

## QUALITY OF LIFE OF POST-STROKE PATIENTS KAKOVOST ŽIVLJENJA BOLNIKOV PO MOŽGANSKI KAPI

Sylva BÁRTLOVÁ<sup>1</sup>\*, Lenka ŠEDOVÁ<sup>1</sup>, Lucie HAVIERNÍKOVÁ<sup>1</sup>, Andrea HUDÁČKOVÁ<sup>1</sup>,  
František DOLÁK<sup>1</sup>, Petr SADÍLEK<sup>2</sup>

<sup>1</sup>University of South Bohemia in České Budějovice, Faculty of Health and Social Sciences, Institute of Nursing, Midwifery and Emergency Care, U Výstaviště 26, 370 05 České Budějovice, Czech Republic

<sup>2</sup>Medical Information Center, Sokolská 31, 120 21 Praha, Czech Republic

Received: Nov 27, 2021

Accepted: Feb 11, 2022

Original scientific article

### ABSTRACT

#### Keywords:

quality of life, stroke, psychological problems, patient, nurses

**Introduction:** Stroke is a disease whose consequences have a considerable impact on the quality of the patient's life. It is a widespread disease that has a disabling impact on life and, in addition to physical changes, brings about a number of psychological and cognitive processes.

**Goal:** The goal of the study was to identify and describe the quality of life of post-stroke patients.

**Methodology:** The study design was quantitative. A questionnaire of the authors' own design and the SF-36 questionnaire were used to obtain the data.

**Results:** Significant differences in patient quality of life were identified in relation to patient gender. Moreover, the quality of life in all individual SF-36 dimensions, except for mental health, deteriorated with age. With regard to occupational placement, employed respondents gave the highest evaluation of quality of life according to SF-36 and old-age pensioners the lowest. The analysis shows that quality of life in individual dimensions is positively influenced by respondents' higher education. The evaluation in individual dimensions improves with the time that has passed since the stroke.

**Conclusion:** The quality of life of post-stroke patients deteriorates with age. The deteriorating level of patient quality of life in older age requires programmes that include assessments and interventions that lead to the treatment of these patients.

### IZVLEČEK

#### Ključne besede:

kakovost življenja, možganska kap, psihološke težave, bolniki, medicinske sestre

**Uvod:** Možganska kap je bolezen, katere posledice pomembno vplivajo na kakovost življenja bolnikov. Gre za eno najbolj razširjenih bolezni, ki lahko vodi v stanje invalidnosti. Pri tem ne gre le za telesne, ampak tudi za številne spremembe v psiholoških in kognitivnih procesih.

**Cilj:** Namen raziskave je bil ugotoviti in opisati kakovost življenja bolnikov po možganski kapi.

**Metodologija:** Za pridobivanje podatkov sta bila uporabljena vprašalnik, ki smo ga sestavili sami, in vprašalnik SF-36.

**Rezultati:** Višja ko je starost bolnika po možganski kapi, slabša je raven kakovosti življenja v vseh dimenzijah lestvice SF-36 z izjemo duševnega zdravja. Glede na poklicni status zaposleni najbolje ocenjujejo kakovost življenja v dimenzijah SF-36, najslabše pa upokojeanci. Analiza je pokazala, da je kakovost življenja v vsaki dimenziji tem boljša, čim višja je izobrazba bolnikov z možgansko kapjo. Daljši ko je čas, ki je pretekel od kapi, boljši so rezultati v vsaki dimenziji.

**Zaključek:** Poslabšanje kakovosti življenja starejših bolnikov po možganski kapi potrjuje potrebo po programih, ki vključujejo oceno in intervencije za njihovo zdravljenje.

\*Corresponding author: Tel. + 420 606 050 592; E-mail: [sbartlova@zsf.jcu.cz](mailto:sbartlova@zsf.jcu.cz)

## 1 INTRODUCTION

In recent times, there has been greater promotion of quality of life (more precisely: health-related quality of life). It has become an essential criterion for the seriousness of patient health. There are many definitions of quality of life. However, they have one thing in common: it is mainly subjective wellness that includes physical, psychological, social and mental dimensions (1). Nursing care puts the spotlight on subjectively perceived quality of life. Nurses play an important role as care providers and as mediators of personal recovery and multidisciplinary care, and can support stroke patients' return to an independent life (2). Chronic diseases, such as stroke, are associated with QoL (Quality of life) impairment. In clinical practice, stronger emphasis should be placed on monitoring the quality of life of post-stroke patients.

Stroke is undoubtedly a disease whose consequences have a considerable impact on the quality of the patient's life. Every year, in a population of one million, approximately 2,400 people will suffer a stroke. Of these, fewer than 50% return to an independent life (Leys et al., 2005). Even those patients who regained their functional independence continue to suffer considerable deficits, limitations and changes in cognitive functions and behaviour. Stroke is a widespread disease that has a disabling impact on life and, in addition to physical changes, brings about a number of psychological and cognitive processes. Stroke is one of the main causes of disability, and doubles the risk of dementia (3). The variables closely associated with a lower QoL or satisfaction with life of post-stroke patients include depression (4, 5), lower functional status (6, 7) and more serious paralysis (8). Post-stroke psychological problems can include depression, anxiety, emotionalism and post-traumatic stress disorder. About one third of surviving patients experience depression at a certain period. However, this tends not to be diagnosed in time or else is insufficiently treated (9). Emotional problems relating to stroke can include fear, anxiety, frustration, loss of trust, feeling of loss, uncertainty and disappointment at not regaining health. Patients who survived a stroke regard information, problem-solving strategies and involvement in activities as highly useful for their recovery and their ability to cope (10). Early psychological interventions are necessary in individuals at risk of QoL impairment, particularly in elderly and lonely patients. Chronic diseases, such as stroke, require long-term treatment. A low quality of life and a poor psychological state can result in a decrease in the patient's compliance with treatment, which can consequently result in stroke recurrence (11). The study shows that effective psychological intervention can significantly decrease stress in post-stroke patients and increase their commitment to treatment (12, 13). Therefore, psychological interventions are essential for these high-risk groups in clinical practice.

Although significant progress has been achieved in the medical treatment of stroke patients (decreases in mortality), post-stroke patients need a qualified nursing approach in the rehabilitation phase (14). According to these authors, the rule of thirds applies: approximately one third die within a few hours, one third completely recover, and one third dies hours, days or weeks after the attack. The remaining third, sometimes called the middle third, can regain independence by using various rehabilitation programmes (14).

The goal of the study was to identify and describe the quality of life of post-stroke patients.

## 2 METHODOLOGY

The study design was quantitative. The study itself was conducted in the Czech Republic between 20 September and 20 October 2020. The data was collected by 96 professional survey workers from the Institute for Health and Lifestyle across the Czech Republic.

### 2.1 Tools

Two instruments were used for obtaining the data: (1) a questionnaire of the authors' own design and (2) the SF-36 questionnaire.

#### 2.1.1 Questionnaire designed by the authors

A non-standardised questionnaire of the authors' own design was used to identify the socio-demographic profiles of stroke patients. It contained 16 items. The factors studied included age, education, occupational placement, the time that had passed since the stroke, persisting symptoms, the patient's ability to deal with the symptoms, the degree of the patient's ability to work and how the patient's ability to work had changed since the stroke, the patient's ability to take care of their loved ones and how this ability had changed since the stroke, the ability to perform common household tasks and how this ability had changed since the stroke, the ability to continue one's hobbies and how this ability had changed since the stroke, the ability to perform the everyday living activities relating to self-care and how this ability had changed since the stroke.

#### 2.1.2 SF-36 questionnaire

Short Form 36 (SF-36) Health Survey Questionnaire, i.e. an abbreviated version containing 36 questions. The actual questionnaire was published by Ware, Sherbourne in 1992 (15). The questionnaire is often used in many medical and nursing disciplines. The Short Form 36 (SF-36) Health Survey Questionnaire is a tool administered by the RAND Corporation, a non-profit organisation deals with the subjective assessment of health and/or quality of

life of patients. The translated questionnaire version was validated for the survey of quality of life of the 40+ Czech population in 2016 (16).

This standardised questionnaire can be used to identify all health problems of a physical character, as well as general mental health, in order to make a general evaluation of quality of life. The questionnaire contains 36 items divided into 8 dimensions. The individual dimensions are as follows: PF - physical functioning; RP - restrictions due to physical problems; BP - body pain; GH - general health; VT - vitality/tiredness; SF - social functioning; RE - restrictions due to emotional problems; MH - mental health. Patient physical and psychological spheres were also generally assessed. Each item (question) contains several suggested answers according to the scale principle. The evaluation used the concept [https://www.rand.org/health-care/surveys\\_tools/mos/36-item-short-form/scoring.html](https://www.rand.org/health-care/surveys_tools/mos/36-item-short-form/scoring.html).

## 2.2 Data collection

The field study used face-to-face interviews. The final form of the interview sheet was established using the pilot study results. The study was anonymous and participation was voluntary. It did not include any controversial ethical questions.

In the field study, 488 respondents were asked to take part in an interview on the topic of post-stroke quality of life. A total of 72 patients (i.e. 14.8% of all persons addressed) refused to take part in an interview, while 416 respondents (i.e. 85.2%) did agree to take part. The proportion of refusals to participate in the study was low. These were patients with minor stroke (according to NIHSS 1-4 - minor stroke).

The main reasons for the refusals included a lack of interest in the study and a general unwillingness to take part in a study (36.5%), and the fact that patients found it difficult to speak about the consequences of stroke (24.3%). Other reasons for refusals included the lack of time (14.8%), distrust of the study and fear of losing privacy (9.5%), fear of infection in the COVID-19 pandemic (9.5%), and the impossibility of communication with the patient or a complete misunderstanding of the questions (5.4%).

## 2.3 Data processing

The data was processed using the SASD 1.5.8 (Statistical Analysis of Social Data) and SPSS software. The analysis used the first and second degrees of classification. In classification degree 1, frequency tables were constructed for individual indicators, and absolute and relative frequencies and expected values were calculated (modus, median, mean, dispersion, standard deviation, range, estimations of the dispersion and standard deviation, and interval estimation of the expected value and dispersion

at the level of 0.05). In classification degree 2, contingency tables with absolute and relative frequencies (column, row, total and expected frequencies) and the sign scheme were calculated.

Tests of the distribution of variables (Tests of Normality) were performed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. According to the character of this distribution and character of the signs, parametric and non-parametric tests (Chi-Square Tests, Mann-Whitney Test, Kruskal-Wallis Tests) were used for the significance calculations. In justified cases, the value for Phi/Cramer V, which also represents an actual significance ( $r$  coefficient) of testing statistic significance and/or Cohen's  $d$ ). Based on this analysis, data was interpreted and relevant tables were processed.

## 2.4 Sample

The sample consisted of stroke patients. Since there is no data about the inner structure of this group, quota sampling was used, where GPs' offices and healthcare facilities treating stroke patients were chosen at random, and stroke patients were randomly chosen with the help of the above-mentioned institutions. As quotas, regions and gender were chosen. The respondents' numbers according to these quotas were derived from the basic sample of the CR population 15+ according to the data of the Czech Statistical Office, valid on 31 December 2019.

## 3 RESULTS

The sample consisted of 416 stroke patients: 207 (49.8%) men and 209 (50.2%) women. In comparison with the basic sample of the Czech population, the deviation is 0.8%. The sample structure corresponds with the structure of the basic sample of the CR population 15+ with regard to gender.

With regard to age, the 70-79 age group was the most numerous and the 49-and-under age group was the least numerous. The most numerous group contained stroke patients with vocational education. The largest group included old-age pensioners. Respondents for whom one to two years had passed since their last stroke were the most numerous (Table 1).

**Table 1.** Socio-demographic characteristics of the sample.

	Absolute frequency	%
<b>Gender</b>		
Men	207	49.8
Women	209	50.2
<b>Age</b>		
Up to 49 years	39	9.4
50-59 years	59	14.2
60-69 years	105	25.2
70-79 years	132	31.7
80 years and over	81	19.5
<b>Education</b>		
Basic	70	16.8
Vocational (no school-leaving exam)	137	32.9
Secondary with school-leaving exam	127	30.6
Higher professional	22	5.3
Academic	60	14.4
<b>Occupational placement</b>		
Self-employed, businessperson	15	3.6
Employed	78	18.8
Disability pensioner	68	16.3
Old-age pensioner	237	57.0
Unemployed	16	3.8
Others	2	0.5
<b>Time that had passed since the last stroke</b>		
up to 1 year	99	23.8
1-2 years	138	33.2
3-4 years	54	13.0
5-6 years	44	10.6
More than 6 years	81	19.5

The composition of the sample of stroke patients with regard to regions has the greatest deviation (0.3%) in comparison with the basic sample of the CZ population 15+. The sample structure corresponds with the structure of the basic sample of the CZ population 15+ with regard to regions.

The variables SF-36 (dependent variables) were examined using the normality test (Kolmogorov-Smirnov). In all features, abnormal distribution was identified. Therefore, non-parametric testing was used to identify differences with regard to independent variables (Mann-Whitney U test and Kruskal-Wallis test, both tests at the significance level of  $p < 0.05$ ).

The QoL results and their description (score SF-36) for the whole group studied are given in Table 2.

No significant differences were discovered with regard to gender in the testing of quality of life in post-stroke patients. The tests did not identify any significant differences in the quality of life between male and female post-stroke patients (Table 3).

The tests the quality of life with regard to age revealed significant differences between individual age groups.

The testing of individual SF-36 dimensions with regard to age categories shows significant differences, except for MH - mental health. The results were as follows: low defect for RE - restrictions due to emotional problems, mean effect for RP - restrictions due to physical problems, BP - body pain, VT - vitality/tiredness, SF - social functioning and in the mental sphere in general (MENTSPH), and high effects for PF - physical functioning, GH - general health and in the physical sphere in general. Generally, the quality of life of stroke patients in individual dimensions, with the exception of mental health, deteriorates with age (Table 4).

**Table 2.** QoL results and their description (score SF-36) for the whole group studied.

	N		Mean	Median	Std. Deviation	Minimum	Maximum
	Valid	Missing					
PF	416	0	41.83	40.00	31.701	0	100
RP	416	0	35.40	25.00	38.123	0	100
BP	416	0	62.67	65.00	28.037	0	100
GH	416	0	38.92	40.00	19.710	0	100
VT	416	0	42.80	40.00	19.423	0	100
SF	416	0	56.28	62.50	28.011	0	100
RE	416	0	57.21	66.67	41.022	0	100
MH	416	0	62.06	64.00	17.678	16	100
FYZOBL	416	0	44.70	40.63	24.207	0	100
DUSOBL	416	0	54.59	56.23	21.790	7	100

Table 3. Quality of life in relation to gender (Mann-Whitney U test).

Domain	Mann-Whitney U test	SD	Asymp. Sig. (2-tailed)
PF - PHYSICAL FUNCTIONING	19,368.50	-1.851	.064
RP - RESTRICTIONS DUE TO PHYSICAL PROBLEMS	20,826.50	-.686	.492
BP - BODY PAIN	20,412.00	-1.002	.316
GH - GENERAL HEALTH	20,092.00	-1.259	.208
VT - VITALITY/TIREDNESS	21,450.00	-.149	.882
SF - SOCIAL FUNCTIONING	19,853.50	-1.463	.143
RE - RESTRICTIONS DUE TO EMOTIONAL PROBLEMS	20,308.50	-1.131	.258
MH - MENTAL HEALTH	20,726.50	-.740	.459
PHYSICAL SPHERE	19,856.00	-1.448	.148
MENTAL SPHERE	20,196.00	-1.171	.242

Table 4. Quality of life in relation to age (Kruskal-Wallis test).

Domain	Chi-Square	df	Asymp. Sig.	Fisher's eta2 ( $\eta^2$ )	Evaluation of the effect
PF - PHYSICAL FUNCTIONING	77.354	4	.000	.191	high effect
RP - RESTRICTIONS DUE TO PHYSICAL PROBLEMS	34.206	4	.000	.077	mean effect
BP - BODY PAIN	41.551	4	.000	.099	mean effect
GH - GENERAL HEALTH	68.911	4	.000	.170	high effect
VT - VITALITY/TIREDNESS	28.584	4	.000	.069	mean effect
SF - SOCIAL FUNCTIONING	31.519	4	.000	.083	mean effect
RE - RESTRICTIONS DUE TO EMOTIONAL PROBLEMS	19.850	4	.001	.050	low effect
MH - MENTAL HEALTH	6.491	4	.165		
PHYSICAL SPHERE	72.132	4	.000	.180	high effect
MENTAL SPHERE	29.660	4	.000	.075	mean effect

The effect evaluation:

$\eta^2 \geq 0.14 \rightarrow$  high effect

$\eta^2 \in (0.06-0.14) \rightarrow$  mean effect,

$\eta^2 \in (0.01-0.06) \rightarrow$  low effect (17).

The analyses of the second degree of classification dealt with the testing of the respondents' quality of life with regard to their occupational placement. In this case, significant differences were also identified. The testing of individual SF-36 dimensions with regard to occupational placement shows that, as in the case of age, significant differences were identified in all dimensions except for MH - mental health. The results were as follows: low effects for VT - vitality/tiredness, RE - restrictions due to emotional problems and the mental sphere in general; mean effect for RP - restrictions due to physical problems, BP - body pain, GH - general health, SF - social functioning, and a high effect for PF - physical functioning and the physical sphere in general. Generally speaking, quality of life in the SF-36 dimensions is scored highest by employed respondents and lowest by old-age pensioners (Table 5).

Table 5. Quality of life relating to occupational placement (Kruskal-Wallis test).

Domain	Chi-Square	df	Asymp. Sig.	Fisher's eta2 ( $\eta^2$ )	Evaluation of the effect
PF - PHYSICAL FUNCTIONING	63.966	4	.000	.165	high effect
RP - RESTRICTIONS DUE TO PHYSICAL PROBLEMS	31.437	4	.000	.082	mean effect
BP - BODY PAIN	36.423	4	.000	.083	mean effect
GH - GENERAL HEALTH	50.763	4	.000	.134	mean effect
VT - VITALITY/TIREDNESS	19.004	4	.001	.044	low effect
SF - SOCIAL FUNCTIONING	29.987	4	.000	.073	mean effect
RE - RESTRICTIONS DUE TO EMOTIONAL PROBLEMS	9.980	4	.041	.024	low effect
MH - MENTAL HEALTH	7.003	4	.136		
PHYSICAL SPHERE	56.304	4	.000	.156	high effect
MENTAL SPHERE	20.378	4	.000	.048	low effect

The analyses also compared quality of life with regard to respondents' education. Significant differences were also identified. In the SF-36 dimensions of quality of life, differences were found (though with a low effect) with regard to education in the following dimensions: PF - physical functioning, RP - restrictions due to physical problems, BP - body pain, GH - general health, VT - vitality/tiredness, and in the sphere of physical health in general. The analysis shows that quality of life is better in respondents with higher education (Table 6).

The time that has passed since the last stroke can also play an important role in quality of life. These correlations were also tested. The comparison of quality of life according to SF-36 with regard to the time that has passed since the last stroke attack revealed differences of low practical significance only in the dimensions of RE - restrictions due to emotional problems and MH - mental health. Quality of life was the worst among patients with the shortest time since their last stroke. The evaluation in these dimensions improves with the time that has passed since the stroke (Table 7).

Table 6. Quality of life relating to education (Kruskal-Wallis test).

Domain	Chi-Square	df	Asymp. Sig.	Fisher's eta2 ( $\eta^2$ )	Evaluation of the effect
PF - PHYSICAL FUNCTIONING	15.468	4	.004	.037	low effect
RP - RESTRICTIONS DUE TO PHYSICAL PROBLEMS	10.958	4	.027	.023	low effect
BP - BODY PAIN	23.680	4	.000	.055	low effect
GH - GENERAL HEALTH	18.420	4	.001	.044	low effect
VT - VITALITY/TIREDNESS	16.753	4	.002	.040	low effect
SF - SOCIAL FUNCTIONING	4.907	4	.297		
RE - RESTRICTIONS DUE TO EMOTIONAL PROBLEMS	6.364	4	.174		
MH - MENTAL HEALTH	4.997	4	.288		
PHYSICAL SPHERE	18.736	4	.001	.048	low effect
MENTAL SPHERE	6.759	4	.149		

Table 7. Quality of life relating to the time that has passed since the last stroke attack (Kruskal-Wallis test).

Domain	Chi-Square	df	Asymp. Sig.	Fisher's eta2 ( $\eta^2$ )	Evaluation of the effect
PF - PHYSICAL FUNCTIONING	1.278	4	.865		
RP - RESTRICTIONS DUE TO PHYSICAL PROBLEMS	8.436	4	.077		
BP - BODY PAIN	1.577	4	.813		
GH - GENERAL HEALTH	2.753	4	.600		
VT - VITALITY/TIREDNESS	9.069	4	.059		
SF - SOCIAL FUNCTIONING	.767	4	.943		
RE - RESTRICTIONS DUE TO EMOTIONAL PROBLEMS	13.352	4	.010	.031	low effect
MH - MENTAL HEALTH	13.442	4	.009	.029	low effect
PHYSICAL SPHERE	1.447	4	.836		
MENTAL SPHERE	9.026	4	.060		

#### 4 DISCUSSION

No significant differences in quality of life were found in stroke patients in relation to their gender. The comparison of quality of life with regard to age identified significant differences between the individual age groups, except for MH - mental health. The results were as follows: low defect for RE - restrictions due to emotional problems, mean effect for RP - restrictions due to physical problems, BP - body pain, VT - vitality/tiredness, SF - social functioning and the mental sphere in general (MENTSPH), and high effects for PF - physical functioning, GH - general health and physical sphere (PHYSPH) in general. The quality of life of stroke patients in individual dimensions according to SF-36, with the exception of mental health, deteriorates with age. The deterioration of quality of life with age can be also influenced by the increasing prevalence of diabetes, hypertension and other coronary diseases (18).

Studies dealing with correlations between age and stroke patients have produced controversial results. This can be caused by the fact that various scales for quality of life were used in individual studies, and there were differences in the severity of respondents' stroke symptoms (19).

In most cross-sectional, short-term and long-term studies dealing with QoL of stroke patients, it was found out that the main QoL determinant was the degree of functional impairment. The study examining elderly Korean post-stroke patients identified physical functioning as the main factor influencing quality of life (20).

The testing of individual SF-36 dimensions with regard to occupational placement shows that, as in the case of age, significant differences were identified in all dimensions except for MH - mental health. The remaining results were as follows: low effects for VT - vitality/tiredness, RE - restrictions due to emotional problems and the mental sphere in general; mean effect for RP - restrictions due to physical problems, BP - body pain, GH - general health, SF - social functioning, and a high effect for PF - physical functioning and the physical sphere in general. In SF-36, quality of life was scored highest by employed respondents and lowest by old-age pensioners.

In the SF-36 dimensions of quality of life, differences were found (though with a low effect) with regard to education in the following dimensions: PF - physical functioning, RP - restrictions due to physical problems, BP - body pain, GH - general health, VT - vitality/tiredness, and in the sphere of physical health in general. The analysis shows that quality of life is better in respondents with higher education.

The time that has passed since the last stroke can also play an important role in the quality of a patient's life. The comparison of quality of life according to SF-36 with regard to the time that has passed since the last stroke attack revealed differences of low actual significance only

in the dimensions of RE - restrictions due to emotional problems and MH - mental health. Quality of life was the worst among patients with the shortest time since their last stroke. The evaluation in these dimensions improves with the time that has passed since the stroke.

The study by Chen, et al. (21) found that no important improvement of quality of life at mental level had occurred in patients after four weeks of post-stroke treatment. Another multi-variation analysis (22) found that marital status and age were factors associated with QoL improvement. The above-mentioned findings suggest that age closely relates to QoL improvement.

As mentioned in the study by Bays (23), the general quality of life of post-stroke patients differed depending on the country in which the study was conducted. The variables that were positively associated with the quality of life of post-stroke patients included independence in everyday activities, improved functional abilities, social support and sources of healthcare. The variables that were negatively associated with the quality of life of post-stroke patients included psychological affection, seriousness of the affection, seriousness of aphasia, inadequate reactions to the illness and pessimism, and incapability of returning to one's occupation. Specifically, between 22% to 73% of QoL dispersion in post-stroke patients was mainly explained by the presence of depression, functional disabilities, particularly of the upper extremities, and socialisation, particularly leisure time activities (23). Professional nursing aiming at the QoL improvement of post-stroke patients includes support of independence, depression management, and the promotion of interpersonal relationships. Rehabilitation should include the promotion of adaptation for patients to help them cope with complicated and uncertain post-stroke lives, and find meaningful and realistic individual goals for their recovery.

The positive features of the study include the fact that a high number of respondents participated, with only a few patients refusing to take part. The non-existence of any data on the internal structure of this sample of respondents represents a limitation.

#### 5 CONCLUSION

Life expectancy is increasing worldwide. However, quality of life deteriorates as the post-stroke patient gets older. Quality of life in the SF-36 dimensions is scored highest by employed respondents and lowest by old-age pensioners. The analysis shows that quality of life improves with better education. The patients with the shortest time since stroke have the lowest quality of life in the dimensions in question. In individual SF-36 dimensions, the quality of life of post-stroke patients improves with time. In combination

with the increased number of persons who have survived stroke, the Czech Republic faces a challenge.

It is assumed that, in future, research in the Czech Republic will have to be focused on the quality of life of patients post-stroke. The assessment and evaluation of quality of life are elements that can significantly help to develop effective individualised curative and preventive treatment in elderly patients. Intervention plans can start at in-patient facilities and continue in outpatient or primary care. Elderly post-stroke patients should therefore be provided with the necessary health and social support.

## CONFLICT OF INTERESTS

The authors declare that no conflicts of interest exist.

## FUNDING

The study was supported by the Ministry of Health of the Czech Republic, grant no NV19-09-00199.

## ETHICAL APPROVAL

Research was conducted in accordance with ethical principles and approved by the Ethics Committee on 4 June 2018.

## REFERENCES

- Karimi M, Brazier J. Health, health-related quality of life, and quality of life: what is the difference? *Pharmacoeconomics*. 2016;34(7):645-9. doi: 10.1007/s40273-016-0389-9.
- Gibbon B, Gibson J, Lightbody CE, Radford K, Watkins C. Promoting rehabilitation for stroke survivors. *Nurs Times*. 2012;108(47):12-5.
- Leys D, Hénon H, Mackowiak-Cordoliani MA, Pasquie F. Poststroke dementia. *Lancet Neurol*. 2005;4(11):752-9. doi: 10.1016/S1474-4422(05)70221-0.
- King, RB. Quality of life after stroke. *Stroke*. 1996;27:1467-72. doi: 10.1161/01.STR.27.9.1467.
- Gill TM, Feinstein AR. A critical appraisal of the quality of quality-of-life measurements. *JAMA* 1994;272(8):619-26.
- Testa MA, Nackley JF. Methods for quality-of-life studies. *Annu Rev Public Health* 1994;15:535-59. doi: 10.1146/annurev.pu.15.050194.002535.
- Aström MM, Asplund K, Aström MT. Psychosocial function and life satisfaction after stroke. *Stroke* 1992;23(4):527-31. doi: 10.1161/01.str.23.4.527.
- Viitanen M, Fugl-Meyer KS, Bernspang B, Fugl-Meyer AR. Life satisfaction in long-term survivors after stroke. *Scand J Rehabil Med*. 1988;20(1):17-24.
- Hackett M, Yapa CH, Pareg V, Anderson CS. Frequency of depression after stroke: a systematic review of observational studies. *Stroke*. 2005;36(6):1330-40. doi: 10.1161/01.STR.0000165928.19135.35.
- Ch'ng AM, French D, McLean N. Coping with the challenges of recovery from stroke: long term perspectives of stroke support group members. *J Health Psycho*. 2008;13(8):1136-46. doi: 10.1177/1359105308095967.
- Xiao Yb, Cai Sh, Liu Ll, Yang X, Yun Jp. Decreased expression of peroxisome proliferator-activated receptor alpha indicates unfavorable outcomes in hepatocellular carcinoma. *Cancer Manag Res*. 2018;10:1781-9. doi: 10.2147/CMAR.S166971.
- Booth J, Connelly L, Lawrence M, Chalmers C, Joice S, Becker C, et al. Evidence of perceived psychosocial stress as a risk factor for stroke in adults: a meta-analysis. *BMC Neuro*. 2015;15:233. doi: 10.1186/s12883-015-0456-4.
- Kronenberg G, Schöner J, Nolte C, Hein A, Endres M, Getz K. Charting the perfect storm: emerging biological interfaces between stress and stroke. *Eur Arch Psychiatry Clin Neurosci*. 2017;267(6):487-94. doi: 10.1007/s00406-017-0794-x.
- Miller EL, Murray L, Richards L, Zorowitz RD, Bakas T, Clark P, et al. Comprehensive overview of nursing and interdisciplinary rehabilitation care of the stroke patient. *Stroke*. 2010;41:2402-48. doi: 10.1161/STR.0b013e3181e7512b.
- Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care*. 1992;30(6):473-83.
- Bártlová S, Tóthová V, Chloubová I, Šedová L, Olišarová V, Michálková H, et al. The quality of health of the Czech population at the age of 40+ using the Short Form-36 (SF-36) questionnaire. *Kontakt*. 2020;22(1):16-26. doi: 10.32725/kont.2020.003.
- Sigmundová D, Sigmund E. Statistická a věcná významnost a použití dat o pohybové aktivitě. *Tělesná Kultura*. 2012;35(1):55-72.
- Cifu DX, Lorish TR. Stroke rehabilitation. 5: stroke outcome. *Arch Phys Med Rehabil*. 1994;75(5 Spec No):S56-60.
- Gunaydin R, Karatepe AG, Kaya T, Ulutas O. Determinants of quality of life (QoL) in elderly stroke patients: a short-term follow-up study. *Arch Gerontol Geriat*. 2011;53(1):19-23. doi: 10.1016/j.archger.2010.06.004.
- Yoon H. Factors affecting quality of life of the Korean aged stroke patients. *J. Aging Hum Dev*. 1997;44:167-81. doi: 10.2190%2F8D0G-4PAW-QH4R-WXU4.
- Chen Q, Cao C, Gong L, Zhang Y. Health related quality of life in stroke patients and risk factors associated with patients for return to work. *Medicine (Baltimore)*. 2019;98(16):e15130. doi: 10.1097/MD.00000000000015130.
- Wang R, Langhammer B. Predictors of quality of life for chronic stroke survivors in relation to cultural differences: a literature review. *Scand J Caring Sc*. 2018;32(2):502-14. doi: 10.1111/scs.12533. Epub 2017 Sep 26.
- Bays CL. Quality of life of stroke survivors: a research synthesis. *J Neurosci Nurs*. 2001;33(6):310-6. doi: 10.1097/01376517-200112000-00005.