

# Determinants of the Health-related Quality of Life for Stroke Survivors

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*Background:* To identify the factors that greatly influence stroke-specific health-related quality of life (HRQoL). The following 5 categories were explored simultaneously in a cross-sectional study: (1) sociodemographic, (2) clinical, (3) symptom severity and physical, (4) neurocognitive, and (5) psychosocial factors. *Methods:* A total of 134 patients who experienced a stroke at least 6 months prior were recruited by convenience sampling. Subjective HRQoL levels were measured using disease-specific scales, the Stroke-specific Quality of Life (SS-QoL)-12, and the modified SS-QoL-8, with a newly added subscale, "activities," as well as the total score. After sociodemographic and clinical data were collected, patients were scored with the National Institutes of Health Stroke Scale, Mini-Mental State Examination, and the Barthel Index (BI). All patients completed the SS-QoL-12, SS-QoL-8, and Stroke Impact Scale (SIS) version 3.0 by self-report. Multiple hierarchical regressions were conducted using the stepwise method. *Results:* Compared with neurocognitive (type 4) factors, the stroke-specific HRQoL levels were significantly impacted by psychosocial (type 5) and "symptom severity and physical" (type 3) factors. The individual factors that significantly influenced stroke-specific HRQoL were the SIS 3.0 social participation subscore and the BI total score. None of the neurocognitive (type 4) factors were significantly associated with the either SS-QoL-12 score or SS-QoL-8 score. *Conclusions:* Research and health care aimed to facilitate social participation and limitations in performing daily activities can be beneficial to improve the HRQoL levels of the patients with stroke. **Key Words:** Disease-specific health-related quality of life—stroke—determinants—social participants. © 2015 by National Stroke Association

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Identifying factors that most greatly affect stroke-specific health-related quality of life (HRQoL)<sup>1</sup> can provide insight into the design of rehabilitation interventions. To identify the factors with the most influence on HRQoL levels, Owolabi et al<sup>2</sup> investigated various

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factors, including the following: (1) sociodemographics such as age, gender, and socioeconomic class; (2) clinical factors such as aphasia, poststroke duration, side and type of stroke, and number of strokes; (3) stroke severity and disability; and (4) social support. This study found that some factors, including gender, socioeconomic class, and stroke type, had no impact on patient HRQoL. Instead, stroke severity and disability, assessed using the stroke severity scale<sup>3</sup> and the modified Rankin scale, respectively, significantly influenced both the generic and disease-specific HRQoL levels of stroke patients.<sup>4</sup> Similarly, stroke severity or motor impairment, represented by the National Institutes of Health Stroke Scale (NIHSS)<sup>5</sup> score, and disability, represented by the Barthel index (BI)<sup>6</sup> score, are consistent determinants of most HRQoL subscale scores in Brazilian stroke patients<sup>7</sup> using the disease-specific Stroke Impact Scale (SIS) version 3.0.<sup>8</sup> For the thinking and communication subscale in the SIS 3.0, the Mini-Mental State

Examination (MMSE)<sup>9</sup> is a significantly influential factor.<sup>7</sup> Nevertheless, in the SIS 3.0, more than half of the subscales (5 of 8) have the items rated on the amount of difficulty perceived.<sup>8</sup> Moreover, not including more patients with mild stroke<sup>7</sup> may have restricted the generalizability of Carod-Artal's study. Further investigation regarding the determinants of HRQoL for stroke patients, particularly those with mild severity, is needed.

Stroke is a disease with heterogeneous characteristics, including typical deficits such as stroke severity, cognitive dysfunction, and disability.<sup>4,7</sup> Currently, the term "disability" can be replaced by "functional limitations" to adapt it to the framework of the International Classification of Functioning, Disability, and Health (ICF).<sup>10</sup> In the ICF, the core sets are body structure/function, activity, and participation; alternatively, these core sets can refer to negative outcomes using the corresponding terms impairment, activity limitations, and participation restrictions. Using these terms and the ICF framework can facilitate professional communications across medical fields worldwide. Therefore, using the ICF framework as a basis can optimally enhance the generalizability of investigations exploring the factors influencing stroke-specific HRQoL.

The HRQoL levels of stroke patients are best monitored with disease-specific, as opposed to generic, HRQoL measures.<sup>1-2</sup> The generic QoL measures can be compared with the general population or across diseases, whereas the disease-specific QoL measures are designed to be sensitive to the characteristics of specific diseases.<sup>1</sup> However, the disease-specific HRQoL measures, such as the one used in the previously addressed study by Owolabi et al,<sup>2</sup> still require further psychometric validation to determine their test-retest reliability, responsiveness,<sup>11</sup> and construct validity with gold-standard or well-developed HRQoL measures. In contrast, a widely used stroke-specific HRQoL measure is the Stroke-Specific Quality of Life (SS-QoL) questionnaire.<sup>12</sup> The SS-QoL originally included 12 subscales<sup>12</sup> and was later modified to include 8 subscales.<sup>13</sup> The SS-QoL with 8 subscales, termed the SS-QoL-8, and the SS-QoL-12 are both well validated and are good choices for monitoring stroke-specific HRQoL.

The aim of this study was to identify determinants that greatly influence stroke-specific HRQoL by simultaneously comparing 5 types of factors. The HRQoL levels were measured in stroke patients, particularly those with mild disease severity, using the SS-QoL-12 and SS-QoL-8 to overcome the limitations of previous studies.<sup>4,7</sup> The candidate factors included type 1-sociodemographics, type 2-clinical characteristics of stroke survivors, type 3-symptom/disease severity and physical factors, type 4-neurocognitive factors, and type 5-psychosocial factors. This investigation contributes to our understanding of stroke-specific HRQoL and can help improve therapeutic outcome.

## Subjects and Methods

In this cross-sectional study, the participants were recruited by convenience sampling from individuals attending rehabilitation centers in 3 general hospitals. The inclusion criteria were as follows: (1) diagnosis of stroke based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV, 1994); (2) hemiplegia due to stroke; (3) age more than 18 years; (4) stable condition for at least 6 months after stroke onset; (5) sufficient reading or listening comprehension to enable the completion of the self-reported HRQoL measures; (6) ability to follow simple instructions; and (7) provision of informed consent.

The SS-QoL with the original 12 subscales<sup>12</sup> was later shortened to the SS-QoL-8 with 47 items in 8 subscales.<sup>13</sup> Both the SS-QoL-12 and the SS-QoL-8 use a 5-point (1-5) Likert scale. In addition to retaining 7 of the original subscales, the SS-QoL-8 also contains a recently developed subscale termed "activities," which combines 4 of the original 12 subscales: mobility, upper extremity function, self-care, and work/productivity. The SS-QoL-8 has been validated and has acceptable psychometric properties.<sup>13</sup> Thus, the modified activities subscale and the total score on the SS-QoL-8 were used to monitor the HRQoL of stroke survivors, in addition to the original SS-QoL-12.

The SIS 3.0 has been refined from the SIS 2.0.<sup>14</sup> The SIS 2.0 originally had 8 subscales with 64 items,<sup>14</sup> and the SIS 3.0 was refined to include 8 subscales with 59 items<sup>4</sup> after conducting a Rasch analysis.<sup>8</sup> Compared with the original SIS 2.0, the subscales of strength, hand function, activities of daily living (ADLs)/instrumental ADLs, and mobility were combined in the SIS 3.0 into a composite physical subscale. Later, this SIS 3.0 composite physical subscale with 28 items was validated as the SIS-16 using a Rasch analysis and by deleting 12 items.<sup>15</sup> This instrument uses a 5-point (1-5) Likert scale. The SIS 3.0 has been validated and has good psychometrics for assessing patients' perspectives on the impact of stroke.<sup>8,16</sup>

Because more than half of the subscales (5 of 8) in the SIS 3.0 include items that are rated on the amount of difficulty perceived,<sup>8</sup> in the present study, the 3 subscales assessing social participation, emotion/mood, and communication in the SIS 3.0 were used to represent type 5 (ie, psychosocial) factors.

The NIHSS<sup>5</sup> is often used to indicate the stroke severity level.<sup>17</sup> The NIHSS consists of 11 items and has a total score ranging from 0 to 42. Lower total scores indicate a less severe stroke: NIHSS scores  $\leq 3$  are considered minor<sup>18</sup>; scores  $3 < \text{NIHSS} \leq 6$  are considered mild; scores  $7 \leq \text{NIHSS} \leq 15$  indicate moderate stroke; and NIHSS  $\geq 16$  indicates severe stroke.<sup>19</sup> The NIHSS has demonstrated acceptable reliability and validity.<sup>20-22</sup> In the present study, the NIHSS total score was used to

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