Quality of Life of Stroke Patients

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Abstract: This descriptive study aimed to comparatively investigate the factors affecting the quality of life (QoL) of stroke patients through a secondary analysis of raw data from the 7th Korea National Health and Nutrition Examination Survey (KNHANES). Participants were stroke patients, selected from a total of 8,127 respondents included in the 7th KNHANES. The mean score for QoL (EQ-5D; EuroQoL-5 dimensions) of stroke patients was 0.88 ± 0.16 . Further, QoL had a significant correlation with age ($r = -0.312$, $p < 0.001$), economic status ($r = -0.362$, $p < 0.001$), education level ($r = -0.456$, $p < 0.001$), subjective health status ($r = -0.376$, $p < 0.001$), activity limitations due to stroke ($r = -0.303$, $p < 0.001$), and economic activity ($r = -0.316$, $p < 0.001$). In addition, the factors affecting QoL in stroke patients were subjective health status ($\beta = -0.263$, $p < 0.001$) and activity limitations due to stroke ($\beta = -0.257$, $p < 0.001$), with an explanatory power of 27.9%. The findings indicate that, in order to improve care services and QoL for stroke patients, it is necessary to develop patient-tailored activity promotion programs according to the level of activity limitations due to stroke, as well as interventions for changing patients' perception of their subjective health status. In addition, when establishing national health promotion programs and healthcare policies for stroke patients in the local community, it is necessary to implement measures to increase the number and scope of activities for stroke patients.

Keywords: Stroke, Quality of Life, Depression, EQ-5D

1. Introduction

1.1 Significance of the study

Stroke is a serious disease resulting in permanent disability with varying manifestations depending on the long treatment process and site of lesion, and it poses serious burden and suffering on the caregiving family. Stroke is the third leading cause of death following cancer and cardiovascular disease[1]. Permanent disability caused by stroke hinders individuals' abilities to perform activities of daily living, such as personal hygiene, toileting, eating, dressing, physical activities, and mobility, that are essential to meeting the basic human needs[2].

Quality of life (QoL) in stroke patients refers to their satisfaction with their health status and surrounding situations[3]. However, QoL generally encompasses an array of factors, including physical, mental, emotional, social, and economic environments[4], which hampers the assessment of QoL in stroke patients.

Previous studies that investigated QoL of stroke patients reported that elderly stroke patients have a

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poorer QoL compared to their normal counterparts[5] and that dance therapy programs and occupational intervention programs utilizing handcraft activities help enhance QoL of stroke patients with permanent physical disability[6][7].

Regarding the predictors of QoL in stroke patients, gender[8] and education level[9] were identified as the predictors of QoL among demographic characteristics. Among physical health-related characteristics, activities of daily life[10] and limitation of activities[11] were found to be associated. Among psychosocial characteristics, depression[9], stress[12], and community involvement[13] were identified as the predictors of QoL in stroke patients.

As shown here, QoL of stroke patients is complex and multifactorial, so patients should be continuously and meticulously followed-up. However, there are only a limited number of studies investigating QoL of stroke patients using the EQ-5D based on the seventh Korea National Health and Nutrition Examination Survey (KNHANES) data[14][15].

The KNHANES is a national survey on the health behaviors of the Korean population, the prevalence of chronic diseases, and food and nutrition intake status conducted by the Korea Centers for Disease Control and Prevention (Korea CDC). The statistical data are representative and reliable and are used for goal setting and evaluation indicators for the National Health Plan, and as basic data required for establishing and evaluating national health policies, such as the development of national health promotion programs (Korea CDC, 2019). Based on the 7th KNHANES (2016–2017), which was conducted with all population groups, the present study aimed to investigate the factors affecting QoL in stroke patients using the Korean version of the EQ-5D and to provide basic data for informing the development of healthcare policies to improve QoL in stroke patients.

1.2 Purpose of the Study

The detailed purposes of the study include the following: 1) examining the quality of life of stroke patients; 2) investigating the correlation between the quality of life and characteristics of stroke patients; and 3) identifying the factors that affect the quality of life of stroke patients.

2. Methods

2.1 Study Design

This was a descriptive study aiming to comparatively investigate the general characteristics and factors affecting the quality of life of stroke patients by performing a secondary analysis of raw data from the 7th KNHANES.

The KNHANES provides government-designated statistics in accordance with the Statistics Act, Article 17 (Approval No. 117002). We obtained data from the health interviews in the 7th KNHANES, conducted in 2017 (KNHANES VII-2), by accessing the latest updated (April 2019) and revised data available from the KNHANES website. The KNHANES contains representative and reliable statistical data, which have been used as indices during the stages of goal setting and evaluation of the national health Plan, and as baseline data necessary for the establishment and evaluation of health policies, including the development of the Health Plan.

2.2 Data Collection

The KNHANES is conducted on Koreans over the age of 1, residing in Korea; it follows a strict sampling procedure to ensure proper representation of the target population. The two-stage stratified cluster sampling method, with the survey zone and household as the primary and secondary sampling

units, respectively, is used to select the survey targets. As for the first- and second-year surveys of the 7th KNHANES (2016-2017), the primary sampling unit, the sampling frame for the survey zone was stratified according to the cities, provinces, counties, towns, and housing type (detached houses and apartments); 192 sample survey zones were selected using the ratio of residential space, the ratio of the education level of the family head, and so on as the intrinsic stratification criteria. As for the second sampling unit, 23 sample households were selected using the systematic extraction method among appropriate households, excluding facilities such as nursing homes, military units, prisons, and foreign households. Within the sampled households, all household members over the age of 1 who satisfied the requirements as a household member were selected as targets of the survey; the number of samples extracted in the second year of the 7th KNHANES (2017) was 8,127.

The data were collected from selected household members, as well as from survey targets, a health survey, a medical examination, and a nutrition survey. The health survey and medical examination were conducted at a mobile examination center, and the nutrition survey was conducted by personal visits to the target households. Data for education level, economic activity, disease, and medical service usage in the health survey, as well as all items of the nutrition survey, were obtained by interviews. Among the health survey items, answers for the health behavior areas, such as smoking and drinking, were filled out by the participants themselves[16].

2.3 Participants

The target population of the 7th KNHANES comprised 192 primary sample units (PSUs); 23 sample households were selected for each PSU among appropriate households using systematic sampling, excluding facilities such as nursing homes, military, prisons, and foreign households. All members aged 1 year or older in the sample households who satisfied the inclusion criteria were selected as participants for the 7th KNHANES[16]. Among the total 8,127 participants in the 7th KNHANES, stroke patients were selected for analysis in this study. Subsequently, patients with missing data on the following study variables were excluded: gender, age, body mass index (BMI), activity limitations due to stroke, stress, marital status, economic activity, income level, education level, subjective health status, and QoL (EQ-5D). Accordingly, data from a total of 138 participants were used in the final analysis.

2.4 Study Variables

Concerning the KNHANES variables used in this study, the general characteristics of the participants included gender, age, BMI, activity limitations due to stroke, stress, marital status, economic activity, income level, education level, and subjective health status. In addition, QoL was measured using the EQ-5D.

2.4.1 QoL (EQ-5D)

The EQ-5D was used to assess quality of life of stroke patients. It comprises five items measuring mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each item was rated by selecting one of three responses, namely, “not problematic at all,” “moderately problematic,” or “very problematic,” and the responses were integrated into a single variable.

2.4.2 General Characteristics

Among the basic variables in the KNHANES, gender (male, female), age (65 years or older), income level (based on household income quartiles: low, lower-middle, upper-middle, or high), and

education level (elementary school or less, high school graduate, and college graduate or higher) were selected in this study. In the health interview of the KNHANES, activity limitations due to stroke (no, yes), perceived stress level (“I feel a great deal of stress,” “I feel a lot of stress,” “I feel a little stress,” and “I hardly feel stress”), marital status (married, single), economic activity status (employed, unemployed/non-economic activity), and subjective health status (very good, good, moderate, or poor) were selected. In the health examination, BMI (underweight, normal, or obese) was selected.

2.5 Data Analysis

The collected data were analyzed using IBM SPSS 20.0. Descriptive statistics were calculated for general characteristics of the participants and QoL (EQ-5D). The correlation between QoL and related variables was analyzed using Pearson’s correlation coefficients, and the factors affecting QoL were identified using multiple regression analysis.

2.6 Ethical Considerations

The KNHANES is generally conducted after receiving approval from the institutional review board (IRB) at the Korea CDC. However, the 7th KNHANES in 2016 and 2017 was included in the studies directly conducted for public welfare by the government pursuant to the Bioethics Act, Article 2 (1) and its enforcement regulations; thus, the 7th KNHANES was conducted without a review from the IRB at the Korea CDC[16].

3. Results

3.1 General Characteristics of Stroke Patients

The general characteristics of stroke patients are shown in Table 1. In terms of gender, there were 78 male and 60 female participants, with a slightly higher proportion of male participants. The mean age of the participants aged between 35 and 80 years was 66.80 years. In terms of income quintile, the proportion of those who perceived that their income quintile was low was the highest (36.2%), and those who perceived that their income quintile was high was the lowest (12.3%); the overall income quintile reported by the participants was 2.07 points, which was in the upper-middle category. In terms of education level, the proportion of those with elementary school education or lower was the highest (47.8%), and that of college graduates or higher was the lowest (15.9%). In terms of subjective health status, 59 participants reported having moderate health status, and 1 participant reported having very good health status. The mean score for subjective health status was 3.46, indicating that it was slightly poorer than average. The proportion of patients without activity limitations due to stroke (84.8%) was higher compared to those with activity limitations due to stroke (15.2%). In terms of perceived stress level, the proportion of those who reported feeling a little stress was the highest (50.7%), whereas that of those who reported feeling a great deal of stress was the lowest (5.8%). In addition, in terms of marital status, 132 were married and 6 were unmarried. The proportion of those with no economic activity (63%) was higher compared to those with economic activity (37%). The mean BMI was 24.65, ranging from 17 to 40, which was in the pre-obese stage.

[Table 1] General Characteristics of Survey Participants (N=138)

Characteristics	Categories	n (%)	Mean $\pm$ SD	Range
Gender	Male (1)	78(56.5)		1–2
	Female (2)	60(43.5)		
Age			66.80 $\pm$ 10.38	35–80
Income level	Low (1)	50(36.2)	2.07 $\pm$ 1.02	1–4
	Lower-middle (2)	45(32.6)		
	Upper-middle (3)	26(18.8)		
	High (4)	17(12.3)		
Education level	Elementary school or lower (1)	66(47.8)	2.04 $\pm$ 1.15	1–4
	Primary school graduate (2)	22(15.9)		
	High school graduate (3)	28(20.3)		
	College or higher (4)	22(15.9)		
Subjective health status	Very good (1)	1(0.7)	3.46 $\pm$ 0.85	1–5
	Good (2)	14(10.1)		
	Moderate (3)	59(42.8)		
	Poor (4)	49(35.5)		
	Very poor (5)	15(10.9)		
Activity limitations due to stroke	No (0)	117(84.8)		
	Yes (1)	21(15.2)		
Stress	I feel a great deal of stress (1)	8(5.8)	2.97 $\pm$ 0.82	1–4
	I feel a lot of stress (2)	24(17.4)		
	I feel a little stress (3)	70(50.7)		
	I hardly feel stress (4)	36(26.1)		
Marital status	Married (1)	132(95.7)		
	Single (2)	6(4.3)		
Economic activity	Yes (1)	51(37.0)		
	No (2)	87(63.0)		
Body mass index			24.65 $\pm$ 3.44	17–40

3.2 QoL in Stroke Patients

The scores of QoL and its subdimensions among the stroke patients in this study are shown in Table 2. The mean EQ-5D score was 0.88. The scores for pain/discomfort, mobility, usual activities, self-care, and anxiety/depression were 1.48, 1.34, 1.27, 1.17, and 1.14, respectively.

[Table 2] Quality of Life in Stroke Patients (N=138)

Variables	Subcategories	n (%)	Mean $\pm$ SD
QoL (EQ-5D)			0.88 $\pm$ 0.16
QoL (Mobility)	I have no difficulty walking (1)	93(67.4)	1.34 $\pm$ 0.51
	I am somewhat troubled walking (2)	43(31.2)	
	I have to lie all day (3)	2(1.4)	
QoL (Self-care)	I have no problem bathing or getting dressed (1)	118(85.5)	1.17 $\pm$ 0.43
	I'm having some trouble bathing or dressing alone (2)	17(12.3)	
	I can't bathe or dress alone (3)	3(2.2)	
QoL (Usual activities)	I have no trouble with my daily activities (1)	105(76.1)	1.27 $\pm$ 0.51
	I am somewhat troubled with my daily activities (2)	29(21.0)	
	I can't do everyday activities (3)	4(2.9)	
QoL (Pain/discomfort)	I have no pain/discomfort (1)	78(56.5)	1.48 $\pm$ 0.58
	I have some pain/discomfort (2)	54(39.1)	
	I have very severe pain/discomfort (3)	6(4.3)	
QoL (Anxiety/depression)	I am not anxious or depressed (1)	120(87.0)	1.14 $\pm$ 0.37
	I am somewhat anxious or depressed (2)	17(12.3)	
	I am very badly anxious or depressed (3)	1(0.7)	

3.3 Correlation between QoL and related Variables in Stroke Patients

The correlations between QoL and related variables in stroke patients are shown in Table 3. The results revealed that age ($r = -0.312$, $p < 0.001$), income level ($r = -0.283$, $p < 0.001$), education level ($r = 0.299$, $p < 0.001$), subjective health status ($r = -0.376$, $p < 0.001$), activity limitations due to stroke ($r = -0.303$, $p < 0.001$), and economic activity ($r = -0.316$, $p < 0.001$) were correlated with QoL in stroke patients.

3.4 Factors Affecting QoL in Stroke Patients

The variables affecting QoL in stroke patients included subjective health status ($\beta = -0.263$, $p < 0.001$) and activity limitations due to stroke ($\beta = -0.257$, $p < 0.001$) (Table 4). The explanatory power of these variables was 27.9%.

[Table 3] Correlations Between QoL and Related Variables in Stroke Patients (N=138)

Variable	QoL	Gender	Age	Income level	Education level	Marital status	Subjective health status	Activity limitations due to stroke	Economic activity	Stress	Body mass index
	r (p)										
QoL	1										
Gender	-0.0141 (0.100)	1									
Age	-0.312 (<0.001)	0.148 (0.083)	1								
Income level	0.283 (<0.001)	-0.134 (0.117)	-0.362 (<0.001)	1							
Education level	0.299 (<0.001)	-0.390 (<0.001)	-0.347 (<0.001)	0.456 (<0.001)	1						
Marital status	0.030 (0.729)	-0.044 (0.611)	-0.175 (0.041)	-0.190 (0.026)	-0.039 (0.649)	1					
Subjective health status	-0.376 (<0.001)	0.166 (0.051)	0.079 (0.356)	-0.224 (0.008)	-0.200 (0.019)	0.095 (0.267)	1				
Activity limitation due to stroke	-0.303 (<0.001)	-0.046 (0.592)	0.004 (0.962)	-0.070 (0.416)	0.054 (0.527)	0.009 (0.920)	0.177 0.038	1			
Economic activity	-0.316 (<0.001)	0.187 (0.028)	0.444 (<0.001)	-0.446 (<0.001)	-0.350 (<0.001)	0.090 (0.296)	0.308 (<0.001)	0.157 (0.066)	1		
Stress	0.090 (0.296)	-0.005 (0.957)	0.147 (0.085)	-0.050 (0.562)	-0.006 (0.941)	-0.036 (0.675)	-0.275 (0.001)	-0.133 (0.119)	-0.027 (0.752)	1	
Body mass index	-0.039 (0.648)	0.199 (0.019)	-0.187 (0.028)	0.032 (0.707)	-0.061 (0.477)	-0.165 (0.054)	0.002 (0.981)	0.040 (0.645)	0.008 (0.928)	-0.056 (0.511)	1

[Table 4] Factors Influencing Quality of Life in Stroke Patients (N=138)

	B	SE	β	t	p
Age	-0.003	0.001	-0.206	-2.435	0.016
Income level	0.007	0.014	0.047	0.533	0.595
Education level	0.022	0.012	0.158	1.853	0.066
Subjective health status	-0.049	0.015	-0.263	-3.372	<0.001
Activity limitations due to stroke	-0.113	0.033	-0.257	-3.426	<0.001
Economic activity	-0.009	0.030	-0.027	-0.304	0.762
Adj.R2=0.279, F=9.816, p < 0.001					

4. Discussion

This descriptive study aimed to comparatively investigate the factors affecting QoL in stroke patients using raw data from the 7th KNHANES in order to inform interventions for improving QoL in this patient population. The results of this study revealed that the mean score for QoL in stroke patients was 0.88 ± 0.16 , which is similar to 0.88 ± 0.17 in diabetic patients in a study using the same tool[17].

The results indicated that QoL in stroke patients was correlated with age, income level, education level, subjective health status, activity limitations due to stroke, and economic activity. Particularly, the limitation of activities caused by stroke ($r = -0.303$, $p < .001$) is similar to previous findings that functional dependence not only had a direct effect on the QoL of stroke patients but also is indirectly affected QoL through physiological and behavioral changes[18]

. In addition, this finding is in line with the results of a study reporting that an improvement in upper extremity function and upper extremity muscle activity increased the activities of daily living and enhanced QoL in stroke patients undergoing upper extremity rehabilitation training[19]. Thus, nursing interventions and support systems that facilitate the recovery of activities of daily living are needed to increase stroke patients' QoL.

Furthermore, it was found that the factors affecting QoL in stroke patients in this study were subjective health status and activity limitations due to stroke, with an explanatory power of 27.9%. This finding is similar to the results of a previous study[20] reporting that activity limitations due to stroke resulted in difficulties in community mobility, thereby limiting the living, economic, and social environments, and lowering the QoL in stroke patients. In addition, this result is also related to the findings of a study on QoL-related factors in Korean stroke patients[21], indicating that activities of daily living had the greatest effect size on QoL, after depression. Therefore, it is important to promote continued engagement in activities and implement exercise-related nursing interventions to strengthen patients' abilities to perform these activities in order to enhance their QoL.

5. Conclusion

Based on these findings, in order to improve care and QoL for stroke patients, it is important to develop patient-tailored activity promotion programs after carefully analyzing the level of activity limitations due to stroke, and design interventions to improve patients' perception of subjective health status. In particular, subjective perception of health status is related to pain and discomfort caused by abnormal sensations that commonly occur after a stroke. Therefore, providing education for pain management or a program for pain relief for stroke patients can help improve the QoL of stroke patients. In addition, when considering an intervention program to improve the QoL of stroke patients, it is necessary to adopt a comprehensive approach that considers multiple factors affecting the QoL of stroke patients, as opposed to individual interventions for each factor. Moreover, it is necessary to devise measures to expand the activity areas and pain relief of stroke patients when establishing national health promotion programs and healthcare policies for this patient group in the local community.

The generalizability of the results of this study is somewhat limited, as this was a secondary analysis of nationally representative data; thus, further studies with different participant groups and a wider scope are suggested to verify the results. Finally, in order to improve the QoL of stroke patients, future research needs to focus on developing nursing interventions for pain relief and reduction of abnormal sensations in these patients.

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