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Determinants of Functional Capacity of Patients Who Experienced Haemorrhagic Stroke

Uwarunkowania sprawności funkcjonalnej pacjentów po przebytym incydencie udaru krwotocznego mózgu

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Abstract

Introduction. Independence in performing basic activities of daily living is an important exponent of the quality of human life. An essential component of nursing services is a systematic analysis of the functional capacity of patients in the acute phase of the brain vascular disease. This creates opportunities to plan holistic and personalized care.
Aim. Evaluation of functional capacity of patients with prior hemorrhagic brain stroke according to selected socio-demographic variables.
Material and Methods. The study included 53 patients with a prior cerebral hemorrhagic stroke, hospitalized in the Department of Neurology of the Provincial Hospital in Plock. As a research tool the Barthel's Scale Questionnaire was used, and it was supplemented with the certificate of patients' socio-demographic data.
Results. The research results confirm the effectiveness of intensive, professional medical practice regarding patients after prior incident of brain stroke. They are in fact reflected in the improvement of patients' functional capacity. However, some selected socio-demographic factors significantly influenced greater independence of the patients in activities of their daily living. Among all the patients surveyed after the incident of stroke, there was found a clear improvement in functional capacity on the day of hospitalization completion.
Conclusions.
1. Men after the incident of hemorrhagic brain stroke show a lower functional efficiency compared to women.
2. Age advancement significantly reduces the functional capacity after the incident of haemorrhagic stroke of the brain.
3. Education significantly affects the level of functional capacity of patients after hemorrhagic stroke of the brain.
4. Marital status and place of residence do not substantially affect the differences in the functional capacity of patients after brain hemorrhagic stroke. **(JNNN 2015;4(2):62–68)**

Key Words: brain stroke, functional capacity, quality of life

Streszczenie

Wstęp. Samodzielność w wykonywaniu podstawowych czynności dnia codziennego to istotny wykładnik jakości życia człowieka. Niezbędnym elementem świadczeń pielęgniarki jest systematyczna analiza sprawności funkcjonalnej pacjentów w ostrym okresie choroby naczyniowej mózgu. Stwarza to szanse na projektowanie holistycznej i zindywidualizowanej opieki.
Cel. Ocena sprawności funkcjonalnej pacjentów po przebytym udarze krwotocznym mózgu w zależności od wybranych zmiennych socjodemograficznych.
Materiał i metody. Badania zostały przeprowadzone wśród 53 pacjentów po udarze krwotocznym mózgu, hospitalizowanych w Oddziale Neurologicznym Wojewódzkiego Szpitala Zespolonego w Płocku. Jako narzędzie badawcze wykorzystano kwestionariusz skali Barthel uzupełniony o metryczkę z danymi socjodemograficznymi chorych.

Wyniki. Wyniki badań potwierdzają skuteczność intensywnego, profesjonalnego postępowania medycznego w odniesieniu do pacjentów po incydencie udaru mózgu. Znajdują bowiem odzwierciedlenie w poprawie sprawności funkcjonalnej badanych. Niemniej jednak wybrane czynniki socjodemograficzne istotnie wpływały na większą samodzielność pacjentów w czynnościach dnia codziennego. Wśród wszystkich badanych po incydencie udaru mózgu stwierdzono wyraźną poprawę w zakresie sprawności funkcjonalnej w dniu zakończenia hospitalizacji.

Wnioski.

1. Mężczyźni po incydencie udaru krwotocznego mózgu wykazują niższą sprawność funkcjonalną w porównaniu z kobietami.
2. Zaawansowanie wieku istotnie obniża sprawność funkcjonalną po incydencie udaru krwotocznego mózgu.
3. Wykształcenie wpływa istotnie na poziom sprawności funkcjonalnej chorych po udarze krwotocznym mózgu.
4. Stan cywilny i miejsce zamieszkania nie wpływają istotnie na różnice w sprawności funkcjonalnej chorych po udarze krwotocznym mózgu. **(PNN 2015;4(2):62–68)**

Słowa kluczowe: udar mózgu, wydolność funkcjonalna, jakość życia

Introduction

The brain stroke is a sudden life-threatening condition that is manifested by focal or generalized brain activity dysfunctions, which are maintained for more than 24 hours and which do not have any other reason than that of vascular nature. It is estimated that 80–85% of strokes are of ischemic nature, whereas the remaining 15–20% are hemorrhagic strokes [1].

The stroke is now one of the most serious and most common neurological diseases in the world. Due to the high mortality rate, it is widely regarded as a condition of immediate threat to life. A worrying phenomenon in Poland is the fact of high rates of mortality and functional disability of patients resulting from this reason, compared with the data obtained in other countries [2].

Brain hemorrhagic stroke means extravasation of blood into the brain parenchyma resulting from various reasons. It is usually caused by cerebrovascular disease, changes in blood leading to congealment disorders, as well as by hemodynamic disorders that cause a sudden rise in blood pressure. The most common reason for bleeding are probably degenerative changes that affect the walls of small blood vessels of the brain [3].

The centre of bleeding may gradually increase, causing pressure and displacements of adjacent brain structures [2]. The clinical significance of this form of stroke results from the frequency of its occurrence as well as from a and high rate of mortality of patients. It concerns approximately 25–60% of patients [4]. The annual incidence of intracerebral hemorrhage ranges from 20 to 60 cases/100 000 adults aged from 45 to 84 years. The largest incidence was found among the Japanese — 55 cases/100 000/a year and in black people — 50 cases /100 000/a year. The smallest one was found, in turn, among white people — 28 cases/100 000/a year [3].

Functional capacity is the ability to cope with activities related to daily living. The simplest human activity requires mental capacity, an efficient way of transferring environmental stimuli to the movement system, which participates in the performance of activities. The functional capacity has a significant psychological dimension, because its deficits adversely affect the well-being and the quality of human life. Independent and efficient functioning in everyday life has a positive effect on physical and mental condition of the patient and favours the sense of independence [5,6].

The source of the patient's problems which occur after the stroke are clinical symptoms, possible complications and consequences in the form of reduced physical and mental efficiency, which are manifested in:

— the loss of correctly controlled motor skills,
— facial-tongue paresis,
— dysesthesia,
— incontinence,
— hemianopsia,
— speech disorders,
— disorders of other higher nervous activity,
— disorder of consciousness and awareness,
— mental disorders [7].

Stroke is the main reason for disability in adults. Clinical evaluation of the patient after the incident of stroke is focused on finding the occurrence of symptoms of focal damage done to the central nervous system as well as on the determination of neurological deficits. It is necessary to determine the patient's independence in performing activities of daily living, the assessment of cognitive deficits as well as emotional and intellectual disorders [8]. Scales are the tools used for assessing patients' functional capacity. They are used for the purpose of evaluating the progress of therapy, classifying patients for rehabilitation and assessment of its performance, forecasting the long-term performance indicators, evaluation of independence in the performance of daily activities, estimating patients' needs in providing possible care, as well as for the purpose of issuing medical opinions [9].

The aim of the study was to evaluate the functional capacity of patients after cerebral hemorrhagic stroke depending on the selected socio-demographic variables such as age, sex, education, marital status, place of residence. The analyses of respondents' independence

regarding the performance of daily activities were carried out twice: on the day of admission and at discharge from hospital. The results obtained were statistically analyzed by means of homogeneity test χ^2 using Statistica 8.0 set by StatSoft. A 5% risk of the final error was adopted. The value of probability $p<0.05$ was considered as statistically significant.

Materials and Methods

The research included 53 patients who had experienced haemorrhagic brain stroke and were hospitalized in the Department of Neurology at the Provincial Hospital Complex in Plock. They regarded both women and men over the age of 40. Prior to the research commencement, relevant consent to its performance was obtained from the respondents, the head of the hospital as well as from the Committee on Bioethics.

The Barthel Scale questionnaire was used as the research tool supplemented with the socio-demographic data of the patient. The Barthel Index on the scale of 0, 5, 10 and 15 points, enables the assessment of the ability of the surveyed of self-service in ten basic activities of daily life, such as: eating, moving from bed to wheelchair and moving back, personal hygiene (washing, combing, shaving), using the toilet, bathing, moving around on flat terrain, climbing up and down the stairs, dressing up and undressing, control of bladder and bowel function. The index is widely applied for functional evaluation of patients, also after the stroke. The scope of the total score ranges from 0 to 100, where 100 points means full capacity, and 0 points the lack of independence [10].

The vast majority of respondents were men (58.5% — 31 patients) compared to hospitalized women (41.5% — 22 patients). The largest group consisted of patients aged 45–64 years (39.6% — 21 patients) and over 75 years of age (37.8% — 20 patients). In the age group ranging 65–74 years there was the smallest number of respondents (22.6% — 12 patients). Most respondents (45.3% — 24 patients) were married. Another group consisted of widows/widowers (37.7% — 20 respondents). 11.3% (6 persons) of the respondents were divorced and 5.7% of respondents (3 persons) were not married. The largest group, ie. 39.6% (21 persons) consisted of patients with vocational education. 30.2% of the respondents (16 people), in turn, had primary education and 22.6% (12 people) had secondary education. The smallest group — 7.6% (4 persons) had a higher education. The vast majority of respondents (58.5% — 31 patients) lived in the city. The remaining respondents (41.5% — 22 patients) were the residents of rural areas. Cardiovascular system diseases identified before the incident of stroke regarded more than a half of the respondents (55.7% — 34 persons).The coexisting diabetes was reported by 19.7% of the respondents (12 patients). Whereas, 24.6% of patients (15 respondents) did not define any coexisting diseases.

Results

Table 1 and Figure present an assessment of the respondents according to the Barthel Scale on the day of their admission and on discharge from hospital. The average number of points on the Barthel Scale scored by the respondents ranged 14.53±1.4 at the time of admission to the ward (median: 11.0; range: 0–100 points). That means that the vast majority of respondents were classified as patients in 'very serious ' condition and required intensive help related to basic activities of

Table 1. Assessment of respondents according to the Barthel Scale on the day of admission and discharge from hospital

Assessment of patients according to the Barthel Scale	On the day of admission	On the day of discharge
	Average number of points	
Having meals	2.74	6.89
Moving from bed to chair and back, sitting	0.57	3.96
Maintaining personal hygiene	0.28	3.96
Using the toilet	0.19	3.87
Washing, bathing the whole body	0.00	2.64
Moving on flat surfaces	0.09	5.85
Climbing up and down stairs	0.28	2.08
Dressing and undressing	1.32	4.72
Stool/sphincter control	4.81	6.04
Urine/bladder sphincter of bladder control	4.25	5.75
The average overall number of points	14.53	45.75

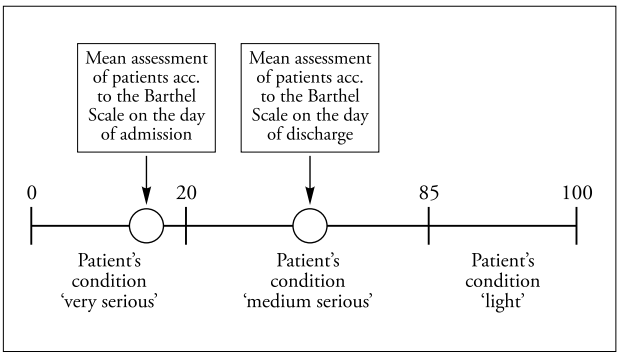

Figure. Assessment of functional condition according to the Barthel Scale, after hemorrhagic brain stroke

daily living. Whereas, at the time of hospital discharge there was observed improvement of the scope of independence of the respondents and partial use of support in self-service activities. The average number of points scored by them ranged 45.75±1.5, which allowed to classify them to the group of patients whose condition was described as 'medium serious'.

Table 2 presents the functional capacity of patients surveyed according to the Barthel Scale depending on their gender, on the day of admission to the ward. It has been confirmed that there is a statistically significant relationship between gender of the respondents and their assessment by the Barthel Scale. On the day of their admission, more than half of women (54.54% — 12 patients) were in the 'medium serious' condition, while at the same time the majority of men (77.42% — 24 patients) were in 'very serious' condition.

Table 3 presents the functional capacity of patients surveyed according to the Barthel Scale depending on their gender, on the day of discharge from the ward. It has been confirmed that there is no statistically significant relationship between gender of the respondents and their assessment by the Barthel Scale. However, on the day of discharge over 68% (15 patients) of the women and over 45% (14 patients) of men, showed the 'medium-serious' condition. Whereas the 'very serious' condition was recorded more frequently with more than 45% (14 patients) of men compared to 18.18% (4 patients) of women.

Table 4 presents the functional capacity of patients surveyed according to Barthel Scale depending on their age, on the day of their admission to the ward. It has been stated that there is statistically significant relationship between the age of the respondents and their assessment according to Barthel Scale. On the day of admission the respondents aged 65–74 years (58.33% — 7 persons) and over 75 years of age (90.00% — 19 persons) showed 'very serious' condition. None of the respondents from the aforementioned age range was registered in the group of patients in 'light condition' which is when they would be independent in performing basic activities of daily living. Such a situation concerned only one person (4.76%) from the group of patients in the youngest age category 45–64 years.

Table 5 presents the functional capacity of respondents surveyed according to the Barthel Scale depending on their age on the day of their discharge from the ward. It has been found that there is a statistically significant relationship between the age of respondents and their assessment according to the Barthel Scale. On the day of their discharge the vast majority of respondents, regardless of age, were in the group indicating 'medium serious' condition. On the other hand, there were

Table 2. Functional capacity of respondents according to the Barthel Scale depending on gender, on the day of admission to the ward

Does gender significantly affect functional capacity of respondents after the incident of hemorrhagic brain stroke	Patient's condition 'light'		Patient's condition 'medium serious'		Patient's condition 'very serious'		Overall
	n=1	%	n=19	%	n=33	%	
Woman	1	4.55	12	54.54	9	40.91	22
Man	0	0.00	7	22.58	24	77.42	31
Significance χ^2			7.83				53

Table 3. Functional capacity of respondents according to the Barthel Scale depending on gender, on the day of discharge from to the ward

Does gender significantly affect functional capacity of respondents after the incident of hemorrhagic brain stroke	Patient's condition 'light'		Patient's condition 'medium serious'		Patient's condtion 'very serious'		Overall
	n=6	%	n=29	%	n=18	%	
Woman	3	13.64	15	68.18	4	18.18	22
Man	3	9.68	14	45.16	14	45.16	31
Significance χ^2			4.18				53

Table 4. Functional capacity of respondents according to the Barthel Scale depending on their age, on the day of admission to the ward

Does age significantly affect functional capacity of respondents after the incident of hemorrhagic brain stroke	Patient's condition 'light'		Patient's condition 'medium serious'		Patien's condition 'very serious'		Overall
	n=1	%	n=19	%	n=33	%	
45–64 years	1	4.76	12	57.14	8	38.10	21
65–74 years	0	0.00	5	41.67	7	58.33	12
75 years and more	0	0.00	2	10.00	18	90.00	20
Significance χ^2			12.49				53

Table 5. Functional capacity of respondents according to the Barthel Scale depending on age, on the day of discharge the ward

Does age significantly affect functional capacity of respondents after the incident of hemorrhagic brain stroke	Patient's conditio 'light'		Patient's condition 'medium serious'		Patien's condition 'very serious'		Overall
	n=6	%	n=29	%	n=18	%	
45–64 years	4	19.05	13	61.90	4	19.05	21
65–74 years	2	16.67	4	33.33	6	50.00	12
75 years and more	0	0.00	12	60.00	8	40.00	20
Significance χ^2			13.46				53

Table 6. Functional capacity of respondents according to the Barthel Scale depending on their education, on the day of admission to the ward

Does education significantly affect functional capacity of respondents after the incident of hemorrhagic brain stroke	Patient's condition 'light'		Patient's condition 'medium serious'		Patient's condition 'very serious'		Overall
	n=1	%	n=19	%	n=33	%	
Primary	0	0.00	4	25.00	12	75.00	16
Vocational	0	0.00	8	38.10	13	61.90	21
Secondary	0	0.00	5	41.67	7	58.33	12
Higher	1	25.00	2	50.00	1	25.00	4
Significance χ^2			14.48				53

Table 7. Functional capacity of respondents according to the Barthel Scale depending on their education, on the day of discharge from the ward

Does education significantly affect functional capacity of respondents after the incident of hemorrhagic brain stroke	Patient's condition 'light'		Patient's condition 'medium serious'		Patient's condition 'very serious'		Overall
	n=6	%	n=29	%	n=18	%	
Primary	0	0.00	10	62.50	6	37.50	16
Vocational	1	4.77	13	61.90	7	33.33	21
Secondary	2	16.66	5	41.67	5	41.67	12
Higher	3	75.00	1	25.00	0	0.00	4
Significance χ^2			20.26				53

significantly fewer youngest respondents in the 45–64 age range in a 'very serious' condition (19.05% — 4 persons), compared to other age groups.

Table 6 presents the functional capacity of respondents surveyed according to the Barthel Scale depending on their educational background on the day of their admission to the ward. It has been found that there is a statistically significant relationship between respondents' level of education and their evaluation according to the Barthel Scale. On the admission day to hospital, the vast majority of the respondents with primary (75.00% — 12 patients) and vocational education (61.90% —

13 patients) seemed to be in a 'very serious' condition. Whereas 'light' condition was identified only in 1 patient (25.0%) with a university degree.

Table 7 shows the functional capability of respondents surveyed according to the Barthel Scale, according to their education on the day of their discharge from the ward. It has been confirmed that there is a statistically significant correlation between the education of respondents and their assessment according to the Barthel Scale. On the day of discharge from hospital in the group of patients in the 'light condition' there were more often recorded respondents with higher (75.00% — 3 persons) and secondary education (16.66% — 2 persons). The respondents with primary (62.50% — 10 patients) and vocational education (61.90% — 13 patients), more often indicated the 'medium serious' condition.

No statistically significant differences have been recorded in terms of functional capacity of respondents, depending on such variables as marital status and the place of residence.

Discussion

When analyzing the survey results, an improvement in the functional status of patients after a hemorrhagic stroke can be observed with time of hospitalization and treatment plan implemented, which assumed improvement of the patients. The average number of points on the Barthel Scale scored by the respondents at the time of admission to the ward qualified most of them to a group of patients being in 'very serious condition' when they needed significant assistance in most basic, daily activities. However, on the day of discharge there was observed an improvement in the functional capacity of the respondents, which resulted in their being included into groups of respondents of the 'medium-serious' condition, who required partial assistance in the performance of self-service activities.

Improvement of the efficiency of functionality and thus other aspects of quality of life was reported in the research carried out by Jaracz and Kozubski. Their studies included a group of 72 patients after the first brain stroke within the first 24 hours of hospitalization, 18–21 days after admission, as well as 3 and 6 months from the beginning of the illness. Quality of life, neurological, functional and emotional condition were assessed. Among all patients, the greatest improvement was observed within the first 3 months after stroke [11]. Similarly, Lorencowicz R. et al., registered an increase in the scope of fitness, the long-term effectiveness index, and therefore the effectiveness of neurological intensive treatment in the group of patients after brain stroke [9].

In the research results included in the study, men after the incident of hemorrhagic stroke had significantly lower functional efficiency, compared to women on the day of admission to hospital. However, on the day of discharge from the ward no significant differences were observed, according to the gender, in patients' self-independence. However, women more often completed hospitalization with higher performance in terms of functionality. Similar results have been obtained by Bartoszek et al., who studied 115 patients aged 18–84 years with various neurological diseases. The influence of health and socio-demographic factors on self-service capacity of patients was analysed. Women showed a higher level of self-service capacity than men did [12]. Wawrzyniak S. and K. Wawrzyniak in turn, analyzing the effect of selected socio-demographic factors on the course of ischemic stroke among 170 patients, have proved that men on the days of their admission and discharge presented significantly smaller disability than women. These differences, however, decreased with age and became statistically insignificant [13].

It has been found in the studies presented that age significantly contributes to the reduction of the functional capacity of respondents after the incident of hemorrhagic stroke. The elderly showed higher deficits in independence regarding the performance of daily routine activities compared to patients from younger age groups. The results of the aforementioned studies carried out by Wawrzyniak S. and K. Wawrzyniak confirm that greater disability and more severe course of the stroke affects older patients [13]. Similarly, Bartoszek A. et al. have confirmed that there is a correlation between age and the level of self-service capacity of patients in the course of neurologically based diseases, as the age advancement contributed to the lowering of the level of patients' efficiency [12].

Our studies have proved that a higher level of education affects the scope of respondents' functional capacity. Similar results have been obtained by Bartoszek A. et al. in the aforementioned studies where it has been determined that people with lower levels of education, present a significantly lower average level of capacity, compared to patients with neurological disorders with secondary or higher education [12].

Conclusions

The analysis of literature and of our research results allows to draw the following conclusions:

1. Men after the incident of hemorrhagic brain stroke show lower functional capacity compared to women.
2. The advancement of age significantly reduces the functional capacity after the incident of hemorrhagic brain stroke.

3. Education significantly affects the level of functional capacity in patients after hemorrhagic brain stroke.
4. Marital status and place of residence do not significantly affect the differences in the functional capacity of patients after hemorrhagic brain stroke.

Implications for Nursing Practice

Independence in performing basic daily routine activities is an important exponent of the quality of human life. Not only systematic analysis of functional capacity of patients chronically ill is an essential component of nursing services, but also in the acute period of cerebral vascular disease. This creates opportunities to design such nursing care which, apart from its holistic dimension, will also refer to the individualized nature of relevant activities.

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(A — Concept and design of research, B — Collection and/or compilation of data, C — Analysis and interpretation of data, D — Statistical analysis, E — Writing an article, F — Search of the literature, G — Critical article analysis, H — Approval of the final version of the article)
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