The relationship between stroke and quality of life in Korean adults: based on the 2010 Korean community health survey

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Abstract. [Purpose] The purpose of this study was to investigate the status of stroke in the Republic of Korea and its relationship with QOL based on standardized data. [Subjects and Methods] This study utilized raw data from the 2010 KCHS. In total, 229,229 individuals participated in the 2010 survey. The final analysis identified 4,604 individuals who had been diagnosed by a doctor with stroke. To identify the correlation between the aftereffect-related characteristics of stroke patients and QOL, a multiple linear regression analysis was performed. [Results] Participants experiencing aftereffects had a statistically significantly lower QOL than participants who had not experienced aftereffects. Regarding the types of aftereffects, participants experiencing palsy in the arms and legs, facial palsy, communication disabilities, swallowing or eating disabilities, and visual disabilities had a statistically significantly lower QOL than participants without aftereffects. The QOL of participants with one, two, three, four, or five aftereffects was statistically significantly less than that of participants without aftereffects [Conclusion] Stroke directly influences QOL and the number of types of aftereffects experienced by patients. Therefore, it is highly important that physical therapists seek to end the occurrence of one or more types of aftereffects in stroke patients.
Key words: Stroke, Quality of life, Korean community healthy survey

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INTRODUCTION

Stroke is the world's second-leading cause of death and a major factor in causing disabilities[1, 2]. An epidemiological analysis predicted that there will be 6.3 million stroke patients in 2015, which would incur enormous costs[3].

In recent years, knowledge of the recovery phase of stroke has expanded rapidly, and the number of stroke survivors has grown due to advances in acute-phase treatments[4]. One report projects that survival after the onset of stroke will increase gradually throughout the world, and almost 90% of those survivors will have a disability[5].The Republic of Korea is no exception to these trends. A number of studies have focused on the causes of stroke, first aid, and intervention methods, but despite these projections, epidemiologic surveys on stroke have been limited[6, 7].

In addition, the quality of life (QOL) can be used as a health-related index frequently more easily than clinical parameters as a health-related index to help healthcare workers to understand patients' needs and provide quality health services[8, 9]. The attention of individuals paid to the health-related QOL measures continues to grow, and relevant studies are underway[10, 11].

Previous studies reported that both patients who have disabilities after a stroke and their guardians experience extreme stress and a reduction in QOL[12, 13]. In addition, stroke commonly results in long-term disabilities[14]. Stoke influences various aspects of QOL, including attitudes, perceptions, and performance[15]. In addition, Baumann et al. reported that monitoring is of great importance in recovering from a stroke[16].

The Korean Community Health Survey (KCHS) was launched to produce comparable regional statistics by establishing and evaluating regional health and medical plans

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Table 1. Characteristics of stroke patients

Parameters	n*	%†	Parameters	n*	%†
Total stroke patients			Sex		
Yes	4,604	1.4	Men	2,308	51.6
No	224,532	98.6	Women	2,296	48.4
Age			Residential area		
19–64	1,282	35.5	Urban	1,983	72.3
≥ 65	3,322	64.5	Rural	2,621	27.7
Physical activity§			Diagnosis of chronic disease//		
Yes	1,953	44.6	Yes	3,643	80.6
No	2,651	55.4	No	961	19.4
Marital status			Aftereffects		
Unmarried	60	2.2	No	1,513	33.1
Married	3,067	66.6	Recovery	724	16.5
Other‡	1,473	31.2	Yes	2,354	50.4
Educational level			Monthly household income (10,000 won)		
Elementary school or less	3,009	55.6	≤100	2,461	48.4
Middle school	581	14.8	101–200	815	22.6
High school	721	20.3	201–300	427	12.6
College and higher	282	9.4	301–400	83	2.3
			≥401	386	14.0

* n: sample size. †%: estimated percent of the population. ‡ Bereaved, divorced, separated, etc. § Physical activity: above more than moderate levels of physical activities (strenuous physical activity more than three times a week, strenuous physical activity for more than 20 minutes a day or moderate levels of physical activity more than five times a week, strenuous physical activity for more than 30 minutes per time), or walking activities for more than 30 minutes five days times a week or over 30 minutes per time. //Diagnosis of chronic diseases: hypertension, diabetes mellitus, dyslipidemia, myocardial infarction, angina pectoris

and by standardizing research implementation systems[17]. The survey has been conducted annually since 2008 and has helped to carry out health projects centered on the nation and each region within in. The purpose of this study was to investigate the status of stroke in the Republic of Korea and its relationship with QOL based on standardized data.

SUBJECTS AND METHODS

Subjects

This study utilized raw data from the 2010 KCHS organized by the Korea Centers for Disease Control and Prevention. The survey took place from August 16, 2010, to October 31, 2010. Trained surveyors visited households selected for the sample and conducted one-on-one electronic surveys using a computer notebook loaded with a survey program. For the national KCHS survey, a sample representative of the population is selected annually before the survey based on nationwide address data from the Ministry of Public Administration and Security and data on housing types and the number of households from the Ministry of Land, Transport and Maritime Affairs. Sample households were extracted from these data with the aim of surveying an average of 900 individuals for each health center. For 2010, 229,229 adults aged 19 or older were surveyed. The operating committee, specialized subcommittees, and administration office that conducted the survey were formed through a partnership among the Korea Centers for Disease Control and Prevention, 16 cities and provinces, 253 health centers, and 36

universities[18, 19]. In total, 229,229 individuals participated in the 2010 survey. The incidence rate of stroke was based on 229,136 participants, excluding 93 with insufficient data to confirm a doctor's diagnosis. The final analysis identified 4,604 individuals who had been diagnosed by a doctor or oriental doctor with stroke. The KCHS's protocol was reviewed and approved by the institutional review board of the Korean Centers for Disease Control and Prevention (2010-02CON-22-P). Written informed consent was obtained from all participants in the KCHS. The general characteristics of the subjects are presented in Table 1.

Methods

To determine the correlation between the aftereffect-related characteristics of stroke patients and their QOL, aftereffects were categorized as nonexistent aftereffects, aftereffects that existed but from which patients had recovered, and existing aftereffects. The types of aftereffects experienced by subjects experiencing or recovering from aftereffects were the occurrence of palsy in the arms and legs, facial palsy, communication disabilities such as poor pronunciation, disabilities in swallowing or eating, and visual impairments. Participants recorded the types of aftereffects they experienced (scale: 0 to 5). For QOL, the EQ-5D, an evaluation tool developed by the Euro-Qol Group founded in 1987, was used. The subjects were instructed to respond to five items on mobility, self-care, usual activity, pain/discomfort, and anxiety/depression and rate the items as not a problem, a minor problem, or a serious problem using

Table 2. Results of multiple regression analysis of quality of life

	R2	B	SE
Occurrence of aftereffects (/No)			
Recovery	0.304	−0.021	0.007*
Yes		−0.224	0.006*
Type of aftereffects (/No)			
Palsy in the arms and legs	0.229	−0.173	0.007*
Facial palsy	0.167	−0.052	0.011*
Communication disabilities	0.187	−0.096	0.007*
Swallowing or eating disorders	0.236	−0.228	0.013*
Visual disabilities	0.178	−0.085	0.008*
The number of aftereffects (/0 time)			
1	0.317	−0.093	0.006*
2		−0.174	0.008*
3		−0.267	0.013*
4		−0.334	0.020*
5		−0.391	0.023*

*p≤0.05, adjusted for sex, age, educational level, marital status, monthly household income, residential area, physical activity, diagnosis of chronic diseases

a 3–point Likert scale. The EQ-5D was calculated using the following equation.

$$EQ\text{-}5D = 1 − (0.05 + 0.096*M2 + 0.418*M3 + 0.046*SC2 + 0.136*SC3 + 0.051*UA2 + 0.208*UA3 + 0.037*PD2 + 0.151*PD3 + 0.043*AD2 + 0.158*AD3 + 0.05*N3)$$

The collected data were analyzed using IBM SPSS Statistics 21.0 and a complex sampling design. Individual weights were applied in order to estimate a population. A frequency analysis was performed to examine the distribution of subjects.

To identify the correlation between the aftereffect-related characteristics of stroke patients and QOL, a multiple linear regression analysis was performed controlling for gender, age, education level, marital status, monthly household income, residential area, physical activity, and presence of venereal diseases. The presented data used relative frequencies (%) and standard errors estimated by applying weighted values, cross ratios, and a 95% confidence interval. The statistical significance level for statistical testing was α=0.05.

RESULTS

To investigate the relationship between QOL and the aftereffect-related characteristics of stroke patients, a multiple linear regression analysis was performed, adjusting for gender, age, education level, marital status, monthly household income, residential area, physical activity, and presence of chronic diseases. Participants who had recovered from aftereffects (B=−0.021, p=0.001) or were experiencing aftereffects (B=−0.224, p<0.001) had a statistically significantly lower QOL than participants who had not experienced aftereffects. Regarding the types of aftereffects, participants experiencing palsy in the arms and legs (B=−0.173, p<0.001), facial palsy (B=−−0.052, p<0.001), communication disabilities (B=−0.096, p<0.001), swallowing or eating disabilities (B=−0.228, p<0.001), and visual disabilities

(B=−0.085, p<0.001) had a statistically significantly lower QOL than participants without aftereffects. The participants with two (B=−0.159, p<0.001), three (B=−0.254, p<0.001), four (B=−0.322, p<0.001), or five aftereffects (B=−0.384, p<0.001) had statistically significantly less QOLs than participants without aftereffects (Table 2).

DISCUSSION

The results of this study showed that the QOL of participants who had recovered or were experiencing aftereffects were statistically significantly lower than that of participants without aftereffects. This aligns with the findings of previous studies showing that, after the onset of a stroke, overall QOL decreases, particularly in sleep, cognitive functions, mobility, emotions, mental feelings, pain, and fatigue[16, 20]. QOL is largely related to physical activities[21], so after the onset of a stroke, medical approaches need to consider not only survival but also poststroke life.

Weakness or paralysis is the most obvious symptom of stroke[22]. Facial palsy could be a factor in lowering QOL[23]. Twenty-one percent to 38% of poststroke patients experience communication disabilities[3]. Patients can also suffer from visual disabilities, such as the sudden loss of sight, and eating disorders[24, 25]. Accordingly, regarding the types of aftereffects, this study showed that participants with palsy in the arms and legs, facial palsy, communication disabilities, swallowing or eating disorders, and visual disabilities had a statistically significantly lower QOL than participants without aftereffects. Thus, this study indicates that poststroke disability factors directly influence QOL.

Regarding the number of aftereffects, participants with one, two, three, four, or five types of aftereffects had a statistically significantly lower QOL than participants without aftereffects. This result is in accordance with previous studies reporting that low poststroke QOL is related to mortality

and that a more severe stroke leads to a correspondingly lower QOL[26]. Therefore, it is highly important that physical therapists reduce one or more of the types of aftereffects through interventions.

Among the limitations of this study, data accuracy could not be maximized through data segmentation because KCHS data were used instead of data collected exclusively for the purposes of analyzing stroke and QOL. However, this study utilized highly valuable data that can be generalized as nationwide data. Follow-up studies conducted with higher levels of data segmentation are likely to produce higher-quality results. In conclusion, stroke directly influences QOL and the number of types of aftereffects experienced by patients. Therefore, it is highly important that physical therapists seek to end the occurrence of one or more of the types of aftereffects in stroke patients.

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