QUALITY OF LIFE AND FUNCTIONAL STATUS OF PATIENTS WITH HIP FRACTURES IN THAILAND

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Abstract. Measurement of quality of life and functional status provides important additional information for priority setting in health policy formulation and resource allocation. Hip fracture has been a concern in health planning in developing countries due to an increasing trend, as reported in several studies. Ironically, in developing countries, studies of the impacts of hip fracture on quality of life and functional status are rare. This prompted our team to seek evidence of the impacts using a longitudinal follow-up approach in a Thai setting. In this study, health-related quality of life (HRQOL) before and after hip fractures was evaluated in 250 Thai patients. Measurement of HRQOL was based on a modified SF-12 questionnaire, which was developed with a realization of the following demands: 1) cultural sensitivity of measurement tools; 2) disease-specific HRQOL measurement and 3) feasibility of conducting field work. Functional status was measured using an adapted version of the Index of Activity of Daily Living (ADL), which was previously developed in another setting in Thailand. Mild, moderate and severe deficits in quality of life were found in 36%, 60%, and 4% respectively, of surviving patients. The number of patients with physical functioning dependency, as measured by the ADL, also increased significantly in all 10 activities assessed. Comorbidities were associated with deficits in health-related quality of life but age, sex, income, education level, and surgery were not. Our findings indicate that hip fracture could lead to crippling consequences, with a pronounced effect on the quality of life of Thai patients. Further studies using control groups and longitudinal design are needed to validate the results of this study.

INTRODUCTION

Quality of life (QOL) is a complex concept, for which a variety of definitions and measures have been developed. It has been described as a measurable endpoint that is a composite of factors in a given disease of an individual. QOL assessment is becoming increasingly important for measuring the illnesses, diseases and their treatment, and for deciding priorities when allocating resources. In developed countries, measurement of QOL has been developed for over a decade, yet cross-cultural application is still problematic (Wood-Dauphinee, 19991; Zuckerman *et al*, 2000; Cantarelli *et al*, 1999). Specific health conditions also call for specific measurement of QOL.

Being aware of the methodological constraints in measuring QOL and the need to assess non-fatal impacts of hip fracture in our aging population, this study attempted to describe the QOL of hip fracture cases. The study dealt with patients surviving a hip fracture episode, comparing pre- and post-fracture status, taking into account levels of physical and mental functioning and the activities of daily living. Some possible predictor variables related to the health-related quality of life were also investigated.

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MATERIALS AND METHODS

Subjects

Two hundred and fifty live hip fracture cases were identified from the data set established for an incidence study in Chiang Mai Province, Thailand. All of the cases were born before 1948. With their fully informed consent, all patients or relatives were interviewed 1-2 years after their fracture episodes (average 19 months). Information on demographic, socio-economic data, comorbidity (pneumonia, bed sore, urinary tract infec-

tions, diabetes, hypertension, cardiovascular diseases) and nature of treatment (surgical/non-surgical) were recorded.

Questionnaires

There were two parts to the questionnaire. The first part included summary measures of health-related quality of life (HRQOL). The second part measured the activities of daily living (ADL). To measure quality of life, 3 crucial factors were taken into account: 1) cultural sensitivity measurement tools, 2) a need for disease-specific HRQOL measurement, and 3) feasibility of conducting field work with 250 subjects spread throughout the province. Concern about the cultural sensitivity issue should be clear, based on a well accepted notion made by Kleinman *et al* (1978) that '…illness is culturally shaped in the sense that how we perceive, experience, and cope with disease is based on explanations of sickness, explanations specific to social positions we occupy and systems of meaning we employ'.

To construct a new HRQOL specific to the study context, we chose the SF-12 Health Survey (Ware *et al*, 19965) since it requires only 2-3 minutes to finish but could provide acceptable validity and reliability for the description of HRQOL. Translation and back translation were done by the first author and the second author, independently. Comparison of backward translated version and the original English version in terms of content and conceptual equivalence was found acceptable by independent peer reviewers. Then, face-to-face in-depth interviews with 30 elderly patients with hip fractures living in nearby provinces were held by the authors to test the construct and content validity of the SF-12 questionnaire. These subjects were of similar age to the studied subjects. During the interview, we went through each question one by one in order to find the subjects' interpretation and understanding and whether they considered it relevant to their context of living. We found that 5 of the 12 items of the SF-12 were relevant to the subjects. Seven new items that were considered relevant by most of the subjects were constructed. The modified version contained 12 items, each scored on a 6-item Likert scale ranging from 1 to 6. Higher scores indicated better HRQOL.

The means of the scores were compared in selected-related variables (age-group, sex, educational level, surgery and comorbidities).

An adapted version of the Index of Activity of Daily Living (ADL) developed by Jitapunkul *et al* (1994) for Thai elderly was used to assess the activities of daily living, the second part of the questionnaire. The adapted version was derived from a pilot testing of the Index in the study setting. The pilot test was carried out on the same 30 selected community elderly subjects mentioned above. It revealed that the extended ADLs (the Chula ADL index) were suitable for describing disability in relatively young elderly people, but were not appropriate in our setting, since all tested subjects were rendered disabled. That is, the face validity of these questions was poor. So the extended ADLs were dropped from the adapted version. The adapted version contained 10 items of daily activities: walking, using a wheel chair, transferring, bathing, tooth brushing, dressing, feeding, toilet use, fecal incontinence and urinary incontinence. All ADLs, except urinary and fecal incontinence, were graded as 'dependent', 'needs major help', 'needs minor help or supervision' or 'independent'. Urinary incontinence was graded as 'none or occasional' and 'at least once a day'. Fecal incontinence was graded as 'none or occasional' and 'at least once a week'.

Summation of item scores yields a total score ranging from 0 to 10. Zero means totally dependent in all aspects and 10 means totally independent in all aspects. Demographic data, nature of treatment and comorbidities were also recorded. The number of patients with each ADL status was then compared before and after the hip fracture episode.

Statistical analysis

In describing overall QOL, the individual QOL scores of all domains were added up together. This resulted in a possible maximum score of 72, and a possible minimum score of 12. The overall QOL deficit was then classified as mild, moderate and severe, using the following cut-off values: 61-72, 37-60 and 12-36, respectively.

The mean score for perception of quality of life after fracture, according to selected impor-

tant variables (agegroup, comorbidity and surgery), was analyzed using the *t*-test. For physical functions, the number of patients with ADL in each item were compared before and after the hip fracture episode using McNemar chi-square method. All statistical analyses were performed using the computer software SPSS for Windows version 10 and Epi-info version 2000.

RESULTS

The samples in this study were predominantly female patients (72%, as shown in Table 1) and rather old elderly, with a mean age of 76. Nearly 40% of the patients perceived their families to be of difficult, to very difficult, financial status. The majority had limited education. Only 145 cases (58%) had been operated upon. Comorbidity was present in 78 patients (31.2%).

Deficit in health-related quality of life was evident in all patients. Mild, moderate and severe deficits in quality of life were found in 60%, 36% and 4%, respectively, of surviving patients (Table 2). Comorbidities were associated with deficit in quality of life, but age, sex, income, education level and surgery were not (Table 3).

The number of patients with functional dependency, as measured by ADL, significantly increased after hip fracture, as depicted in Table 4.

DISCUSSION

Decline in physical functioning and quality of life following hip fractures has been known for decades (Randell *et al*, 20007, Hall *et al*, 2000). Several methods of assessing quality of life were investigated, mostly from the western world. Due to cross-cultural differences, we developed our own measure suitable for our patients. Although other investigators used different methodologies, most of which included many items in the questionnaire, we believe lengthy and exhaustive interviews may not yield valid responses in Thai patients. Concise and clear questions in the interview will give better, reliable information in such elderly patients. We therefore used the modified SF-12 questionnaire the original version of which was previously proved to be a practical alternative to the SF-36 Health Survey (Gandek *et al*, 1998). To our knowledge, this is the first report of health-related quality of life in Thai patients with hip fracture.

Table 1
Demographic and treatment profiles of patients with hip fracture.

Characteristics (N=250)	%
Age (years), mean, SD, range	75.5, 9.47, 52-101
Sex,women	72
Family income per month in US$ (1 US$ = 42 baht)	
Less than 111	45.6
111 to 222	41.6
223 to 333	6.8
334 to 444	3.6
Over 444	2.4
Self assessment of financial status of family	
Very difficult	7.6
Somewhat difficult	30.4
Not difficult but have limited savings	52.4
Not difficult and have satisfactory savings	9.6
Education	
No schooling	60.4
Primary school	35.2
Secondary school	3.2
Vocational training	0.4
Bachelor or higher	0.8
Household members	
Live alone	4.8
Spouse	9.6
Extended family	85.6
Treatment modalities	
Hip replacement	58.0
Hip traction	39.2
Medication only	2.4
Traditional healer	0.4

Table 2
Quality of life deficit in patients with hip fracture.

Quality of life deficit	Number of patients	%
Mild	151	35.6
Moderate	89	60.4
Severe	10	4.0
Total	250	100

Table 3
QOL score difference of predictor variables.

	Mean QOL score	QOL score difference	p-value
Agegroup (75 / >75 y/o)	56.70 / 54.58	2.12	0.068
Sex (male / female)	55.62 / 55.59	0.03	0.366
Education (yes / no)	55.82 / 55.48	0.34	0.89
Income (high / low)	56.52 / 54.13	2.39	0.081
Surgery (yes / no)	56.51 / 54.37	2.14	0.069
Comorbidities (no / yes)	57.06 / 52.54	4.52	0.000

Table 4
Number and percentages of patients with functional dependency before and after fracture.

ADL	Number and percentages of patients				p-value[a]
	Before fracture		After fracture		
	N	%	N	%	
Walking with support	3	1.2	35	14	0.000
Use wheelchair	3	1.2	58	23.2	0.000
Transferring assisted	2	0.8	28	11.2	0.000
Bathing assisted	2	0.8	28	11.2	0.000
Tooth-brushing assisted	0	0	10	4	0.002[b]
Dressing assisted	3	1.2	25	10	0.000[b]
Feeding assisted	0	0	12	4.8	0.000[b]
Toileting assisted	2	0.8	52	21.6	0.000
Fecal incontinence	0	0	8	3.2	0.008[b]
Urinary incontinence	4	1.6	17	6.8	0.000[b]

[a]McNemar test; [b]Binomial distribution used.

Our results showed clearly the deterioration in quality of life after hip fracture. All patients suffered some degree of deficit in health perception, mental health, emotional, physical, social functioning and bodily pain, as measured by the modified SF-12 Health Survey. This was consistent with several studies reported previously (Johansson *et al*, 1998; Wolinsky *et al*, 1997; Michel *et al*, 2000). We found that comorbidity was the only associated predictive variable for quality of life. However, the review of the literature revealed contradicting results. A recent case-control study by Norton *et al* (2000) confirmed dramatic declines in quality of life at two years after hip fracture. The decline was independent of the effects of increasing age, pre-existing medical conditions and disabilities. Mossey *et al* (1989) independently reported age, prefracture physical functioning and cognitive status as determinants of recovery 12 months after hip fracture. Koval *et al* (1996) cited age lower and fewer comorbidities as being predictive of greater likelihood to regain pre-fracture independent living status. Other predictors of functional recovery following hip fracture included psychosocial factors (Magaziner *et al*, 1990) and delirium (Marcantonio *et al*, 2000). The discrepancy among several studies could possibly arise from different study designs and durations of patient follow-up. Replication of this study with a larger sample size may identify other predictor variables for health-related quality of life.

The domains of physical function and activities of daily living represent areas of specific con-

cern for patients with hip fractures. How are the results of this study comparable to those of Western countries? The Thai version of ADLs developed by Jitapunkul *et al* (1994) was based on the Barthel ADL Index (Research Unit of the Royal College of Physicians and the British Geriatrics Society, 1992) and the Office of Population Censuses and Surveys disability scale (Martin *et al,* 1988), which have been widely used in Western countries. Hence, the results for physical function in this study, relying on the adapted version, could be comparable to a certain degree to those of Western countries, except for the following activities: walking outdoors, cooking, using public transport, using money, and heavy housework.

The results showed that hip fracture severely affected each of these domains, with the majority of patients experiencing moderate impairment or impact on their lives in most domains. Several studies have assessed the effect of hip fracture on functional status. At the end of a year after hip fracture, 40% of people are still unable to walk independently, 60% require assistance with one essential activity of daily living (for example, dressing, bathing, food preparation), and 80% are unable to perform at least one instrumental activity of daily living (Cooper, 1997). Marottoli *et al* (1992) followed 120 cohort members who sustained a hip fracture in the 6-year study period. They found considerable decrease in the activities of daily living (dressing, walking, climbing stairs, etc) 6 months after hip fracture. At baseline, 86% could dress independently versus 32% at 6 months; 75% could walk across a room independently versus 15% at 6 months; 63% could climb a flight of stairs versus 8% at 6 months; and 1% could walk one-half mile versus 6% at 6 months. Our results showed similar findings. The proportion of patients with functional dependency increased from 4-20 fold approximately 1-2 years after the fracture episodes. Another study in the Netherlands found mobility and functional recovery in only 29% and 24% of patients, respectively, at 12 months (Koot *et al,* 2000). Magaziner *et al* (2000) measured eight areas of function (upper and lower extremity physical and instrumental activities of daily living: gait and balance; social, cognitive, and affective functions). They reported that new dependency in physical and instrumental tasks for those not requiring equipment or human assistance prefracture ranged from 20.3% for putting on pants to 89.9% for climbing five stairs. Their patients were followed during subsequent hospitalizations, which may mean they were severe cases. The reason for our lower figures for functional dependency was probably the community-based nature of the patients. We found only 4-20% of patients who became functionally dependent in various activities of daily living. However, the difference between the proportion measured before, versus after the fracture episode, was statistically significant.

Some potential limitations should be taken into account in interpreting self-reported physical functioning among the elderly. It has been suggested that performance measures of functional status have several advantages over self-reported measures. Myers *et al* (1993) challenged this assumed superiority by conducting a study. They concluded that functional performance measures were not superior to self-assessments. Another potential problem that is generalizable to all research evaluating health status outcomes is the lack of a single reference standard for health-related quality of life. With regard to the aforementioned limitations, we carried out an extensive review and modification of the instrument, as well as repeated training and pre-testing on data collection, as described above. Finally, the lack of control group in this study casts doubt on the relationship between hip fracture and the adverse outcomes demonstrated above. However, it should be noted that this study did not aim to establish such a relationship. Despite all these efforts, some error was inevitable in this retrospective study due to recall bias present in such elderly patients.

In summary, the present study provided compelling evidence that hip fracture patients experienced a significant deterioration in health-related quality of life. There were substantial decreases in the activities of daily living across all domains, suggesting the differences seen are indeed clinically important. This emphasized the importance of implementing preventive strategies to reduce the incidence of hip fractures. Future research should examine the predictor variables of health-related quality of life not found in this study.

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