Health-related quality of life among chronic stroke survivors attending a rehabilitation clinic

Kong K H, Yang S Y

Department of
  Rehabilitation
  Medicine
Tan Tock Seng
  Hospital
11 Jalan Tan
  Tock Seng
Singapore 308433

Kong K H, MBBS,
  MRCP
Senior Consultant and
  Head

Yang S Y, BSc
Psychologist

Correspondence to:
Dr Kong Keng He
Ang Mo Kio
  Community Hospital
17 Ang Mo Kio Ave 9
Singapore 569766
Tel: (65) 6450 6164
Fax: (65) 6459 0414
Email: keng_he_kong
@ttsh.com.sg

ABSTRACT

Introduction: To assess health-related quality of life (HRQOL) among chronic stroke survivors and factors associated with it.

Methods: Cross-sectional survey study of patients who had survived one year or more after a stroke. Subjects consisted of stroke patients attending the outpatient clinic of a rehabilitation centre. HRQOL was assessed using the Medical Outcomes 36-Item Short-Form Health Survey (SF-36), functional status using the Modified Barthel Index (MBI), and mood using the Beck's Depression Inventory (BDI).

Results: A total of 100 patients (63 men and 37 women, mean age 60.7 +/-10.8 years) were interviewed at an average of 22.2 +/-14.5 months post-stroke. The mean MBI was 88.9 +/-17.9, and the prevalence of depression 24%. 50 percent of patients needed varying degrees of care for their activities of daily living. The SF-36 scores of the patients were comparable to that of the general population except for the domain of physical function, which was much lower (23.9 versus 83.4). Age, sex, post-stroke duration, MBI score and side of hemiplegia were not associated with HRQOL. Depressed patients however had significantly lower SF-36 scores across all domains except for that of physical function and bodily pain (p-value is less than 0.001).

Conclusion: A significant proportion of chronic stroke survivors attending the rehabilitation clinic continue to face limitations in their physical activities. In addition, almost 30 percent of these survivors have depression that affects their HRQOL adversely.

Keywords: cerebrovascular accident, depression, quality of life, stroke, stroke rehabilitation

Singapore Med J 2006; 47(3):213-218

INTRODUCTION

Stroke is a major cause of disability, and when severe, has substantial adverse impact on the stroke survivor's health-related quality of life (HRQOL)[1-5]. Factors that have been shown to be consistently associated with lower HRQOL include depression, lower functional status, and greater severity of paralysis[1-3]. In Singapore, stroke is the third leading cause of death and probably the major cause of disability in the adult population[6]. Given this, it is surprising to note that apart from studies on functional outcome, there has been to the best of our knowledge, no study on HRQOL in stroke survivors[7-11]. The objectives of this study are to determine HRQOL in a cohort of individuals with long-term stroke and to examine the relationship between selected variables and HRQOL. Knowledge of HRQOL and its predictors may help with the planning, provision and allocation of health services for the care of stroke survivors, especially in this climate of healthcare cost containment.

METHODS

Stroke patients who have completed inpatient rehabilitation and were attending the outpatient clinic of the Department of Rehabilitation Medicine, Tan Tock Seng Hospital, were screened for enrollment into this study over a three-month period. The Department of Rehabilitation Medicine, Tan Tock Seng Hospital, is the largest tertiary rehabilitation centre in Singapore with a total of 100 inpatient beds, of which almost 50 are devoted to stroke rehabilitation. Patients were included if they were one year or more post-stroke. Excluded were patients with recurrent stroke and those with significant cognitive and language impairments that prevented them from answering questions reliably. The diagnosis of stroke was made both clinically and radiologically by computed tomography (CT) and/ or magnetic resonance (MR) imaging of the brain.

A cross-sectional, descriptive design was used. The individual rehabilitation physician managing the patient did the screening of patients for the study.

The Hodkinson's Abbreviated Mental Test was used for screening cognition[12]. This ten-question screening tool assesses the patient's orientation, attention span, memory and general knowledge. Patients achieving a score of less than eight were excluded. Aphasia was assessed informally by evaluating the patient's comprehension and expression skills on oral and written language. Patients were then interviewed in a quiet room on questions from a questionnaire consisting of the Short Form 36 (SF-36)[13], the 21-question Beck's Depression Inventory (BDI)[14] and the Modified Barthel Index (MBI) by Shah et al[15]. The interview was done by a psychologist and wherever possible, patients were encouraged to answer the questions without cueing or prompting from the interviewer.

The SF-36 is a generic, subjective measure of HRQOL. It allows for assessment across eight health domains, namely: physical functioning, role limitations due to physical problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health. Scores of 100 in the domains of physical functioning, role limitations due to physical problems, bodily pain, social functioning and role limitations due to emotional problems, and scores of 50 in the three remaining domains of general health, vitality and mental health, indicate an absence of problems in these areas. For example, a score of 100 in physical functioning indicates an ability to perform all activities without limitations due to health; a score of 50 in mental health indicates an ability to function without personal or emotional problems.

To obtain scores more than 50 for general health, vitality and mental health, health must be evaluated positively. For example, a score of 100 in the mental health domain indicates that the respondent feels peaceful and happy and is calm all the time. The scores of these eight domains can also be summated into two major categories – Physical Composite Score (PCS) and Mental Composite Score (MCS) to reflect overall physical and mental health, respectively. The SF-36 has been well validated in the assessment of HRQOL in the stroke population[16]. Normal scores are available for the Singapore population[17].

The 21-question BDI is an assessment tool to screen for depression. Patients with a score of more than ten were deemed to be depressed. The MBI is a well-validated tool for the assessment of selfcare and mobility skills in the stroke population. The categories assessed are feeding, dressing, personal hygiene, bathing, toileting, bladder and bowel

Table I. Clinical characteristics of patients.

Clinical parameter	Number
Age (in years)	
16 - 60	48
61 - 80	52
Duration post-stroke	
1 year	27
>1 year	73
Sex	
Male	63
Female	37
Race	
Chinese	92
Malay	4
Indian	4
Marital status	
Single	9
Married	78
Widowed/Divorced	13
Nature of stroke	
Infarct	62
Haemorrhage	38
Side of hemiplegia	
Left	57
Right	43
MBI score	
0 - 49 (severely dependent)	7
50 - 74 (moderately dependent)	10
75 - 90 (mildly dependent)	14
91 - 99 (minimally dependent)	16
100 (independent)	53
Beck's Depression Inventory	
10 or less (not depressed)	76
more than 10 (depressed)	24

Table II. SF-36 scores of patients and the general population.

	Patients	General population
Physical functioning	23.9	83.4
Role limitations due to physical problems	78.7	82.9
Bodily pain	83.2	80.5
General health	70.1	65.9
Social functioning	85.9	84.7
Vitality	64.9	61.9
Role limitations due to emotional problems	80.1	81.3
Mental health	74.9	71.8

control, transfers, ambulation, and stair climbing. Each category of the MBI is rated on a scale of one to five, with one indicating inability to perform the task and five, full independence. Weighted scores are then given to these ratings to give a maximum

Table III. Analysis of factors influencing SF-36 score.

	Physical composite score	p-value	Mental composite score	p-value
Sex				
Male	257.6(56.7)		308.8(68.7)	
Female	263.3(49.6)	0.61*	08.2(78.3)	0.96*
Side of hemiplegia				
Left	261.5(53.8)		307.4(66.3)	
Right	254.7(50.8)	0.44*	05.8(62.8)	0.84*
Depression				
Yes	222.1(56.5)		224.5(79.1)	
No	271.6(47.8)	<0.001*	35.2(44.1)	<0.001*
Age	r = -0.157	0.12#	= -0.14	0.89#
Post-stroke duration (months)	r = 0.191	0.08#	= -0.035	0.73#
MBI score	r = 0.189	0.07#	= 0.153	013#

Results expressed as mean (standard deviation).

* Student's t-test.

r is Pearson correlation coefficient.

MBI score of 100. For non-English speaking patients (Chinese, Malay and Tamil patients), interviews were conducted through interpreters. Other data that were collected included the patient's demographical characteristics and vocational status after the stroke. Informed consent was obtained from all patients.

The chi-square test was used to examine relations between categorical variables. Comparison of continuous variables was done using the Student's t test. Correlation between continuous variables was evaluated by calculating the Pearson correlation coefficient. All data are expressed as mean (+/- standard deviation) and a two-tailed probability value of <0.05 was the criterion for statistical significance.

RESULTS

Over a three-month period, 132 chronic stroke patients were screened. Of these, only 100 patients were eligible for the study. The clinical and demographical characteristics of the patients are shown in Table I. The mean age of the study group was 60.7 (+/10.8) years and the mean post-stroke duration (time from onset of stroke to time of study) 22.2 (+/-14.5) months. The majority of the study cohort was Chinese. All 100 patients were community dwellers and living with their families, except for three who were living on their own.

The mean MBI score was 88.9±17.9, and looking at the functional status of the patients, 53 patients were fully independent, with the remaining 47 needing varying degrees of assistance for their self-care and mobility needs. Seven patients were non-ambulators and were wheelchair-bound. Domestic maids were employed for the sole purpose of care-giving in 28 patients. 15 patients were still attending outpatient rehabilitation.

24 patients were deemed to be depressed on the BDI, of which only four (16.6%) were on antidepressants. In the 76 non-depressed patients, six (7.9%) were on anti-depressants. The SF-36 scores of the study cohort when compared to that expected of the general population (matched for age, sex and race) are shown in Table II. Overall, the scores for the various domains were quite similar except for that of physical functioning, which was much lower in our study cohort.

The results of analysis of the influence of age, sex, poststroke duration, side of hemiplegia, MBI score and depression on the PCS and MCS of the SF-36 are shown in Table III. Only depression was significantly associated with MCS and PCS. Patients who were depressed had lower scores on the PCS and MCS. Table IV shows the detailed breakdown of SF-36 scores for the various domains in depressed and non-depressed patients. The scores were all significantly lower in depressed patients, except for the categories of physical functioning and bodily pain. Depression was however not associated or correlated with age, sex, side of hemiplegia, post-stroke duration and the MBI score. Of the 54 patients who were working prior to onset of stroke, only 14 (25.9%) continued to be gainfully employed. Of these 14 patients, 11 were able to go back to their previous jobs while the remaining three had to change jobs because of their physical impairments.

Table IV. Comparison of clinical characteristics and SF-36 scores between patients with and without depression.

	With depression	Without depression	p-value
Age (in years)	56.9(13.2)	61.9 (9.9)	0.09[#]
Side of hemiplegia			
Left	15	42	0.41*
Right	10	33	
Duration post-stroke (in months)	22.1 (13.8)	22.5 (16.8)	0.91[#]
MBI score	89.0 (16.6)	88.8 (18.5)	0.91[#]
Physical functioning	28.7 (23.5)	20.9 (23.2)	0.16[#]
Role limitations due to physical problems	56.3 (47.3)	88.5 (27.2)	0.001[#]
Bodily pain	77.7 (29.9)	83.5 (22.9)	0.39[#]
General health	59.4 (22.7)	78.6 (17.7)	0.001[#]
Vitality	47.5 (16.4)	69.7 (15.3)	0.001[#]
Social functioning	71.3 (23.7)	90.7 (15.8)	0.001[#]
Role limitations due to emotional problems	52.7 (50.4)	91.7 (27.2)	0.001[#]
Mental health	52.8 (19.8)	83.0 (11.9)	0.001[#]

Results expressed as mean (standard deviation).

[#] student's t-test.

* chi square test.

DISCUSSION

This study shows that apart from the domain of physical functioning, the HRQOL in this select group of chronic stroke survivors were comparable to that of the general population, when matched for sex and age. The much lower physical functioning score suggests that many of these patients still encountered limitations or difficulties with their physical activities. This finding is not incongruous with the relatively high mean MBI score of 88.9, as the MBI evaluates only basic activities of daily living ranging from feeding, dressing, grooming to walking. The physical functioning domain of the SF-36, on the other hand, evaluates independent activities of daily living, which are more demanding physically. These include activities like carrying groceries, running and lifting heavy objects, which are activities that most stroke patients find difficult to perform.

The finding of a low physical functioning score has been reported in two previous studies of HRQOL in stroke survivors using the SF-36. Mayo et al, in their study of community-dwelling stroke survivors in Montreal, Quebec, noted a mean physical functioning score of 63.4 in the stroke group at six months post-stroke, while that of controls was 85.0[18]. The scores for the other seven domains of the SF-36 were also significantly lower in stroke survivors. Hackett et al found that long-term stroke survivors in New Zealand, when compared to controls, had significantly lower SF-36 scores in physical functioning, role limitations due to physical problems, general health and role limitations due to emotional problems, but not bodily pain, vitality, social functioning and mental health[19]. Thus it would appear that the HRQOL of patients in our study was the least affected compared to the above two studies. One reason for this difference is the selection of patients.

The studies by Mayo et al[18] and Hackett et al[19] were large population-based studies and included all patients with stroke, irrespective of severity and rehabilitation needs. On the other hand, our study is only confined to patients who had undergone inpatient rehabilitation at our rehabilitation centre. These were likely to be patients who have been pre-selected, based on their positive rehabilitation potential, and as such, patients with very severe strokes are likely to be excluded. The relatively young age of 60.7 years in our study compared to 68.4 years and 71 years in the other two studies is probably reflective of this selection bias. The significantly lower SF-36 scores across all domains in Mayo et al's study compared to Hackett et al's study and that of ours could be explained by the difference in post-stroke duration (six months versus six years and 22.2 months, respectively). A longer post-stroke duration allows more time for patients to cope with their disabilities, and this is likely to have a positive effect on their HRQOL.

Previous studies on post-stroke depression reported prevalence rates ranging from 18% to 61%, depending on patient selection, criteria for diagnosis of depression, and post-stroke duration[20]. Factors reported to be significantly associated with depression include a history of depression, a lower functional status and lesion laterality[21]. In our study, 24% of patients were noted to be depressed based on the BDI. This figure could actually be higher if one were to include the six patients who were not depressed because they were on antidepressants, and the consideration that patients with significant aphasia and cognitive impairments were excluded. Although depressed patients had similar MBI scores to non-depressed patients, their SF-36 scores were uniformly and significantly lower (except for the domains of physical functioning and bodily pain). This negative influence of depression on HRQOL is a finding that has been reported by previous authors[1,2,4,5].

Of more concern is the fact that 83.4% of depressed patients were not on any antidepressant treatment. In light of the recent findings from the Sunnybrook Stroke study that even mild depression can have significant impact on functional recovery and social functioning, the need to routinely screen chronic stroke survivors for depression so that appropriate treatment can be instituted cannot be overemphasised[21]. Double-blind controlled trials have documented the efficacy of drugs like the tricyclic antidepressants and selective serotonin reuptake inhibitors in treating post-stroke depression[22-24]. However, it is unclear whether improvement in depressive symptoms will improve HRQOL.

Only 26% of patients who were working before the stroke were able to return to gainful employment. This figure is much lower than that reported in an earlier study by Tan[7]. In that study, Tan retrospectively analysed 1,310 stroke patients who had completed inpatient rehabilitation at the same centre over a ten-year period from 1973 to 1982. Out of 668 cases who were working before the onset of stroke, 338 (50.6%) were able to return to gainful employment after hospital discharge. Although data on return to work at one year or more post-stroke were not available, one can argue that this figure is likely to be higher, if not the same, than that reported on hospital discharge as the patient's neurological and functional status is likely to improve with time.

The study by Tan was done more than 20 years ago, when two to three rehabilitation physicians managing a maximum of 60 inpatients only staffed the then fledgling rehabilitation centre. This compares to the seven to eight rehabilitation physicians managing up to 100 inpatients since 1996. Differences in rehabilitation programmes and more importantly, criteria for selecting patients for inpatient rehabilitation are therefore to be expected. We believe that patients in the earlier study were probably screened more stringently for positive rehabilitation potential before they were accepted for inpatient rehabilitation. This is the most likely reason for the disparity in rates of return to gainful employment between the two studies. Another reason is the different economic climates between the seventies and the late nineties. Singapore in the seventies was a rapidly developing country with almost negligible unemployment rates. On the other hand, the Asian financial crisis and economic recession with loss of jobs and diminished employment opportunities marked the late nineties. It is not unexpected that workers with physical impairments and disabilities are more likely to be affected by this than those who are able-bodied.

The phenomenon of employing foreign maids, usually from neighbouring countries, as paid care-givers is not uncommon in Singapore. These maids would invariably live in the same house as the patient and would also help out with house chores. Certainly, some of the more disabled patients in our study are candidates for nursing homes. However, it is still culturally and socially unacceptable in Singapore for children to "abandon" their parents/ relatives to nursing institutions. Financially, paid caregivers are also more affordable than nursing home costs. The figure of 24% of patients with maids as caregivers is quite similar to the 28% reported in a previous study on elderly stroke patients[11].

The biggest limitation of this study is the biased and the pre-selected nature of the study cohort as only patients who had received inpatient rehabilitation were surveyed. Thus, patients with mild or severe strokes are not likely to have been included and the study cohort is therefore not representative of the general stroke population in Singapore. Despite this, the results of this study indicate that except for ongoing limitations of physical function, the majority of patients who had survived one year or more post-stroke had HRQOL that is comparable to that of the general population. We also suggest that chronic stroke survivors be routinely screened for depression given its rather high prevalence and its negative impact of depression on HRQOL.

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