Health-related quality of life is associated with stroke deficits in older adults

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Abstract

Background/objectives: although the functional impairments of stroke survivors are associated with poor health-related quality of life (HRQoL), few studies have demonstrated the impact of individual stroke deficits on the quality of life of survivors. In this study, we investigated the association between HRQoL and stroke-related deficits, especially with respect to the number and types of deficits, in older adults.

Methods: the data were obtained from the 2008 and 2009 Korean Community Health Survey. The EuroQoL 5 Dimension (EQ-5D) questionnaire used as the HRQoL index, and stroke-related information included the number of stroke deficits and five types of deficits.

Results: of the 122,095 participants, 6,698 (5.5%) subjects had a history of stroke, of whom 2,222 patients (33.2%) reported one or more stroke-related deficits. After adjustments for potential variables, the EQ-5D scores of the stroke survivors with persisting deficits were significantly reduced as the number of stroke deficits increased ($\beta = -0.080, -0.147, -0.229, -0.252$ and $-0.293$ for one, two, three, four and five deficits, respectively). The type of stroke deficits was associated with the level of HRQoL. Specifically, the adjusted EQ-5D score of patients who suffered from hemiplegia ($\beta = -0.143; P$ value $< .00001$) was worse than that of patients with any stroke deficits. The most frequent problems were related to mobility and pain/discomfort, regardless of the number or type of stroke deficits.

Conclusion: we found that impaired HRQoL was significantly associated with the number and type of stroke deficits in older adults with a history of stroke.

Keywords: quality of life, stroke deficits, community health survey, older people

Introduction

Stroke is a major health problem worldwide, and it is a leading cause of death [1]. Furthermore, stroke survivors are often challenged by various degrees of permanent sequelae and dependency [1]. Functional deficits and psychological problems after stroke disrupt the patient’s ability to perform activities of daily living, which negatively impacts their health-related quality of life (HRQoL) [2]. Several studies have reported that patients with a history of stroke or stroke symptoms have poor HRQoL [3–9].

Considering that the HRQoL of stroke survivors might be greatly affected by decreased functionality, whether individual stroke sequelae affects the quality of life of survivors and which sequelae have the greatest effect on HRQoL should be determined. However, most studies have focused on HRQoL changes in the short-term or long-term period after the onset of stroke or domain-specific measures of the HRQoL of individuals affected by stroke [3, 5, 6]. Few studies have demonstrated the association between HRQoL and stroke-induced individual sequelae or disability/handicap [3, 10]. Studies that have examined the impact of stroke sequelae on HRQoL have been rather limited in sample size, performed with a selective patient group (e.g. hospital admission and stroke unit), or undertaken with insufficient adjustments for confounding variables [3, 11].

We used a large, representative sample from Korea and investigated the association between HRQoL and stroke deficits, particularly with respect to the number and the types of stroke deficits (i.e. hemiplegia, facial palsy, dysarthria, dysphagia or visual disturbance), in older adults.
Methods

Study population

We used data from the 2008 and 2009 Korean Community Health Survey, which was conducted by the Korea Centers for Disease Control and Prevention [12]. Of the participants, 138,920 participants who were older than 60 years of age were initially included in the current study. We excluded 16,825 subjects who did not respond or responded incompletely to the EQ-5D and had missing variables of interest. Therefore, 122,095 (87.9%) participants were included in this study.

Variables of interest

Each patient’s history of stroke was determined based on a question concerning whether the respondent had previously suffered a stroke and had been diagnosed by a physician. If the response was affirmative, the patient was asked to report when the diagnosis was made. Additionally, if the patient had a history of stroke, an additional question asked whether the respondent had been or was suffering from stroke-related deficits. Stroke-related deficits in the past or present included hemiplegia (paralysis of one side of the leg or arm), facial palsy, dysarthria (speech impairment), dysphagia (disruption of the swallowing process and difficulty eating) and visual disturbance.

HRQoL was measured using the EQ-5D, which was developed by the EuroQol Group [13]. The Korean version of the EQ-5D was validated by the Korean Centers for Disease Control and Prevention [14]. The following formula converted the scores for the five dimensions:

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

The numbers 2 and 3 indicate the level of severity for the five dimensions of the EQ-5D (‘some problems’ and ‘severe problems’, respectively). N3 was rescaled from 0 to 1 if at least 1 dimension at Level 2 or 3 (some or severe problems) was 1; otherwise, N3 was set at 0 [14].

Other variables of interest included age (60–64, 65–69, 70–74, 75–79 or ≥ 80 years), gender, marital status (married, divorced or widowed or never married), monthly income (quartiles: 1Q-4Q), education (less than high school, high school, or college or higher), smoking status (current, former or never), alcohol consumption (drinker or non-drinker), self-estimated health status (very good, good, moderate, bad or very bad), physician-diagnosed diseases (e.g. hypertension, diabetes mellitus, dyslipidaemia, stroke, myocardial infarction, angina, arthritis or osteoporosis) and years since stroke (≥3, 3–5, 5–7, ≤7).

Statistical analysis

Differences in quality of life according to stroke deficits, especially with respect to the number and types of deficits, were assessed based on the mean of the EQ-5D scores and the frequency of subjects with ‘some’ or ‘severe’ problems in the five dimensions of the EQ-5D. To examine the association between quality of life and stroke-related deficits, general linear regression models were used, and the EQ-5D index was a continuous variable. This model produced the adjusted estimates (\(\beta\)) and standard errors (SE) of the EQ-5D in stroke patients according to the number and types of deficits. All of the analyses were performed using SAS 9.2 software (SAS Institute, Cary, NC, USA), and the significance level was set at \(\alpha = .05\).

Results

Of the 122,095 participants, 5.5% subjects (\(n = 6,698\)) had a history of stroke. Compared with those who had no history of stroke, stroke patients were more likely to display the following characteristics: older, female, low income, low educational level, former smokers and currently not drinking alcohol. Stroke patients had a higher percentage of poor self-estimated health status and physician-diagnosed diseases, except for arthritis or osteoporosis. Approximately half of the patients (49%) suffered a stroke <5 years ago. Regarding the HRQoL, stroke patients had significantly lower EQ-5D scores (0.67 versus 0.87) and many experienced ‘some problems’ or ‘severe problems’ in the EQ-5D dimensions than participants without a history of stroke.

Of the stroke patients, 33.2% patients (\(n = 2,222\)) reported one or more stroke-related deficits. Of these, patients with hemiplegia accounted for the highest proportion (63.9%), followed by those with dysarthria (20.3%), visual disturbance (7.9%), facial palsy (7.6%) and dysphagia (1.1%). The EQ-5D scores dramatically decreased with increases in the number of deficits, and patients with hemiplegia had the lowest EQ-5D scores (0.63) compared with patients with other deficits (Figure 1). With the regard to EQ-5D dimension (Figure 1), the most frequent problems were related to mobility and pain/discomfort, regardless of the number or type of stroke deficits. The percentage of patients having problems according to the EQ-5D dimension increased with increases in the number of persisting deficits. Patients with hemiplegia had the greatest proportion of problems with mobility, self-care, usual activities, pain/discomfort and anxiety/depression compared with patients with other deficits.

Table 1 shows the results of the multivariate regression analysis of the EQ-5D by the number and type of deficits. The EQ-5D scores were significantly reduced in patients with deficits compared to patients without deficits (reference group). Additionally, their quality of life of patients with deficits gradually decreased as the number of deficits increased (\(\beta = -0.080, -0.147, -0.229, -0.252, \) and -0.293 for one, two, three, four and five deficits, respectively).

Compared with stroke patients with facial palsy, patients with...
hemiplegia had a reduced quality of life ($\beta = -0.143$; $P$ value < 0.0001), and this reduction was greater than that found for other deficits.

**Discussion**

We found that at the community level, a substantial proportion of stroke survivors suffered from stroke deficits, and these deficits were significantly associated with impaired HRQoL in older adults. A significant reduction in EQ-5D scores was observed as the number of persisting stroke deficits and specific types increased, especially with hemiplegia. Additionally, ‘some’ or ‘severe’ problems related to mobility and pain/discomfort were observed in subjects who experienced stroke deficits. This study suggests that the treatment and management of stroke survivors’ deficits are important factors for their subsequent life satisfaction. However, this study has several limitations, indicating a cross-sectional study design, self-reported bias and measurement errors, and self-evaluation...
of stroke deficits rather than objective physician assessment. These limitations should be noted when interpreting the findings.

Despite advances in the diagnosis and treatment of cerebrovascular disease, stroke remains the leading cause of disability. The prevalence of stroke survivors who experience an incomplete recovery is 461 per 100,000, and one-third of these survivors require assistance with at least one activity of daily living [15]. Among older patients at 6 months post-stroke, the estimated disability prevalence was as follows: 50% hemiparesis, 19.6% hemianopsia, 18.9% aphasia, 15.4% sensory deficits and 30.8% inability to walk unassisted [16]. Several epidemiological studies have shown that post-stroke functional impairment decrease the survivors’ HRQoL, which imposes a substantial burden to individuals, caregivers and society [3, 4, 7, 10, 17–20]. The deterioration of HRQoL in stroke survivors can even occur among patients with good or stable functional recovery [8, 21, 22]. Some studies have identified the negative impact on HRQoL of individual stroke sequelae, namely aphasia, hemiplegia and upper limb post-stroke spasticity [23–25].

Consistent with this, we observed that there was a significantly lower HRQoL among patients with stroke deficits, and there was a dose–response relationship between the EQ-5D score and the number of deficits. Notably, hemiplegia, one of the most common stroke disabilities, may have the worst impact on HRQoL. Considering that stroke patients with deficits, particularly hemiplegia, had more problems with mobility, usual activity and pain/discomfort (Figure 1), the deficits may hinder independence during activities of daily living and create painful conditions leading to decreased HRQoL in these stroke survivors. Thus, strategies that can minimise the number of stroke deficits or ameliorate deficits that involve physical impairments, particularly hemiplegia, are expected to improve the HRQoL of stroke survivors.

**Key points**

- Functional limitations of stroke survivors impact health-related quality of life.
- We investigated the association between quality of life and stroke-related deficits.
- Low quality of life was associated with the number and type of stroke deficits.
- Older adults with hemiplegia had a lower quality of life than those with any stroke deficits.
- Minimizing stroke deficits is expected to improve the quality of life in older adults.

**Authors’ contributions**

J.-y.M. contributed to study design, statistical analyses, data interpretation, literature search, wrote the first draft of manuscript and approved final submission. K.-b.M. contributed to study design, statistical analyses, figures and manuscript revisions and approval of final submission. As corresponding author, he had full access to all data and final responsibility for the decision to submit for publication.

**Conflicts of interest**

None declared.

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**References**

Factors influencing deprescribing habits among geriatricians

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Abstract

Background: deprescribing habits among physicians managing older, frailer, cognitively impaired patients have not been well investigated.

Methods: an anonymised electronic survey was disseminated to all members of an international geriatric society/local advanced trainee network (N = 930). This comprised a Likert-scale analysis of factors influencing desprescribing, and five case vignettes, detailing a patient with progressive cognitive impairment and dependency, on a background of ischaemic heart disease and hypertension.

Results: among 134 respondents (response rate 14.4%), 47.4% were female, 48.9% aged 36–50 years and 84.1% specialists (15.9% trainees). Respondents commonly rated limited life expectancy (96.2%) and cognitive impairment (84.1%) as very/extremely important to deprescribing practices. On multivariable analysis, older respondents less commonly rated functional dependency (odds ratio [OR] 0.22 per change in age category; P < 0.001) and limited life expectancy (OR 0.09, P = 0.04) important when deprescribing, while female participants (OR 3.03, P < 0.001) and trainees (versus specialists OR 14.29, P < 0.001) more often rated adherence to evidence-based guidelines important. As vignettes described increasing dependency and cognitive impairment, physicians were more likely to stop donepezil, aspirin, atorvastatin and antihypertensives (all