

A Comparison of the Long-term Health Related Quality of Life and Handicap of Stroke Patients in Mainland China and Hong Kong

Kwok T¹, Jin X², Yeung F¹, Cheng J¹, Lo RSK³, Lam CLK⁴, Yuan HJ⁵ and Woo J¹

¹Department of Medicine and Therapeutics, Prince of Wales Hospital, the Chinese University of Hong Kong. ²Department of Geriatrics, Renji Hospital, Shanghai. ³Department of Geriatrics and Medicine, Shatin Hospital, Hong Kong. ⁴Family Medicine Unit, Department of Medicine, University of Hong Kong. ⁵West China Health Promotion and Training Center on Ageing of 4th Hospital of Sichuan University, Chengdu, Sichuan, PR China. Email: tkwok@cuhk.edu.hk

Abstract

Purpose: To compare health related quality of life (HRQOL) and handicap of stroke survivors in Hong Kong (HK) and Chengdu (CD) in Mainland China.

Method: Fifty-four pairs of first ever stroke patients in CD and in HK matched by age, sex and Modified Barthel Index (MBI) were interviewed using a structured questionnaire at 16–36 months after stroke. HRQOL and handicap outcomes were evaluated by the Chinese version of the Short-Form Health Survey (SF-36) and London Handicap Scale (LHS) respectively.

Results: Compared to stroke patients in CD, HK subjects reported significantly greater handicap, especially in the occupation domain. HK subjects also had significantly lower HRQOL Z scores in domains of role limitations due to emotional or physical problems, and bodily pain. CD subjects had more social support, but had more difficulties in meeting medical costs, and were less likely to have regular medical follow-up and dysphagia symptom. After adjusting for social and health related factors, the site differences in handicap and the role limitation (physical) domain of SF36 became insignificant.

Conclusions: CD stroke survivors had better scores in HRQOL and fewer handicaps than their counterparts in HK, because of social and health related factors.

Keywords: Stroke outcome, Stroke rehabilitation, Quality of life

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Introduction

Stroke rehabilitation has been shown to be effective in promoting functional recovery and facilitating discharge from hospital to the community.^{1,2} But how people with stroke cope with their residual disabilities psychologically and socially after hospital discharge have not been extensively examined. Cross-sectional studies of people with stroke have found poor health related quality of life (HRQOL),^{3,4} persistent handicap⁵ and high risk of depression.^{6,7} We have also demonstrated prospectively that there was a decline in HRQOL during the first year of stroke.⁸

The psychosocial adjustment of individuals to their own disabilities is subject to a whole range of external factors e.g. social support, culture, social network, living environment and social expectations.^{9–11} It would therefore be interesting to compare the HRQOL and handicap of people with stroke in different communities.

Mainland China and Hong Kong share the same ethnicity and to a large extent the Chinese culture. Due to differences in health and social care systems^{12,13} the experience of stroke patients in the two places could be very different. In Hong Kong, the great majority of stroke patients were admitted to publicly funded hospitals for acute management and received multidisciplinary rehabilitation before they were discharged. Those who required further rehabilitation attended day hospitals for another two to three months after discharge. Most stroke patients were followed up in specialist medical clinics in public hospitals. Welfare support was available to those with residual disability and need nursing home placement.

On the other hand, health services in Mainland China were only partially funded by the government and there was almost no health insurance. With limited financial resources, many patients could not afford prolonged hospital stay. Moreover, rehabilitation as a specialty was not well developed.¹⁴ Consequently, stroke patients in hospitals were discharged home without having any specific stroke rehabilitation. There was also no specific disability related welfare assistance. Almost all disabled stroke patients had to be looked after at home because of the lack of nursing homes.

We therefore compared the HRQOL and handicap of people with stroke in Hong Kong (HK) and

Chengdu (CD), the capital city of the most populous Sichuan province of Mainland China. Another important objective was to examine how the differences in health care policy and the social care arrangement for people with strokes impact on the HRQOL and handicap.

Method

Participants

Chengdu (CD) is the capital city of Sichuan province situated at the South West region of China. The city had a population of 10.1 million in 2000 when the study was conducted. The CD subjects were recruited from 150 CD residents who participated in a home survey on HRQOL at six to nine months post stroke. This sample was recruited from first ever stroke patients admitted to the First Hospital of West China University of Medical Sciences, Chengdu, over a six month period, in 1998–9.¹⁵ The participation rate was 80%. The hospital was a university affiliated hospital, receiving patients from all over CD and neighboring areas in Sichuan. Most stroke patients in CD were expected to attend this type of hospital. The Hong Kong subjects were recruited from participants of a previous cohort study of stroke patients⁸ matched in age (within two years), sex and disability level (Modified Barthel index = 20 or 19–15 or <15).

The subjects were contacted by trained research assistants via telephone and invited to participate in this study at around 24 months (range 16–36 months) after onset of stroke. Those with significant cognitive impairment, scoring <16 on the mini mental state examination (MMSE) or with severe communication problems e.g. deafness, dysphasia were excluded. The study was approved by the Clinical Research Ethics Committee of the Chinese University of Hong Kong.

Data collection

All subjects were interviewed face to face at home by one trained research assistant (RA) at each city. The RA in CD was trained and supervised by the RA in HK (YF). After obtaining written consent, a standard questionnaire was administered to obtain information on demographics, use of health care services, social support, and stroke-related symptoms. Basic functional status was assessed by the modified Barthel Index (MBI), which has ten items of activities



of daily living. The total score of 20 indicates full independence in these activities.¹⁶ Cognitive function was assessed by the Chinese mini-mental state examination (MMSE).¹⁷ Handicap in six domains was measured by the London Handicap Scale (LHS).¹⁸ A reliability coefficient of 0.91 was found upon initial validation on patients one year post-stroke.¹⁹ The LHS is a generic handicap measure which had been translated into Chinese and validated in Hong Kong²⁰ ($R = 0.88$ when correlated with UK dataset) and Mainland China²¹ ($R = 0.85$ when correlated with UK dataset). It consists of 6 questions measuring the levels of handicap (scores ranging from 1–6) in six dimensions including mobility, independence, occupation, social integration, orientation and economic self-sufficiency. The domain scores and the summated total scores were analyzed with higher scores indicating higher levels of handicap.

HRQOL was measured by the locally validated Chinese versions of the Short Form-36 Health Survey (SF-36).²² The SF-36 is an internationally validated, generic measure of quality of life. It consists of 8 subscales, including physical functioning, role limitations due to physical health problems, role limitations due to emotional health problems, bodily pain, social functioning, vitality, general health and mental health. The Chinese version of the SF-36 had been validated in Hong Kong²³ and mainland China.²⁴ Table 1 shows that the internal reliability of all SF-36 scales in the Hong Kong version are comparable to the Mainland version, except for the social functioning (SF) scale.

Table 1. Comparison of Cronbach's α coefficients in the Chinese (Hong Kong) and the Chinese (Mainland) version of SF-36.

Scale	Cronbach's α	
	Hong Kong (n = 2410) ¹⁴	Mainland (n = 1316) ¹⁵
Physical functioning	0.81	0.87
Role limitations (physical)	0.83	0.88
Body pain	0.74	0.80
General health	0.65	0.72
Vitality	0.72	0.66
Social functioning	0.75	0.39
Role limitations (emotions)	0.82	0.87
Mental health	0.78	0.75

Statistical analysis

Statistical analysis was carried out using SPSS13.0 for Windows. Subject characteristics in the two cities were compared using χ^2 or paired-t test, as appropriate. Results on the total and domain scores of LHS were analyzed using the non-parametric Wilcoxon Signed-ranks test, as the distribution of data was skewed. HK and CD results on the eight SF-36 subscales were compared using paired t-tests. As the SF36 scores may be influenced by cultural and socioeconomic differences, Z scores (difference between score and local average score^{25,26} divided by the standard deviation of local population) of domain scores of CD and HK subjects were compared. In addition, Bonferroni correction was applied to multiple group comparisons in SF36 and LHS domain scores.

Multiple regression analysis was performed to examine the independent effects of study sites, patient characteristics, social support, symptoms of stroke and the use of medical and rehabilitative services on LHS total scores and Z scores of HRQOL domains, which showed significant differences between HK and CD. Backward elimination was used to remove insignificant factors from the regression model. Collinearity between independent variables was checked by correlation analysis.

Results

Out of 150 stroke patients in CD who participated in a previous study on post stroke HRQOL, 69 subjects were successfully interviewed at 16–36 month after the onset of stroke. The reasons for dropout were: untraceable address because of poor record or having moved out (N = 49), moved out of Chengdu (N = 17), death (N = 9) and refusal (N = 5). Fifteen subjects were excluded a posteriori because of having MMSE < 16 (N = 8), and lack of matched subjects in HK (N = 7). Therefore, the final sample consisted of 54 matched pairs. The average age and sex of the CD subjects included for analysis in this study were similar to those of the original sample, though they had significantly higher SF36 scores in role limitations (physical) and role limitations (emotions) domains (77.3 versus 52.8; 94.4 versus 72.9 respectively, both $P = 0.0003$ by Student t test).¹⁵

The average ages of CD and HK subjects were 67.2 and 68.9 years respectively. 63% of the subjects



were male. 72% of the subjects had full MBI scores indicating independence in basic activities of daily living. 25% were partially dependent (MBI 15–19) and 3% were dependent (MBI < 15). One HK subject and nil CD subject resided in an old age home.

The other demographic details and social support of the CD and HK were compared in Table 2. HK subjects had significantly lower average MMSE than CD subjects (24.3 versus 26.4, $P = 0.001$, paired t test). After adjusting for education, the difference in MMSE scores became insignificant. On the other hand, CD subjects had significantly greater family support and social visits, than HK subjects.

Table 3 showed the stroke related symptoms and medical management in both cities. More CD subjects reported pain in the affected side, but HK subjects were more likely to report dysphagia. More CD subjects had difficulties in meeting health care costs. More HK subjects had regular medical follow-up and used walking aids. The use of traditional therapy e.g. acuapunctures and massage was more prevalent in CD than in HK. HK subjects were

Table 2. Comparison of demographic details and social support of stroke patients in Hong Kong and Chengdu.

Characteristics	Hong Kong	Chengdu
Education level***		
Primary or below	48 (88.9)	15 (27.8)
Secondary	2 (3.7)	6 (11.1)
High school/University	4 (7.4)	33 (61.1)
Marital status		
Single/Divorced/ Widowed	43 (79.6)	46 (85.2)
Married	11 (20.4)	8 (14.8)
Care giving from family***		
No	7 (13.2)	9 (17)
Seldom	5 (9.4)	1 (1.9)
Sometimes	25 (47.2)	5 (9.4)
Often	16 (30.2)	38 (71.7)
Visits from friends/neighbour/ relatives***		
No	15 (27.8)	2 (3.7)
Seldom	29 (53.7)	20 (37)
Sometimes	7 (13)	12 (22.2)
Often	3 (5.6)	20 (37)
Social activities		
No	36 (66.7)	29 (53.7)
Seldom	9 (16.7)	12 (22.2)
Sometimes	3 (5.6)	7 (13)
Often	6 (11.1)	6 (11.1)

Note: Values are n (valid%), compared using χ^2 .
*** $P < 0.001$.

Table 3. Comparison of stroke related symptoms and medical management in Hong Kong and Chengdu.

Characteristics	Hong Kong	Chengdu
Pain in affected side*	19 (35.2)	31 (57.4)
Dysphagia symptom**	27 (50)	12 (22.2)
Recurrent stroke since last stroke	6 (12.2)	10 (20.4)
Admitted to hospital since last stroke	27 (52.9)	23 (45.1)
Use of walking aid*	20 (37)	10 (18.5)
Use of wheelchair	4 (7.4)	1 (1.9)
Payment difficulty for medical treatment***	8 (14.8)	28 (51.9)
Regular medical follow-up***	35 (100)	18 (51.4)
Traditional Therapy#***	0 (0.0)	11 (20.4)
Expectation of health*		
Better	13 (25)	25 (48.1)
No change	23 (44.2)	21 (40.4)
Worse	16 (30.8)	6 (11.5)

Note: Values are n (valid%), compared using χ^2 test.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

#Included Acuapuncture and massage.

significantly more pessimistic about their health in the coming year.

The LHS scores of HK and CD subjects were compared in Table 4. HK subjects reported greater total handicap score ($P = 0.029$, Wilcoxon signed ranked test). Out of the six LHS domains, the occupation and independence domains showed significant site differences. But when Bonferroni correction was applied, only the site difference in the occupation domain was considered to be significant.

The original scores and Z scores of SF36 in HK and CD were compared in Table 5. When compared with CD subjects, HK subjects had significantly lower Z scores in bodily pain, role limitations (emotions), and role limitations (physical). On Bonferroni correction, the site differences in the former two domains remained significant, but the site difference in role limitations (physical) was regarded as borderline significant, as P value was just greater than 0.004. Despite this borderline result, this domain was included in the subsequent multiple regression analysis.

Multiple regression models on LHS total score and the Z score of role limitations (physical), bodily pain and role limitations (emotions) domains of SF36, were shown in Table 6. There was significant collinearity between walking stick use and modified

**Table 4.** Comparison of London Handicap Scale (LHS) between stroke patients in Hong Kong and Chengdu.

Items	Hong Kong	Chengdu
LHS domains		
Mobility	3 (1–3)	2 (1–3)
Independence*	2 (1–4)	1 (1–2)
Occupation**	3 (2–4)	1 (1–3)
Social integration	2 (2–2)	2 (1–3)
Orientation	2 (1–2)	2 (1–3)
Economic self-sufficiency	2 (2–4)	3 (2–3)
LHS Total*	14 (11.5–16)	11 (9–16)

Note: Values are median (interquartile range), compared by Wilcoxon signed-rank test.

* $P < 0.05$; ** $P < 0.001$.

Barthel index; the former was therefore not included in regression analysis. Education status was included in regression analysis despite having moderate correlation with place of study ($R = 0.62$). Nevertheless it was not included in any of the final models. In the final models for Z score of role limitations (physical) and total LHS scores, site difference was not a significant factor after adjusting for medical factors and family support respectively.

Discussion

This study compared the long term outcomes in HRQOL and handicap of people with stroke in two distinct populations—Hong Kong and Chengdu, a major city in Mainland China. Despite having similar basic functional status, HK subjects perceived greater handicap and had worse HRQOL than the CD subjects. The differences in family support, dysphagia symptom,

and accessibility to medical follow-up might account for the geographical differences in handicap and the physical role limitation domain of SF36.

HK and CD populations shared the same ethnicity and culture but differed in socioeconomic status and structure. In order to correct for baseline cultural differences in the two populations, SF36 domain scores were transformed into Z scores by comparing the individual values with the local norms. There was normative data of SF36 for urban CD over a wide age range for this purpose.²⁴ Although the stroke subjects in both cities had similar levels of perceived economic handicap, more CD subjects reported financial difficulty in meeting medical costs. This could be explained by the better funded social security and public health system in Hong Kong.

Although nearly three quarters of the subjects were independent in basic ADL, there was significant handicap which is a measure of social limitation due to disease or disability. The LHS scale has been independently validated in Mainland China and Hong Kong.²⁰ It should therefore be valid to compare the LHS values in the two cities. It was remarkable that the majority of CD subjects reported significantly less handicap in occupation than HK subjects. The most likely explanation was that CD subjects had better family support which was independently associated with less handicap.

It is interesting that the differences in health care utilization of stroke patients in CD and HK might account for the site differences in the physical role limitation domain of HRQOL. The great majority of stroke patients in Hong Kong were assessed by the

Table 5. Comparison of SF36 domain scores in Hong Kong and Chengdu stroke patients.

Domain	Original score		P	Z score		P
	Hong Kong	Chengdu		Hong Kong	Chengdu	
PF	60.0 (27.0)	67.2 (24.4)	NS	-1.38 (1.40)	-1.23 (1.94)	NS
RP	56.0 (36.3)	77.3 (41.0)	NS	-0.69 (1.18)	-0.01 (1.28)	0.007
BP	67.2 (28.9)	83.9 (14.5)	<0.001	-0.58 (1.18)	0.27 (0.75)	<0.001
GH	44.8 (22.6)	59.7 (23.6)	0.001	-0.35 (1.11)	-0.33 (1.32)	NS
VT	51.6 (18.5)	55.9 (15.9)	NS	-0.49 (0.99)	-0.93 (0.98)	NS
SF	80.5 (21.2)	65.9 (29.5)	NS	-0.77 (1.43)	-0.72 (1.38)	NS
RE	59.9 (39.1)	94.4 (23.1)	<0.001	-0.50 (1.08)	0.38 (0.69)	<0.001
MH	67.4 (18.9)	71.9 (9.8)	NS	-0.46 (1.07)	-0.18 (0.58)	NS

Note: Values are mean (s.d.); Groups compared by paired t-test.

Abbreviations: PF, physical functioning; RP, role limitations (physical); BP, bodily pain; GH, general health; VT, vitality; SF, social functioning; RE, role limitations (emotions); MH, mental health; NS, not significant.

Table 6. Regression coefficients of multiple regression models on Z scores of SF36 domains and total scores of London Handicap Scale (LHS).

Variables in the final model	SF36 domains			
	RP	BP	RE	LHS
	R² = 0.314	R² = 0.230	R² = 0.263	R² = 0.410
Area (Chengdu Hong Kong)	NS	1.098***	1.012***	NS
Age (per unit versus increase)	0.030*	NS	0.024*	0.151**
Sex (Male versus Female)	-0.494*	NS	NS	NS
MBI				
<15 versus 20	NS	NS	NS	7.149***
15–19 versus 20	NS	NS	NS	1.898*
Care giving from family				
None versus Very much	NS	NS	NS	-1.772
Seldom versus Very much	NS	NS	NS	-0.902
Sometimes versus Very much	NS	NS	NS	2.633**
Pain in affected side	-0.525*	-0.510*	-0.402*	NS
Dysphagia symptom	-0.761**	NS	NS	NS
Medical follow-up	-0.878**	NS	NS	NS
Traditional Therapy [#]	NS	-0.719*	NS	NS

Note: Values were presented as the regression coefficient. Education, visits from friends/neighbours/relatives, difficulty in paying for medical care, health expectation in coming year were not significant factors. Physical functioning, general health, social functioning and mental health domains of SF36 were not analyzed as they showed no significant difference between HK and CD.

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

[#]Included acupuncture and massage.

Abbreviations: PF, physical functioning; RP, role limitations (physical); BP, bodily pain; RE, role limitations (emotions); NS, factor not included in the final model due to insignificance.

multidisciplinary team when they were treated in public hospitals. Probably because of this, HK subjects were more likely to be diagnosed to have dysphagia and be prescribed walking aids. The former was associated with lower scores in role limitation (physical) domain, probably because the prescription of soft diets or tube feeding had promoted the sick role. A cohort study of Hong Kong found that 29% of stroke patients were still either on soft diet or tube feeding at three months after stroke.⁸ It is important to review the impact of lifestyle restrictions (intentional or unintentional) in stroke patients on a regular basis.

Almost all people with stroke in HK were followed up either in specialist outpatient clinic or primary care clinics, while only half of CD subjects had regular medical follow-up, probably because the latter had difficulty in paying for medical treatments. However, the more frequent use of regular medical follow-up in HK stroke patients somehow accounted for their lower scores in the physical role limitation domain. Medical follow-up is important in the control of vascular risk factors, which can prevent recurrence of stroke in the longer term. But the need for long

term medication may be burdensome to patients and reinforce the sick role. Critical review of medication to avoid polypharmacy and side effects may lessen these negative impacts of patients' HRQOL.

In Mainland China, traditional Chinese therapies e.g. acupuncture and massage, were frequently used by stroke patients both in hospital and in the community. It is interesting to note that one fifth of the CD subjects were still receiving traditional Chinese therapy two years after stroke. Until now, there is a lack of well designed studies to demonstrate the effectiveness of traditional Chinese therapies e.g. acupuncture on stroke outcomes,²⁷ though small uncontrolled trials showed that acupuncture could improve patient psychological and social functions as well as their life satisfaction.^{28,29} Our data did not suggest that the greater use of traditional therapies accounted for the better HRQOL of the Mainland stroke patients. Instead it suggested that those with lower scores in bodily pain domain of HRQOL were more likely to seek traditional therapies.

Our CD subjects were not representative of stroke patients in Mainland China in that they were recruited from the top hospital in the province. Furthermore,



the sample was restricted to those who could be followed up at home two years after stroke amidst rapid urban redevelopment and re-location, and to those who were able to complete the HRQOL questionnaire. The higher SF36 scores of our CD subjects from the original sample and their low levels of disabilities were also evidence of selection bias. These may explain some of the subjects' characteristics e.g. education, family support, and possibly the site differences in the bodily pain and role limitations (emotions) domains in SF36, which remained significant after adjusting for medical and social factors. Nevertheless, these relatively better-off stroke patients in CD remained different from the carefully matched control subjects in HK in chronic health care management, and this partially explained the site difference in the role limitation (physical) domain of the SF36.

Another limitation of the study was that SF36 is a generic HRQOL scale. A more specific HRQOL instrument for stroke patients e.g. stroke impact scale might provide more detailed information on the HRQOL of stroke patients. Lastly, in the past two decades, Mainland China has enjoyed rapid socio-economic development, especially in major urban cities. The current social environment of people with stroke in Chengdu may be slightly different from what it was in 2001 when this study was performed. But the health care systems in the Mainland and Hong Kong have remained largely unchanged.

In conclusion, this study found major differences in the way Chinese stroke patients in two different communities with very different socioeconomic characteristics coped with their disabilities and chronic diseases. Greater access to regular medical follow-up and greater awareness of dysphagia among Hong Kong patients were associated with decreased HRQOL, when compared with people with strokes in Mainland China. The lower level of family support in Hong Kong subjects also accounted for their higher levels of handicap, but the higher level of family support in our subjects in Chengdu might have been subject to selection bias.

Clinical Point

Social support and health care systems in different societies can account for some of the differences in health related quality of life and handicap of stroke survivors.

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Disclosures

This manuscript has been read and approved by all authors. This paper is unique and is not under consideration by any other publication and has not been published elsewhere. The authors and peer reviewers of this paper report no conflicts of interest. The authors confirm that they have permission to reproduce any copyrighted material.

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