

Rehabilitacja pacjentów po udarze mózgu z uwzględnieniem czynników socjo-demograficznych

The rehabilitation of patients after the cerebral stroke including socio-demographic factors

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Streszczenie

Wstęp. Według danych Światowej Organizacji Zdrowia udar mózgu stanowi trzecią po chorobach serca i nowotworach przyczynę zgonów. Szacuje się, że co roku umiera z tego powodu 4,6 miliona ludzi na świecie, w tym 3,2 miliona w krajach rozwijających się i 1,2 miliona w krajach uprzemysłowionych. Zaobserwowano, że na skuteczność fizjoterapii osób po udarze mózgu wpływ mają czynniki biologiczne, oraz sytuacja społeczno-ekonomiczna pacjenta.

Cel pracy. Celem pracy jest analiza roli czynników socjo-demograficznych w procesie fizjoterapii pacjentów po udarze mózgu.

Materiał i metody badań. Badania przeprowadzono na oddziale rehabilitacji neurologicznej we Wrocławskim Centrum Rehabilitacji i Medycyny Sportowej. Badana grupa obejmowała ogółem 120 osób po przebytych udarze mózgu. Badania przeprowadzono w dwóch punktach czasowych. W pierwszym dniu pobytu pacjenta na oddziale rehabilitacji neurologicznej oraz po trzech tygodniach prowadzonego usprawniania. Wszyscy pacjenci uczestniczyli w systematycznej fizjoterapii prowadzonej standardowo na oddziale rehabilitacji neurologicznej z określeniem częstotliwości i czasu jej trwania. Dla każdego pacjenta pełen cykl badawczy trwał trzy tygodnie. W pracy wykorzystano następujące metody badań: Skala Barthel (Barthel Index, BI), Skala Lawtona (Instrumental Activity of Daily Living IADL), Indeks Mobilności Rivermead (IMR), Krótka Skala Oceny Stanu Psychicznego (Mini-Mental State Examination, MMSE), Geriatryczna Skala Oceny Depresji (Geriatric Depression Scale, GDS), Skala Uogólnionej Własnej Skuteczności (Generalized Self – Efficacy Scale, GSES), Skala Akceptacji Choroby (Acceptance of Illness Scale, AIS), Wizualna Analogowa Skala Bólu (Visual Analogue Scale, VAS).

Wyniki. Cechy natury biologicznej takie jak wiek, czas od udaru, rodzaj udaru, ilość chorób współistniejących, mają związek z niską skutecznością fizjoterapii prowadzonej na oddziale rehabilitacji neurologicznej. Czynniki socjo-demograficzne takie jak stan cywilny, aktywność zawodowa, rodzaj wykonywanej pracy mają związek z niską skutecznością prowadzonej fizjoterapii.

Wnioski. Kompleksowa rehabilitacja neurologiczna pacjentów po udarze mózgu uwzględniająca czynniki socjo-demograficzne jest niezbędna do osiągnięcia wysokiej skuteczności fizjoterapii.

Słowa kluczowe:

udar mózgu, fizjoterapia, czynniki socjo-demograficzne

Abstract

Introduction. According to the World Health Organization, cerebral stroke constitutes the third largest cause of death just after heart disease and cancer. It is estimated that every year 4.6 million people die due to stroke, including 3.2 in developing countries and 1.2 in developed ones. It has been observed that the effectiveness of physiotherapy in patients after a stroke depends on biological factors but also on their socio-economic condition.

The dissertation goal. The goal of this dissertation is to analyze the role of socio-demographic factors in the process of physiotherapy for patients after a cerebral stroke.

Materials and methods. The research has been carried out at the neurological rehabilitation ward of the Wrocław Center for Rehabilitation and Sports Medicine. The research group consisted of 120 patients after cerebral stroke. The examination was conducted at two time intervals - on the first day of the patient's treatment at the neurological rehabilitation ward, and after three weeks of rehabilitation. All the patients participated in the systematic physiotherapy, which is a standard procedure at the neurological rehabilitation ward, where they had a defined schedule of frequency and time of rehab. A full research cycle lasted for three weeks for every patient. The following methods were used in the research: Barthel Scale (Barthel Index, BI), Lawton Scale (Instrumental Activity of Daily Living (IADL), Rivermead Mobility Index (RMI), Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS), Generalized Self – Efficacy Scale (GSES), Acceptance of Illness Scale (AIS), and Visual Analogue Scale (VAS).

Results. Factors regarding the biological nature of the patient's condition such as age, time since the stroke, type of stroke, and number of coexisting diseases have a definite impact on the low effectiveness of the physiotherapy conducted at the neurological rehabilitation ward. Socio-demographic factors, marital status, professional activity, and kind of job, also have an impact on the low effectiveness of the conducted physiotherapy.

Conclusions. Comprehensive rehabilitation of neurological patients after the cerebral stroke, taking into account socio-demographic factors is essential to achieve high effectiveness of physiotherapy.

Key words:

stroke, physiotherapy, socio-demographic factors

Introduction

Stroke as defined by the World Health Organization (World Health Organization, WHO) in 1983, means "a clinical syndrome characterized by the sudden appearance of focal or global dysfunction of the brain, which, if not lead earlier death - persist longer than 24 hours and have no cause other than vascular "(Membership, 1999). This disease is a major problem not only medical but also social. It is a major cause of morbidity, mortality and disability psychophysical.

Risk factors for stroke is divided into modifiable, such as hypertension, heart disease, obesity, diabetes, cigarette smoking, alcoholism, low physical activity, lipid disorders, and non-modifiable factors. Five modifiable risk factors (hypertension, smoking, abdominal obesity, poor diet, lack of physical activity) is responsible for 80% of the risk of stroke, and the most important is hypertension. The cause-effect relationship has been proven in 45.2% of patients with ischemic stroke and in 73.6% of haemorrhagic stroke. (O'Donnell et al., 2010). For non-modifiable factors include: age and gender, race, genetic factors. The most important of the listed non-modifiable factors for stroke is age. It is estimated that with age, the incidence of stroke in the adult population doubles with each decade and affects as many as 5% of people over the age of 65 (Hirz et al., 2007; Strepikowska and Buciński, 2009).

According to the World Health Organization, stroke is the third, after heart disease and cancer cause of death (Wolfe et al., 2000). It is estimated that each year die because of that 4.6 million people worldwide, including 3 million in the industrialized countries (Ryglewicz, 2007). The incidence of stroke varies depending on the country. The incidence rate for first in human life stroke (first ever stroke, FES) on the basis of Monica (Monitoring Trends and Determinants in Cardiovascular Disease) was in the US and Europe from 110 to 190/100 000 in the general population (Truelsent et al., 2006). The highest incidence in European countries among men and women in the age group 35 to 64 years were registered in Finland, Russia, Yugoslavia, Lithuania, and the lowest in Germany and Italy (Wolfe et al., 2000). In Poland, the incidence of stroke in the years 1991-1994 was 171/100 000 in men and in women 93/100 000 (Członowska et al., 2006).

In the years 1991-1992 was launched prospective studies conducted in the framework of the Warsaw Stroke Registry. The results found that the incidence rate of stroke in men in the age group of 30 to 80 years was 134/100 000 and women – 91/100 000.

For people in the age range 35-64 years ratios were as follows: 128/100 000 in men and women 81/100 000 (Niewada et al., 2006). Ryglewicz and Grabowska-Fudala based on the results of these studies have determined that the rate of incidence of stroke in Poland is similar to the rates in other European countries and has a total of 177/100 000 in men and 125/100 000 in women (Grabowska-Fudala and et al., 2010; Ryglewicz, 2007).

Given the published results, it is estimated that in Poland every year there are about 60 000 new cases of hemorrhagic stroke and ischemic stroke (Grabowska-Fudala et al., 2010). While one in six will suffer a stroke in their lifetime, and approximately 8% of patients within a year, there is

a recurrent stroke (Hankey and Warlow, 1999; Mazurek et al., 2013). Stroke Foundation reports that the average Poland which occurs eight minutes incident new percussion (Magoń, 2005). Analysing the dynamics shaping the years 1945-1987 the incidence of stroke in time, been a decline in new cases (Grabowska-Fudula et al., 2010; Mazurek et al., 2013).

Due to changes in the demographic situation in Europe is expected, however, inhibition of favorable downward trend. The main reason is the increase in the population of people over 65 years of age, the incidence of stroke is the largest (Central Statistical Office, 2011). It is estimated that in 2050 the size of the population aged > 65 years in the European Union will increase to 35% (Eurostat, 2012). For comparison in 2000 this percentage was 20% (Mazurek et al., 2013; Truelsen et al., 2006).

Therefore it predicts that the number of strokes will increase from 1.1 million in 2000 to 1.5 million in 2025, assuming that the incidence of stroke will not change (Grabowska-Fudula et al., 2010; Rószkiwicz, 2006; Truelsen et al., 2006).

The dissertation goal

The aim of the study is to analyze the role of socio-demographic factors in the physical therapy of stroke patients and the appointment of characteristics, which is the cause of low effectiveness of physiotherapy.

Materials and methods

The study was conducted at the Department of Neurological Rehabilitation in the Wrocław Centre for Rehabilitation and Sports Medicine. It is a branch of which, stay patient takes up to three or six weeks. The aim of the stay is to obtain the highest efficiency, improvement of the physical and functional patient, to the extent that it can independently or with the help of other people's work in the home and in society. The study group consisted of patients after stroke, meets the following inclusion criteria:

- written consent of the patient to participate in research,
- a history of stroke or brain hemorrhage,
- the ability to conduct full test of cognitive function,
- the satisfactory condition of cognitive function (MMSE \geq 19) allowing for other psychological research,
- the possibility of testing physical fitness using the methods set out in the project,
- functional status of \leq 85 points in the Barthel.

It was also established criteria for exclusion from participation in the study:

- the occurrence of aphasia,
- multiple incidents impacting,
- severe loss of vision or hearing preventing cognitive assessment based on the MMSE,
- the functional state of the Barthel Index above 85 points (BI > 85),
- presence at the time of the study or in the documentation of mental retardation, impaired -consciousness or other serious mental disorders,

- addiction to drugs or other psychoactive substances,
- refusal of a patient at any stage of research.

The study group consisted of a total of 120 people, including 48 women (40%) and 72 men (60%). The mean age was 58 ± 8.6 years. Age of women stood between 36 and 77 years of age. Age men was 41-72 years. Comparison of the distribution of the age of the men and women showed no statistically significant difference ($p = 0.20 > 0.05$) (Table 1). The mean time from stroke was 16.4 ± 17.2 months, the average number of comorbidities is 1.6 ± 1.5 , and mean BMI (Body Mass Index) of 27.8 ± 3.3 .

Table 1. Variable age in the study group

Group	n	age [years]				student's test	
		average	SD	Minimum	Maximum	t	p
Women	48	59.3	8.8	36.0	77.0		
Men	72	57.2	8.4	41.0	72.0	1.28	0.20
Total	120	58.0	8.6	36.0	77.0		

Taking into account the type of stroke divided into test group for people after a ischemic stroke and people after a hemorrhagic stroke. The largest group of respondents, as many as 76% were after ischemic stroke (Table 2). This has been found both in women and men. It should be noted that ischemic stroke occurred more frequently in men (81%). Analyzing the relationship type of stroke by gender is not statistically significant correlation, as evidenced by the calculated value of chi-square (Table 2).

Table 2. Type of stroke in study groups for men and women

	women		men		total		χ^2	p
	n	%	n	%	n	%		
Ischemic	33	33	58	81	91	76		
Haemorrhagic	15	15	14	19	29	24	2.19	0.14

In the group of patients after stroke outweighed weakness left-hand (75 persons), regardless of the type of prior stroke. In the case of ischemic stroke, 54 patients appeared paresis left-hand and right-hand in 37 patients. Among subjects with haemorrhagic stroke, paralysis of the left-hand occurred in 21 patients, right hand in 8 patients. Used chi-square test showed no statistically significant correlation side paralysis of the type of prior stroke (Table 3).

Table 3. Side of paralysis and type of stroke

Type of stroke	Paresis		Total	χ^2	p
	Left-side	Right-side			
Ischemic	54	37	91		
Haemorrhagic	21	8	29	1.60	0.21
Total	75	45	120		

Table 4 shows the socio-demographic data. Analysis of the data showed that most patients came from the city (63%), 38% of people lived in the countryside. Most people had secondary education (38%) and the least essential (13%). From higher education took away 23 people (19%), and professional – 36 people (30%). Taking into account the situation of the professional, the largest group consisted of 53 retired people (44%), the smallest group – unemployed (8%), the rest are working (28%) and people receiving disability pensions – 19%. 59% of respondents were involved in jobs physical, 41% mental work. Taking into account the marital status of the largest group were people unmarried – 58%, the other person is a widow / widower – 21% and 21% also lonely.

Schematic of the experiment

The study was conducted at two time points:

1. On the first day of stay of the patient on the ward neurological rehabilitation.
2. After three weeks kept improving, the last day of stay of the patient on the ward neurological rehabilitation.

All patients participated in a systematic physiotherapy conducted in standard neurological rehabilitation ward and the frequency and the duration, daily from monday to friday, for 140 minutes, and saturday 50 minutes. For each patient a full test cycle lasted three weeks. Physiotherapy program was consistent with the medical order, depend on the physical condition of the patient and includes:

1. Individual exercises according to the method PNF (ang. Proprioceptive Neuromuscular Facilitation) – 60 minutes per day from monday to friday.

The program was planned by physiotherapist - individually for each patient, including the neurological and functional deficits.

Table 4. The socio-demographic characteristics of gender patients

Feature	Category	women		men		total	
		n	%	n	%	n	%
Place of residence	city	28	58	47	65	75	62.5
	village	20	42	25	35	45	37.5
Education	primary	7	15	9	13	16	13
	vocational	8	17	28	39	36	30
	secondary	28	58	17	24	45	38
	higher	5	10	18	25	23	19
Professional situation	working	11	23	23	32	34	28
	retirees	23	48	30	42	53	44
	pensioners	8	17	15	21	23	19
	unemployed	6	13	4	6	10	8
Type of work	physical	25	52	46	64	71	59
	intellectual	23	48	26	36	49	41
Marital status	marriage	21	44	49	68	70	58
	lonely	9	19	16	22	25	21
	widow/widower	18	38	7	10	25	21

2. Exercise on the bike to active and passive rehabilitation of upper and lower limbs with biofeedback (simultaneous work of the upper limbs and lower) – 20 minutes a day from monday to saturday.

3. Science and improvement of walk (walking on flat, uneven ground, the track to learn walking and stairs) – 30 minutes per day from monday to saturday.

4. Exercise therapy was supported by physical therapy and hydrotherapy. Depending on indications and contraindications were used the following types of treatments:

- massage whirlpool upper and lower limbs (performed alternately on one upper limb, lower limb next day), from monday to friday – treatment time 20 minutes,

- laser scanning method (performed on one area treatment facilities) from monday to friday, procedure time between 5 and 10 minutes between dose 2-4 J / cm², the power of 400 mW.

5. Physiotherapy was assisted by occupational therapy conducted in the conditions of the group from monday to friday – up to 60 minutes on saturday to 30 minutes.

6. Help psychologist - from monday to friday, planned individually with the adjustment to the schedule of physiotherapy.

The patient received the first day schedule with its developed program of physiotherapy, which were defined specific hours of treatments. In the morning, they were carried out individual exercises, learning and improving gait and whirlpool massage before exercise individual.

In the afternoon from 15 P.M. – exercises on the bike to active and passive rehabilitation and laser treatment. On saturday, the patient participated in physiotherapy only on the morning hours.

Results

Place of residence

Resident patients had no significant impact on the effectiveness of physiotherapy conducted (Table 5).

Table 5. The dependence of the effects of physiotherapy from the place of residence of patients (Mann-Whitney test)

Parameter (scale)	place of residence	Before therapy		After therapy		av. change	p
		Mean	SD	Mean	SD		
Barthel	City	56.53	16.52	70.27	15.13	13.73	0.886
	Village	56.11	15.15	70.00	13.31	13.89	
Rivermead	City	7.04	2.31	8.96	1.88	1.92	0.322
	Village	7.20	2.25	8.62	2.15	1.42	
IADL	City	17.08	4.30	18.49	3.77	1.41	0.710
	Village	17.31	3.90	18.64	3.42	1.33	
GDS	City	8.09	6.34	8.03	6.80	-0.07	0.818
	Village	8.07	5.25	8.07	5.61	0.00	
AIS	City	23.27	10.10	25.09	11.00	1.83	0.240
	Village	21.40	7.33	23.04	8.35	1.64	
GSES	City	29.11	9.25	30.07	9.95	0.96	0.751
	Village	25.78	9.49	27.29	10.16	1.51	
VAS	City	1.03	2.37	0.75	1.86	-0.28	0.823
	Village	0.96	2.22	0.71	1.67	-0.24	

The place where the patient was admitted

Only in the case of changes IADL (improvement in the performance of complex activities of daily living) after physiotherapy was a significant association of the place from which the patient was admitted to the rehabilitation. In this case, in fact it proved to be more effective physical therapy of patients admitted to the hospital directly (Table 6).

Table 6. The dependence of the effects of physiotherapy from the place from patients was admitted (Mann-Whitney test)
Professional situation

Parameter (scale)	where adopted	Before therapy		After therapy		av. change	p
		Mean	SD	Mean	SD		
Barthel	Home	60.64	15.20	73.71	11.28	13.07	0.263
	Hospital	50.82	15.05	65.92	16.19	15.10	
Rivermead	Home	7.69	2.06	9.26	1.83	1.57	0.174
	Hospital	6.33	2.34	8.31	2.01	1.98	
IADL	Home	18.43	3.87	19.51	3.10	1.09	0.017
	Hospital	15.55	3.76	17.39	3.71	1.84	
GDS	Home	7.83	5.84	7.56	6.12	-0.27	0.807
	Hospital	8.18	5.89	8.47	6.51	0.29	
AIS	Home	24.37	8.79	25.89	9.16	1.51	0.743
	Hospital	20.29	9.11	22.43	10.94	2.14	
GSES	Home	29.26	8.82	30.49	9.30	1.23	0.438
	Hospital	26.14	9.97	27.27	10.77	1.12	
VAS	Home	0.77	2.02	0.53	1.42	-0.24	0.600
	Hospital	1.35	2.66	1.04	2.20	-0.31	

Values in red marked significant correlations at $p < 0.05$

Professional situation

The effectiveness of physiotherapy was greater in patients workforce. This was all considered parameters. but only in the event of changes in mobility and self-service Barthel advantage of the effectiveness of physiotherapy in the workforce was statistically significant (Table 7).

Education

The level of education were considered in two categories: basic and vocational training and secondary and higher. Only in the case Geriatric Depression Scale (GDS) significantly greater improvement (reduction of depression) were observed in patients the relatively lower level of education. For other features. there was no clear relationship between the effectiveness of physiotherapy education level (Table 8).

Table 7. Effectiveness of physiotherapy and professional situation (Mann-Whitney test)

Parameter (scale)	professional situation	Aver. improvement after physiotherapy	p
Barthel	Employed persons	18.38	0.006
	People retired, pension, unemployed	12.03	
Rivermead	Employed persons	1.91	0.492
	People retired, pension, unemployed	1.79	
IADL	Employed persons	1.71	0.250
	People retired, pension, unemployed	1.28	
GDS	Employed persons	1.44	0.251
	People retired, pension, unemployed	0.92	
AIS	Employed persons	3.06	0.431
	People retired, pension, unemployed	2.16	
GSES	Employed persons	1.88	0.487
	People retired, pension, unemployed	1.65	
VAS	Employed persons	0.32	0.263
	People retired, pension, unemployed	0.24	

Values in red marked significant correlations at $p < 0.05$

Table 8. Efficacy of physiotherapy and educational level (Mann-Whitney test)

Parameter (scale)	education	Aver. improvement after physiotherapy	p
Barthel	Primary and vocational	12.60	0.264
	Secondary and higher	14.78	
Rivermead	Primary and vocational	1.73	0.575
	Secondary and higher	1.90	
IADL	Primary and vocational	1.46	0.845
	Secondary and higher	1.35	
GDS	Primary and vocational	1.60	0.004
	Secondary and higher	0.66	
AIS	Primary and vocational	2.33	0.884
	Secondary and higher	2.49	
GSES	Primary and vocational	1.90	0.791
	Secondary and higher	1.57	
VAS	Primary and vocational	0.23	0.797
	Secondary and higher	0.29	

Values in red marked significant correlations at $p < 0.05$

Profession

More effective physiotherapy was observed in the group of people doing mental work (Table 9). A statistically significant difference was found for the Barthel Index and the GDS (the result of borderline statistical significance).

Table 9. Dependence of the effects of physiotherapy on the type of work performed (Mann-Whitney test)

Parameter (scale)	education	Aver. improvement after physiotherapy	p
Barthel	Physical work	12.04	0.020
	Intellectual work	16.43	
Rivermead	Physical work	1.63	0.069
	Intellectual work	2.10	
IADL	Physical work	1.24	0.093
	Intellectual work	1.63	
GDS	Physical work	1.28	0.195
	Intellectual work	0.76	
AIS	Physical work	2.23	0.425
	Intellectual work	2.69	
GSES	Physical work	1.56	0.056
	Intellectual work	1.94	
VAS	Physical work	0.27	0.698
	Intellectual work	0.27	

Values in red marked significant correlations at $p < 0.05$

Marital status

The analysis examined two groups: those unmarried ($n = 70$), and widows / widowers and singles together ($n = 50$). In all analyzed parameters, except for the pain VAS, physical therapy was statistically significantly more effective in patients remaining in marriage (or with a partner / partner) (Table 10).

The analysis shows that the traits influencing the effects of physiotherapy are: age, diagnosis, time since stroke, the place where the patient was adopted, professional situation, occupation and marital status. Of course, these features do not affect the efficacy of physical therapy separately, they are mutually correlated. To determine the hierarchy of the impact of these characteristics on the outcome of physiotherapy should establish a collective measure of the effectiveness of physiotherapy, as in the above analysis dealt 7 parameters (from Barthel to VAS). For this purpose, the number of cases is summarized improvement in each of these parameters. The resultant meter accepts therefore (theoretically) values from 0 (no improvement at all) to 7 (the improvement occurred in all parameters).

Table 10. Dependence of physiotherapy effects of marital status (Mann-Whitney test)

Parameter (scale)	marital status	Aver. improvement after physiotherapy	p
Barthel	In marriages	17.36	0.0001
	Widow, widower and lonely persons	8.90	
Rivermead	In marriages	2.09	0.0083
	Widow, widower and lonely persons	1.46	
IADL	In marriages	1.73	0.0156
	Widow, widower and lonely persons	0.94	
GDS	In marriages	1.41	0.0082
	Widow, widower and lonely persons	0.58	
AIS	In marriages	2.84	0.0112
	Widow, widower and lonely persons	1.82	
GSES	In marriages	2.20	0.0116
	Widow, widower and lonely persons	1.04	
VAS	In marriages	0.30	0.5591
	Widow, widower and lonely persons	0.22	

Values in red marked significant correlations at $p < 0.05$

In summary, we should compare the features most affecting to low effectiveness of physiotherapy after stroke (Table 12).

Table 11. Values / categories of biological characteristics and socio-demographic, at which forecast the effectiveness of physiotherapy is the lowest

Feature	Value/Category
Age	Under 55 years
Medical diagnosis	Haemorrhagic stroke
Time from stroke	over 16 weeks
Where adopted	From home
Professional activity	Pension, life annuity
Type of work	/Physical work
Marital status	Lonely, widow or widower

Discussion

Stroke is the most common neurological diseases. Due to the high mortality rate in the initial stage of the disease, multidirectional and sustainability of the process of treatment and rehabilitation, this disease is a serious medical and social problem. The fact that stroke has a high prevalence, etiopathogenesis diverse and increasingly common occurrence among young people, professionally and socially active, contributing to even greater complexity in solving this problem of interdisciplinary (Przysada et al., 2007). The population of patients after stroke, recognized as persons with disabilities now exceeds 330 thousand. (Kleinrok et al., 2013). A high percentage of patients dependent causes serious social and economic consequences. They are all the more important that together with time comes for these patients to further loss of efficiency, regardless of the presence of risk factors and impassable subsequent strokes.

Unfortunately, in Poland it is still not fully realized the objectives set by the Declaration Helsingborg 2006. There are no clear guidelines as to the choice of methods physiotherapy nor the duration of rehabilitation. Little is known on factors affecting the effectiveness of the existing improvement. Many authors more and more attention paid to obtain accurate information about treatment and related costs. Such knowledge is essential in the planning of health services, including rehabilitation (Caro et al., 2000; Dewey et al., 2001; Przysada et al., 2007). Opportunity to learn about the factors affecting the effectiveness of physiotherapy can not only facilitate an individual approach to treatment and rehabilitation, but also in advance to prepare adequate support for patients discharged from the hospital and their carers. It seems reasonable to base the prediction model on the factors of simple, capable of assessment as early as possible after the adoption of the patient's rehabilitation branch. It was also the foundation of this research project.

As part of the statistical analysis of the collected material in the first place, the effect of each factor separately and distinguished group of factors predisposing patients to low effectiveness of physiotherapy. At this point it should be noted and emphasized that in the context of the analyzed parameters determining the effectiveness of physiotherapy noted a large discrepancy. It turned out that post-stroke rehabilitation ward conducted neurological rehabilitation Wrocław Center for Rehabilitation and Sports Medicine was the most effective for improving independence in basic activities of daily living measured by Barthel scale and improve the mobility of the measured scale Rivermead. The lowest percentage was obtained while reduction of pain and the VAS measured for psychological parameters. Based on the results of own research it can be concluded that gender has no significant impact on the effects of physiotherapy, which is consistent with the literature data (Appelros et al., 2010; Koziolec et al., 2005; Kwolek and Rykała, 2009; Przysada et al., 2007). This is also confirmed research Kwolek and Rykała, who stated that gender did not play a significant role in the assessment of the quality of life of patients and did not affect the level of functional capacity (Kwolek and Rykała, 2009). Also Przysada et al. showed in their study that gender had no

significant effect on the size of the effect of rehabilitation (Przysada et al., 2007). Also, other authors do not consider gender as a prognostic determinants affecting the effectiveness of physiotherapy after stroke (Czlonkowska and Kobayaski, 2003). However, in studies Glader et al. women after stroke achieved worse results than men rehabilitation. According to the authors, this could be due to poorer against stroke, which affects greater number of comorbidities and older age of women compared to men (Glader et al., 2003). This is confirmed by the results of its own, established fact that the comorbidities were more frequent in women. The most common disease among women was hypertension, and is consistent with the literature data (Czarnecka and Kloch-Budałek., 2007; Flis and Bejer., 2013; Kleinrok et al., 2013). In our study, it was found that the better the effects of stroke rehabilitation patients receive over 55 years of age. This is a surprising result, because it seems that younger people should be greater benefit in the rehabilitation process. Some researchers show a clear correlation - the younger the patient, the better the effects of improving (Simanski et al., 2002; Flis and Bejer, 2013). Teasell et al. argue that the youngest patients, survivors of stroke have the greatest psychosocial problems, including: break ties with a partner, lack of work, or difficulties in the implementation of educational functions of the children (Teasell et al., 2000). In our opinion, this issue is a clear link to the received test results. Poland has no idea on how to help young people who have undergone a stroke to return to work and performed social roles, and their losses after stroke are huge - in most cases lose their ability to perform the current work, they lose performed so far social roles, and family relationships are put to great test. Therefore, this subject must be recognized and be the subject of real action to improve the situation of persons who have a stroke, while still of working age. Otherwise, the only chance for the survival of their financial people becomes an annuity, a stay at a rehabilitation ward is written off because the patient realizes that soon awaits him ZUS (Social Insurance Institution) committee adjudicating on the degree of disability. In this case, instead of using the hospitalization, worried whether his condition is "bad enough" to get a pension.

Another study analyzed in their own aspect was kind of stroke. Greater improvements in efficiency assessed Barthel scale, improve mood (GDS) and acceptance of the disease (AIS) was observed in patients after ischemic stroke. This is contrary to reports authors Przysada et al. and Lubart et al., who observed that the better results obtained physiotherapy patients after hemorrhagic stroke (Lubart et al., 2005; Przysada et al., 2007). Flis and Bejer also analyzed the type of stroke and the impact of this trait on the results of physiotherapy. According to the authors, patients of hemorrhagic stroke brain, even worse baseline achieved better results in terms of improving balance and gait (Flis and Bejer, 2013). Likewise, Kelly et al. show that the admission the patients with hemorrhagic stroke motor deficits were larger, but these patients achieved greater benefits the rehabilitation performed (Kelly et al., 2003). We might be wondering whether received in a research project results are not associated with the number of patients participating in the

experiment. A significant proportion, as much as 76% were after ischemic stroke, and this disparity could distort the results.

According to the currently prevailing views on the final outcome of the rehabilitation of significantly affects the position of the fire percussion. Damage to the left hemisphere of the brain results in verbal memory, speech functions, writing, and learning. With damage to the right hemisphere of the brain occurs while the perceptual disorders – motor, lack of acceptance of the situation, the same motivation for rehabilitation and neglect hemiparesis, which makes patients with left-sided hemiparesis receive worse effects of rehabilitation. That's why outbreaks of impact in a particular hemisphere of the brain characterized by right or left-sided hemiparesis may be more important in improving motor function, and not the kind of stroke. In papers published, patients with right-sided hemiparesis achieve better results in terms of the rehabilitation efficiency (Laufer et al., 2003; Przysada et al., 2007). Some researchers in their work shows no differences, however, in the results of rehabilitation in patients with right-sided hemiparesis and left- side. Czernicki and Woldańska-Okońska, Yavuzer et al. argue that the party paresis does not affect the effectiveness of physiotherapy conducted (Czernicki and Woldańska-Okońska, 1999; Yavuzer et al., 2001). Flis and Bejer assessing gait of stroke patients did not confirm a significant difference between the right-sided hemiparesis and left-side. The same study, however, indicate that the assessment of the balance perform better patients with paresis of the left (Flis and Bejer, 2013). In our study site paresis had no influence on the effects of rehabilitation. But keep in mind that the exclusion criteria was the aphasia due to the inability to perform in such a case the required project of psychological diagnosis. Therefore, the result obtained could vary dramatically if the studies involved people with aphasia, which as we know is the damage to the left hemisphere of the brain.

In the present study also assessed the impact of time that has passed since the impact on the effectiveness of physiotherapy evaluated three scales Barthel, Rivermead and IADL. It has been shown that the longer the time from stroke to take rehabilitation, physiotherapy, the effectiveness is lower. A critical point in time is 16 weeks from stroke, then the effectiveness of improvement decreases the most. This is confirmed by studies of most authors, early started rehabilitation allows to obtain better results functional capacity of patients after stroke (Bernhardt et al., 2004; Jaracz and Kozubski, 2001b; Kleinrok et al., 2013; Malczewski, 2005; Piskorz et al. 2014).

The results show that the effectiveness of physiotherapy was greater in patients workforce. In reports Zawadzka et al. shows that employed persons perceive their quality of life in the areas of self-service, mobility, work, social roles, family roles, and energy far the best. The authors emphasize, however, that the possibility of earning applies to persons having a better efficiency and at the same time at the outset better quality of life (Zawadzka et al., 2014). Similarly Muss et al. They pointed out in the working population significantly better quality of life for urban mobility (Muss et al., 2010). It seems that the ability to work is one of the most important factors affecting the quality of life after stroke (Vestling et al., 2003; Ziółkowska-Kochan and Pracka, 2003). Wichowicz emphasizes that the loss of jobs at patients after stroke is a strong risk factor for post-stroke depression (Wichowicz,

2008). Pop et al. recognize the differences in the prevalence of depression among patients living alone and patients living in the family (Pop et al., 2009).

With regard to marital status, most researchers say that the presence of your spouse's positive effect on the healing process and rehabilitation of patients after stroke. Conducted physical therapy was more effective in patients remaining in marriage. Similar observations have Kowalska et al. and Adunsky et al., who emphasize that the status can be a prognostic factor influencing the effectiveness of physiotherapy (Andusky et al., 2001; Kowalska et al., 2010). Also Jaracz and Kozubski, indicated that the married person functioned better than single people or widowed (Jaracz and Kozubski, 2001). It was also studied the dependence of the effects of physiotherapy on the place from which the patient was admitted to the rehabilitation. Studies have shown that patients admitted to the hospital ward showed greater efficacy of physiotherapy in performing complex activities of daily living evaluated IADL scale. The literature lacks reports on the impact of the place from which the patient was admitted to the performance of activities of daily living. Analyzing this relationship is shown a clear link with the time elapsed since the stroke. Patients admitted directly to the hospital to have the person on the fresh incident cerebral. In this case, the time elapsed since the stroke is, as already demonstrated, the impact on the efficiency of the improvement - the authors are unanimous. There is no doubt that the earlier taken physiotherapy, the better the effects (Jaracz and Kozubski, 2001; Kleinrok et al., 2013 Kwakkel et al., 2010).

This study investigated the effect of the place of residence (town., village) on the effectiveness of physiotherapy at stroke. The analysis shows that it is irrelevant to the effects of physiotherapy.

A similar view has Zawadzka et al. (Zawadzka et al., 2014). Perhaps this effect becomes apparent in the long term, when the patient leaves the hospital ward and will require further rehabilitation conducted on an outpatient basis.

The study also analyzed the impact of education on the effects of rehabilitation of patients after stroke. It was agreed that in the case of patients with primary and vocational education, a greater improvement. However, in the case of other features, there was no apparent effect of education on the effectiveness of physiotherapy. The resulting experiment result can be interpreted as follows: the early stage of the patients after stroke with primary and vocational education may not yet be fully aware of what the effects and consequences carries a stroke. Better educated people, however, have greater knowledge about and awareness of distant consequences, hence the greater emotional problems and mood disorders. But it can be a transitional state, and in the long run they will be better able to cope with the situation. At the same time our study found that more effective physiotherapy mobility was achieved in the group of persons engaged in so far mental work than those working individual. Especially it concerns the assessment of mobility, motor skills and activities of daily living. As is well known to perform mental work is usually associated with higher education, the result in a way confirms the reports of other authors that better educated people in many areas are doing better after a stroke.

Conclusions

1. Socio-demographic factors such as age, gender, marital status, economic activity, type of work, have an impact on the effectiveness of physiotherapy conducted.
2. Comprehensive neurological rehabilitation, taking into account socio-demographic factors of stroke patients is essential to achieve high effectiveness of physiotherapy.

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