Factors Predicting Quality of Life in Stroke Patients: A Cross-Sectional Study

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Abstract

Aims: Stroke affects the quality of life by affecting daily activities. This study aimed at determining the factors predicting quality of life in patients with stroke referring to Shahid Beheshti Hospital in Kashan. **Materials and Methods:** In this cross-sectional study, sampling was done by census method during 2019 and in the first 6 months of 2020, and 188 patients with stroke referring to Shahid Beheshti Hospital in Kashan who had at least 2 months after stroke were evaluated. Data collection tools were questionnaire of Stroke Impact Scale-16 and possible factors associated with stroke. Data were analyzed using SPSS software version 16 using the tests of Mann–Whitney, Kruskal–Wallis, independent t-test, Pearson's correlation coefficient (Spearman), and multivariate linear regression analysis. **Findings:** The mean quality of life was 50.92 ± 24.97. In univariate analysis, the quality of life was significantly associated with gender, marital status, education level, type of stroke, use of rehabilitation services, spouse's education level, occupation, number of children, regular exercise, history of hypertension, and previous history of stroke. Based on the results of multivariate analysis, 62.4% of variance was explained by four factors of the required number of rehabilitation sessions, history of previous stroke, level of education, and severity of stroke ($F = 11.597$, $R^2 = 0.624$, and $P < 0.001$). The most important factor was the number of rehabilitation sessions required. **Conclusion:** To improve the stroke patients' quality of life, healthcare professionals should pay attention to the predictive role of low education level, more need for rehabilitation, severity, and history of stroke in their programs and procedures.

Keywords: Cerebrovascular accident, quality of life, stroke

INTRODUCTION

Stroke is one of the most common neurological diseases and the second leading cause of death in the world, with a mortality rate of 5.5 million people annually.[1,2] The prevalence of stroke in Iran is 150 per 100,000 people so that 100,000 ones are infected annually.[3] It is the third leading cause of disability in the world.[2] Stroke includes two types: ischemic and hemorrhagic. About 85% of strokes are ischemic.[4,5] Disability due to stroke complications affects patients' quality of life.[6] Most studies, including those in Brazil,[7] Poland,[8] Iran,[9] and Norway,[10] have reported low poststroke quality of life.

The World Health Organization defines quality of life as people's perception of life, values, goals, standards, and interests. In other words, quality of life refers to the level of physical, mental, and social well-being, such as life satisfaction, feeling of health, having a job, having a spouse, appropriate socioeconomic status, creativity, sense of ownership, and cooperation with others that are perceived by individuals.[11]

Quality of life in this century is one of the biggest health issues, and its evaluation in recent years has been considered as one

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of the goals in stroke treatment and has become increasingly important in enhancing life expectancy and improving patient function.[12] Recognizing the predictors of quality of life in stroke patients can also help early diagnosis of more vulnerable patients to modify these factors to improve the quality of life in these patients.[9]

Numerous studies have reported different and contradictory factors predicting the quality of life of stroke patients. In the study by Kariyawasam *et al*. in Sri Lanka, the level of dependence, severity of speech disorder, age, the type of stroke, side of lesion, and level of education,[13] and in the study of Hieberg *et al*. in Norway and Denmark, being younger adults (under 65 years), predicted a negative change in the quality of life.[14] In a study by Oni *et al*. in Nigeria, the most important predictors were hypercholesterolemia and diabetes.[15] In the study of Laberton *et al*. in Norway, the severity of primary stroke,[10] and in the study of Mahesh *et al*. in Sri Lanka, age, gender, level of education, level of disability, blood cholesterol, and level of health infrastructure were important predictors of the quality of life in these patients.[16] In the study of Rancic *et al*. in Serbia, the quantity and quality of rehabilitation were important predictors.[17] Another important predictor of quality of life was depression.[18] Due to the difference in quality of life of stroke patients in different geographies and cultures,[14,19] different or contradictory results in some studies, importance of assessing the quality of life of these patients at home and not conducting similar research in Kashan and also due to the epidemic COVID-19, which affected many aspects of life, this study was done to assess the factors predicting quality of life in stroke patients referred to Shahid Beheshti Hospital in Kashan during 2019-2020 were studied.

MATERIALS AND METHODS

This cross-sectional study was conducted with the approval of Vice Chancellor (99191) and the Ethics Committee (IR. KAUMS.NUHEPM.REC.1399.080) of Kashan University of Medical Sciences, and the researcher was introduced to Shahid Beheshti Hospital. After satisfying the hospital officials by giving the necessary explanations about the goals and the research procedure, the first author of the article (M.Sc. student of Internal-Surgical Nursing trained in the care of stroke patients) reviewed the records of all hospitalized patients diagnosed with stroke. All eligible patients referring to Shahid Beheshti Hospital in Kashan from March 2019 to October 2020 were examined by continuous random sampling in even days of each month and were included in the study. To determine the sample size by considering the 95% confidence interval ($Z = 1.96$) and the standard deviation of 29.18 (according to previous studies) and d which was considered 15% of the standard deviation, the sample size was calculated to be 171, taking into account the 10% drop, increased to 188 people.

In addition to telephone numbers, some information (such as stroke type, Modified Rankin Scale, and National Institute

of Health Stroke Scale) was extracted from the patients' records. Then, the patient (or patient's caregiver if the patient is unable to answer) was given the necessary explanations about the purpose of the research and performance method, confidentiality of information, and the ability to leave the study at each stage by phone. Inclusion criteria were the age of over 18 years, willingness to participate in the study, the time elapsed since the recent stroke was at least 2 months, and no limitation in life activities for reasons other than stroke, and the exclusion criterion was incomplete questionnaires.

If they agreed to participate, patients were asked to set an appropriate time to answer the questions. Participants' consent was obtained orally and by telephone. Due to the COVID pandemic, it was not possible to obtain written consent at the time of data collection. At the appointed time, the researcher asked the patient or his caregiver the questions slowly and clearly by phone and wrote down the answers. If the patient or his/her caregiver had access to mobile phone, internet, etc., the researcher would have sent them a questionnaire file so that they would have read and answered it carefully at the appropriate time.

Data collection tools included personal characteristics questionnaires (gender, age, marital status and employment status, educational level, nationality, financial status, regular exercise, Alteplase therapy, kind of stroke, history of hypertension, diabetes and stroke, time elapsed after stroke, stroke severity, and number of rehabilitation sessions required based on the opinion of a neurologist) and Stroke Impact Scale-16 (SIS-16) Questionnaire. The demographic and personal characteristics questionnaire included 17 questions. The SIS-16 Questionnaire is a shortened form of the SIS-3 Questionnaire developed by Duncan *et al*. It contains 16 questions on daily life activities, mobility, the use of the affected hand, and the amount of strength and balance. Likert' scale questions with five items were administered, including: doing the job alone and completely independently – 1 point; doing the job with minimal help – 2; doing the job with moderate help – 3; needing a lot of help to do the job – 4, and doing the desired work completely dependently – 5. The mean score of this questionnaire is in the range of 1 to 5. Achievable scores of 16–80 (changed to 20–100 in scale of 100) and lower scores indicate a better quality of life.[20] Jalilian and Imani approved the reliability and validity of this questionnaire in Iran. To determine reliability, test–retest was used with a 2-week interval. The results showed that the questionnaire had acceptable reliability, and the value of Cronbach's alpha coefficient was equal to 0.96.[21] In the present study, the Cronbach's alpha of the questionnaire was calculated 0.87. The primary outcome and secondary measurements in this study were quality of life in stroke patients and its related factors, respectively.

Data analysis was performed using SPSS version 16 (SPSS Inc., IBM, USA) in two steps. In the first stage, univariate analysis was performed. Quantitative variables were described using

measures of dispersion and central tendency, and qualitative variables with absolute and relative frequency. Independent *t*-test was used to investigate the relationship between each of the related factors classified into two-level categorical variables (such as gender), and for not normal distribution, the nonparametric equivalent of Mann–Whitney U-test was used. ANOVA was used for possible multivariate-categorized–related factors (such as level of education), and in case of nonnormal data distribution, its nonparametric equivalent (Kruskal–Wallis) was used. Pearson's correlation coefficient was used for some possible related factors, and for nonnormal data, Spearman's rank correlation coefficient was applied. In the second step, all variables that had $P < 0.2$ in univariate analysis were entered into the multiple linear regression model by stepwise method. The normality of the data was checked using the Kolmogorov–Smirnov test.

RESULTS

From 188 patients participated in the study, there were 61.2% of male and the rest was female. The mean age of the patients was 66.36 ± 14.89 years, and 97.3% of them had Iranian citizenship; 73.9% of patients were married, 51.1% were illiterate, and only 4.3% had university education, and 68.6% of them had low income. In addition, 90.4% of them were ischemic stroke patients. Among them, 24.5% had a previous history of stroke, and the time elapsed since the recent stroke was about 13.16 ± 6.78 months. Of the all patients, 13.8% always had regular exercise, and only 51.6% used counseling and rehabilitation services. The mean number of rehabilitation sessions for patients was about 20.9 ± 12.81 sessions and 23.4% of patients had received Alteplase. The patients' quality of life score was 50.92 ± 24.97 (from 100).

Univariable analysis indicated the significant relationship between the quality of life of people with stroke and gender, marital status, education, occupation, spouse education, number of children, regular exercise, type of stroke, use of rehabilitation services, history of hypertension, and history of previous stroke. However, the quality of life of patients did not show a statistically significant relationship with the variables of spouse's job, nationality, income status, type of insurance, receiving Alteplase, history of diabetes, concurrence with COVID-19 pandemic, and stroke day (holiday or nonholiday) [Table 1a and b].

The most important factor affecting the quality of life of people with stroke has been the number of rehabilitation sessions required, and 27.7% of the quality of life of people with stroke has been determined, and for every 1 unit increase in the number of rehabilitation sessions, 0.758 units reduction is seen in quality of life [Table 2].

DISCUSSION

The aim of this study was to determine the predictive factors of quality of life of patients with stroke in Shahid Beheshti Hospital in Kashan during 2019–2020. The findings showed that the mean quality of life of patients is low, which is in line with the findings of Labberton *et al.* in Norway,[10] Ramos-lima *et al.* (2018) in Brazil,[7] Pacian *et al.* (2018) in Poland,[8] and Salehi *et al.* in Iran-Arak.[9] Most patients suffer from multiple physical problems and disabilities following a stroke, with about 30%–40% of survivors experiencing severe disabilities, 78%–60% reduction in speed and movement control, and more than 50% having long-term disabilities,[22] which naturally affects their quality of life. The quality of life of these patients, in addition to the physical domain, is further damaged in terms of social activities.[23]

Univariate analysis showed that quality of life has a significant relationship with gender, marital status, education, spouse education status, occupation, regular exercise, type of stroke, use of counseling and rehabilitation services, history of hypertension, history of previous stroke, age, age of spouse, number of rehabilitation sessions required, the number of children, and the severity of stroke. However, in multiple linear regression analysis, the simultaneous presence of four factors; the number of required rehabilitation sessions, previous stroke history, education level, and stroke severity in the model were reported significant. The four factors explained 62.4% of the variance, and the most important factor was the number of rehabilitation sessions required. Patients who needed more rehabilitation sessions had lower quality of life, which is similar to the results of the study by Kariyawasam *et al.*[13] Rehabilitation is the most important and effective treatment strategy in patients with stroke, which has a great impact on increasing the quality of life of survivors.[21] Nevertheless, the need for more sessions of this treatment is evidence of the severity and extent of stroke and disability.

A history of previous stroke was one of the predicting factors of low quality of life in survivors, which is in line with the results of Salehi *et al.* (2019), Aarnio *et al.*, and Alotaibi *et al.* in Saudi Arabia.[9,23,24] A history of previous stroke is one of the most important factors that increase the rate of poststroke death. Factors such as diabetes, high blood pressure and lipids, and genetics play a large role in the second stroke.[23,24]

Lower education level was another predictor of low quality of life, which was in line with the findings of Jalilian and Imani, Mahesh *et al.*, Kariyawasam *et al.*, and Zemed *et al.*.[13,16,18,21] Patients with higher education have more information about the disease, treatment methods, and rehabilitation, which can affect their adherence to the instructions and their adherence to treatment management and increase the quality of life. In addition, people with higher education are likely to have better jobs and higher incomes, making access to healthcare easier and faster. In particular, the possibility of using expensive rehabilitation methods is more available for this group of patients.[16]

Another predictor of low quality of life was the severity of stroke, which is consistent with the findings of many studies.[7,9,10,13,16,25-27] As the severity of the stroke increases, the associated dependence and neurological problems, including

Table 1a: Quality of life score by possible related factors (categorized variables) in research

Parameter	Frequency (%)	Mean±SD	P
Gender			
Female	73 (38.8)	55.56±24.59	0.028*
Male	115 (61.2)	47.96±24.86	
Marital status			
Single	7 (3.7)	26.61±16.39	0.003**
Married	139 (73.9)	50.20±24.85	
Divorced/widowed	42 (22.4)	57.35±24.11	
Employment status			
Employee	8 (4.3)	22.81±4.85	0.001**
Self-employed	69 (36.7)	51.39±26.06	
Retired	39 (20.7)	47.34±21.98	
Homemaker	72 (38.3)	55.52±24.77	
Employment status of spouse			
Retired	13 (9.3)	40.48±20.12	0.22**
Self-employed	24 (17.2)	54.90±25.42	
Homemaker	92 (66.2)	49.33±24.86	
Worker	10 (7.2)	59.63±26.86	
Educational level			
Illiterate	96 (51.1)	56.41±23.55	0.001**
Primary high school	70 (37.2)	46.91±25.27	
Diploma	14 (7.4)	43.57±25.06	
University	8 (4.3)	32.97±24.95	
Educational level of spouse			
Illiterate	59 (42.4)	57.12±24.88	0.02**
Primary high school	57 (41)	46.89±23.90	
Diploma	16 (11.5)	41.72±23.43	
University	7 (5.1)	38.39±23.99	
Nationality			
Iranian	183 (97.3)	51.12±24.82	0.31*
Non Iranian	5 (2.7)	43.50±32.61	
Financial status			
Poor	6 (3.2)	52.89±25.24	0.22**
Moderate	53 (28.2)	46.25±24.96	
Good	129 (68.6)	49.79±14.17	
Kind of insurance			
Social security	125 (66.5)	50.26±23.92	0.19**
Health	29 (15.4)	47.28±29.10	
Imam Khomeini Relief Foundation	11 (5.9)	66.82±29.32	
Health service	23 (12.2)	51.47±21.46	
Regular exercise			
Always	26 (13.8)	49.71±22.91	0.013**
Most	12 (6.4)	36.15±15.91	
Sometimes	37 (19.7)	42.50±19.11	
Not at all	113 (60.1)	55.52±26.70	
Alteplase therapy			
Yes	44 (23.4)	46.28±22.24	0.19*
No	144 (76.6)	52.34±25.65	
Kind of stroke			
Ischemic	170 (90.4)	49.18±23.83	0.011*
Hemorrhagic	18 (9.6)	67.36±29.97	
Use of counseling and rehabilitation services			
Yes	97 (51.6)	56.77±24.13	0.001*
No	91 (48.4)	44.68±24.47	

Contd...

Table 1a: Contd...

Parameter	Frequency (%)	Mean±SD	P
History of hypertension			
Yes	124 (66)	54.27±25.03	0.009*
No	64 (34)	44.41±23.72	
History of diabetes			
Yes	70 (37.2)	52.98±21.71	0.17*
No	118 (62.8)	49.69±26.73	
History of stroke			
Yes	46 (24.5)	60.05±25.48	0.005*
No	142 (75.5)	47.96±24.16	
Simultaneous with the occurrence of COVID-19			
Yes	79 (42)	48.21±26.87	0.49*
No	109 (58)	52.88±23.43	
Day of stroke			
Weekend	56 (29.8)	54.40±26.55	0.29*
Nonweekend	132 (70.2)	49.44±24.22	

*Mann–Whitney U, **Kruskal–Wallis. SD: Standard deviation

Table 1b: Quality of life score by possible related factors (quantitative variables) in research samples

Parameter	Mean±SD	The correlation coefficient	P
Age	66.36±14.89	0.385	0.001***
Spouse's age	71.7±20.48	0.207	0.004***
Time elapsed after stroke	13.16±6.78	0.116	0.110****
Number of rehabilitation sessions required	12.81±20.89	0.408	0.001****
Number of children	4.47±2.49	0.244	0.001****
Stroke severity	6.45±4.35	0.409	0.018****

***Pearson, ****Spearman. SD: Standard deviation

Table 2: The results of the multiple linear regression analysis to determine the predictors of quality of life in the patients with stroke

Model	R^2	t	P	β	B	SE
Constant		5.913	<0.001		68.59	11.598
Number of rehabilitation sessions required	0.277	4.849	<0.001	0.593	0.758	0.156
History of stroke	0.158	−2.509	<0.018	−0.310	−13.667	5.447
Educational level	0.130	−3.002	<0.006	−0.352	−8.033	2.676
Stroke severity	0.059	2.093	<0.046	0.255	1.204	0.575
Total	0.624					

R=0.790, *F*=11.597, *P*=0.001. SE: Standard error

decreased or impaired level of consciousness, power of speech, field of vision, eye movement, motor power, facial muscle function, forgetfulness, ataxia, dysarthria, and loss of sensation, increase and affect the quality of life.[26] Some limitations of this study was sampling in the COVID-19 pandemic era and impossibility to complete the questionnaire in person, lack of stroke severity score in most of patient's records, and, in some cases, conduction proxy interviews with patient's caregiver due to patients' restrictions on speaking and lack of follow-up of patients' quality of life over time. The strengths of the study were the lack of sample loss, and due to the small number and comprehensiveness questions, telephone interviews were used in COVID-19 pandemic conditions.

Conclusion

In the present study, it was found that the quality of life of stroke patients is relatively undesirable. Factors predicting the quality of life were the number of rehabilitation sessions required, previous stroke history, level of education, and stroke severity. These four factors determined 62.4% of the variance and the most important factor was the required number of rehabilitation sessions. Health policymakers and planners can improve the quality of life of these patients by considering these factors in their plans and programs.

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Conflicts of interest

There are no conflicts of interest.

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