

## Analysis of causes of hospitalization and functional fitness of patients in a rehabilitation department

### *Analiza przyczyn hospitalizacji i sprawności funkcjonalnej pacjentów kliniki rehabilitacji*

Beata Szczepanowska-Wołowicz<sup>1,2</sup>, Katarzyna Rurarz<sup>2</sup>, Magdalena Adamczyk<sup>3</sup>, Paulina Sztandera<sup>4</sup>, Grażyna Ściegienna-Zdeb<sup>2</sup>, Ireneusz Kotela<sup>1,5</sup>

<sup>1</sup>Department of Rehabilitation in Disease of the Locomotor, Institute of Physiotherapy, Faculty of Medicine and Health Science, Jan Kochanowski University, Kielce, Poland

Head of the Department: Prof. JKU Ireneusz Kotela MD, PhD

<sup>2</sup>Rehabilitation Department, Regional Polyclinical Hospital, Kielce, Poland

Head of the Department: Grażyna Ściegienna-Zdeb MD

<sup>3</sup>Student of Physiotherapy, Jan Kochanowski University, Kielce, Poland

<sup>4</sup>Department of Neurological Rehabilitation, Regional Polyclinical Hospital, Kielce, Poland

Head of the Department: Justyna Sieczka MD

<sup>5</sup>Clinical Department of Orthopedics and Traumatology, Central Clinical Hospital of the Ministry of the Interior, Warsaw, Poland

Head of the Department: Prof. CCHMI Ireneusz Kotela MD, PhD

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**Key words:** causes of hospitalization, assessment of functional fitness, Up and Go test.

**Słowa kluczowe:** przyczyny hospitalizacji, ocena sprawności funkcjonalnej, test „wstań i idź”.

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#### Abstract

**Introduction:** The increase observed in the size of the elderly population is related to an increase in the average life span. Involutional changes in the human body concern all organs and systems. Multiple morbidities, to a considerable extent, contribute to the limitation of motor fitness. Recently, a change has been noted in the age of patients hospitalized in rehabilitation departments. The majority of these patients are aged over 60, and are admitted due to aggravation of polyarticular pain, arterial hypertension, problems with knee or hip joints (degeneration, pain), ischemic heart disease, or degenerative polyarthritis. Hospitalization in the rehabilitation department contributes to the improvement in their state of health.

**Aim of the research:** The objective of the study was to analyse the causes of hospitalization and functional fitness of patients hospitalized in the Rehabilitation Department at the Regional Polyclinical Hospital in Kielce.

**Material and methods:** The study included 102 patients of the Rehabilitation Department at the Regional Polyclinical Hospital in Kielce, 79 female and 23 male, mean age 72.6.

**Results:** The majority of patients (74%) were admitted to the department with the diagnosis of aggravation of polyarticular pain, followed by arterial hypertension (as many as 64%), problems concerning knee and hip joints (degeneration, pain), ischemic heart disease, and polyarticular changes.

**Conclusions:** Patients aged over 60 comprised the largest group in the study, and the dominant causes of hospitalization were aggravation of pain and arterial hypertension.

#### Streszczenie

**Wprowadzenie:** Wzrost liczby osób w podeszłym wieku wiąże się z wydłużeniem średniej długości życia. Zmiany inwolucyjne zachodzące w organizmie człowieka dotyczą wszystkich narządów i układów. Wielochorobowość w znacznym stopniu przyczynia się do ograniczenia sprawności ruchowej. Obecnie na oddziałach rehabilitacyjnych widoczna jest zmiana wieku hospitalizowanych pacjentów. Większość z nich to osoby powyżej 60. roku życia. Rozpoznanie, z jakimi większość pacjentów trafia na oddział, to: zaostrzenia dolegliwości bólowych wielostawowych, nadciśnienie tętnicze, problemy ze stawami kolanowymi i biodrowymi (zwyrodnienie, ból), choroba niedokrwienna serca, zmiany zwyrodnieniowe wielostawowe. Pobyt na oddziale rehabilitacyjnym przyczynia się do poprawy stanu zdrowia.

**Cel pracy:** Analiza przyczyn hospitalizacji i sprawności funkcjonalnej pacjentów przebywających w Klinice Rehabilitacji Wojewódzkiego Szpitala Zespolonego w Kielcach.

**Materiał i metody:** Badania przeprowadzono u 102 osób będących pacjentami Kliniki Rehabilitacji Wojewódzkiego Szpitala Zespolonego w Kielcach. Wśród badanych było 79 kobiet i 23 mężczyzn. Średnia wieku pacjentów wynosiła 72,6 roku.

**Wyniki:** Najwięcej (74%) pacjentów trafia na oddział z rozpoznaniem zaostrzenia dolegliwości bólowych wielostawowych, aż 64% pacjentów ma rozpoznane nadciśnienie tętnicze. Kolejną grupę stanowią pacjenci mający problemy ze stawami kolanowymi i biodrowymi (zwyrodnienie, ból), a następnie z chorobą niedokrwienną serca i zmianami zwyrodnieniowymi wielostawowymi. **Wnioski:** Najliczniejszą grupę pacjentów stanowią osoby powyżej 60. roku życia. Zaostrzenie dolegliwości bólowych i nadciśnienie tętnicze to główne rozpoznania u osób hospitalizowanych.

## Introduction

Today, the problem of the ageing of the population is very frequently addressed. This natural process is inscribed in the course of ontogenesis, and results in many unfavourable changes which limit the compensatory and regenerative capabilities of the body. A gradual reduction of body reserves begins at the age of 30–40, and progresses with the passage of time [1, 2].

Longitudinal studies have shown that at the age of over 50, muscle mass is reduced by 6% per decade, on average, muscle strength decreases between the ages 50 to 60 by 1.5% annually, while at the age of over 60, it decreases by 3% annually, on average. The reduction in muscle strength, motor coordination, balance disorders and multiple morbidities are the factors which hinder the maintenance of motor fitness in the elderly [3].

The elderly are the main group of patients admitted to the rehabilitation department. Low physical activity and senile changes in physiological control of postural and walking stability exert a considerable effect on the deterioration of motor fitness. Poly-pathology, polytherapy, and polypharmacy are the subsequent factors which greatly contribute to the limitation of fitness [4]. The most frequent pathologies observed among seniors are arterial hypertension, ischemic heart disease, degenerative and inflammatory joint diseases, overweight, malnutrition, diabetes and osteoporosis [5].

Involuntal changes concern all organs and systems of the human body. With respect to the motor organ, changes in the muscular and skeletal systems seem to be most important, and affect patients' physical activity. Muscle mass, cross-section and density decrease with age, which is related to an increased content of intramuscular fat. Changes are also observed in the structure of collagen, which exerts an effect on muscle flexibility. A decrease in muscle strength is associated with a change in muscle innervation. The number of neurons in the spinal cord changes, there occurs a synaptic delay, and the process of motor neuron stimulation in the central nervous system (CNS) slows down, resulting in disturbances in responding to stimuli. The reduction in muscle strength is larger in the lower extremities, which considerably affects locomotion [6–8]. Ageing of the body contributes to the demineralization of bones, as well as to the loss of their flexibility. Rigidity of the connective tissue and joint capsule results in a reduction of the extent of motion in the joints [6]. Involuntal changes in the nervous system lead to the slowing down of the thinking pro-

cess, weakening of reflexes, and a decrease in muscle tension. Apart from motor functions, there occur psychological changes in seniors, problems with memory and cognitive functions, changes in the processes of thinking and perception, loss of emotions and interest, as well as personality disorders [1]. The reduction of muscle strength and neuromuscular coordination, and changes in flexibility and balance contribute to the deterioration of the functional fitness of patients.

Therefore, the task of physiotherapy will be to improve the state of health, delay the ageing process, increase functional fitness and improve the quality of life of the patients. Thus, it seems justifiable to carry out physical therapy targeted at improving walking and balance, and increasing muscle strength.

## Aim of the research

Analysis of the causes of hospitalization and functional fitness of patients hospitalized in the Rehabilitation Department at the Regional Polyclinical Hospital in Kielce.

## Material and methods

The study was conducted during the period 31 March to 10 April 2015, in the Rehabilitation Department at the Regional Polyclinical Hospital in Kielce, and included 102 patients, 79 female and 23 male, who expressed their written consent to participate in the research (Figure 1).

While analysing the age structure of patients participating in the study an age histogram was constructed. The youngest patient hospitalized in the department of the unit was a woman aged 45, and the oldest was a woman aged 98. Table 1 and Figure 2 present the relevant statistics by age.

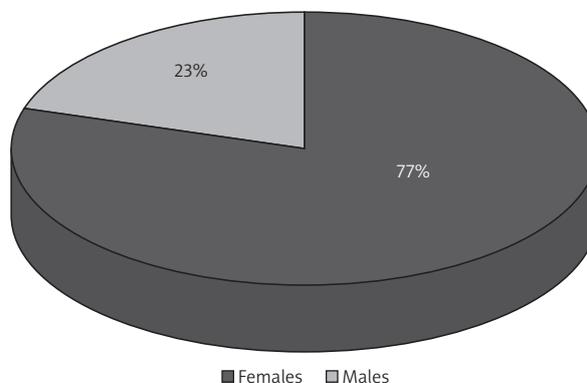
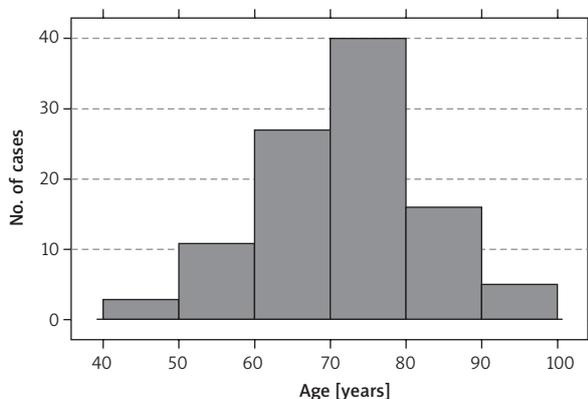


Figure 1. Structure of patients according to gender

**Table 1.** Structure of patients according to age in years

Minimum	Mean	Median	Maximum
45	72.6	73	98

**Figure 2.** Structure of patients in the study by age

The majority of patients participating in the study were the elderly (90 patients), i.e. 88% of the patients hospitalized in the department, the majority of whom were female, mainly urban inhabitants with secondary school education (Table 2).

Table 3 presents the division according to the body mass index (BMI) based on the WHO classification [9]. It shows that 82% of patients were overweight or obese.

In accordance with the assumptions and the objective of the study, inclusion and exclusion criteria were adopted.

Inclusion criterion: patients of the Rehabilitation Department, patient's consent to conduct the study,

ability to walk independently or with the use of orthopaedic equipment (crutches, walking frame).

Exclusion criterion: lack of consent to conduct the study, incomplete medical records, people who were not patients of the Rehabilitation Department.

At the first stage of research, a survey was conducted designed according to our own methodology. The survey contained 19 items in the form of open and closed questions. Subsequently, the patients performed the Up and Go test. This is a relatively simple test for the evaluation of walking and functional fitness.

The result of the test is the time needed to complete the task. Three attempts are always undertaken. The results obtained were subject to statistical analysis. The data of a quantitative character were characterised by the determination of the size of the group.

## Results

Patients admitted to the department due to aggravation of polyarticular pain made up the largest proportion (74%), and as many as 64% of patients suffered from arterial hypertension. The next largest group comprised patients with problems concerning knee and hip joints (degeneration, pain), followed by those with ischemic heart disease and degenerative polyarticular changes (Figure 3).

The mean number of disorders diagnosed in patients admitted to the department was 5; 21% of patients were diagnosed with 7 or more disorders; as many as 75% of patients were admitted to the department with at least 4 disorders diagnosed (Figure 4).

For all the cases available (102), a histogram was prepared pertaining to the time required for perfor-

**Table 2.** Structure of patients participating in the study

Structure of study group according to: gender, age, education level, place of residence		No. of patients	Percentage	Orthopaedic aid	
				No. of patients	Percentage
Gender	Females	79	77	22	28
	Males	23	23	7	30
Age	< 60	12	12	4	33
	60–69	28	27	8	29
	70–79	37	36	5	14
	≥ 80	25	25	12	48
Education level	Primary	30	29	7	23
	Primary vocational	20	20	2	10
	Secondary school	42	41	18	43
	University	10	10	2	20
Place of residence	Urban area	73	72	21	29
	Rural area	29	28	8	28

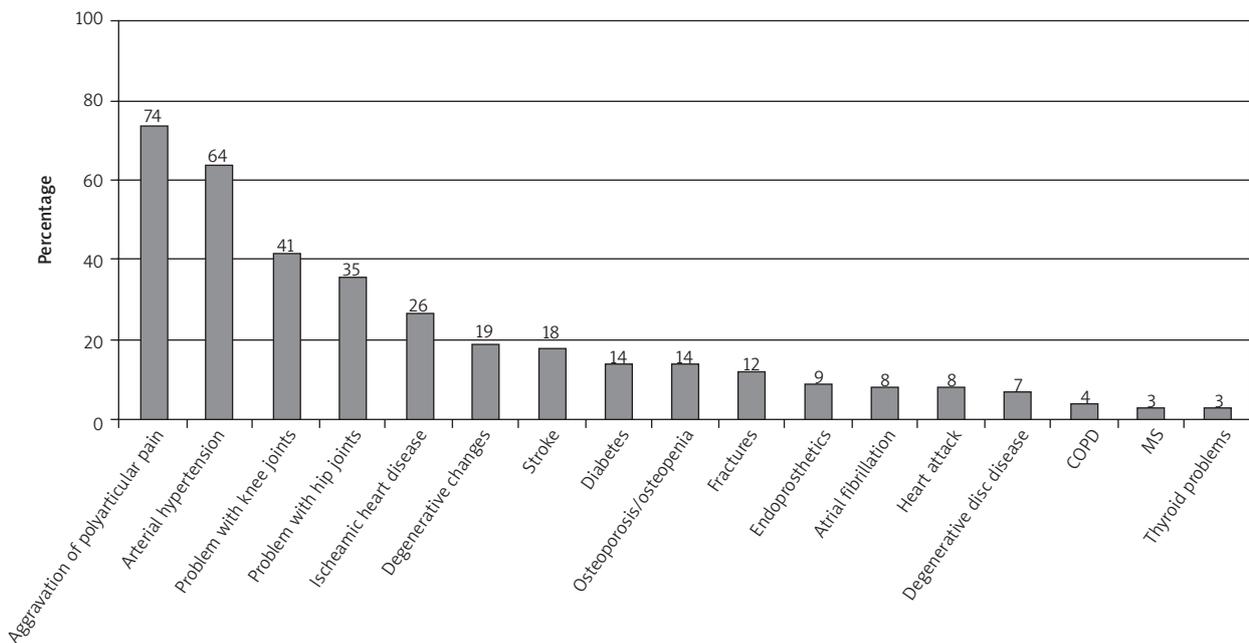


Figure 3. Diagnoses with which patients are admitted to the Rehabilitation Department

Table 3. Structure of patients according to body mass index (BMI)

BMI classes	No. of patients	Percentage
Underweight	2	2
Normal weight	16	16
Overweight	36	35
Obesity	48	47

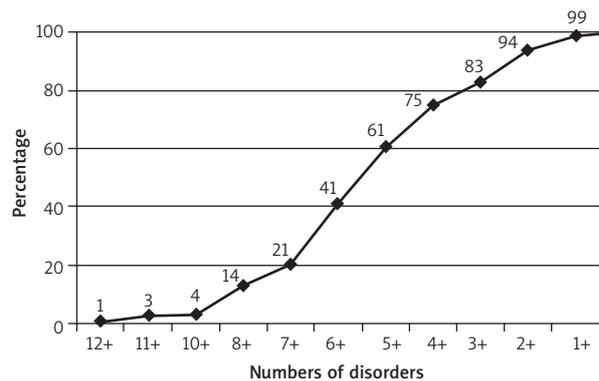


Figure 4. Number of disorders diagnosed in patients admitted to the department

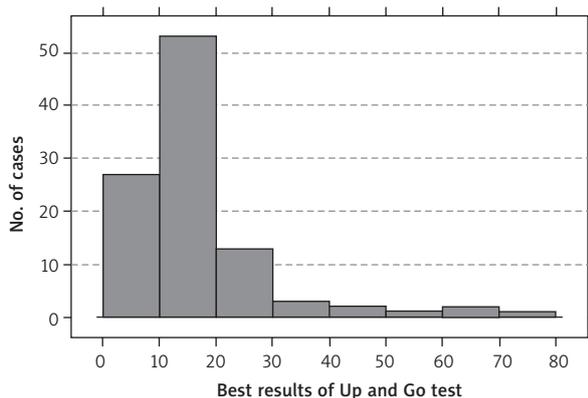


Figure 5. Histogram of time [s] required to perform the Up and Go test

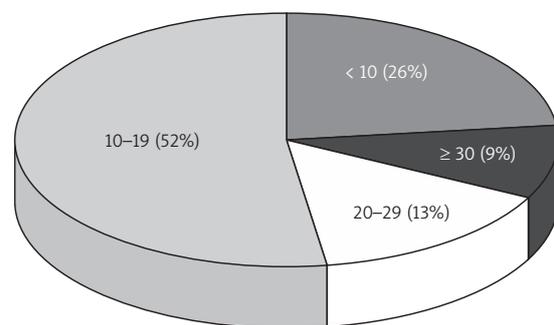


Figure 6. Results of Up and Go test

mance of the Up and Go test. The best time obtained in three attempts was adopted as a result. Figure 5 shows that the majority of patients in the study needed 10–20 s to perform the test (Figures 5 and 6).

Only 27 patients performed the test during a time < 10 s, the largest group (53 patients) performed the test within 10–19 s, 13 patients took 20–29 s, while 9 patients needed more than 30 s to perform the test,

and these were mainly patients using orthopaedic aids (Figures 5 and 6).

## Discussion

The progress in medical sciences and modern methods of treatment contribute to an increase in the average life span. Statistical prognoses by the Main Statistical Office assume that in 2020, 23% of the population will be aged over 60. In 2030, the number of the population aged over 65 will reach 8.2 million. A relatively rapid increase will be noted in the number of the population aged over 80 – from 1.3 to 1.6 million in 2020, and up to 2 million in 2030. According to the World Health Organization (WHO), a geriatric patient is a person with a minimum age of 60, referred to a geriatrician, with the diagnosis of at least 4 chronic diseases. The WHO distinguishes with respect to old age: advanced age 60–75, senior age 75–90, and old age over 90 [1, 10].

In our own studies there prevailed patients at advanced and senior ages, and similar relationships were observed by Paszkiewicz *et al.* and Dzieża-Grudnik *et al.* [10, 11]. The majority of patients were women, similar to observations of Arinzon *et al.* [12]. The most frequently reported cause of hospitalization was aggravation of pain concerning various joints, and consequently the deterioration of functional fitness of patients, which was also observed in the study by Paszkiewicz *et al.* [10]. Among the geriatric patients, a frequently diagnosed pathology was arterial hypertension, which was confirmed by our study and also found in the study by Żak and Gryglewska [4].

Degenerative joint disease was a disorder frequently observed among the elderly, which was also confirmed by our study.

Gajewska *et al.* [13] observed an increase in hospitalization due to obesity. In our study it was noted that 82% of patients hospitalized in the department were overweight or obese.

The majority of patients who used inpatient hospitalization were aged over 60 and characterized by multiple morbidities. A change of profile was clearly observed – from a general patient towards that of a geriatric patient. In addition, the occurrence of so-called ‘geriatric giants’ among patients hospitalized was characteristic. Involutional changes in the elderly are expressed by the prolongation of the time of performance of the Up and Go test, and consequently an increase in the risk of falling. That tendency was also observed in Zasadzka’s *et al.* [14], Siu’s *et al.* [15], Villafañe’s *et al.* [16], and Żak’s *et al.* [17] studies. Physical activity of elderly people in most cases is significantly reduced, and it is one of the important factors affecting so-called favourable aging, contributing to a delay in the aging process. Reduced physical fitness and muscle strength increase the risk of falls and all consequences related to this.

Maintenance of the functional fitness of seniors contributes to the improvement in the way of locomotion, and exerts an effect on postural stability – as demonstrated in our studies as well as those of Mancoundia *et al.* [18], da Silva *et al.* [19], and Howe *et al.* [20]. The natural aging process cannot be avoided, but may be delayed by physical activity. Research shows that systematic physical activity is beneficial for physical and mental health and reduces the effects of physical disability [21, 22].

The goal of effective rehabilitation is the reduction of pain, and maintenance and improvement of motor fitness, with consideration of limitations resulting from poly pathology.

## Conclusions

Patients hospitalized in the department were mainly at senior and advanced age. The largest group of hospitalized patients suffered from aggravation of pain and arterial hypertension. The largest group of hospitalized patients could independently go outdoors and did not need orthopaedic aids; however, in these patients an in-depth evaluation of the risk of falling is recommended. Continuation of studies which could assess the influence of physiotherapy on results of the Up and Go test is needed.

## Conflict of interest

The authors declare no conflict of interest.

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**Address for correspondence:**

**Beata Szczepanowska-Wołowicz** PhD  
Institute of Physiotherapy  
Faculty of Medicine and Health Science  
Jan Kochanowski University  
al. IX Wieków Kielc 19, 25-317 Kielce, Poland  
Phone: +48 604 144 751  
E-mail: beatawolowicz@op.pl