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Factors Related to Functional Improvement of Patients After Ischemic Stroke and the Prognostic Value of the Functional State Rating Scale

Czynniki związane z poprawą funkcjonalną chorych po udarze niedokrwiennym mózgu oraz wartość rokownicza skal oceny stanu funkcjonalnego

Katarzyna Ziejka¹, Walenty M. Nyka², Kamil Chwojncki²,
Marcelina Skrzypek-Czerko³, Piotr Kasprzak¹

¹Regional Specialist Hospital Dr. Wl. Bieganski in Grudziądz, Poland

²Department of Adult Neurology, Medical University of Gdańsk, Poland

³Department of Neurological — Psychiatric Nursing, Medical University of Gdańsk, Poland

Abstract

Introduction. Stroke is still the leading cause of disability. Stroke experiencing reduces the quality of life in the functional and psychological sphere. It is recommended by the European Stroke Initiative that patients with stroke should be guaranteed rehabilitation as early as possible.

Aim. Assessment of the impact of various factors on the post-stroke functional condition and the evaluation of the usefulness of scales assessing the functional status in a distant prognosis.

Material and Methods. The study included 103 patients hospitalised in the Ward of Systemic Rehabilitation with the Neurological Rehabilitation Unit of RSS in Grudziądz. It was carried out with the use of a questionnaire of sociodemographic, clinical data, selected functional scales and categorization of nursing care.

Results. The greatest functional progress during hospitalization was observed within the first 21 days of rehabilitation; whereas in week four it was the smallest.

Conclusions. Clinical NIHSS scale, the analysed scales and functional categorization of nursing care proved to be appropriate tools to predict functional post-stroke prognosis, where the strongest impact in the multifactorial analysis was found for BI. (JNPN 2017;6(1):11–19)

Key Words: stroke, disability, post-stroke rehabilitation

Streszczenie

Wstęp. Udar mózgu nadal jest najczęstszą przyczyną niepełnosprawności. Przebycie udaru powoduje obniżenie jakości życia w sferze funkcjonalnej i psychicznej. Rekomendacje Europejskiej Inicjatywy Udarowej zalecają, aby chory z udarem mózgu miał jak najwcześniej zapewnioną rehabilitację.

Cel. Ocena wpływu różnych czynników na poudarowy stan funkcjonalny oraz ocena przydatności skal oceny stanu funkcjonalnego w odległym rokowaniu.

Material i metody. Badaniem objęto 103 pacjentów hospitalizowanych w Oddziale Rehabilitacji Ogólnoustrojowej z Pododdziałem Rehabilitacji Neurologicznej RSS w Grudziądz. Badanie przeprowadzono za pomocą kwestionariusza danych socjodemograficznych, klinicznych, wybranych skal funkcjonalnych oraz kategoryzacji opieki pielęgniarskiej.

Wyniki. Największy postęp funkcjonalny w czasie pobytu na oddziale obserwowano w ciągu pierwszych 21 dni rehabilitacji; w 4. tygodniu był on najmniejszy.

Wnioski. Skala kliniczna NIHSS, analizowane skale funkcjonalne oraz kategoryzacja opieki pielęgniarskiej okazały się dobrymi narzędziami do prognozowania funkcjonalnego rokowania poudarowego, przy czym najsilniejszy wpływ w analizie wieloczynnikowej stwierdzono dla BI. (PNN 2017;6(1):11–19)

Słowa kluczowe: udar mózgu, niepełnosprawność, rehabilitacja poudarowa

Introduction

Strokes are currently extremely significant economic and social problems, being one of the major diseases that threaten human life [1].

Post-stroke rehabilitation is a very important element in the treatment of patients with BS. This process starts already during hospitalization and continues throughout the patient's life [2]. Early commencement of rehabilitation following BS plays an important role in improving independence in the performance of daily activities.

Brain stroke triggers stress in patients and their families due to the new and unknown situation. Life of patients after BS has been the subject of numerous studies. Patients must cope with a lot of problems regarding, among other things, the loss of independence, work, their social status, as well as with the issues related to anxiety, worsening their financial situation and to changes in family environment [3]. Worldwide, there are over 55 million people after BS. In half of them this disease has had a significant effect on their functioning in the scope of daily activities [4].

Due to the fact that BS is included in the list of the most common causes of death, it is very important to identify the factors that may contribute to the improvement in post-stroke rehabilitation. In light of the studies carried out, it was found that the quality of life after BS, also in the functional dimension, is reduced as a result of motor deficit, which usually leads to significant disability [5].

The study results indicate that 30–42% of patients with BS continue to live independently without any visible restrictions. It is therefore important to identify the factors enabling the prediction of the functional status of patients in order to establish realistic goals of rehabilitation and prepare the family or caretakers to the return of the patient's home. According to some studies those prognostic factors include age, severity of stroke in the early stages, patient's awareness of the disease, incontinence, severity of paralysis, patient's confusion in place and time, preliminary result concerning the activities of daily living (ADL). Additionally there are mentioned: female gender, diabetes, hypertension, AF, lack of physical activity, heart diseases, depression, cognitive impairment, as well as the lack of support and of specialist care [6].

Within the period of 12 months following the brain stroke a third of patients die, and another third becomes disabled, which significantly reduces the performance of self-service activities, and also requires support and assistance from others. The most dynamic improvement occurs within the first 6 months after the stroke. Some authors have observed a recovery within the period ranging from three weeks to six months following the

stroke. Almost half of the patients regained functional independence. In other large studies it was shown that two thirds were unable to move within the first weeks following the stroke without any assistance [7].

According to the scientific studies published, after 6 months following BS, 22% of patients have not been able to move independently, 48% have been diagnosed with hemiparesis, 24–53% have required assistance in performing the activities of daily living, whereas in 12–18% there have appeared speech disorders [8].

Post-stroke rehabilitation is a very important element being an active process which starts during the hospitalisation period and is continued after patient's return to home environment. It aims at maximising patient's chances to return to active and creative life. Taking into account the fact that a variety of stroke symptoms are various and complex, rehabilitation is carried out by an interdisciplinary team [9]. The main goals of stroke rehabilitation is to restore the lost functions in the possibly highest degree, prevent complications and to improve the quality of life [10]. The result of the neurological rehabilitation applied is the reduction of the degree of disability and decrease of the number of complications resulting in subsequent hospitalisation periods [11].

According to the Declaration of Helsingborg an early post-stroke rehabilitation should include all patients after BS "without pre-selection" (1st Conference in 1996. 2nd Conference in 2006).

Modern rehabilitation assumes that each patient after BS from the beginning is treated in such a manner as if they were to regain completely all the lost functions. Compensatory measures can be taken only in the later period of rehabilitation when there are no effects of improvement [12]. According to the assumptions of the Declaration of Helsingborg, by 2015 70% of patients in the third month after BS will have regained independence in activities of daily living as a result of the rehabilitation applied. Unfortunately, the situation in Poland does not meet these assumptions [13].

In the process of rehabilitation of patients with BS it is very important to assess the degree of disability. This assessment should also include intellectual capacity disorders, mainly in the field of cognitive functions [14]. It is important to pay special attention to the functional status of patients after the completion of the rehabilitation process, when they return to their own environment.

The research conducted by Desrosiers et al. [15] suggests that the biggest problem for patients after BS is to participate in activities related to leisure, career and education. Improving the rehabilitation process makes it easier for the patient to gain the greatest degree of independence in daily life, which in turn leads to a reduction in the degree of disability as well as to the improvement of the quality of life [16]. Kwakkeli et al.

[17] in their observations note that early rehabilitation is a very significant element in the care of the BS patients; they emphasize its impact on the improvement of the functional status of patients.

The prospect of an early prediction of the functional status of a patient with stroke will facilitate an individual attitude to therapy and rehabilitation and will enable earlier preparation of support for patients after their leaving hospital and when they return to their home environment [18].

In most patients after BS during the first weeks and months some symptoms retreat, disability also decreases. However, in many other cases there is no complete recovery. Of those who suffered from BS, approximately 60% regain independence in the performance of daily living activities, and 80% — the ability to move. Post-stroke environmental rehabilitation is very significant in stroke care. Scientific studies prove its beneficial effect on the indicators of patients' disability and the quality of their lives [19].

BS in most cases leaves permanent disability, leading to partial or total dependence on third parties. In a patient after BS it is important to learn basic activities of daily living and implement self-care. It is the nurse, who through frequent contact with the patient is the one who starts this process of learning [20].

Self-care can be identified with independence in meeting basic needs, which may include control over physiological functions, eating, moving and maintaining personal hygiene [21]. In post-stroke rehabilitation efficient cooperation of an interdisciplinary team has a significant impact on the pace of regaining patients' independence in daily functioning. One of the links of that team consists of nurses, who have appropriate practical qualifications and broad knowledge, which allows them to execute the nursing process adjusted to the patient's clinical condition.

The main criteria for assessing the severity of the patient's condition from the point of view of nursing is also the verbal contact, the degree of independence in performing activities of daily living, motor activity, the ability to swallow, a tendency of bed sore formation and sphincter function. The main role of the nurse in the rehabilitation of a patient with BS is the prevention of complications of a stroke, motivating the patient to perform independently activities of daily living, watch over the patient during the performance of exercise taught by a physiotherapist, assistance in moving, implementation of self-care and education of patients and their families [22,23].

The stroke happens not to leave a permanent disability, but it may result in a change to the patient's psyche. Patients can manifest anxiety, worry about their future, how they will function after returning to the home environment. Therefore, the role of the nurse is to

motivate them to actions, support and include their families in the process of care and rehabilitation [20].

The stroke can often result in impaired communication. A key element is the ability of the nurse to communicate with patients, which allows to understand their needs. Nurses by constant contact with the patient have the opportunity to collect important information about the communication deficits in the patient and they forward important observations to the other members of the therapeutic team [24,25].

The aims of this research consisted of:

1. Evaluation of the impact of clinical factors, including the risk factors for ischemic stroke, the location of the stroke focus and sociodemographic factors, on the post-stroke functional condition.
2. Evaluation of the usefulness of scales assessing the functional status in patients with ischemic stroke in a remote prognosis.

In order to make the purpose of research clear, the following research questions have been asked:

- is there a correlation between socio-demographic factors and functional improvement in patients with ischemic stroke?,
- can stroke risk factors and the location of the stroke focus contribute to the improvement of the functional status?,
- can the scales selected to assess the functional status of patients with ischemic stroke and the categorisation of nursing care have a prognostic value in remote prognosis?

Materials and Methods

The study was conducted at the Systemic Rehabilitation Ward with Neurological Rehabilitation Unit of the Regional Hospital in Grudziądz in 2011–2013. There were analysed the data of patients (retrospectively and prospectively), who were admitted to the ward in the framework of early neurological rehabilitation. The age of patients ranged 50–79 years. Demographic and clinical data were collected at three time points — the date of admission to the rehabilitation ward, in the course of hospitalisation, on the discharge day and 3 months after the stroke during a visit a rehabilitation center. The functional status of patients was assessed as a part of routine procedures performed in the ward. All patients were subject to comprehensive care and rehabilitation carried out by an interdisciplinary team consisting of a medical rehabilitation doctor, a nurse, a physiotherapist, a psychologist, a speech therapist and an occupational therapist. The process of rehabilitation was carried out during the whole stay.

The final draft of the dissertation has been approved by the Bioethical Committee of the Kuyavian-Pomeranian Regional Medical Chamber in Toruń (36/KB/13).

Results

The study group included 47 women and 56 men aged 50–79 years. The age median was 67 years, while the average age was 66.6 years. The average score on the NIHSS Scale at admission to the rehabilitation ward was 7.07 ± 4.73 . The functional status of 0–2 points on mRS scale was found in 4.8% of cases, the remaining patients (mRS 3–5 pts.) accounted for 95.2%. 61.2% of patients were residents of cities with the population of about 100.000 whereas the remaining 38.8% lived either in a small town or in a village. This has a significant relationship with the area of medicinal RSS in Grudziądz.

In the study group the vast majority — 88 (85.4%) — were people, in whom ischemic stroke occurred for the first time, while in the case of 15 respondents (14.6%) it was another cerebrovascular accident. Paresis of the right hand occurred in 51.46% of respondents, while paresis of the left hand — in 39.80%. Motor aphasia was diagnosed in 18.87% of patients, mixed aphasia in 6.6%, whereas the sensory aphasia — in 2.83% of patients. The unilateral neglect syndrome (UNS) was diagnosed in 16.98% of patients, where 16.04% of cases were left-hand, and in 0.94% — right-hand neglect.

The load by risk factors of ischemic stroke was as follows: hypertension — 80.77% of the respondents, diabetes — 31.86% of the respondents, history of atrial fibrillation — 18.84% of patients, lipid economy disorders — 78.27%, coronary artery disease and other heart diseases — 13.01% of the patients. In the study group, 45.13% of respondents declared to be nonsmokers, 23.51% of patients admitted smoking in the past, whereas 31.34% of respondents had smoked cigarettes until the moment of hospitalisation commencement. Body mass index $>30 \text{ kg/m}^2$ was found in 13.01% of patients. On the other hand, 12.29% of respondents abused alcohol. Low physical activity before the stroke was declared by 8.72% of the respondents. The most common mechanism of developing the disease was the mechanism of atherosclerosis that occurs on the background of extracranial carotid arteries atherosclerosis and intracranial vessels. In the study group there dominated strokes from the field of so-called anterior

circulation (TACI+PACI), a smaller percentage represented lacunar strokes (due to small brain vessels disease) and posteriori fossa ones (POCI).

Assessing the functional status of patients according to the selected clinicometrical scales, it was examined whether there was a correlation between the values of differences in the results obtained by patients on different scales on admission and after 3 months (Table).

Analysing the growth on each scale at weekly intervals, it was found that they were all statistically significant (Student's *t* test for dependent tests). The biggest functional improvement was observed in the 1st, 2nd and 3rd week of rehabilitation, in the 4th week it was the smallest (Figure 1).

In reference to BI and Rivermead Scales it was noted that the greatest improvement in the functional status occurred between the discharge from the Rehabilitation Ward and the third month after the stroke. The analysis of the data regarding the ability to walk independently

Table. Correlation between selected functional scales

Scale		Δ NIHSS	Δ BI	Δ Rivermead	Δ Repty
Δ NIHSS	r	1.00000	-0.36791	-0.22054	-0.21866
	p	–	0.0005	0.0413	0.0419
Δ BI	r	-0.36791	1.00000	0.83502	0.76388
	p	0.0005	–	<0.001	<0.001
Δ Rivermead	r	-0.22054	0.83502	1.00000	0.69004
	p	0.0413	<0.001	–	<0.001
Δ Repty	r	-0.21866	0.76388	0.69004	1.00000
	p	0.0419	<0.001	<0.001	–

r — Pearson correlation coefficient; p — level of significance; Δ NIHSS — difference in NIHSS values on admission and after 3 months; Δ BI — difference in BI values on admission and after 3 months; Δ Rivermead — difference of values on Rivermead Scale on admission and after 3 months; Δ Repty — difference in values on Repty Scale on admission and after 3 months

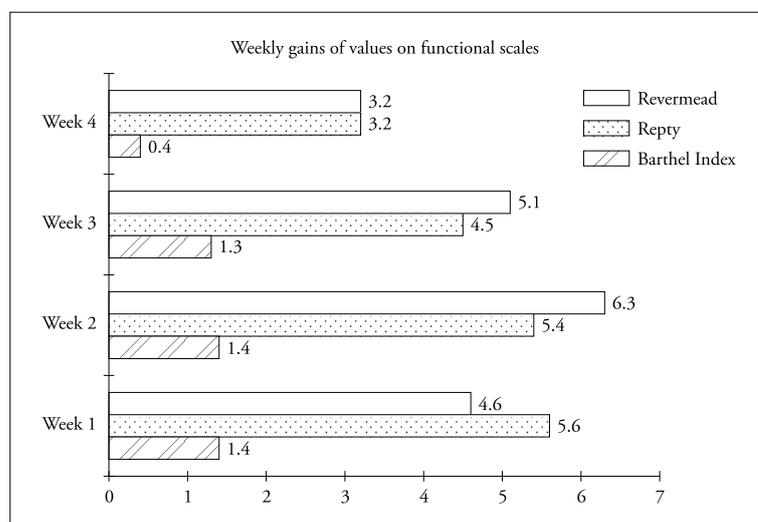


Figure 1. Weekly growth of the value on functional scales since the start of the rehabilitation at the rehabilitation ward

showed that after 3 months following the occurrence of the incident of stroke 61.45% of patients could move independently or with the use of an orthopedic item. This result improved by 44.96%. On the other hand, as regards independent use of the toilet, independence in this respect improved during the course of the research by 38.42%. In the period between admission to the ward and the 3rd month following the incidence of the disease in terms of changing one's seat the percentage of patients who did not need any assistance increased by 42.37%. Smaller progress has been made in terms of getting dressed, walking up and down the stairs and bathing. The smallest improvement in daily functioning was found in the category of having bath — only 30.12% of patients were independent in this respect.

Assessing the results on another scale — functional Rivermead — it was found that during the study the highest percentage of patients had regained independence in basic activities.

The category of nursing care was determined on the date of admission to the ward and at discharge. The analysis proved that the most dynamic changes were observed in the 3rd Category. During hospitalization, the percentage of patients in this category decreased by 27.18%. In the 1st category at discharge the percentage of patients increased by 19.42%, whereas in the 2nd Category — by 6%. The results clearly indicate the improvement of the functional status during the period of rehabilitation at the ward. The percentage of patients requiring intensive nursing care (3rd Category) declined with a simultaneous increase in the number of self-sufficient patients (1st Category) (Figure 2).

These results indicate a significant effect of all the scales tested on the prognosis for rehabilitation. It should also be noted that the greatest impact in the model is shown by NIHSS (an increase in the scale by 1 point reduces the likelihood of the result in mRS 0–2 points

by half), however the NIHSS scale is a clinical one. Among the functional scales the strongest impact of BI was found (the likelihood of the result in mRS 0–2 points grew with the point value increase on the scale by 1.3 times).

The Nursing Category, on admission even more than the NIHSS and BI score, determined the outcome in a multifactorial model — a change of the category by 1 point (for heavier) caused a nearly 90-percent decrease of the likelihood that the patient would score 0–2 points in mRS.

Discussion

A review of the literature on the rehabilitation of patients after UM leads to the conclusion, that there has been constant increase of interest of many researchers in developing the most effective methods of rehabilitation. The most important objective of post-stroke rehabilitation is to restore all the functions lost by the patient as a result of the disease, as well as the compensation for those which have been irretrievably lost. In the Assessment of the functional status of patients after BS, clinimetric scales were used. In this work BI, Rivermead Mobility Index and WFR were applied. Based on the assessment of the patient according to functional scales the nurse can determine which functions should be tried to be improved in the patient; which of them are the most significant for the patient, and which may impair the quality of patient's life. This is very important in determining nursing diagnosis and in planning appropriate action in the implementation of the nursing process, which is continuously subject to many modifications depending on changes of patient's health condition. There have been analysed the correlation between the scales of the functional status assessment, setting the coefficient of Pearson. It has been found that a strong correlation of the coefficient >0.7 was observed for WFR, BI and for Rivermead mobility index. In turn, NIHSS correlated negatively with the others, Pearson coefficient ranged 0.2–0.4. The value obtained indicates a moderate correlation at most. Both of these results are statistically significant ($p < 0.05$). They are also consistent with those obtained by other authors which regarded a correlation of the scales in question [26,27]. Similar results were obtained in their study by Ślusarz et al., where the result of correlation between BI and WFR was 0.97 [28].

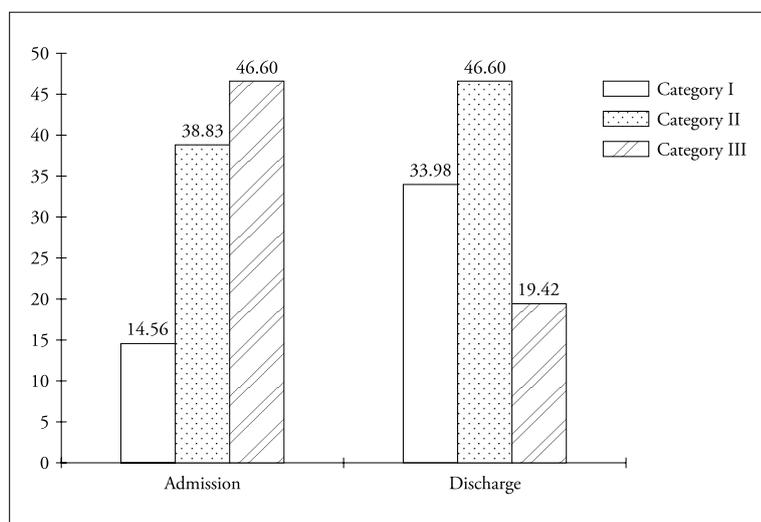


Figure 2. Changes in the categorization of nursing care during patients' stay at a rehabilitation ward

This study evaluated the impact of socio-demographic and stroke risk factors on the improvement of the functional condition. In

the described material, there was not observed any statistical significance between the presence of risk factors for stroke and functional improvement of patients. Taking into account the selected socio-demographic factors, such as place of residence, education, marital status and gender, no statistical significance was observed. Pop et al. [29] in a study conducted in Podkarpacie came to the conclusion that the place of residence does not affect the final results of rehabilitation. Opalińska et al. [30] found that gender and age did not significantly affect the results obtained in rehabilitation. Rynkiewicz et al. [16] carried out a similar study stating that age and gender showed independence of final effects, which proves the necessity of conducting the rehabilitation process in all patients, regardless of various factors. Different results were presented by Kleinrok et al. [18] in their research. In the material they presented data indicating that factors important for the functional status include education, marital status, nature of employment, place of residence and the occurrence of hypertension and diabetes. Assessing the post-stroke functional status, it was examined whether the location of the stroke focus can influence the effects of rehabilitation. The results of the analysis of variance of each scale in the function of damage location showed no relationship between the improvement of the functional status and the location of ischemic focus. However, determining with the use of scales and observing the dynamics of change in the period of patient's hospitalization at the rehabilitation ward, it has been concluded that in BI and WFR patients with the location of damage in the left hemisphere of the brain have achieved more progress compared to patients with the location of ischemic focus in the right hemisphere and the posterior cranial cavity. Different results have been by obtained Belt et al. [31] and Przysada et al. [32] who in their studies found a relationship between the location of ischemic focus and the effects of rehabilitation.

When conducting weekly assessment of selected activities by functional scales during hospitalization at the ward, it was noticed that the increases on scales are statistically significant. The greatest progress was observed in the 1st, 2nd and 3rd week of rehabilitation, whereas at week 4 it was the smallest. The greatest progress in the categories surveyed can be observed however, while comparing the period between discharge from hospital and a control visit at a rehabilitation center. This indicates an important role of the home environment, in the improvement patient's independence in the performance of daily living activities as well as of the factor of time itself required to learn the lost functions. A detailed review of selected activities significant in later functioning of the patient at home allows to obtain the picture of the dynamics of subsequent stages of the lost functions

return resulting from the comprehensive neurological rehabilitation.

The results of this study show that in the assessment made with BI the patients achieved the greatest progress in eating meals. The proportion of patients independent in the scope of this activity increased in the course of the study by 70.77%. A very considerable improvement was also observed in one's care of oneself and in the control over sphincters. Independence in the care of oneself, when hygiene items are handed in by the caretaker, increased by 44.82%. Regaining full control of the anal sphincters increased by 33.48%. In sphere of control of the sphincter of the bladder, the percentage of patients who regained it completely or could use a urinary catheter, increased by 42.41%. Control was improved quite abruptly in the course of rehabilitation. At the end of the test there were 61.45% of patients who were moving independently or by means of some orthopedic aid. The percentage of patients being able to use the toilet independently increased by 38.42%. Independence in terms of changing seats increased by 42.37%. The progress regarding the improvement in performing these activities was the fastest in the period from discharge to the 3rd month following the stroke. A smaller rate of change referred to the category of getting dressed, climbing down and up the stairs and to having a bath. Assessing the activity of getting dressed in the period between the time of admission to the 3rd month after a stroke, there was noted an increase in the percentage of patients being able to get dressed, do buttons and zippers. After 3 months following the incidence of stroke 38.55% of patients were able to climb up and down the stairs independently. The smallest progress has been observed in the category of bath taking — only 30.12% of patients were independent. The reason for a smaller improvement in the aforementioned categories being undoubtedly the fact that these operations are more complex and require greater involvement of organs and senses. Very similar results were presented in their work by Grochulska and Jastrzębska. When evaluating patients according to BI they stated that having a bath had turned out to be the most difficult activity for patients. The patients most easily regained independence in moving from bed to chair and to bed again, and in eating meals [22]. Rynkiewicz et al. [16] conducting a similar study, estimated that most patients regained their independence in the control of excretory activities, the activities of hygiene, walking on flat ground and moving. Whereas taking a bath, getting dressed and having meals were the biggest problem. In the studies carried out by Nakao et al. [33] 6 months after the onset of the disease, patients regained independence with the exception of such activities as climbing stairs and bathing.

An analysis according to Rivermead mobility index showed that during the study, the largest percentage of patients had regained independence in basic activities, such as maintaining a balance in the sitting position, turning around from side to side and standing without support. A slightly smaller percentage of patients regaining independence as a result of the post-stroke rehabilitation was observed in terms of: moving while being assisted, changing the lying position to sitting one, changing position from sitting to standing as well as moving from bed to chair and back to bed. It is worth noting that both in regard to Rivermead mobility index and to BI the most rapid improvement occurred in the period between discharge from hospital and the 3rd month after the disease onset, which confirms the facts of the positive effect of the home environment and of appropriate period required to regain independence. Miller [34] in her studies showed that the performance of some activities within the bed such as turning from side to side, changing one's position in bed to a sitting one, maintaining a sitting position and moving from bed to chair had improved most visibly between the 5th and the 8th week following the stroke. According to the author moving outdoors was the activity hardest to regain.

On admission to the ward evaluation was made according to the categorization of nursing care; measurement was performed again at the time of discharge from hospital. Categorization to a given group allows the nurse to determine patient's need for care. However, changes in the category are also a determinant of the improvement of the functional status. In the present study, the author observed a decrease in the number of patients requiring intensive nursing care, and at the same time an increase in the number of those requiring a minimum and moderate care. This clearly proves the purposefulness of rehabilitation oriented on the improvement of functions lost as a result of BS. The nursing category, determined at admission more strongly than the BI scores, determines the prognosis for patients. A change within the category by 1 point (for harder) results in nearly a 90-percent drop in the probability that the patient will obtain 0–2 points in mES. It is difficult to refer the obtained results to the national data, as the attempts to find reports on this subject in the literature turned out to be a failure. Prognostic studies based on clinimetric data provide extremely important information to each member of the rehabilitation team. These results indicate a significant effect of all tested scales on the prognosis in stroke rehabilitation. The largest impact in the model is shown by NIHSS. The increase in value by 1 point on this scale reduces the likelihood of obtaining 0–2 points on mRS scale (independent patients) by half. However, the NIHSS scale is a clinical one. As regards functional scales, the

strongest effect is observed for BI. The probability of mRS 0–2 points goes up with the point value increase on the scale by 1.3 times. Nakao et al. [33] believe that the result on the BI can help in predicting disability of the patient in terms of activities of daily living over the next 6 months.

To conclude, it is worth noting that the achievement of positive results in the rehabilitation of patients with BS would not be fully possible without the full involvement of all members of the rehabilitation team.

Conclusions

1. Socio-demographic factors had no significant effect on functional improvement.
2. The prevalence of risk factors was consistent with the described references and no effect on the prognosis of rehabilitation.
3. NIHSS Clinic Scale and the analysed functional scales turned out to be reliable tools for the functional prediction of post-stroke prognosis, however the strongest impact in the multifactorial analysis was found for BI.
4. The category of nursing care at admission to the rehabilitation ward stronger determines post-stroke prognosis in the multifactorial model than the result obtained by the patient in NIHSS and BI do.

Implications for Nursing Practice

The results presented show a significant effect of all tested scales on the prognosis for rehabilitation. It should also be noted that the greatest impact in the model is observed in NIHSS (an increase on the scale by 1 point reduces the probability of 0–2 points result in mRS by half), however the NIHSS is a clinical scale. Among the functional scales the strongest effect was observed in the case of BI (the probability of 0–2 point result in mRS was rising with the point value increase on this scale 1.3 time).

In the regression model the nursing care category turned out to be statistically significant, similarly to the functional scales tested.

The nursing category at the admission even more than scores in NIHSS and BI determined the prognosis in the multifactorial model — a change of the category by 1 point (for harder) resulted in a nearly 90-percent decrease of the probability of the patient's scoring 0–2 points on mRS.

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Corresponding Author:

Katarzyna Ziejka
Regional Specialist Hospital Dr. Wl. Bieganski
in Grudziądz
ul. Rydygiera 15/17, 86-300 Grudziądz, Poland
e-mail: k.ziejka@bieganski.org

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Author Contributions: Katarzyna Ziejka^{A,F}, Walenty M. Nyka^{A-C, G, H}, Kamil Chwojnicky^{C, D}, Marcelina Skrzypek-Czerko^F, Piotr Kasprzak^F

(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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