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## An Analysis of Patient Quality of Life after Ischemic Stroke of the Brain

### Analiza jakości życia pacjentów po udarze niedokrwiennym mózgu

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#### Abstract

**Introduction.** In highly developed countries, apart from heart attack and malignancies, stroke is the third leading cause for death and one of the major causes for disability or worsening of self-reliance, and consequently the quality of life for adults.

**Aim.** To evaluate the quality of life and its conditions in patients who suffered an ischemic stroke.

**Material and Methods.** The study involved 100 patients who suffered an ischemic stroke of the brain at the Department of Neurological Rehabilitation of the Regional Hospital in Białystok. A custom-designed self-assessment questionnaire, the WHOQOL BREF Scale for assessing the quality of life, the Barthel Scale, and the Geriatric Depression Scale were used as research tools.

**Results.** 40 (40%) women and 60 (60%) men in the age range between 36 and 86 years old (mean age 69±9.93). The mean level of the overall quality of life in the study group of ischemic stroke of the brain patients was at 3.23±0.81, while self-assessment of health was worse than that. The somatic domain was rated as the worst by the elderly. Patients with diabetes, hypertension, and heart disease have assessed their quality of life to be worse. Patients in a fair functional condition rated their quality of life and self-assessed health as better.

**Conclusions.** The overall quality of life of patients after ischemic stroke of the brain was at an average level, both under objective and subjective assessment, and was correlated with functional fitness, worsening of depressive disorders, risk factors, education, and gender. (JNPN 2017;6(2):44–54)

**Key Words:** quality of life, ischemic stroke

#### Streszczenie

**Wstęp.** W krajach wysoko rozwiniętych tuż po zawałach serca i nowotworach złośliwych, udary mózgu są trzecią co do częstości przyczyną zgonów, oraz jedną z głównych przyczyn kalectwa czy pogorszenia samodzielności, a co za tym idzie obniżenia jakości życia osób dorosłych.

**Cel.** Ocena jakości życia pacjentów po przebytych udarach niedokrwiennym mózgu i jej uwarunkowań.

**Material i metody.** Badaniem objęto 100 pacjentów po przebytych udarach niedokrwiennym mózgu przebywających na Oddziale Rehabilitacji Neurologicznej Wojewódzkiego Szpitala Zespołowego w Białymstoku. Jako narzędzie badawcze użyta została ankieta konstrukcji własnej, skala WHOQOL BREF — oceniająca jakość życia, skala Barthel, oraz Geriatryczna Skala Depresji.

**Wyniki.** Wśród badanych było 40 (40%) kobiet oraz 60 (60%) mężczyzn w wieku od 36 do 86 lat (średnia wieku 69±9,93). Ogólna jakość życia badanej grupy osób z udarem niedokrwiennym mózgu kształtowała się na poziomie średniej 3,23±0,81. Natomiast samoocena stanu zdrowia była gorsza. Osoby z otyłością III° lepiej oceniały dziedzinę środowiskową. Dziedzina somatyczna najgorzej oceniana była przez osoby w przedziale wieku 60–69 lat, oraz 80–89 lat, natomiast osoby w wieku 40–49 lat znacznie gorzej od innych oceniały dziedzinę psychologiczną. Osoby chorujące na cukrzycę i nadciśnienie tętnicze i choroby serca gorzej oceniały swoją jakość życia. Pacjenci w stanie funkcjonalnym „lekkim” lepiej też oceniali swoją jakość życia i samoocenę zdrowia. Respondenci z „ciężką depresją” gorzej ocenili ogólną jakość życia, oraz samoocenę stanu zdrowia.

**Wnioski.** Ogólna jakość życia pacjentów po udarze niedokrwiennym mózgu była na poziomie średnim zarówno w obiektywnej jak i subiektywnej ocenie i związana była ze stopniem sprawności funkcjonalnej, nasileniem zaburzeń depresyjnych, obciążeniem czynnikami ryzyka, wykształceniem badanych oraz płcią. (PNN 2017;6(2):44–54)

**Słowa kluczowe:** jakość życia, niedokrwienny udar mózgu

## Introduction

Stroke is the most common type of brain diseases, the third most common cause for death after heart attack and cancer, and is frequently associated with impaired self-reliance and often causes disability [1]. This ailment affects the elderly, usually between the age of 70 and 75 changing the lives of both the affected person and their family. Family members take on the role of caregivers obliged to acquaint themselves with the basic principles of care and treatment of stroke patients. Knowledge about this disease shapes the involvement and treatment, thus contributing to the quality of life of both of the patients and of their caregivers [2].

Assessment of the quality of life, its determinants, and the functional capacity of patients after ischemic stroke of the brain.

## Material and Methods

The study included 100 patients affected by ischemic stroke admitted at the Department of Neurological Rehabilitation of the Regional Hospital in Białystok. A self-constructed survey, the WHOQOL-BREF Scale, the Barthel Scale, and the Geriatric Depression Scale were used as research tools. WHOQoL-BREF is a shortened version of the WHOQoL questionnaire exploring four domains of the quality of life: psychological, physical, welfare, and environmental [3].

## Results

### *General Characteristics of the Respondents*

The study involved 100 patients: 40 women (40%) and 60 men (60%) aged between 36 and 86 (mean  $69 \pm 9.93$  years). The largest group consisted of 70–79-year olds (41%), and the smallest group was aged between 30 and 39 (1%). The 40–49-year old age group constituted 2%, 50–59-year old age group constituted 16%, 60–69-year old age group constituted 27%, and the group of 80–89-year olds constituted 13% of the respondents. The majority of the respondents (58%) resided in the city, while 42% resided in the countryside.

30 (30%) women and 41% (41%) men in the study group had been affected by stroke during the previous

year. Two (6%) women and 16 (16%) men had suffered from stroke during the previous two years. The smallest number of people had suffered from stroke three years prior to their current stay in the Rehabilitation Ward — 4 (4%) women and 3 (3%) men.

Among the respondents, the majority of both women and men had suffered one ischemic stroke — 36 (36%) women and 37 (37%) men. None of them had more than two ischemic strokes.

Right-sided motor dysfunction occurred in 32 (32%) of the respondents, of whom 15 were (15%) women and 17 (17%) men. Left-sided motor dysfunction occurred in 51 (51%) of the respondents — 18 (18%) women and 33% (33%) men. Motor dysfunction had not occurred in 17 (17%) of them — 7 (7%) women and 10 (10%) men. In contrast, speech disorders were found among 66 (66%) of the respondents of whom 44 (66.7%) were men.

It was found that the BMI (according to the WHO) for the analyzed group was at the level of 18.1–44.0 kg/m<sup>2</sup>. The average BMI for women was 30.4 kg/m<sup>2</sup>, whereas for men it was 26.3 kg/m<sup>2</sup>. 11 women (27.5%) and 23 men (38.3%) were characterized by normal BMI. 6 women (15%) and 25 men (41.6%) were overweight. The first degree obesity was found in 13 women (32.5%) and 8 men (13.3%). The second degree obesity was found in 6 women (15%) and 2 men (3.3%), and 4 (10%) women and 1 man (1.6%) were found to have the third degree obesity. None of the women were underweight in contrast to 1 man (1.6%).

### *Occurrence of Comorbidities and Risk Factors*

In 32 patients (32%) two comorbidities were present, in 26 (26%) three, and in 17 (17%) there were found four morbidities. One comorbidity has been detected in 13 (13%) participants, five comorbidities were detected in 7 (7%), and six comorbidities in 3 (3%) patients.

Hypertensive patients constituted the largest group of patients with comorbidities — 33 women (82.5%) and 49 men (81.7%). 46 (46%) respondents had no diabetes, 24 (24%) had diabetes — 11 women (27.5%) and 13 men (21.7%). Most, as many as 20 (20%) people with diabetes took oral anti-diabetic drugs. A large number of patients — 72 (72%) showed elevated cholesterol levels — 30 women (30%) accounting for 75%, as well as 42 men (42%) accounting for 70% of

all respondents. 28 (28%) respondents did not show symptoms of elevated cholesterol levels.

Coronary heart disease occurred in 34 (34%) respondents — 15 (15%) women and 19 (19%) of men. Atrial fibrillation occurred in 37 (37%) respondents — 20 (20%) women and 17 (17%) men. 27 (27%) of respondents have had a myocardial infarction.

35 (35%) respondents smoked cigarettes, 40 (40%) were non-smokers, and 25 (25%) people had given up smoking. Men who smoked cigarettes constituted the most numerous group — 24 (24%) people.

14 (14%) responders drank alcohol on an occasional basis, 5 drank alcohol on a daily basis, and 37 (37%) drank alcohol only on special occasions. 36 respondents — 15 (15%) women and 21 (21%) men admitted to not drinking alcohol at all. 20 (20%) men who admitted to drinking alcohol only on special occasions made up 46.7% of respondents and constituted the most numerous group in this category, while 42.5% of all women have consumed alcohol on special occasions only. None of the 40 (40%) women used oral contraceptives (Table 1).

Table 1. Comorbidities in the study group of patients with ischemic stroke

1	Comorbidities				
	Women (N=40)	Men (N=60)	Total (N=100)	% of all women	% of all men
2	3	4	5	6	
<b>Hypertension</b>					
Yes	33	49	82	82.50	81.70
No	7	11	18	17.50	18.30
Total	40	60	100	100	100
<b>Diabetes and its treatment method</b>					
Yes	11	13	24	27.50	12.70
Insulin	3	1	4	27.20	7.70
Anti-diabetic medicine	8	12	20	72.80	92.30
No	29	47	76	72.50	78.30
Total	40	60	100	100	100
<b>Elevated cholesterol levels</b>					
Yes	30	42	72	75	70
No	10	18	28	25	30
Total	40	60	100	100	100
<b>Hypertension</b>					
Yes	33	49	82	82.50	81.70
No	7	11	18	17.50	18.30
Total	40	60	100	100	100
<b>Diabetes and its treatment method</b>					
Yes	11	13	24	27.50	12.70
Insulin	3	1	4	27.20	7.70
Anti-diabetic medicine	8	12	20	72.80	92.30
No	29	47	76	72.50	78.30
Total	40	60	100	100	100
<b>Elevated cholesterol levels</b>					
Yes	30	42	72	75	70
No	10	18	28	25	30
Total	40	60	100	100	100
<b>Ischemic heart disease</b>					
Yes	15	19	34	37.50	31.70
No	25	41	66	62.50	68.30
Total	40	60	100	100	100

Table 1. Continued

	1	2	3	4	5	6
<b>Atrial fibrillation</b>						
Yes		20	17	37	50	28.30
No		20	43	63	50	71.70
Total		40	60	100	100	100
<b>History of myocardial infarction</b>						
Yes		10	17	27	25	28.30
No		30	43	73	75	71.70
Total		40	60	100	100	100
<b>Smoking cigarettes</b>						
Yes		11	24	35	27.50	40
Quit		7	18	25	17.50	30
No		22	18	40	55	30
Total		40	60	100	100	100
<b>Alcohol consumption</b>						
Occasionally		6	8	14	15	13.30
Daily		2	3	5	5	5
Only on special occasions		17	28	45	42.50	46.70
No		15	21	36	37.50	35
Total		40	60	100	100	100
<b>Contraceptives</b>						
Yes		0	–	0	0	–
No		40	–	40	100	–
Total		40	–	40	100	–

### *The Occurrence of Depression in Patients after Stroke*

Most women in the study group did not have depression — 20 (20%). The smallest group consisted of women with moderate depression — 7 (7%). In contrast, 13 (13%) of women reported severe depression. 24 (24%) men reported severe depression, while 19 (19%) reported mild depression. 17 (17%) men did not exhibit signs of depression.

### *Assessment of the Performance of Activities of Daily Living*

According to the Barthel Scale the majority of respondents — 24 (24%) women and 29% (29%) men were in “moderately severe” condition, with 7 (7%) women and 7 (7%) men in “fair” condition, whereas 9 (9%) women and 24 (24%) men were in “very severe” condition.

### *Quality of Life Assessment in Patients with Ischemic Stroke of the Brain in Accordance with the WHOQOL-BREF*

#### a. General assessment of the quality of life and health

The overall quality of life for the entire group of patients with ischemic stroke was at an average of  $3.23 \pm 0.81$ . This indicated that the patients exhibited an average level of satisfaction with their quality of life. Self-assessment of the state of health was worse, and on a scale of 1 to 5 it averaged at  $2.66 \pm 0.91$ , which means an average satisfaction with one’s health.

Patients with ischemic stroke had the worst score in the welfare domain at  $9.54 \pm 1.85$ , while the environmental domain was assessed as the best at  $25.17 \pm 5.82$ . The psychological domain was rated at  $19.42 \pm 3.23$ , and the somatic domain at  $20.18 \pm 3.19$ .

#### b. Gender and the assessment of the quality of life

The overall quality of life assessment for patients with ischemic stroke on a scale from 1 to 5 was on average among women  $3.45 \pm 0.77$  and among men  $3.08 \pm 0.8$ . Self-assessment of the state of one’s health

among women was  $2.65 \pm 1.03$  and among men  $2.66 \pm 0.82$ .

2.5% (1) of women were very dissatisfied with their quality of life, 5% (2) of women and 16.7% (10) of men were dissatisfied, 42.5% (17) of women and 50% (30) of men were moderately satisfied, 45% (18) of women and 28.3% (17) of men were satisfied, while 2 women (5%) and 1 man (1.7%) were very satisfied (Table 2).

Self-assessment of patient health was on average at  $2.65 \pm 1.03$  in women and  $2.66 \pm 0.82$  in men. The results were worse than the quality of life assessment for men and women. There was no significant difference between the groups of men and women in terms of self-assessment. 8 (20%) of women and 5 (8.3%) of men were very dissatisfied. 7 (17.5%) women and 19 (31.7%) men were dissatisfied. 16 (40%) women and 27 (45%) of men were moderately satisfied. 9 (22.5%) of women and 9 (15%) of men. No one in the surveyed group evaluated their health status as very good.

In the analysis of the impact of gender on the quality of life, it has been demonstrated that the highest rated domain for both women and men was the environmental domain, assessed at  $25.53 \pm 5.75$  for women and  $25.17 \pm 5.82$  for men, whereas the worst was the social field — women  $9.5 \pm 1.88$ ; Men  $9.54 \pm 1.85$ . There were no statistically significant differences between women and men in the assessment of any of the domains (Table 3).

### c. BMI and the quality of life

An analysis of the impact of BMI on the quality of life has demonstrated that the best results in the somatic domain have been achieved by those with III degree obesity (mean of 22.25) while the worst by underweight respondents (mean of 19). In the psychological domain patients with underweight (mean of 22) achieved the best results, the worst were achieved by those with normal range BMI (18.62). The worst result in the welfare

Table 2. General assessment of the quality of life in accordance with the WHOQOL-BREF

General quality of life scale (points)	Women (N=40)		Men (N=60)	
	Number of patients	Percentage of patients	Number of patients	Percentage of patients
1	1	2.50	2	3.30
2	2	5	10	16.70
3	17	42.50	30	50
4	18	45	17	28.30
5	2	5	1	1.70
Total	40	100	60	100

Table 3. Relationship between gender and the quality of life assessment in specific domains

Domain	Women (N=40)		Men (N=60)	
	Average	SD	Average	SD
Somatic	20.22	3.23	20.18	3.19
Psychological	19.46	2.26	19.42	3.23
Welfare	9.5	1.88	9.54	1.85
Environmental	25.53	5.75	25.17	5.82

domain was achieved by patients with BMI in the normal range (mean of 9.09), and the best by patients with III degree obesity. The environmental domain has been evaluated as the worst for subjects with the lowest BMI (mean of 24.5), and as the best for respondents with III degree obesity (mean 28.25).

The overall quality of life was rated the highest by the underweight (4 on a 5-point scale) and the lowest by the overweight (3.2 on a 5-point scale). The subjective assessment of health was slightly worse, however, it was rated the highest by respondents with III degree (3.2 on a 5-point scale), and the worst by patients with BMI within the normal range (2.4 on a 5-point scale). No statistically significant relationship between the quality of life and BMI has been demonstrated (Table 4 and 5).

Table 4. Relationship between BMI and quality of life. Part 1

Domains	BMI INDEX					
	Underweight		Normal		Overweight	
	Average	SD	Average	SD	Average	SD
Somatic	19	0	19.82	3.26	20.09	3.21
Psychological	22	0	18.62	3.28	19.69	3.28
Welfare	10	0	9.09	1.9	9.63	1.86
Environmental	27	0	24.5	5.74	25.03	5.83
General quality of life	4	0.47	3	0.84	3.2	0.81
Health self-assessment	3	0.47	2.47	0.93	2.67	0.91



Table 5. Relationship between BMI and quality of life. Part 2

Domains	BMI INDEX					
	I degree obesity		II degree obesity		III degree obesity	
	Average	SD	Average	SD	Average	SD
Somatic	20.75	3.29	19.78	3.24	22.25	3.19
Psychological	20.2	3.37	18.67	3.64	21.25	3.55
Welfare	10.1	1.91	9.22	2.13	10.5	1.92
Environmental	26.3	5.96	24.11	6.74	28.25	6.15
General quality of life	3.2	0.83	3.37	0.92	3.75	0.79
Health self-assessment	2.8	0.92	2.5	0.96	3.25	0.93

#### d. Age of the respondents and the quality of life

An analysis of the relationship between the age of the study group and the quality of life, revealed that the somatic domain was rated the worst by people aged 60–69 and 80–89 (mean of 20.17). Participants in the 40–49-age range assessed the psychological domain (mean of 19.19) to be far worse than in other age groups.

Those 30–39 years of age evaluated their overall quality of life (average 5 points on a 5-point scale) to be the best. In contrast, people in the 80–89-age group had the worst quality of life (2.92 points on a 5-point scale). It has been demonstrated that younger people indicate both their quality of life and self-assessed health to be better than the elderly (Table 6 and 7).

Table 6. Relationship between age and quality of life. Part 1

Domains	Age of the participants					
	30–39		40–49		50–59	
	Average	SD	Average	SD	Average	SD
Somatic	29	0	29	3.35	20.22	3.24
Psychological	26	0	19.19	3.98	19.46	3.27
Welfare	14	0	9.48	2.4	9.57	1.86
Environmental	33	0	25.57	7.05	25.09	5.89
General quality of life	5	0	4	1.08	3.37	0.84
Health self-assessment	4	0	3	0.95	2.62	0.91

Table 7. Relationship between age and quality of life. Part 2

Domains	Age of the participants					
	60–69		70–79		80–89	
	Average	SD	Average	SD	Average	SD
Somatic	20.17	3.2	20.21	3.22	20.17	3.22
Psychological	19.41	3.24	19.43	3.26	19.35	3.25
Welfare	9.53	1.84	9.52	1.86	9.49	1.86
Environmental	25.19	5.88	25.35	5.81	25.44	5.73
General quality of life	3.4	0.81	3.07	0.81	2.92	0.82
Health self-assessment	2.92	0.9	2.56	0.9	2.3	0.92

#### e. Participant's education and the quality of life

An analysis of the impact of education on the quality of life, has shown that the overall quality of life was rated highest by those with higher education (3.55 points on a 5-point scale), and rated lowest by those with basic

education (2.97 points). Health self-assessment was slightly worse, but the results were the best in people with secondary education (3.03 points on a 5-point scale). There were no statistically significant differences in the

somatic, psychological, welfare, and environmental domains in relation to education.

#### f. Comorbidities and the quality of life

An analysis of the effect of diabetes on the quality of life of the patients has shown that the patients with coexisting diabetes were similar in their assessment of the quality of their lives with respect to the following domains. The environmental domain was rated highest (25.18 ±5.85). The welfare domain (mean 9.52) (patients with diabetes) was rated the worst. People without diabetes rated their psychological domain higher (19.44) than those with diabetes (19.38) (Table 8).

An analysis of the relationship between hypertension and patient's quality of life of patients has demonstrated that patients with coexisting hypertension have assessed all domains — somatic, psychological, welfare, and environmental to be comparatively worse. The welfare domain was rated the worst, at an average of 9.45 (hypertensive participants), and 9.94 (non-hypertensive participants). Also, the overall quality of life and health self-assessment were much worse for respondents with hypertension (overall quality of life — 3.15 on a 5-point scale; self-esteem of health — 2.57 on a 5-point scale) (Table 9).

Patients with coexisting coronary heart disease assessed their health, as well as all domains (except for the environmental domain which did not differ in both respondent groups, as well as health self-assessment), slightly worse than those without coronary heart disease. A statistical analysis revealed differences (except for the environmental domain) between the subjective assessment of the quality of life in patients with coronary heart disease and those who do not suffer from it. Those suffering from this comorbidity assessed their quality of life to be worse (average 3.38) than those who do not suffer from it (3.15) (Table 10).

Respondents who had had myocardial infarction in the past, assessed their health and all domains (excluding the environmental domain — the average for those who experienced a myocardial infarction was 25.38) slightly worse than those who had never experienced it (mean of 25.17). People who had experienced myocardial infarction assessed their quality of life to be worse (3.18 on a 5-point scale) than those who have never experienced it (mean of 3.24 on a 5-point scale), as well as their health self-assessment. Patients who have experienced myocardial infarction; patients who have never experienced it (Table 11).

Table 8. Relationship between the quality of life and coexisting diabetes

Domains	Diabetes			
	Yes (N=24)		No (N=76)	
	Average	SD	Average	SD
Somatic	20.15	3.2	20.2	3.2
Psychological	19.38	3.23	19.44	3.24
Welfare	9.52	1.84	9.56	1.85
Environmental	25.18	5.85	25.18	5.85
General quality of life	3.5	0.81	3.14	0.78
Health self-assessment	3.04	0.97	2.53	0.86

Table 9. Relationship between the quality of life and hypertension

Domains	Diabetes			
	Yes (N=82)		No (N=18)	
	Average	SD	Average	SD
Somatic	19.95	3.15	21.22	3.35
Psychological	19.02	3.22	21.22	2.82
Welfare	9.45	1.91	9.94	1.59
Environmental	24.41	5.62	28.61	5.79
General quality of life	3.15	0.84	3.55	0.49
Health self-assessment	2.57	0.95	3.05	0.62

Table 10. Relationship between the quality of life and coexisting coronary heart disease

Domains	Coronary heart diseases			
	Yes (N=34)		No (N=66)	
	Average	SD	Average	SD
Somatic	20.15	3.2	20.02	3.2
Psychological	19.38	3.23	19.44	3.24
Welfare	9.52	1.84	9.56	1.85
Environmental	25.18	5.85	25.18	5.85
General quality of life	3.38	0.84	3.15	0.78
Health self-assessment	2.7	0.95	3	0.62

Table 11. Relationship between the quality of life and myocardial infarction

Domains	Myocardial infarction			
	Yes (N=27)		No (N=73)	
	Average	SD	Average	SD
Somatic	20.13	3.23	20.18	3.19
Psychological	19.32	3.3	19.42	3.23
Welfare	9.45	1.89	9.54	1.85
Environmental	25.38	5.75	25.17	5.82
General quality of life	3.18	0.81	3.24	0.8
Health self-assessment	2.55	0.87	2.69	0.93

## g. Other risk factors and the quality of life

An analysis of the relationship between smoking and the quality of life has shown that cigarette smokers estimated the somatic and environmental domains, as well as the overall quality of life and health self-assessment slightly worse. The psychological and social domains, however, were rated by smokers slightly better than by non-smokers (Table 12).

An analysis of the relationship between alcohol consumption and the quality of life has shown that those who consume alcohol occasionally evaluated the somatic,

psychological, welfare, and environmental domains, as well as the overall quality of life and health self-assessment to be the best of all groups. The environmental domain has been rated highest among all respondents at 26.86 (occasional drinkers), 26.75 (non drinkers), 23.67 (drinkers only on special occasions), and 22.6 (daily drinkers). The subjective assessment of the quality of life was the worst among those who consumed alcohol only on special occasions — 2.57 on a 5 point scale (Table 13).

Table 12. The relationship between quality of life and smoking

Domains	Smoking					
	Yes (N=35)		No (N=40)		Quit (N=25)	
	Average	SD	Average	SD	Average	SD
Somatic	20.18	3.19	20.17	3.2	20.21	3.22
Psychological	19.42	3.23	19.41	3.24	19.37	3.28
Welfare	9.54	1.85	9.53	1.84	9.51	1.86
Environmental	25.17	5.82	25.19	5.88	25.42	5.81
General quality of life	3	0.79	3.27	0.92	3.4	0.56
Health self-assessment	2.54	0.83	2.7	1	2.76	0.86

Table 13. The relationship between the quality of life and alcohol consumption

Domains	Alcohol consumption							
	Yes — occasionally		Yes — every day		Yes — on special occasions		No	
	Average	SD	Average	SD	Average	SD	Average	SD
Somatic	22.14	3.25	20.6	3.05	19.2	3.19	20.58	2.89
Psychological	20.86	3.3	18.6	2.79	18.44	3.45	20.19	2.69
Welfare	10.21	2.08	10	0.71	9.22	1.93	9.61	1.74
Environmental	26.86	6.36	22.6	6.11	23.67	5.76	26.75	5.33
General quality of life	3.5	0.73	3.2	0.74	3	0.96	3.3	0.56
Health self-assessment	3	0.84	2.6	0.8	2.57	0.88	2.63	0.97
Health self-assessment	2.39		0.76		2.74		0.94	

## h. Assessment of physical fitness according to the Barthel's Scale and the quality of life

An analysis of the relationship between the Barthel Activities of Daily Living score and the quality of life of the study group showed that patients in a fair condition (86–100 points) achieved significantly higher scores in all domains — somatic, psychological, welfare, and environmental, as well as overall quality of life and health self-assessment than respondents in severe (0–20 points) and moderately severe (21–85 points) condition. Those in very severe condition assessed all domains to be worse than those in fair condition.

The welfare domain was rated the poorest among all respondents: those in severe condition rated it at an average of 8.06, those in moderately severe condition rated it on average at 9.75, and those in fair condition, at 12.21. The environmental domain was rated the highest: on average for those in severe condition at 19.58, those in moderately severe condition at 26.75, and those in fair condition at 32.36. The overall quality of life after brain stroke was rated between 2.48 points on a 5-point scale (severe condition) and 4.14 points on a 5 point scale (fair condition). The subjective assessment of the health of the respondents ranged from 1.9 points



in the 5-point scale (severe condition) and 3.85 points on a 5-point scale (fair condition).

Significant relationship has been demonstrated between the physical condition assessed in accordance

with the Barthel Scale and the quality of life. The worse the physical condition according the Barthel Scale, the worse was the subjectively and objectively assessed quality of life of the respondents (Table 14).

Table 14. Relationship between the quality of life and physical fitness rated according to the Barthel Scale

Domains	Barthel					
	Severe condition		Moderately severe condition		Fair condition	
	Average	SD	Average	SD	Average	SD
Somatic	17.24	2.1	21.08	2.5	23.71	1.67
Psychological	16.21	1.81	20.3	2.2	23.64	1.91
Welfare	8.06	1.15	9.75	1.4	12.21	1.15
Environmental	19.58	3.53	26.75	3.77	32.36	4.92
General quality of life	2.48	0.65	3.45	0.53	4.14	0.51
Health self-assessment	1.9	0.71	2.81	0.7	3.85	0.34

i. Depression assessment in accordance with the Geriatric Depression Scale and the quality of life

An assessment of the impact of depression on the quality of life, in accordance with the Geriatric Depression Scale, emotionally stable patients were found to have significantly better outcomes in somatic, psychological, welfare, and environmental domains, as well as the overall quality of life and health self-assessment than those with moderate and severe depression. Respondents with severe depression rated all domains to be worse than those with moderate depression. The welfare domain has been rated the worst: those with no signs of depression — an average of 11.14, moderate depression — an average of 9.39, severe depression — an average of 7.97. The environmental domain has been rated highest: those

with no signs of depression — an average of 30.73, moderate depression — an of average 24.93, severe depression — an average of 19.49. The overall quality of life was rated between 2.5 points on a 5-point scale (subjects with severe depression) and 4.05 points on a 5-point scale (patients with no signs of depression). The health self-assessment score ranged from 1.82 points on a 5-point scale (subjects with severe depression) and 3.37 points on a 5-point scale (patients without depression). Significant correlations were found between depression according to Geriatric Depression Scale and quality of life. The more severe the depressive disorders were, the worse was the subjectively and objectively assessed quality of life (Table 15).

Table 15. The relationship between the quality of life and the occurrence of depression assessed in accordance with the Geriatric Depression Assessment Scale

Domains	Depression					
	No signs		Moderate depression		Severe depression	
	Average	SD	Average	SD	Average	SD
Somatic	23.43	1.48	19.64	1.63	17.17	2.05
Psychological	22.73	1.6	19.07	1.44	16.2	1.86
Welfare	11.14	1.28	9.39	1.37	7.97	1.16
Environmental	30.73	3.92	24.93	2.49	19.49	3.27
General quality of life	4.05	0.32	3.03	0.32	2.5	0.64
Health self-assessment	3.37	0.67	2.75	0.57	1.82	0.65

## Discussion

Ischemic stroke of the brain mainly occurs in the elderly. Up to 65 years of age stroke is more common

among men (1.3:1.0), however, later in life, it occurs more commonly in women, which is a result both of a longer life span of women and menopause [1]. Banecka-Majkutewicz et al. show that male gender is one of the

factors predisposing to ischemic stroke [4]. The study involved 40 (40%) women and 60 (60%) men. Banecka-Majkutewicz et al. argue that ischemic stroke affects mainly the elderly, most often between 70 and 75 years of age [4]. In this study, the age ranged from 36 to 86 years (mean age  $48.3 \pm 12.7$  years). The largest group was comprised of 70 to 79 year olds — 41 (41%).

Tsigos et al. has demonstrated that obesity has a significant impact both on the occurrence of diseases identified as risk factors for ischemic stroke, as well as on the occurrence of the stroke itself. Patients abdominal obesity and BMI exceeding  $30 \text{ kg/m}^2$  are particularly prone to stroke [5]. The BMI of the analyzed group ranged from 18.1 to  $44.0 \text{ kg/m}^2$ . The average BMI of women was  $30.4 \text{ kg/m}^2$ , while of men it was  $26.3 \text{ kg/m}^2$ .

Numerous authors consider hypertension to be a significant risk factor, increasing the incidence of ischemic stroke as high as 5 times [6]. Our own studies indicate that hypertension coexisted in 82 (82%) of the respondents, including 49 (49%) men and 33 (33%) women. Many authors, including Tatoń et al. [2], emphasize that carbohydrate metabolism disorders are an equally important risk factor, increasing the incidence of ischemic stroke even 4 times. In our own research, 24% of respondents suffered from carbohydrate metabolism disorders, including 11 women and 13 men.

Ciecierski et al. note that elevated cholesterol levels lead to atherosclerosis, especially in intracranial and extracranial arteries, leading to ischemic stroke [7]. In our own research group, the dysfunction of lipid metabolism was found in 72% of the subjects, in a comparable proportion among men and women.

Grochulska et al., note in their paper that an occurrence of ischemic stroke results in a rapid change in both the health and psychosocial status of the patient, but above all, it affects the functioning at the work, social, and familial environments. The authors have shown that even 50% of patients are hemiplegic, while a 30% suffer from motor coordination disorders, more than 20% suffer from aphasia disorder, and a third of them suffer from anxiety and depression. Half (50%) of patients require care from third parties due to physical disability and mental challenges [8]. This is confirmed by Fudal et al [9]. In our own research, using the Barthel Scale we have determined that the largest group of respondents (53 — 53%) were in a moderately severe condition (21–85 points) 33 (33%) respondents were in a severe condition (0–20 points), while the smallest group of 14 (14%) people were in a fair condition (86–100 points). Evaluating the quality of life of the respondents demonstrated that the worse the physical condition according to the Barthel Scale, the worse was the subjective and objective evaluation of the quality of life of the respondents. The welfare domain was rated

to be the worst, whereas the environmental domain was rated to be the best.

In his work Wichowicz notes that depression is one of the common psychiatric comorbidities for ischemic stroke, and it affects even a third of stroke patients. Most cases occur 3 to 6 months after the stroke. After one year, the incidence of depression decreases, and after 2 years it returns to its baseline level [10]. The risk of developing depression after ischemic stroke is related to the degree of physical disability, severity of the stroke, cognitive deficits, and social factors such as loneliness and lack of support from the environment. In the author's view, the onset of depression after ischemic stroke is not influenced by gender, age, education, stroke subtype or co-morbidities [11].

Spetruk points to the influence of the disease on the quality of life. It causes its worsening, and the prospect of a deterioration of the quality of life in turn has a negative impact on motivational mechanisms of recovering patients [12]. In our own research conducted using the Geriatric Depression Scale, 37 (37%) self-reported patients exhibited no signs of depression (0–5 points) and 37 (37%) patients were suffering from severe depression (11–15). Moderate depression (6–10 points) was found in 26 (26%) subjects. By investigating the quality of life of the respondents it was shown that the deeper the depression according to the Geriatric Depression Scale, the worse was the subjectively and objectively assessed quality of life. Welfare was the lowest rated domain, while the environmental domain was rated as the best.

The quality of life is a dynamic and complex issue. It includes numerous perspectives on mental, physical, and environmental health problems, as well as other ailments that contribute to the deterioration of the quality of life [13].

## Conclusions

Hypertension, diabetes mellitus, coronary heart disease, atrial fibrillation, and cigarette smoking were the most common risk factors for stroke, and were co-occurring.

Patients who had suffered a stroke were in moderately severe functional condition and frequently suffered from coexisting depressive disorders.

The overall quality of life of patients after ischemic stroke was at an average level, both in an objective and subjective assessments, and was related to the degree of functionality, the severity of depressive disorders, the occurrence of risk factors, education of the respondents, and their gender.

## Implications for Nursing Practice

The quality of life of patients is conditioned by many factors. These include factors, dependent and independent of the patient. That is why it is so crucial to perform educational, as well as care and therapeutic activities to enhance the quality of life, especially in patients who suffered an ischemic stroke of the brain.

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