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ORIGINAL ARTICLE

Impact of Anxiety on Health-Related Quality of Life After Stroke: A Cross-Sectional Study

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Abstract

Objective: To examine the impact of anxiety on health-related quality of life (HRQOL) of stroke survivors.

Design: Cross-sectional study.

Setting: Acute stroke unit in a regional hospital.

Participants: Patients (N=374) from an acute stroke unit.

Interventions: Not applicable.

Main Outcome Measures: The presence of anxiety was defined as a score of ≥8 on the anxiety subscale of the Hospital Anxiety Depression Scale. HRQOL was measured by the total score and 12 domain scores of the Stroke Specific Quality of Life (SSQOL) scale. Demographic characteristics and history of medical conditions were also recorded. Clinical characteristics were obtained using the following scales: National Institutes of Health Stroke Scale, Barthel Index, Mini-Mental State Examination, and Geriatric Depression Scale (GDS).

Results: Eighty-six (23%) stroke survivors had anxiety. The anxiety group had significantly more women (62.8% vs 35.1%), higher GDS scores (7.5±4.5 vs 3.5±3.6), and lower scores for total SSQOL (3.9±0.6 vs 4.5±0.6) and SSQOL domains of energy (2.0±1.2 vs 3.4±1.4), mood (3.6±1.5 vs 4.6±0.9), personality (3.4±1.7 vs 4.4±1.1), and thinking (2.4±1.2 vs 3.5±1.4), after adjustment for sex and GDS score. In subsequent multivariate regression analysis, the Hospital Anxiety Depression Scale anxiety score was negatively associated with the SSQOL total score ($r=-.154$) and 5 of the 12 domain scores, namely energy ($r=-.29$), mood ($r=-.102$), personality ($r=-.195$), thinking ($r=-.136$), and work/productivity ($r=-.096$).

Conclusions: Anxiety has a negative effect on HRQOL of stroke survivors, independent from depression. Interventions for anxiety should improve stroke survivors' quality of life.

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Health-related quality of life (HRQOL) is a measure of overall well-being of an individual.[1] HRQOL, as a patient outcome, has been gaining increasing attention in stroke literature.[2] HRQOL is essential for health care providers in terms of decision-making, service management, and evaluation of resource allocation and services provided.[3] Godwin et al[4] pointed out that physical and mental health are significantly worse in stroke survivors than their age-matched counterparts 3 to 5 years after the onset of stroke. Certain HRQOL domains, including emotion, communication, memory, and social participation, declined during the second year after stroke.[4] Older age,[5] pain,[6-8] disturbed mood,[9-11] cognitive impairment,[12] and physical impairment[5] are correlated with declining HRQOL after stroke.

Anxiety disorder is common in stroke survivors and can be observed from 2 weeks to at least 5 years after the index stroke.[13-16] The prevalence of poststroke anxiety ranges from 23% to 29%.[17-19] Anxiety effects HRQOL of stroke patients from 1 month to 1 year after the index stroke.[16,18,20] The demographic characteristics associated with poststroke anxiety include being a woman,[19,21,22] younger age,[22] less social activity,[23] and more depressive symptoms.[11,15,19]

Not only is anxiety associated with poor HRQOL after stroke,[11,24] but it is also an independent determinant of HRQOL after stroke.[12,16,18,20] High levels of anxiety are negatively associated with

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Table 1 Comparison of participants with and without anxiety (N=374) with respect to sociodemographic and clinical variables

Variables	Anxiety (n=86)	Nonanxiety (n=288)	Variable ($t/\chi^2/z$)	*P*	95% CI of the Difference in Means
Clinical variables					
Age (y)	64.8±9.8	66.3±10.3	−1.262*	.208	NA
Sex (female)	54 (62.8)	101 (35.1)	20.971†	<.001	NA
Education (y)	6.1±4.3	6.5±5.1	−0.641*	.522	NA
NIHSS	3.6±3.3	3.2±0.2	0.113*	.910	NA
Hypertension	57 (66.3)	220 (76.7)	3.727†	.054	NA
Diabetes mellitus	25 (29.1)	101 (35.3)	4.346†	.114	NA
IHD	6 (7.0)	21 (7.3)	0.011†	.915	NA
Prior stroke	13 (15.1)	29 (10.1)	1.663†	.197	NA
Assessment at 3mo after stroke					
MMSE	27.4±2.3	27.4±2.4	−0.091*	.927	NA
GDS	7.5±4.5	3.5±3.6	7.308*	<.001	NA
BI	19.1±2.7	19.3±2.0	−0.286‡	.775	NA
Domains of the SSQOL					
Total	3.9±0.6	4.5±0.6	−6.832*	<.001	−0.671 to −0.369
Energy	2.0±1.2	3.4±1.4	−9.519*	<.001	−1.774 to −1.165
Family role	3.9±1.4	4.5±1.0	−3.984*	<.001	−0.978 to −0.328
Language	4.9±0.2	4.9±0.5	1.845*	.066	−0.005 to 0.139
Mobility	4.5±0.8	4.6±0.7	−0.865*	.387	−0.256 to 0.099
Mood	3.6±1.5	4.6±0.9	−5.919*	<.001	−1.360 to −0.678
Personality	3.4±1.7	4.4±1.1	−5.145*	<.001	−1.382 to −0.614
Self-care	4.8±0.6	4.9±0.5	−0.814*	.416	−0.179 to 0.074
Social roles	3.7±1.5	4.4±1.1	−3.613*	<.001	−0.952 to 0.278
Thinking	2.4±1.2	3.5±1.4	−6.849*	<.001	−1.367 to −0.755
Upper extremity	4.8±0.5	4.8±0.6	−0.210*	.834	−1.471 to 0.119
Vision	4.5±0.8	4.7±1.2	−1.186*	.236	−0.444 to 0.110
Work	3.8±0.9	4.3±0.9	−4.000*	<.001	−0.682 to −0.233

NOTE. Values are mean ± SD, n (%), or as otherwise indicated.
Abbreviations: CI, confidence interval; IHD, ischemic heart disease; NA, not applicable; NIHSS, National Institutes of Health Stroke Scale.
* *t* test.
† Chi-square test.
‡ Mann-Whitney *U* test.

physical and psychological health in HRQOL after stroke,[10,24] including physical and emotional well-being[24] and occupational and interpersonal functioning.[24] The impact of anxiety disorder subtypes on HRQOL is unknown. For instance, the impact of posttraumatic stress disorder on HRQOL has not been studied, although posttraumatic stress disorder may be present in 10% of stroke survivors.[25] Other limitations of the literature include the use of convenience samples from hospitals[16] and rehabilitation settings,[11] small sample sizes,[26] and the use of generic, rather than stroke-specific, HRQOL instruments.[16,18,24] Specific HRQOL scales have additional items that measure domains that are relevant to stroke patients and family members, such as vision or language impairments.[2]

List of abbreviations:

BI	**Barthel Index**
GDS	**Geriatric Depression Scale**
HADS	**Hospital Anxiety Depression Scale**
HRQOL	**health-related quality of life**
MMSE	**Mini-Mental State Examination**
SIS	**Stroke Impact Scale**
SSQOL	**Stroke Specific Quality of Life**

Only 1 previous study[27] used a specific HRQOL instrument, the Stroke Impact Scale (SIS), and it found negative correlations between anxiety symptoms and the SIS communication and emotional domains.[9] Similar to other studies, the effect of concurrent depressive symptoms was not controlled; hence, it is uncertain whether anxiety symptoms independently affect HRQOL after stroke.

The Stroke Specific Quality of Life (SSQOL) scale[28] is one of the most commonly used specific HRQOL scales. It has additional domains that were not measured by the SIS, including personality, family role, vision, and work. The first aim of this study was to reexamine the impact of anxiety on HRQOL after stroke using a stroke-specific HRQOL measure. The second aim was to determine if anxiety effects on HRQOL are independent of concurrent depressive symptoms.

Methods

A sample of 374 stroke survivors was recruited from the acute stroke unit of the Prince of Wales Hospital between June 2008 and September 2011, 3 months after the index stroke. The Prince of Wales Hospital is a university-affiliated regional hospital serving a population of 800,000 in the Shatin district of Hong Kong.

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