

# THE EFFECTIVENESS OF REHABILITATION AND THE ASSESSMENT OF THE FUNCTIONAL CONDITION OF PATIENTS IN THE NURSING AND CARE INSTITUTION

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A. Study design/planning • B. Data collection/entry • C. Data analysis/statistics • D. Data interpretation • E. Preparation of manuscript • F. Literature analysis/search • G. Funds collection

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## ABSTRACT

**Background:** The number of people over 65 years of age is systematically growing throughout the world. One of the primary goals of advanced patient treatment is to restore self-reliance and functional independence. Numerous studies show that age-adjusted physical activity in a group of geriatric patients relieves pain in the locomotor system.

**Aim of the study** was to analyze the contribution of rehabilitation to the improvement of the health status and functional capacity of nursing home residents.

**Material and methods:** This survey-based study was conducted in a group of 65 nursing home residents (women and men). The ages of the participants ranged from 56 to 99 years. The research instrument employed in the study was the Barthel Scale.

**Results:** Most respondents (64.6%) enjoyed taking part in rehabilitation, and reported improvement in health status (63.1%). Physical activity in the past, the state of nutrition, and the preserved ability to communicate verbally had an effect on the general fitness assessment. An experience of stroke in the past had no influence on the level of fitness.

**Conclusions:** Early regular rehabilitation substantially improves the functional condition of nursing home residents. Physical activity in the past and the state of nutrition have an impact on the results of rehabilitation of nursing home residents.

**Key words:** advanced age, rehabilitation, functional capacity.

## INTRODUCTION

The basic goal of elderly patients' treatment and care is to maintain and increase their functional capacity so as to enable them to return to an independent life in the society, and thus, provide them with the optimal quality of life in the old age. Geriatric age and accompanying problems require specific solutions. They are mainly aimed at maintaining elderly patients' fitness and of self-sufficiency as long as possible. Patients' independence in satisfying their basic needs is the main factor which affects the character of nursing work and undertaken actions. Depending on patients' condition and efficiency a nurse helps them with basic everyday tasks or does these tasks for them [1]. The

job of a geriatric nurse consists also in preparing the patient for self-care and coping with the disease or disability. It often becomes the only way to keep independence and self-reliance. The nurse's role in supporting the rehabilitation process of the elderly involves prevention of disability and introducing basic rehabilitation treatment into regular nursing process [2, 3]. Geriatric patients often suffer from multiple morbidities, which means co-occurrence of several chronic disease. All co-occurring diseases have a negative impact on patients' physical activity and, consequently, on their muscle strength, which, in turn, leads to limitations in functional capacity necessary to perform basic everyday tasks. Multiple morbidities constitute a very serious problem in rehabilitation because the

therapy must be frequently modified in various ways [4]. Rehabilitation of elderly patients must be preceded by detailed tests and examination of patients' medical history and health condition. It is essential that every recuperation program should be preceded by a detailed interview and medical examination. A geriatric interview must take into account the whole spectrum of symptoms including collapsing, fainting, unstable weight, sphincter muscles disorders, impairment of physical performance and cognitive functions as well as communication and speech disorders [5].

One of the indicators of functional capacity especially in elderly geriatric patients is undertaking everyday activities without experiencing pain. Clinical studies show that in the case of patients suffering from musculoskeletal diseases properly chosen physical activity does not increase the pain but, on the contrary, tends to alleviate it [6]. Therefore, physical rehabilitation is one of the most important non-pharmacological forms of treatment in geriatric patients [7]. Elderly residents of nursing homes can be provided with a whole range of medical treatment covered by insurance including consultations provided by a doctor, nurse, psychologist, occupational therapist or dietician and, moreover, basic general rehabilitation, medical equipment and health education [8].

## AIM OF THE STUDY

The main objective of this study was to analyze the impact of applied rehabilitation on the functional capacity of nursing home residents.

## MATERIAL AND METHODS

The study was conducted in 2016 in a group of 65 residents of a nursing facility. The examined group consisted of both men and women aged between 56 and 99. They were mainly geriatric patients suffering from numerous multiple morbidities and taking advantage of everyday rehabilitation. The group varied as far as patients' level of functional capacity and independence was concerned. The study was conducted with an informed consent of the patients.

The study was conducted by means of a diagnostic survey. It applied a standardized Barthel scale, which is commonly used to assess patients' physical condition and their need for nursing care. The Barthel scale consists of 10 daily activities such as feeding, mobility, dressing and undressing, grooming, toilet use or bladder and bowels control. The total maximum score that a respondent can get is 100 and the scores are interpreted according to the following guidelines: the scores of 0-20 indicate total dependency, 20-80 indicate that the patient requires various forms of help and the scores of 80-100 mean that with a little help the patient can function independently [9].

The survey with the application of the Barthel scale was carried out twice: at the beginning of the project (June) and at the end of 6-month rehabilitation in which the respondents took part regularly (November).

Statistical analysis including Mann-Whitney U test and Spearman's correlation coefficient was used to evaluate examined aspects.

## RESULTS

The study was conducted in a group of 65 patients. The vast majority of respondents were women 76.9% ( $n = 50$ ), as compared to 23.1% ( $n = 15$ ) of men. The minimum weight of respondents was 56 kg, whereas the maximum weight was 89 kg, which gives the average weight of  $67 \pm 9$  kg. The minimum body mass index (BMI) of the respondents was 20.7 and the maximum – 49.2, so the average BMI was  $28.3 \pm 7.1$ . The patients stayed in the nursing home from 1 to the maximum of 6 years and their average length of stay in the facility was 2.3 years  $\pm 1.4$  year. Majority of respondents could not walk on their own. Their percentage reached 61.6% ( $n = 40$ ). 38.4% ( $n = 25$ ) of respondents were able to walk. The average score of respondents on the Barthel scale was  $22.5 \pm 14.1$  at the beginning of the study and  $23.8 \pm 14.7$  in its last month, the differences, however, were not statistically significant. No statistically significant correlation was found between the age and physical capacity of patients according to the Barthel scale at the beginning and after the end of rehabilitation.

The correlation between the length of the stay in the nursing home and the evaluation of physical capacity measured on the Barthel scale showed that a longer stay in the facility coincided with a higher physical capacity score both at the beginning of rehabilitation ( $r = 0.31$ ;  $p = 0.013$ ) and after its end ( $r = 0.28$ ;  $p = 0.025$ ).

Most respondents (64.6%;  $n = 42$ ) were eager to take part in the rehabilitation. More than a half of them used to do some sport in the past. All the examined patients worked out regularly at least 3 times a week. It was connected with the rehabilitation in which they were taking part.

The health condition of most of them improved due to rehabilitation. Their percentage reached 63.1% ( $n = 41$ ). No improvement following rehabilitation was found in 36.9% ( $n = 24$ ) of the respondents. 32.3% ( $n = 21$ ) of the respondents had to remain in a recumbent position.

The health condition of 41 patients improved after the end of rehabilitation (November). A statistical analysis showed statistically significant differences ( $p < 0.001$ ) in the results of the evaluation of functional capacity between the respondents whose functional capacity was positively influenced by rehabilitation and those who did not experience such an improvement (Table 1).

A conducted data analysis showed statistically significant correlations  $F(5, 65) = 70.32; p < 0.001$  between doing sports and their evaluation of functional capacity measured on the Barthel scale. Patients doing sports scored higher both at the beginning of rehabilitation (June) and after its end (November) than people who did not do any sport (Table 2).

The analysis showed statistically significant differences between the patients who were able to eat on their own and those who needed to be fed. Self-feeding respondents scored higher on the Barthel scale as far as their functional capacity was concerned both at the beginning of rehabilitation and after its end (Table 3).

The analysis showed statistically significant correlations between the ability to maintain verbal contact

and the evaluation on the Barthel scale at the beginning of rehabilitation and after its end (Table 4).

The analysis did not show any statistically significant correlations between the stroke experienced in the past and the level of functional capacity either at the beginning of rehabilitation or after its end (Table 5).

## DISCUSSION

Elderly patients staying in nursing homes can be at risk of an increasing decline of their functional self-reliability and physical capacity. Individualized approach to patients' problems allows for maintaining functional capacity of the elderly patient on the optimal

**Table 1.** Impact of rehabilitation on the assessment of the efficiency of the subjects according to the Barthel scale

Survey time	Barthel scale	Impact of rehabilitation on the improvement of patients' condition	M $\pm$ SD	Min–Max	Z	p
November		yes (n = 41)	28.8 $\pm$ 13.3	0-45	3.6	< 0,001
		no (n = 24)	15.2 $\pm$ 13.1	0-40		

M – mean; SD – standard deviation; Min – minimum score; Max – maximum score; Z – Mann-Whitney U test; p – significance level for Z test

**Table 2.** Playing sports and assessing the fitness of the subjects under the Barthel Scale at the beginning and after the end of rehabilitation

Survey time	Barthel scale	Doing sports in the past	M $\pm$ SD	Min–Max	Z	p
June		yes (n = 33)	28 $\pm$ 11.5	5-40	3.2	0.002
		no (n = 32)	16.9 $\pm$ 14.5	0-40		
November		yes (n = 33)	28.8 $\pm$ 13.2	0-45	2.9	0.004
		no (n = 32)	18.6 $\pm$ 14.6	0-45		

M – mean; SD – standard deviation; Min – minimum score; Max – maximum score; Z – Mann-Whitney U test; p – significance level for Z test

**Table 3.** Self-feeding and the assessment of fitness of the subjects under the Barthel Scale at the beginning and after the end of rehabilitation

Survey time	Barthel scale	Self-feeding	M $\pm$ SD	Min–Max	Z	p
June		yes (n = 48)	27.8 $\pm$ 11.8	5-40	5.1	< 0.001
		no (n = 17)	7.7 $\pm$ 8.1	0-25		
November		yes (n = 48)	29 $\pm$ 12.7	0-45	4.8	< 0.001
		no (n = 17)	9.2 $\pm$ 8.7	0-30		

M – mean; SD – standard deviation; Min – minimum score; Max – maximum score; Z – Mann-Whitney U test; p – significance level for Z test

**Table 4.** Opportunity to make verbal contact and assess the fitness of respondents according to the Barthel scale at the beginning and after the end of rehabilitation

Survey time	Barthel scale	Opportunity to make verbal contact with patient	M $\pm$ SD	Min–Max	Z	p
June		yes (n = 46)	26.4 $\pm$ 12.5	5-40	3.5	< 0.001
		no (n = 19)	13.2 $\pm$ 13.6	0-40		
November		yes (n = 46)	27.3 $\pm$ 13.6	0-45	3.1	0.002
		no (n = 19)	15.3 $\pm$ 14.1	0-40		

M – mean; SD – standard deviation; Min – minimum score; Max – maximum score; Z – Mann-Whitney U test; p – significance level for Z test

**Table 5.** Opportunity to make verbal contact and assess the fitness of respondents according the Barthel scale at the beginning and after the end of rehabilitation

Survey time	Barthel scale	Stroke	M ±SD	Min–Max	Z	p
June		yes (n = 43)	20.9 ±14.4	0-40	1.3	0.197
		no (n =22)	25.7 ±13.2	5-40		
November		yes (n= 43)	22.1 ±15.2	0-45	1.2	0.252
		no (n = 22)	27.1 ±13.3	5-45		

M – mean; SD – standard deviation; Min – minimum score; Max – maximum score; Z – Mann-Whitney U test; p – significance level for Z test

level. Systematic physical rehabilitation has a positive impact on patients' mobility.

Other currently accessible studies confirm that patients' psychophysical condition is influenced by physical exercise, especially age-adjusted rehabilitation, efficiency of their organism and intercurrent illnesses [9-13].

The study conducted by Gorzkowska *et al.* [11] confirms that regular physical therapy is beneficial also for patients' emotional life as it reduces stress and anxiety and improves patients' mood. These benefits have a direct effect on the elderly patients' life quality in a broad sense. An improvement of patients' physical condition leads to regaining self-confidence and, in consequence, to better chances for integration and performing important social roles.

Another study conducted by Tomaszewski's team [14] proved that physical rehabilitation, which applies various methods adapted to age requirements, has an enormous potential and may, at least to some extent, help to reduce functional deficits and fight back isolation and passiveness. Consequently, patients' sense of independence and social usefulness is secured. Moreover, proper rehabilitation makes the organism develop beneficial adaptation mechanisms.

The authors' own study also proved a positive impact of rehabilitation on the improvement in elderly patients' functioning. The patients who took part in regular rehabilitation scored higher on the Barthel Scale.

Kozak-Szkopek's team [15] examined the influence of physical therapy on psychophysical condition of elderly patients. The aforementioned study was conducted in a group of 22 women aged between 72 and 88. The program of physical therapy lasted 2 months. It included health education and 30-minute physical workout sessions in groups which took place 3 times a week. After such a therapy, a statistically significant improvement could be observed in the respondents' hand grip strength and it was accompanied by a general improvement in the functioning of their organisms. The authors' own research also confirms a positive influence of physical therapy on the improvement in elderly patients' functioning. After completing their rehabilitation, patients obtained higher scores on the Barthel scale.

Another study by Szczepańska-Gieracha *et al.* [16] dealt with the efficiency of physical therapy in elderly patients rehabilitated in the environment of nursing homes. The researchers found out that an essential factor determining the positive outcome of the physical therapy was the type of the main health problem which was the reason of rehabilitation ( $p = 0.0106$ ). The type of disease and the progress in physical therapy after the first month of hospitalization were the most important predictors for the positive outcome of the whole rehabilitation process provided by the nursing home. Positive outcome of the rehabilitation process provided by the nursing home was influenced by the type of trauma which the patients suffered. Physical therapy was considerably less effective in the case of patients suffering from chronic diseases of the old age and those who had a stroke.

Miller's research [17] conducted in a group of stroke patients showed that an active participation of both patients and their family members in the process of post-stroke rehabilitation has a positive influence on the final positive outcome. The study proved the existence of some deficits responsible for deterioration in general functioning of patients who suffered from brain stroke. Similar results were obtained by Marciniak's team [18] which studied a group of stroke patients who underwent immediate and regular rehabilitation program. The authors' own research did not confirm the thesis about deterioration in patients' functioning because no correlation was found between functioning capacity and stroke.

Marchewka *et al.* [19] conducted a research into the influence of physical activity at a young age and the quality of life of elderly patients. The results led to a conclusion that various intensity of physical activity before the age of 35 which was declared by respondents had a significant impact on their quality of life in later years. The respondents who used to be very active in the past evaluated their health much higher and coped better with undertaken everyday activities. Also spending free time in an active way with their families at a young age had a significant impact on respondents' current health condition and their functional capacity. It was confirmed by the results of the authors' own study in which respondents who used to do

sports in the past scored much higher on the Barthel scale as far as their physical condition was concerned.

A frequent problem of the old age is senile dementia. The study conducted by Wdowiak *et al.* [20] prove that patients suffering from dementia lose the ability to take in new information, their language functions deteriorate gradually and they tend to lose communication skills with time. These changes are frequently accompanied by behavioural problems or sleep and wakefulness disorders. An analysis of the authors' own study showed that in the case of patients who were able to maintain verbal contact their evaluation of functional capacity on the Barthel scale was higher both at the beginning of rehabilitation and after its end.

## CONCLUSIONS

1. According to the respondents immediate and regular rehabilitation has a significant influence on the improvement of health condition of nursing home residents.
2. Past physical activity and proper nutrition have an influence on the progress in rehabilitation of nursing home residents.

### Disclosure

The authors declare no conflict of interest.

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