

# Quality of Life of Patients after Stroke in County Osijek-Baranya

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## ABSTRACT

*The purpose of this prospective study was to determine quality of life of patients after stroke in Osijek-Baranya County. The research included 161 patients (82 men and 79 women) who had their first acute stroke and were treated at Department of Neurology, Osijek University Hospital Center. The Barthel Index (BI) was used to assess functional deficiency and SS-QOL (Stroke-Specific Quality of Life) questionnaire was used for self-evaluation of patients' physical and mental health. The first assessment was carried out in the acute phase of the disease, and control assessments 30, 90 and 180 days after the stroke. Mean Barthel Index score was higher at every successive measurement (55, 80, 95, 95). All BI items were statistically significant (Friedman,  $p < 0.001$ ) apart from dressing and bowel control. BI score indicated greater dependence in women in all assessments except for those taken 90 days after onset of symptoms ( $\chi^2$ -test,  $p = 0.111$ ). Mean values of SS-QOL for physical health were: 105.2, 98.3, 105.7, 117.5 and for mental health: 64.24, 57.9, 64.3, 68.1. Statistically significant difference was present in men, both for physical health (Friedman  $p = 0.009$ ) and total SS-QOL (Friedman  $p = 0.014$ ), while in women there was no statistically significant difference between the measurements (Friedman  $p = 0.719$ ). The research showed that stroke has significant influence on basic and specific daily life activities and interferes with the quality of life of stroke patients. Women have lower level of independence. Patients who live with their families make better evaluation of their physical and mental health.*

**Key words:** stroke, patient, quality of life, re-socialization

## Introduction

According to epidemiological data stroke is second most frequent cause of death in the world. According to World Health Organisation 5.7 million people died of stroke in 2005, which is 9.9% of all deaths<sup>1</sup>. In western countries both morbidity and mortality rates are decreasing.

Stroke is one of leading causes of deaths in the Republic of Croatia<sup>2,3</sup>. General mortality rate in 2007 for cerebro-vascular diseases is 187.6 *per* 100,000 inhabitants. Insult, not specified as haemorrhage or infarction, was the most frequent diagnosis that caused death in 65.4% of people who died of cardiovascular diseases<sup>4-6</sup>.

Stroke is among ten leading causes of death in County Osijek-Baranya and the first one in the year 2007 with

676 deaths (254 men and 422 women), which is 16.4% of all deaths. Mortality rate in cerebro-vascular diseases is higher in women than in men, 245.6 and 160.1 *per* 100,000 inhabitants, respectively. Number of patients hospitalized in Clinical Hospital Osijek for stroke is constantly increasing. Seven hundred eighty one patient were hospitalized for stroke in 2001, while in 2007 there were 1065 stroke hospitalizations<sup>7</sup>.

Quality of life has been in the focus of interest of many researchers and scientists for a long time. Definitions and measurements of quality of life have varied and changed over the years. World Health Organisation defines quality of life as individual's perceptions in the context of their culture and value systems, and their per-

sonal goals, standards and concerns. This general definition includes physical health, psychological status, and level of independence, social relations and personal beliefs in the context of their culture. This definition also reflects the attitude that quality of life is subjective experience that simultaneously includes positive and negative views on life and has multi-dimensional quality<sup>8</sup>.

Stroke outcome and level of functional deficiency in patients who survive stroke depends on the stroke type, early admission to hospital, treatment, presence of other diseases, age, gender, rehabilitation, post-hospitalization care<sup>9,10</sup>. The Helsingborg Declaration 2006 states as the main goal of stroke outcomes by 2015 that more than 85% of patients will survive a month after the stroke and 70% of the survived will be independent in their daily-life activities in the next three months after the stroke<sup>11</sup>.

Patient's personal evaluation is important in assessment of physical and social outcome of the disease – quality of life<sup>12</sup>. Patients who can return to normal life situations have better outcome and quality of life<sup>13</sup>.

Many patients who have had stroke have restrictions in their physical and cognitive functions. Mental health, physical and cognitive impairment are related to decreased quality of life, but it is possible to decrease the influence of the functional status on quality of life by providing social support and education of patients and their family members along with suitable community support<sup>14–21</sup>.

The aim of this research was to determine quality of life of patients after stroke in County Osijek-Baranya.

## Subjects and Methods

### Subjects

The prospective study included 161 subjects (Table 1) who were treated in Osijek University Hospital Center, Clinic of Neurology, for their first acute stroke and who survived 10–15 days after the stroke onset.

The research was conducted in the period from October 25<sup>th</sup> 2007 to December 20<sup>th</sup> 2008. During the research 38 subjects died (23.60% of subjects); out of whom 25 were women and 13 men (31.64% and 15.85% respectively), 10 subjects moved and two subjects dropped out of the study.

Assessment of functional deficiency level and self-evaluation of health was carried out during treatment of stroke in its acute phase (10–15 days after onset of symptoms) at Osijek University Hospital Center, Clinic of Neurology, and during acute rehabilitation (30 days after onset of symptoms) at Osijek University Hospital Center, Department of Physical Medicine and Rehabilitation or in patient's home. After completed hospital treatment, further assessment was carried out in 90 and 180 days after the stroke in patient's home in co-operation with qualified health visitors and nurses providing nursing care at patient's home.

### Methods

The following methods were applied in the research: medical documentation analysis, structured interviews, observation and self-evaluation.

For this research special form was prepared – Patient's data – to collect general data: patient's personal identification number, admission date, name and surname, date of birth, address, qualification, health insurance, way of living, marital status, data on the stroke type, stroke localization, risk factors, (TIA-transient ischemic attack, smoking, alcohol, blood cholesterol level, diabetes, BP-blood pressure values and heart conditions). Trained nurse with a bachelor's degree – researcher collected data for every patient included in the research analyzing the patient's medical documentation (personal history) and interviewing the patient to fill in the form Patient's data.

To assess basic activities and functional independence of patients in every-day life researchers applied the standardized instrument in all four measurements – the Barthel Index (BI)<sup>22</sup>, which is a simple indicator of the level of independence, useful in monitoring the progress (improvement) in patients after stroke. The Barthel Index consists of 10 items (eating, grooming, bathing, dressing, using the toilette, stair climbing and descending, ability to move, transfer bed – chair – bed, bowel control, bladder control) on a scale of 0, 5, 10, 15, where 0 marks complete dependence in all 10 items, and 5, 10 or 15 independence. Total sum of points in all 10 items gives BI score according to which the level of independence is determined: 0 – 49 dependent, 50 – 74 moderately dependent, and 75 – 99 mildly dependent and 100 independent in all self-care activities. Total score is not as important as individual items, since they indicate the area where patient's ability is impaired<sup>22</sup>.

In all four measurements of SS-QOL (Stroke Specific Quality of Life) a questionnaire for quality of life assessment in patients who have had stroke was applied. The questionnaire consists of 49 items. Each item is related to one of 12 parameters of quality of life. Seven items are related to physical health (strength, speech-language, mobility, self-care, upper extremities functions, eye-sight and work) and five items are related to mental health (mood, personality, thinking, family roles and social roles). The answer for each item is evaluated according to: a) help needed to perform specific tasks in the range from 1- with full assistance to 5- assistance not needed; b) level of difficulties a patient is experiencing while trying to perform a task in the range from 1 – he/she cannot perform it by himself/herself to 5 – no difficulties; c) agreeing with the statements in the range from 1- completely agrees to 5 – completely disagrees. Result in each area is expressed as mean value for items describing this area. Total result for seven areas is the assessment of physical health, and total for another five areas is assessment of mental health (maximum score for subjective health is 260 points). In all areas of the questionnaire higher scores indicate better subjective health<sup>23,24</sup>.

*Statistical data analysis*

Numerical data were presented as mean value and standard deviation. Categorical variables were presented in absolute and relative frequencies.

The difference was tested for each group of patients in four measurements. The difference between categorical variables was tested by  $\chi^2$ -test. Friedman test was used in analysis of differences between the four measurements. Spearman and Pearson coefficient of correlation ( $\bar{r}$ ) was used to evaluate the correlation<sup>25-27</sup>.

Originally designed programs for data bases were used along with the statistical packet Statistical for Windows 2005 (variant 7.1, Stat Soft Inc., Tulsa, OK, USA).

To evaluate the significance of the obtained data the significance level  $\alpha=0.05$  was chosen.

**Results**

The research included 161 patients, 82 men and 79 women. The youngest patient was 35 and the oldest 98 years old, while their average age was 72.43 years. Regarding their way of living, the majority of patients (73 patients, which is 45.3% of all patients) lived with a spouse and only two patients (1.2%) lived with a housekeeper or domestic help. There was difference in distribution of patients regarding their way of living according to their sex ( $\chi^2$ -test,  $p < 0.001$ ). Regarding their qualifications, the majority of patients (117 patients, which is 72% of all patients) had only elementary school and only five patients (3.1%) had master's degree. Regarding their marital status, 77 patients (47%) were married, out of whom 54 were men (65.85%) and 23 women (29.11%). There was difference in distribution of patients regard-

**TABLE 1**  
SUBJECTS' CHARACTERISTICS

Characteristics	Number of subjects (%)		p*
	Sex		
	Men n=82 (50.93)	Women n=79 (49.07)	
Age			
Mean value	67.35	72.43	
Minimum	42	35	
Maximum	93	98	
Way of living			
Alone	20 (24.39)	21 (26.58)	<0.001
With a spouse	52 (63.41)	21 (26.58)	
With a housekeeper or domestic help	0	2 (2.53)	
In a Home for the Elderly	5 (6.10)	13 (16.46)	
Other	5 (6.10)	22 (27.85)	
Qualifications			
Elementary school	56 (68.29)	61 (77.22)	0.624
High school / Vocational school	21 (25.61)	14 (17.72)	
Bachelor's degree	2 (2.44)	2 (2.53)	
Master's degree	3 (3.66)	2 (2.53)	
Marital status			
Married	54 (65.85)	23 (29.11)	<0.001
Divorced	9 (10.98)	4 (5.06)	
Widowed	13 (15.85)	46 (58.23)	
Never been married	6 (7.32)	6 (7.59)	
Stroke type <sup>‡</sup>			
Ischemic	75 (91.46)	70 (88.61)	0.605
Haemorrhagic	7 (8.54)	9 (11.39)	
Stroke localization			
Right hemisphere	33 (40.24)	40 (50.63)	0.376
Left hemisphere	38 (46.34)	34 (43.04)	
Cerebella	4 (4.88)	2 (2.53)	
Bilateral	7 (8.54)	3 (3.80)	

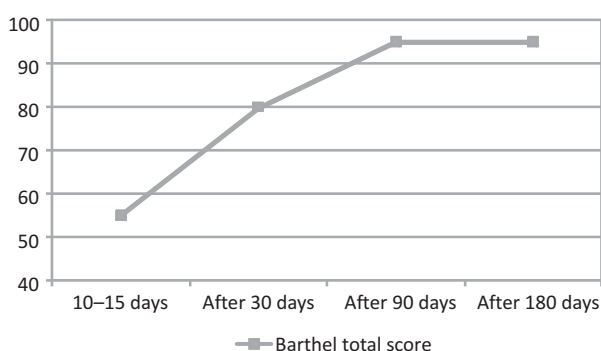


Fig. 1. Median of the Barthel Index.

ing their marital status according to their sex ( $\chi^2$ -test,  $p < 0.001$ ). Regarding the stroke type, 145 patients (90.1%) had ischemic stroke and 16 patients (9.9%) had haemorrhagic stroke. Regarding the stroke localization, both hemispheres were almost equally affected: stroke occurred in the right hemisphere in 73 patients (45.6%) and in the left hemisphere in 72 patients (44.7%) (Table 1).

The Barthel Index showed the difference between the measurements (Figure 1), and Friedman test did not show any statistically significant difference regarding the measurements ( $p = 0.076$ ).

All items of the Barthel Index for measurements were statistically significant (Friedman,  $p < 0.001$ ) apart from

TABLE 2  
COMPARISON OF THE INDEPENDENCE LEVEL ACCORDING TO SEX AND THE MEASUREMENTS

TIME OF MEASUREMENT	SEX	INDEPENDENCE LEVEL BI				p*
		BI 0–49	BI 50–74	BI 75–99	BI 100	
		Completely dependent	Moderately dependent	Mildly dependent	Independent	
		N (%)	N (%)	N (%)	N (%)	
10–15 days	M	30 (38.5)	13 (54.2)	27 (60.0)	12 (85.7)	0.004
	W	48 (61.5)	11 (13.9)	18 (22.8)	2 (2.5)	
Total	78 (100)	24 (100)	45 (100)	14 (100)		
30 days	M	17 (43.6)	8 (50.0)	20 (54.1)	30 (76.9)	0.019
	W	22 (56.4)	8 (50.0)	17 (45.9)	9 (23.1)	
Total	39 (100)	16 (100)	37 (100)	39 (100)		
90 days	M	9 (40.9)	4 (44.4)	22 (61.1)	34 (69.4)	0.111
	W	13 (59.1)	5 (55.6)	14 (38.9)	15 (30.6)	
Total	22 (100)	9 (100)	36 (100)	49 (100)		
180 days	M	2 (18.2)	8 (57.1)	19 (57.6)	36 (67.9)	0.027
	W	9 (81.8)	6 (42.9)	14 (42.4)	17 (32.1)	
Total	11 (100)	14 (100)	33 (100)	53 (100)		

\*Fisher’s exact test

TABLE 3  
SPEARMAN CORRELATION BETWEEN BARTHEL INDEX ITEMS IN THE FIRST MEASUREMENT

BI items*	F	B	G	D	BoC	BIC	UT	T	M	S
F	$\rho^\dagger$									
B	$\rho^\dagger$	.556								
G	$\rho^\dagger$	.656	.754							
D	$\rho^\dagger$	.758	.724	.793						
BoC	$\rho^\dagger$	.725	.534	.633	.728					
BIC	$\rho^\dagger$	.738	.537	.665	.740	.936				
UT	$\rho^\dagger$	.745	.660	.749	.818	.726	.774			
T	$\rho^\dagger$	.762	.686	.776	.812	.724	.764	.905		
M	$\rho^\dagger$	.744	.723	.797	.857	.741	.775	.916	.933	
S	$\rho^\dagger$	.668	.727	.742	.788	.671	.701	.860	.867	.879

\*F-feeding, B-bathing, G-grooming, D-dressing, BoC-bowel control, BIC-bladder control, UT-using the toilette, T-transfer (from bed to chair and back), M-mobility, S-stairs

† Spearman correlation coefficient ( $\rho$ )

**TABLE 4**  
SPEARMAN CORRELATION BETWEEN BARTHEL INDEX ITEMS IM THE SECOND MEASUREMENT

BI items*		F	B	G	D	BoC	BIC	UT	T	M	S
F	$\rho^\dagger$										
B	$\rho^\dagger$	.783									
G	$\rho^\dagger$	.728	.638								
D	$\rho^\dagger$	.846	.812	.793							
BoC	$\rho^\dagger$	.669	.477	.675	.642						
BIC	$\rho^\dagger$	.676	.499	.695	.666	.817					
UT	$\rho^\dagger$	.833	.780	.859	.878	.715	.725				
T	$\rho^\dagger$	.821	.674	.811	.818	.754	.736	.873			
M	$\rho^\dagger$	.793	.713	.797	.814	.722	.730	.899	.885		
S	$\rho^\dagger$	.845	.831	.728	.851	.625	.654	.845	.790	.872	(-)

\*F-feeding, B-bathing, G-grooming, D-dressing, BoC-bowel control, BIC-bladder control, UT-using the toilette, T-transfer (from bed to chair and back), M-mobility, S-stairs

$\dagger$  Spearman correlation coefficient ( $\rho$ )

**TABLE 5**  
SPEARMAN CORRELATION BETWEEN BARTHEL INDEX ITEMS IM THE THIRD MEASUREMENT

BI items*		F	B	G	D	BoC	BIC	UT	T	M	S
F	$\rho^\dagger$										
B	$\rho^\dagger$	.759									
G	$\rho^\dagger$	.730	.681								
D	$\rho^\dagger$	.864	.818	.760							
BoC	$\rho^\dagger$	.550	.438	.599	.581						
BIC	$\rho^\dagger$	.453	.440	.528	.524	.753					
UT	$\rho^\dagger$	.764	.630	.773	.771	.691	.577				
T	$\rho^\dagger$	.706	.496	.647	.750	.601	.567	.768			
M	$\rho^\dagger$	.763	.593	.687	.765	.685	.624	.800	.779		
S	$\rho^\dagger$	.792	.722	.711	.817	.560	.570	.736	.697	.801	(-)

\*F-feeding, B-bathing, G-grooming, D-dressing, BoC-bowel control, BIC-bladder control, UT-using the toilette, T-transfer (from bed to chair and back), M-mobility, S-stairs

$\dagger$  Spearman correlation coefficient ( $\rho$ )

**TABLE 6**  
SPEARMAN CORRELATION BETWEEN BARTHEL INDEX ITEMS IM THE FOURTH MEASUREMENT

BI items*		F	B	G	D	BoC	BIC	UT	T	M	S
F	$\rho^\dagger$										
B	$\rho^\dagger$	.754									
G	$\rho^\dagger$	.541	.513								
D	$\rho^\dagger$	.791	.812	.617							
BoC	$\rho^\dagger$	.404	.417	.468	.422						
BIC	$\rho^\dagger$	.474	.359	.409	.374	.747					
UT	$\rho^\dagger$	.670	.650	.718	.720	.506	.488				
T	$\rho^\dagger$	.673	.572	.708	.707	.523	.550	.769			
M	$\rho^\dagger$	.641	.555	.670	.695	.517	.556	.783	.753		
S	$\rho^\dagger$	.683	.683	.625	.746	.393	.380	.717	.726	.742	(-)

\*F-feeding, B-bathing, G-grooming, D-dressing, BoC-bowel control, BIC-bladder control, UT-using the toilette, T-transfer (from bed to chair and back), M-mobility, S-stairs

$\dagger$  Spearman correlation coefficient ( $\rho$ )

**TABLE 7**  
QUALITY OF LIFE AREAS ACCORDING TO THE MEASUREMENTS

HEALTH AREAS	SS-QOL ITEMS	Measurements				p <sup>†</sup>
		10–15 days (N=161)	30 days (N=131)	90 days (N=116)	180 days (N=111)	
		$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	
Physical health	Strength	8.66 (3.46)	7.58 (3.14)	8.69 (3.23)	9.57 (3.12)	0.001
	Speech- language	18.2 (5.37)	19.0 (6.65)	19.6 (5.70)	21.2 (4.95)	0.012
	Mobility	20 (8.18)	18.4 (8.38)	20.4 (8.38)	23.2 (6.79)	0.003
	Self-care	16.2 (7.18)	16.5 (7.98)	18.4 (7.61)	19.7 (6.83)	0.329
	Upper extremities functions	15.1 (6.57)	15.8 (7.78)	17.6 (7.69)	19.4 (6.77)	0.004
	Eye-sight	10.8 (3.70)	10.4 (3.63)	11.2 (3.64)	11.9 (3.07)	0.176
	Work / Productivity	8.84 (3.99)	7.42 (4.03)	8.97 (4.55)	9.90 (4.48)	0.001
Mental health	Family roles	9.79 (3.56)	8.66 (3.53)	10.1 (3.46)	10.5 (3.41)	0.527
	Mood	17.5 (5.56)	16.7 (5.22)	17.9 (5.27)	18.8 (4.90)	0.078
	Personality	11.7 (3.06)	10.0 (2.97)	10.4 (3.37)	10.8 (3.16)	0.001
	Social roles	14.3 (6.64)	12.1 (5.90)	15.0 (6.28)	16.2 (5.97)	0.035
	Thinking	10.7 (3.37)	10.3 (3.66)	10.7 (3.69)	11.5 (3.25)	0.734
PHYSICAL HEALTH		105.2 (29.5)	98.3 (34.5)	105.7 (34.4)	117.5 (29.2)	0.032
MENTAL HEALTH		64.24 (18.2)	57.9 (17.8)	64.3 (19.1)	68.1 (17.9)	0.603
QUALTY OF LIFE – TOTAL		174 (44.4)	157.6 (51.2)	170.4 (51.9)	187.4 (44.7)	0.032

\*Mean value (Standard deviation)

† Friedman test

dressing and bowel control. The patients showed greatest dependence 180 days after the stroke in the item »bathing«, in 19 men (29.2%) and 24 women (52.2%).

In all four measurements of independence level according to the Barthel Index the dependence was greater in women. In the first measurement 10–15 days after the first symptoms 78 patients out of which 48 women (61.5%) and 30 men (38.5%) were totally dependent, after 30 days 39 patients out of which 22 women (56.4%) and 17 men (43.6%), after 90 days 22 patients out of which 13 women (59.1%) and 9 men (40.9%) and after six months 11 patients out of which 9 women (81.8%) and 2 men (18.2%) (Table 2). In relation to sex there was difference in dependence in all measurements by Barthel except 90 days after the onset of symptoms (Fisher exact test,  $p=0.111$ ) (Table 2).

In the first measurement 10 – 15 days after onset of symptoms there was difference in the items dependence and stroke type ( $\chi^2$ -test,  $p=0.048$ ). Thirty days after onset of symptoms there was difference in the items dependence and marital status ( $\chi^2$ -test,  $p=0.032$ ).

The results showed very good to excellent correlation between the BI items (Spearman correlation coefficient  $\rho > 0.8$ ,  $p < 0.001$ ). Correlation between a large number of items was present in the first and second measurements, while in the fourth measurement fewer items were correlated (Tables 3, 4, 5, 6).

SS-QOL measurements showed difference in the quality of life areas of physical and mental health (Friedman test). In physical health there was difference in five items, while in mental health the difference was in two items. There was difference in total health between the measurements (Table 7).

Comparison of health areas and quality of life items measured by SS-QOL regarding sex and measurements (Friedman test) showed statistically significant difference in men in the area of physical health for items work-productivity ( $p \leq 0.001$ ); in the area of mental health for items personality ( $p \leq 0.001$ ), social roles ( $p = 0.048$ ) and total SS-QOL for respective measurements, while in women there was statistically significant difference in the area of mental health for item personality ( $p \leq 0.001$ ) (Table 8).

Mean value for total physical health (MV=108, 106, 111, 123) and for total mental health (MV= 66.8, 61.9, 67.8, 72.2) for respective measurements in men was higher than in women (Table 8).

The results showed very good to excellent correlation between the SS-QOL items (Spearman correlation coefficient  $\rho > 0.8$ ,  $p < 0.001$ ) in all four measurements. Correlation between a large number of items of physical and mental health was present in the first measurement, while in the second measurement the number of correlated items was reduced (Tables 9, 10, 11,12).

**TABLE 8**  
COMPARISON OF HEALTH AREAS AND QUALITY OF LIFE ITEMS ACCORDING TO SEX AND MEASUREMENTS

HEALTH AREAS	SS-QOL ITEMS	Measurements								p†	
		10 – 15 days		30 days		60 days		180 days			
		N 161		N 131		N 116		N 111		M	F
		M	F	M	F	M	F	M	F		
* $\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)	$\bar{X}$ (SD)				
Physical health	Strength	9 (3.33)	8.21 (3.65)	8.28 (3.16)	6.62 (2.89)	9.33 (3.04)	7.76 (3.32)	10.4 (3.11)	8.28 (2.68)	0.056	0.360
	Speech- language	18.6 (4.67)	17.6 (6.27)	19.7 (6.14)	18.0 (7.23)	20.0 (5.40)	19.0 (6.12)	21.6 (4.56)	20.5 (5.44)	0.106	0.785
	Mobility	21.2 (7.27)	18.1 (9.24)	20.6 (7.84)	15.4 (8.21)	22.1 (7.31)	17.8 (9.26)	25.0 (5.34)	20.6 (7.86)	0.138	0.185
	Self-care	16.8 (7.01)	15.4 (7.50)	18.1 (7.44)	14.2 (8.24)	19.7 (6.65)	16.7 (8.58)	21.1 (5.56)	17.6 (7.90)	0.465	0.247
	Upper extremities functions	16.3 (6.41)	13.5 (6.57)	17.3 (7.51)	13.8 (7.74)	18.7 (7.11)	16.0 (8.27)	20.7 (5.80)	17.5 (7.64)	0.070	0.737
	Eye-sight	11.0 (3.50)	10.5 (4.04)	10.7 (3.59)	9.96 (3.66)	11.7 (3.44)	10.4 (3.83)	12.2 (2.89)	11.5 (3.29)	0.366	0.522
	Work / Productivity	9.43 (3.84)	8 (4.14)	7.96 (4.05)	6.66 (3.90)	9.57 (4.11)	8.10 (5.03)	10.9 (4.08)	8.41 (4.63)	0.001	0.296
Mental health	Family roles	10.4 (3.37)	8.91 (3.69)	9.52 (3.55)	7.48 (3.17)	10.7 (3.32)	9.23 (3.52)	11.6 (3.03)	9.04 (3.35)	0.677	0.868
	Mood	17.9 (4.93)	17.0 (6.40)	18.0 (5.08)	15.0 (4.93)	18.9 (5.07)	16.4 (5.23)	19.7 (4.79)	17.4 (4.77)	0.746	0.867
	Personality	11.7 (2.84)	11.6 (3.41)	10.5 (2.88)	9.29 (2.97)	10.7 (3.17)	9.91 (3.61)	11.0 (2.92)	10.5 (3.48)	<0.001	<0.001
	Social roles	15.7 (6.68)	12.5 (6.28)	12.8 (5.75)	11.1 (6.01)	16.2 (5.64)	13.2 (6.79)	17.6 (5.58)	14.1 (5.95)	0.048	0.228
	Thinking	10.9 (2.83)	10.4 (4.05)	10.9 (3.53)	9.51 (3.71)	11.1 (3.43)	10.1 (4.00)	12 (2.83)	10.8 (3.69)	0.204	0.514
PHYSICAL HEALTH		108 (27.5)	99.8 (32.6)	106 (31.8)	86.9 (35.1)	111 (30.8)	96.9 (37.9)	123 (24.7)	108 (32.8)	0.009	0.655
MENTAL HEALTH		66.8 (17.0)	60.7 (19.4)	61.9 (17.0)	52.4 (17.7)	67.8 (17.8)	59 (19.9)	72.2 (16.4)	62.2 (18.5)	0.515	0.741
QUALITY OF LIFE – TOTAL		179 (41.7)	165 (48.7)	170 (47.0)	140 (51.8)	179 (47.6)	156 (55.5)	197 (39.0)	172 (48.9)	0.014	0.719

\*Mean value (Standard deviation)

† Friedman test

Test correlation (Pearson correlation) showed excellent correlation between SS-QOL – mental health and the Barthel index in all four measurements ( $r=0.869$ ,  $r=0.827$ ,  $r=0.920$ ,  $r=0.875$ ,  $p<0.001$ ).

## Discussion

Stroke causes damage in brain structures that has both physical and mental consequences in patients who survive it, which impairs their quality of life.

Stroke outcome and level of functional deficiency of survived patients depends on the type of stroke, early ad-

mission to hospital, treatment, presence of other diseases, age, sex, rehabilitation, post-hospitalization care<sup>9</sup>.

Evaluation of the BI items scores determined the influence of stroke on the level of self-care, which was highest in the first measurement. After completion of treatment and acute rehabilitation, the patients' level of independence was higher after three months, but total BI did not change after the third measurement.

BI was applied in many studies conducted to evaluate the level of self-care and stroke outcomes, but according to available literature distribution according to BI score was different<sup>15,28–33</sup>. Evaluation was carried out either just once and/or in time intervals different from those

**TABLE 9**  
SPEARMAN CORRELATION BETWEEN SS-QOL ITEMS IN THE FIRST MEASUREMENT

Items*		E	F	L	M	P	SC	SR	T	UE	V	W	MO
S	$\rho^\dagger$												
F	$\rho^\dagger$	.887											
S-L	$\rho^\dagger$	.440	.346										
M	$\rho^\dagger$	.755	.794	.356									
P	$\rho^\dagger$	.356	.288	.267	.351								
SC	$\rho^\dagger$	.803	.845	.379	.812	.373							
SR	$\rho^\dagger$	.689	.754	.413	.682	.228	.802						
T	$\rho^\dagger$	.483	.446	.596	.586	.448	.511	.509					
UE	$\rho^\dagger$	.717	.775	.602	.763	.350	.862	.826	.663				
E-S	$\rho^\dagger$	.701	.761	.528	.680	.327	.769	.736	.535	.819			
W	$\rho^\dagger$	.700	.803	.403	.687	.227	.845	.890	.423	.814	.775		
M	$\rho^\dagger$	.746	.757	.545	.719	.446	.752	.660	.658	.811	.738	.658	(-)

\* E – energy. F – family roles. L – language. M – mobility. P –personality. SC – self-care. SR – social roles. T – thinking. UE – upper extremity Function.V – vision. W – work. MO – mood

† Spearman correlation coefficient ( $\rho$ )

**TABLE 10**  
SPEARMAN CORRELATION BETWEEN SS-QOL ITEMS IN THE SECOND MEASUREMENT

Items*		E	F	L	M	P	S-C	SR	T	UE	V	W	MO
S	$\rho^\dagger$												
F	$\rho^\dagger$	.771											
S-L	$\rho^\dagger$	.556	.537										
M	$\rho^\dagger$	.746	.804	.549									
P	$\rho^\dagger$	.525	.498	.435	.529								
S-C	$\rho^\dagger$	.674	.777	.571	.848	.380							
SR	$\rho^\dagger$	.633	.776	.407	.755	.432	.771						
T	$\rho^\dagger$	.640	.587	.703	.651	.549	.629	.520					
UE	$\rho^\dagger$	.657	.747	.620	.797	.475	.857	.783	.650				
E-S	$\rho^\dagger$	.471	.403	.429	.481	.412	.460	.401	.502	.523			
W	$\rho^\dagger$	.706	.740	.530	.775	.378	.805	.760	.606	.761	.521		
MO	$\rho^\dagger$	.658	.765	.625	.202	.532	.679	.572	.677	.686	.552	.611	(-)

\* E – energy. F – family roles. L – language. M – mobility. P –personality. SC – self care. SR – social roles. T – thinking. UE – upper extremity Function.V – vision. W – work. MO – mood

† Spearman correlation coefficient ( $\rho$ )

used in this study. In the up-to-date literature there are few prospective studies that carried out BI evaluation in the same intervals as in this study. In the first and second measurements BI was higher in our study in relation to previous studies<sup>34,35</sup>.

The results of short-term outcomes were similar to the results presented in the previous studies<sup>36</sup>. However, the results of outcomes six months after the stroke were more favourable in our study.

Correlation analysis for BI items revealed that the lower the BI score, the lower level of independence and the higher correlation between more BI items. Higher correlation between items provides useful guidelines for

rehabilitation and nursing care planning. Total BI score is not as significant as scores for individual items, since these individual scores show where patients' ability is impaired and which items correlate. In the item bathing the results showed that even after 180 days 19 men and 24 women (29.23% and 52.17% respectively) needed help. Also, there was excellent correlation between the items dressing and bathing (Spearman correlation coefficient  $\rho=0.812$ ,  $p<0.001$ ). Similar results were obtained in earlier studies<sup>14</sup>.

High total BI score which shows ability to take care of oneself does not mean that a patient can live alone, but it means that a patient can live without a caregiver. Inde-



**TABLE 11**  
SPEARMAN CORRELATION BETWEEN SS-QOL ITEMS IN THE THIRD MEASUREMENT

Items*	E	F	L	M	P	S-C	SR	T	UE	E-S	W	MO
S	$\rho^\dagger$											
F	$\rho^\dagger$	.759										
S-L	$\rho^\dagger$	.519	.629									
M	$\rho^\dagger$	.793	.782	.544								
P	$\rho^\dagger$	.570	.625	.482	.600							
S-C	$\rho^\dagger$	.645	.747	.515	.830	.445						
SR	$\rho^\dagger$	.714	.830	.646	.838	.645	.816					
T	$\rho^\dagger$	.584	.598	.647	.585	.577	.411	.589				
UE	$\rho^\dagger$	.625	.704	.586	.738	.448	.839	.756	.530			
E-S	$\rho^\dagger$	.517	.540	.471	.557	.570	.399	.611	.513	.440		
W	$\rho^\dagger$	.769	.789	.574	.847	.547	.864	.818	.568	.789	.511	
MO	$\rho^\dagger$	.559	.702	.576	.620	.767	.582	.712	.606	.537	.571	.653 (-)

\* E – energy. F – family roles. L – language. M – mobility. P –personality. S-C – self-care. SR – social roles. T – thinking. UE – upper extremity Function. V – vision. W – work. MO – mood

† Spearman correlation coefficient ( $\rho$ )

**TABLE 12**  
SPEARMAN CORRELATION BETWEEN SS-QOL ITEMS IN THE FOURTH MEASUREMENT

Items*	E	F	L	M	P	S-C	SR	T	UE	V	W	MO
S	$\rho^\dagger$											
F	$\rho^\dagger$	.805										
S-L	$\rho^\dagger$	.511	.584									
M	$\rho^\dagger$	.791	.748	.469								
P	$\rho^\dagger$	.619	.556	.470	.559							
S-C	$\rho^\dagger$	.622	.715	.543	.668	.450						
SR	$\rho^\dagger$	.713	.821	.581	.768	.595	.772					
T	$\rho^\dagger$	.681	.634	.748	.639	.585	.476	.633				
UE	$\rho^\dagger$	.621	.725	.646	.702	.491	.871	.779	.582			
E-S	$\rho^\dagger$	.472	.402	.393	.505	.473	.387	.541	.517	.498		
W	$\rho^\dagger$	.750	.792	.536	.788	.522	.849	.821	.597	.861	.504	
MO	$\rho^\dagger$	.741	.684	.538	.350	.725	.638	.753	.645	.628	.497	.711 (-)

\* E – energy. F – family roles. L – language. M – mobility. P –personality. S-C – self-care. SR – social roles. T – thinking. UE – upper extremity Function. V – vision. W – work. MO – mood

† Spearman correlation coefficient ( $\rho$ )

pendent and moderately dependent patients can live at home with the help of family or community<sup>22</sup>.

Subjective perception of a patient is important to evaluate physical and mental outcome of the disease – quality of life<sup>12</sup>. Applying specific scale for quality of life after stroke we determined the influence of stroke on both physical and mental health. There was difference between the measurements in total physical health and total quality of life. Level of physical health was higher than level of mental health in all four measurements. The lowest level of both physical and mental health was measured 30 days after the first stroke symptoms had occurred. There was significant correlation between the

items. Correlation analysis for SS-QOL items revealed that there was correlation between items in the subscale physical health and items in the subscale mental health as well as between physical and mental health. The higher SS-QOL score, the higher the quality of life and the lower the correlation between the items. Higher correlation between the items provides useful guidelines for rehabilitation and nursing care planning as well as for participation of a family in taking care of a patient after stroke. Similar results were obtained in other studies<sup>24,37</sup>.

BI and SS-QOL scores showed high correlation in all four measurements. It is therefore significant to apply these tests in every-day work and in monitoring patients

after stroke. These tests provide useful guidelines for rehabilitation and nursing care planning as well as for social care and community actions for stroke patients.

When analyzing differences in results for quality of life in relation to other studies we need to take into account the context of patients' culture and their value systems in relation to their goals, expectations, standards and hopes.

Age is one of significant risk factors for development of stroke, and stroke consequences are getting worse with older age. Age influences quality of life, especially in patients who have had stroke. Research on quality of life of the elderly who have not had stroke<sup>38,39</sup> showed that their level of both physical and mental health was higher than in patients included in our research. The results of the research that compared the consequences of stroke with the age showed that during acute treatment and rehabilitation older patients had better results in body pain and general perception of health and younger patients in vitality. Six months after stroke there were no significant differences, which indicated that age was not an important factor in quality of life after stroke<sup>16</sup>. Furthermore, age did not have influence on mortality after stroke in the period up to 30 days. In study of Carandang and al. mortality decreased from 23% to 14%, while in women there was not significant decrease<sup>40</sup>.

Sex is also a risk factor, especially in women of older age. There was difference according to sex in all four measurements. Women evaluated their health as lower in all measurements. Similar results were obtained in other studies<sup>16,41</sup>.

We could not determine the influence of education level on mental health because 117 patients (72.67% of all included patients) had only elementary school and only five patients had a master's degree. The patients included in the research had three professional visits during the research, not only to carry out the study but also to give patients instructions how to live and to give them support, which may be linked to their evaluation of quality of life.

Type of stroke influences quality of life after stroke. Patients with haemorrhagic stroke evaluated their health as better in the first, third and fourth measurements. These results may be explained by less severe clinical picture in patients who survived haemorrhagic stroke.

During the research there were no marked differences in patients according to stroke localization, but greater independence in performing every day activities was present in women with left hemisphere stroke. After six months there was no difference according to localization<sup>16</sup>.

After completion of acute treatment and rehabilitation, patients' quality of life also depended on their marital status. The obtained results may be explained by a large number of widows and their way of life, since the majority of our patients lived in their families.

Many patients who have survived stroke have impaired physical and cognitive functions. More than 40%

of patients who survived stroke become dependent on help of other people in every day activities in a greater or lesser degree, which may be frustrating for some people. For many of them the disease and non-acceptance of the disease cause chronic stress, which has unfavourable influence on the course of treatment and may cause disturbance in family relations. Closest family members may motivate patients and assure them that they are wanted, loved and needed. Unfortunately, there are situations where a family does not want to take care of a bed-ridden person, and avoids taking a patient home as long as possible, either by moving him/her from hospital to hospital or by putting him/her in homes or in foster families. The situation is more difficult when the patients are aware of their disease and disability<sup>14,42</sup>.

In our study patients who lived with their families showed significant improvement in relation to patients who were placed into a home or a foster family after hospital discharge. Their final outcome was death. Hopman described similar results<sup>16</sup>. The research on quality of life carried out in Quebec six months after stroke showed that 50% of patients who did not have help in their families needed help during 24 hours. Most patients expressed need for organized group to give help and support for stroke patients and their families<sup>34</sup>.

Education of patients and their families on stroke and its consequences is significant for treatment, rehabilitation and quality of life. Patients and members of their families need to be informed about neurological disorder and educated to understand and accept disability caused by stroke and probability for improvement, but only with time, patience and perseverance. Recovering from stroke depends on good care and rehabilitation, but also on general health condition and fitness of a patient, his/her character, behaviour and emotional status as well as on emotional status of others, especially of close persons<sup>14,42</sup>.

Mental health, physical and cognitive impairment are related to decreased quality of life, but it is possible to decrease the influence of the functional status on quality of life with social support, education of both patients and members of their families and suitable support of the community<sup>15–20,43,44</sup>.

After conducting this research it may be concluded that stroke has significant influence on basic activities of every day life and that it decreases quality of life of people who have had stroke. Age is a risk factor for development of stroke. Consequences of stroke become worse with older age and influence the quality of life. There is difference in the quality of life after stroke in men and women. Level of independence in self-care is lower in women. They evaluate their health, both physical and mental, as lower than men. Family and/or caregivers have significant role in patient's adjustment to the disease and its consequences and to changes in the way of living. Patients who stayed in their families after stroke and in the same environment where they lived before the stroke evaluated their physical and mental health as better.

To improve quality of life of stroke patients in our region it would be necessary to initiate measures for improvement through various activities of secondary prevention: carry out activities of health education to promote healthy lifestyle, gain knowledge, attitudes and behaviour regarding stroke; in every new patient and his/her family member and/or caregivers determine the level of knowledge, attitudes and behaviour regarding healthy life and stroke; according to the level of knowledge prepare a programme and carry out individual and/or group education.

This research also has certain limitations that need to be mentioned. Firstly, the sample included patients who have had stroke and whose »control« was time that has passed since the onset of symptoms. Had we included subjects of the same age and sex without stroke, we could

have obtained more reliable results. Secondly, all observed parameters of health were measured by observation and self-evaluation and therefore were subjective. Furthermore, there is a question of being sincere in answering the questions in self-evaluation, as well as cognitive prejudice and non-recognition of real symptoms and feelings. In spite of this, our results may be useful in planning activities within a family and local community. This research is an example of a relatively simple way to evaluate general health and needs of patients who have had stroke by interviewing them and evaluating their functional status. The next step is to provide necessary care, adjusted to the needs of stroke patients and their families, and by re-evaluating their general status monitor the efficiency of the provided care and promptly react to changes in needs of an individual.

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## KVALITETA ŽIVOTA BOLESNIKA POSLIJE MOŽDANOG UDARA U OSJEČKO-BARANJSKOJ ŽUPANIJI

### S A Ž E T A K

Cilj je prospektivne studije bio utvrditi kvalitetu života bolesnika nakon moždanog udara (MU) u Osječko-baranjskoj županiji. Istraživanjem je obuhvaćen 161 bolesnik (82 muškarca i 79 žena) s prvim u životu akutnim MU koji je liječen na Klinici za neurologiju Kliničke bolnice Osijek. Za procjenu funkcionalnog deficita upotrijebljen je Barthelov indeks (BI), a za samoprocjenu tjelesnog i mentalnog zdravlja upotrijebljen je SS-QOL (Stroke-Specific Quality of Life) upitnik. Prvo mjerenje učinjeno je u akutnoj fazi bolesti, a kontrolne smo procjene izvršili 30, 90 i 180 dana nakon MU. Vrijednosti BI bile su u stalnom porastu (Me=55, 80, 95, 95). Sve čestice BI po mjerenjima statistički su značajne (Friedman,  $p < 0,001$ ) osim odijevanja i stolice. BI pokazuje veću ovisnost žena u svim mjerenjima osim 90 dana od pojave simptoma ( $\chi^2$ -test,  $p = 0,111$ ). Srednja vrijednost SS-QOL za tjelesno zdravlje iznosila je: 105,2, 98,3, 105,7, 117,5 i za mentalno zdravlje: 64,24, 57,9, 64,3, 68,1. Kod muškaraca je statistički značajna razlika u tjelesnom (Friedman  $p = 0,009$ ), i ukupnom SS-QOL (Friedman  $p = 0,014$ ), dok kod žena nema statistički značajna razlike između mjerenja (Friedman  $p = 0,719$ ). Istraživanje pokazuje da MU značajno utječe na temeljne aktivnosti dnevnoga života i narušava kvalitetu života oboljelih. Žene imaju nižu razinu samostalnosti. Bolesnici koji ostaju u svojim obiteljima bolje procjenjuju svoje tjelesno i mentalno zdravlje.