Medycyna Pracy*.2005;56(3):235-239.

<sup>9</sup>Kułagowska E., Kosińska M., Karolak I.: Bezpieczeństwo i ergonomia w pracy pielęgniarki długoterminowej. *Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie*, t. 35, nr 3, wrzesień 2017

Measurement of workload and determination of staffing have a direct impact on the quality of nurses' work services. It is worth noting that the more nurse has patients during night shift, the less often they increase weights according to OSH regulations (60.9%). In studies conducted by Bliski and Sykuteran on the subject of load on the musculooskeletal system and their health consequences among nurses of four Poznań hospitals, authors showed that only 4.68% of nurses knew the correct limit of weight lifting allowed by Polish regulations.<sup>10</sup>

13% of respondents use ladders and rollers in working with patients, 28.3% use lifts for the transport of patients. An important role in changing the position of the patient is to help the other person (nurse or medical caregiver) - 30.4%. The results obtained prove that the ZOL equipment is not as important as the right personnel settlement. The non-adaptation to the needs of the size of staffing on the shift is also a limitation in the possibility of using auxiliary equipment.

From the research we can confirm the hypothesis that the number of nurses on duty significantly affects the workload. Results obtained from the survey show that employees of ZOL 1 (53.6%) and ZOL 2 (55%) more often than the other respondents, are considering a change of place of work, this is significantly related to the large number of patients in the facilities (over 40 patients up to 100). Workload is an issue analyzed in the area of nursing, often referred to as a reason for leaving the profession or a health risk to nurses. Despite the high workload, the majority of surveyed nurses (76.1%) were in favor of the fact that their work brings them satisfaction, and even 65% of respondents admit that they do not tend to change their place of work.

### **Conslusions**

1. Nurses working in ZOL belong to a professional group that is particularly vulnerable to overloading the musculoskeletal system, the most frequently mentioned complaints include pain in the joints and spine.
2. The number of mentees definitely influences the nurse's quality of work. Too many patients per nurse cause haste and fatigue, which results in non-compliance with health and safety regulations.
3. The nuisance factors in the work of a nurse in ZOL are:
  - personal shortages,
  - a large number of patients,
  - obesity, dementia and vegetative states of patients,
  - transport work related to lifting patients,
  - transport work related to the transfer of patients and medical equipment,
  - staying in a standing position for a significant part of the working time.
4. A negligible number of nurses use modern techniques facilitating the transport and uplifting of patients.

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