

Emotional support levels can predict physical functioning and health related quality of life among elderly Taiwanese with hip fractures

Y.-I. L. Shyu · W.-R. Tang · W.-C. Tsai ·
J. Liang · M.-C. Chen

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Abstract *Introduction:* There has been increasing interest in the role emotional support plays on recovery and the perceptions of health. However, the vast majority of studies have been based on data from Western nations. Little is known about hip-fractured elders in Asian countries. This study has examined the influences of emotional support on functional recovery, and health-related quality of life (HRQoL) among elderly patients in Taiwan. *Methods:* Data were gathered from 126 hip fractured elders, in a teaching hospital in northern Taiwan. Eleven items from the Medical Outcome Study (MOS) Social Support Survey were administered, in order to measure emotional support at 1 month after discharge. The Chinese Barthel Index (CBI),

Lawton and Brody's instrumental activities of daily living (IADL) scale, and MOS Short Form—36 Taiwan version were administered at the end of months 1, 3, and 6 after discharge. *Results:* After controlling for covariates, greater levels of emotional support predicted a better recovery of the activities of daily living (ADL) ($\beta=0.23$, $P=0.04$) and IADL ($\beta=0.03$, $P=0.03$), and better HRQoL in seven of eight dimensions (P ranged from <0.0001 to 0.04), except social function, emotional role, and physical role during the first 6 months after hospital discharge. *Conclusions:* Emotional support can have a significant impact on the recovery of self—care ability, and different aspects of HRQoL during the first 6 months after discharge for hip fractured elders in Taiwan. Clinical implications were made, on the basis of these findings.

Y. -I. L. Shyu (✉)
Center for Gerontological Research,
School of Nursing,
Chang Gung University,
259 Wen-Hwa 1st Road, Kwei-Shan, Taoyuan 333,
Taiwan, Republic of China
e-mail: yeaing@mail.cgu.edu.tw
Tel.: +886-3-2118800
Fax: +886-3-2118400

W. -R. Tang
School of Nursing, Chang Gung University,
259 Wen-Hwa 1st Road, Kwei-Shan, Taoyuan 333,
Taiwan, Republic of China

W. -C. Tsai
Department of Psychiatry,
National Taiwan University Hospital,
7 Chung San South Road, Taipei,
Taiwan, Republic of China

J. Liang
School of Public Health & Institute of Gerontology,
University of Michigan,
1420 Washington Heights,
Ann Arbor, MI 48109, USA

M. -C. Chen
Department of Public Health & Biostatistics Consulting Center,
Chang Gung University,
259 Wen-Hwa 1st Road, Kwei-Shan, Taoyuan 333,
Taiwan, Republic of China

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Introduction

Hip fracture is a serious consequence of osteoporosis in the elderly, because it can lead to mortality of 5–20%, and morbidity, which result in huge economic costs [1–3]. As the aging population increases rapidly in Taiwan, as in many other countries [4], the problems caused by hip fracture are aggravated and it has become a major concern for health care providers. Several factors, such as pre-fracture physical condition, cognitive functioning, morbidity and age, were found to influence recovery rates after hip fracture [3, 5, 6]. At the same time, there is also evidence that psychological and social factors, particularly social support, influence recovery and post-fracture quality of life [6–14].

Previous studies of health outcomes and recovery after hip fracture have found that post-fracture social support was associated with better post-fracture health perceptions [9] and better recovery [6, 8, 9, 11, 13]. However, these studies focused on network structures, quantifying social

support, with few focused on the subjective assessment of quality of social support [11]. Perceived emotional support, which can be viewed as one dimension of social support [15], has been found to have an important impact on health outcomes, perceived health and adjustment for patients with a major illness such as cancer, HIV/AIDS and coronary diseases [15–19]. A lack of studies on the influence of emotional support on health outcomes of elders with hip fractures was found. In addition, the vast majority of studies which have examined the potential role of social support on recovery and health perceptions of hip-fractured elders were based on data collected in Western developed countries; little is known about hip-fractured elders in Asian countries.

Thus, the purpose of this study was to describe the influence of emotional support on post-operative changes in health related quality of life (HRQoL), physical functioning, including activities of daily living (ADLs), and instrumental activities of daily living (IADLs), for a sample of hip-fractured elders in Taiwan, during the 6 months following their hospital discharge. The rationale for choosing the first 6 months after discharge as the observational period was that most recovery after a hip fracture occurs during the first 6 months [2, 3]. By analyzing data from more than two time-points, this study was able to provide information on the relationship between after-discharge emotional support and 6 months post-operative health and functional outcomes for elderly hip fractured patients in Taiwan.

Materials and methods

Participants and setting

This study was conducted in the trauma wards of a 3,000–bed medical center in northern Taiwan as well as in the patients' homes. The inclusion criteria were: (1) being 60 years of age or older; (2) hospitalized due to a hip fracture, and having received surgery for internal fixation or arthroplasty; (3) living in the geographical area of northern Taiwan; (4) having no cognitive impairment, judged by the attending physician; and (5) being able to walk independently or with a cane before the fracture.

As shown in Fig. 1, a total of 732 hip-fractured elders were admitted to the medical center and screened, during the data collection period; of these, 298 met the research criteria and 158 patients agreed to participate in the study. Of these, 126 were able to complete the emotional support survey and the MOS Short Form 36 at the end of the first month after discharge. Case loss was due to refusal to continue ($n=26$) and lost contact ($n=6$). Therefore, in this study data from 126 subjects were analyzed. We further compared the differences in gender, age, marital status, education background, living status, type of operation, length of hospital stay, concomitant diseases, and pre-fracture self-care ability between those who completed the emotional support survey ($n=126$) and those who agreed first but did not completed the survey ($n=32$) and found no

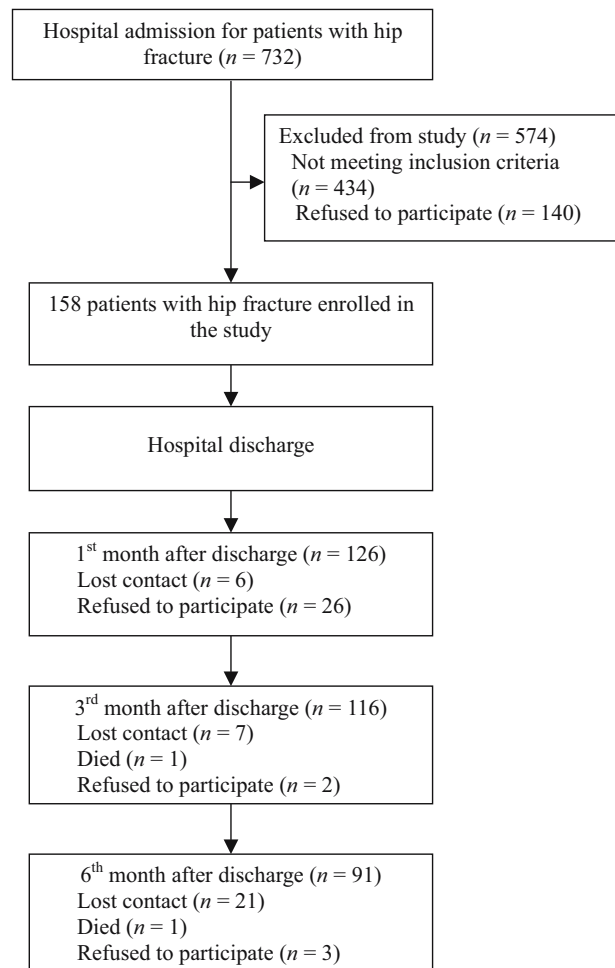


Fig. 1 Flow of participants throughout the study period

significant differences between the two groups except for gender ($P=0.04$). A higher percentage of females was found for those who did not complete the survey (84.4%) compared with those who did complete it (65.1%). Therefore, gender was entered as a covariate in the analysis to minimize the impact of the gender difference on generalizability of the study results. During the first and third months after discharge, two subjects dropped out of the study due to refusal, one due to mortality, and seven due to loss of contact; thus, 116 subjects remained in study at this point. During the third and sixth months after discharge, three subjects dropped out of the study due to refusal, one due to mortality, and 21 due to loss of contact; thus, 91 subjects then remained in study.

Instruments

Emotional support Eleven items, hypothesized to measure affectionate (4) and emotional/informational (7) support, were selected from the MOS social support survey [20] to measure the perception of availability of emotional aspects of social support. For each item, the respondent was asked to indicate how often each type of support was available to

them, if it was required. Response options were: none of the time (1), a little of the time (2), some of the time (3), most of the time (4), and all of the time (5). The reliability and validity of these measures in an American population of adults with chronic illness has been established [20]. In this study, the Cronbach's alpha coefficient was 0.95 for emotional support. The potential score on this scale ranged from 11 to 55, with 11 representing emotional support being available none of the time to 55 representing emotional support being available all of the time.

The medical outcomes study short form (SF-36) The SF-36 Taiwan version was translated and demonstrated good reliability and validity in a sample of hip-fractured patients [2]. The SF-36 consists of 36 items, representing eight generic health concepts: physical functioning (PF), role disability due to physical health problems (RP); bodily pain (BP); vitality (energy/fatigue) (VT); general health perceptions (GH); social functioning (SF); role disability due to emotional problems (RE); and general mental health (MH). In the final score, the higher the score, the better the implied health related quality of life. The internal consistency of these eight scales ranged from 0.71 to 0.89 at the end of the first month after discharge in this study.

Activities of daily living (ADL) ADL was measured by the Chinese Barthel Index (CBI) [21]. The index scale ranges from 0 (total dependence) to 100 (total independence). In this study, Cronbach's alpha of the CBI ranged from 0.79 to 0.85 at the first, third and sixth month after discharge.

Instrumental activities of daily living (IADL) IADL was measured by the Chinese version of Lawton and Brody's [22] IADL scale [21]. The scale ranges from 0 (total dependence) to 8 (total independence). In this study, Cronbach's alpha ranged between 0.72 to 0.87 at the first, third and sixth month after discharge.

Covariates Covariates of the emotional support included gender, concomitant illness, pre-fracture walking ability, education (being illiterate or not), whether living with a spouse, age, type of surgery, length of hospital stay and whether at risk for depression. Depression entered as a covariate was because that depression was found previously to have strong relationship with emotional support and might be a confounder of the study [23, 24]. Regarding concomitant illness, conditions such as cancer, stroke, heart, renal or liver disease, diabetes mellitus, osteoporosis or dementia appearing on the chart were collected to code the number of concomitant illness. We used the item for assessing walking independence in the CBI to assess pre-fracture walking ability. The scale ranges from 0 (complete unable to walk) to 15 (able to walk independently or use a cane).

The Chinese versions of the Geriatric Depression Scale (GDS) short form was used to assess the depressive symptoms. The total score on the GDS short form ranges

from 0 to 15; the higher the total score the more severe the depressive symptoms and a score ≥ 5 was categorized as having risk for depression [25]. The internal consistency reliability and the construct validity of the GDS short form have been established among the Taiwanese elderly [26].

Procedures

Approval was obtained from the institution and the participants before collecting the data. Research assistants identified potential subjects, after they had received surgery and before they were discharged from the hospital, and invited them to participate in this study. SF-36, CBI, and Lawton and Brody's IADL, and GDS were collected by face-to-face interviews at 1, 3, and 6 months after hospital discharge. Emotional support was collected at 1 month after discharge.

Statistical analysis

Descriptive statistics were used to describe the sample characteristics. A generalized estimating equations (GEE) [27, 28] approach was used to determine whether the emotional support is related to the trends of HRQoL, ADL and IADL during the first 6 months following hospital discharge. The GEE approach accounts for possible correlations in repeated measures over time and explores the differences among time points. Its application in our study was to model dependent variables (HRQoL, ADL and IADL) as a function of time, gender, age, hospital stay, whether illiterate or not, type of surgery, concomitant diseases, pre-fracture walking ability, living arrangement, whether at risk for depression and emotional support. Variables other than emotional support were treated as confounding variables.

For the elders who died ($n=2$, 1.6%) or dropped out ($n=33$, 26.1%) within 6 months following discharge, the data before their death or before dropping out were included in the analysis. We found that there were no significant differences in demographic variables, physical functioning (ADL, IADL, and SF-36) at the end of the first month between those who dropped out ($n=35$) and those who remained in the study throughout the 6 months. Therefore, the influence of death and attrition on the longitudinal data analyses may be limited. All data were analyzed by SAS Win 8.0.

Results

Sample characteristics

Sample characteristics are listed in Table 1. The subjects in this sample were mostly female (65.1%), with an average age of 77.8 (SD=7.7) years; around half of them were married (53.2%), and illiterate (49.6%). Eighty (63.5%) subjects received internal fixation and 46 (36.5%) received

Table 1 Characteristics of elders with hip fracture ($n=126$)

| Characteristic | |
|---|------------------|
| <i>Gender</i> | |
| Male | 44 (34.9 %) |
| Female | 82 (65.1%) |
| Age (mean \pm SD) | 77.83 \pm 7.67 |
| Length of hospital stay (days, mean \pm SD) | 9.71 \pm 3.82 |
| <i>Previous living status</i> | |
| Living alone | 10 (7.9%) |
| With spouse only or family | 115 (91.3%) |
| Other | 1 (0.8%) |
| <i>Marital status</i> | |
| Single | 1 (0.8%) |
| Married | 67 (53.2%) |
| Widowed | 57 (45.2%) |
| Divorced | 1 (0.8%) |
| <i>Educational background</i> | |
| Illiterate | 62 (49.6%) |
| Primary school | 36 (28.8%) |
| High school | 15 (12.0%) |
| College or above | 12 (9.6%) |
| <i>Type of surgery</i> | |
| Arthroplasty | 46 (36.5%) |
| Internal fixation | 80 (63.5%) |
| Number of illness (mean \pm SD) | 1.56 \pm 1.34 |

arthroplasty; the average length of hospital stay was 9.71 (SD=3.82) days. Before admitted, most of the subjects had lived with their family members or with a spouse only ($n=115$, 91.3%). Before their fracture ($n=126$), an average CBI of 96.12 (SD=6.4), and IADL scale of 5.6 (SD=2.4) was found, and 106 (84.8%) of these elderly patients could walk independently, or with the aid of a cane. Emotional support at the end of the first month after hospital

discharge, ranged from 11 to 55, with an average of 33.92 (SD=11.36).

Influence of emotional support on HRQoL

The means of each SF-36 subscale, at each time point, are listed in Table 2. In examining the influence of emotional support on trends of HRQoL, it was found that subjects with higher emotional support have significantly better outcomes in most scales of the SF-36, except for RP, SF and RE, after adjusting for confounders. For the other covariates, longer hospital stay was a significant predictor for poorer BP ($\beta=-1.22$, $P=0.049$), worse GH ($\beta=-1.07$, $P=0.048$) and worse MH ($\beta=-1.13$, $P=0.03$); more concomitant diseases was a significant predictor for worse GH ($\beta=-3.61$, $P=0.01$); and older age was a significant predictor for poorer PF ($\beta=-0.74$, $P=0.01$). At the same time, not being at risk for depression was a significant predictor for better GH ($\beta=9.29$, $P=0.014$); better VT ($\beta=7.02$, $P=0.04$); better RE ($\beta=14.55$, $P=0.02$); and better MH ($\beta=10.46$, $P=0.003$). and being male was a significant predictor for better BP ($\beta=10.84$, $P=0.02$) (not shown).

Influence of emotional support on physical functioning

The means of ADL and IADL at each time-point were listed in Table 2 for examination of the effect of emotional support on the trends of recovery in ADL and IADL across different time-points. It was found that after controlling for confounders, those elderly persons reporting better emotional support appeared to have a significantly better recovery of ADL and IADL, during the first 6 months after hospital discharge. For the other covariates, older age was a significant predictor of poorer recovery of ADL ($\beta=-0.41$,

Table 2 Means, standard deviations, and regression coefficients of emotional support, for each SF-36 subscale (BP, GH, VT, SF, RE, MH, PF, RP), ADL and IADL at each time-point, during the first 6 months after discharge. The P value was obtained using the GEE approach and denotes the significance between two time-points and the baseline and the regression coefficient of emotional support, after controlling for confounding variables: gender, living arrangement, educational background, type of surgery, age, hospital stay, number of concomitant diseases, pre-fracture walking ability and whether at risk for depression

| Variable | Time (mean \pm SD) | | | Emotional support (β) |
|---------------|------------------------------|----------------------------------|----------------------------------|-------------------------------|
| | 1st month | 3rd month | 6th month | |
| SF36 subscale | | | | |
| BP | 65.7 \pm 25.62 (Baseline) | 71.48 \pm 26.56 ($P=0.94$) | 73.45 \pm 27.43 ($P=0.07$) | 0.76 ($P<0.0001$) |
| GH | 53.81 \pm 23.33 (Baseline) | 54.02 \pm 23.92 ($P=0.99$) | 52.86 \pm 23.82 ($P=0.69$) | 0.35 ($P=0.03$) |
| VT | 57.93 \pm 23.90 (Baseline) | 61.68 \pm 19.04 ($P=0.77$) | 63.69 \pm 20.02 ($P=0.56$) | 0.55 ($P<0.0001$) |
| SF | 54.66 \pm 27.87 (Baseline) | 68.42 \pm 24.64 ($P=0.002$) | 76.13 \pm 27.17 ($P<0.0001$) | 0.12 ($P=0.53$) |
| RE | 69.84 \pm 41.18 (Baseline) | 82.75 \pm 34.46 ($P=0.005$) | 80.68 \pm 37.04 ($P=0.007$) | 0.39 ($P=0.13$) |
| MH | 61.36 \pm 22.84 (Baseline) | 63.82 \pm 20.15 ($P=0.47$) | 67.31 \pm 20.12 ($P=0.15$) | 0.47 ($P=0.0005$) |
| PF | 21.58 \pm 20.28 (Baseline) | 40.04 \pm 30.07 ($P<0.0001$) | 49.82 \pm 30.69 ($P<0.0001$) | 0.40 ($P=0.04$) |
| RP | 26.98 \pm 38.54 (Baseline) | 41.37 \pm 41.45 ($P=0.04$) | 59.94 \pm 43.14 ($P<0.0001$) | 0.24 ($P=0.41$) |
| ADL | 78.7 \pm 15.81 (Baseline) | 85.7 \pm 17.29 ($P<0.0001$) | 89.9 \pm 15.37 ($P<0.0001$) | 0.23 ($P=0.04$) |
| IADL | 2.6 \pm 1.67 (Baseline) | 3.5 \pm 2.18 ($P<0.0001$) | 4.1 \pm 2.67 ($P<0.0001$) | 0.03 ($P=0.03$) |

$P=0.013$) and IADL ($\beta=-0.08$, $P=0.002$) and illiteracy was a predictor of poorer IADL ($\beta=-0.80$, $P=0.03$) (not shown).

Discussion

Previous studies have found that social support was associated with better health perceptions and recovery in this population [6, 8, 9, 11, 13]. This study further contributes to the knowledge base related to the influence of a specific aspect of social support, emotional support, on the recovery of hip-fractured elderly people in the first 6 months after hospital discharge. With our study's longitudinal and prospective design, after controlling for confounding variables, the influence of emotional support on both subjective evaluation of health outcomes and objective evaluation of ADL, IADL for hip-fractured elderly patients in Taiwan can be established.

Although not specifically in people with hip fracture from studies in Western countries, emotional support or love has been found to have an impact on self-perceived health and psychosocial adjustment in older women with breast cancer [16]; on quality of life for patients with HIV/AIDS [17]; and the progression of coronary atherosclerosis [15] and recovery from coronary diseases [18]. Ethnic differences in respect to social resources and social support has been recognized and addressed extensively [29, 30]. However, other than depressive symptoms, little empirical evidence on the influence of social support on the health outcomes and well-being of Asian elderly persons was found [23, 24]. Around 91% of the subjects in this study lived with family members; this number is close to the percentage of elderly persons with functional impairment who are cared for by family caregivers in Taiwan [31]. In terms of the network size, there is a long tradition of extended family households in Taiwan, reflecting strong norms of filial support. Approximately 70% of older Taiwanese live with their children. In addition, 62% of older Taiwanese receive money from others, primarily their adult children [32]. In contrast, only 13% of older Americans share a household with their children, and only 4% of adult children reported giving \$200 or more to their parents during a 5-year period [33]. The emphasis of social orientation and interdependence among family members in Chinese culture [34] may increase the importance of emotional support in the recovery phase after hip fracture for elderly people in Taiwan.

The low literacy among our subjects (49.6% illiteracy) may raise a concern for the quality of data. However, this is addressed by the fact that all the scales were validated in Taiwan. In addition, all interviews were conducted, either in person or over the phone, by trained interviewers with a nursing background. Today illiteracy remains high among older people in the less developed regions. According to the United Nations Population Division (2002) [35], 56% of persons aged 60 or over were illiterate in 2000. Illiteracy rates are significantly higher women and those in the

advanced age groups because of the gender gap in schooling and rapid improvement of educational attainment of younger generations. The proportion of illiteracy among our subjects reflects the current state of education in Taiwan [36] and other Eastern Asian nations such as Singapore, Hong Kong, and South Korea, where between 12 and 33% of those aged 60 and over were illiterate in 2000 [35]. Although the distribution of educational attainment in our study differs significantly from those in the developed nations, the correlations between education and health status are quite similar to those observed in Western countries [32]. More importantly, the significant effect of emotional support on physical functioning and quality of life has been validated even among those who are not well educated.

Based on the findings of this study, suggestions can be offered to clinical practitioners when taking care of Chinese hip-fractured elders. First of all, health care professionals should pay special attention to the emotional support of hip-fractured elders after hospital discharge. Second, it can be very beneficial to prescribe interventions to enhance perceived emotional support for hip-fractured elders during the discharge transition, in order to promote their self-care ability and health outcome in the critical recovering phase.

Given the small convenience sample and the considerable number of subjects who met the research criteria but did not agree to participate, and especially because of the lack of detailed demographic information for comparison between those who agreed and those who did not, the study results are of limited generalizability. Therefore, the findings of this study should be viewed with caution. However, the trends of functional recovery and changes in health-related quality of life found in this study were similar to findings in previous studies of hip-fractured elderly people in Taiwan [2, 3]. We also entered as covariates in this study whether illiterate and the percentage of gender that appeared to be different between subjects who completed the emotional support survey and who did not. Thus, the impact of the sampling limitations on the generalizability of the findings of this study may be lessened.

Several issues raised by the study results may be explored in the future. For example: what is the role of the other aspects of social support on the functional recovery and health outcomes after hip fracture? How does the role of emotional support, in functional recovery and health outcomes after hip fracture differ among different ethnicities? The effect of emotional support on functional recovery and health outcomes after 6 months requires further investigation. As the Asian populations of Western countries are growing rapidly [29], the results of this study may be applicable to other countries with Chinese populations. It offers a reference for health care providers in these countries, in dealing with Chinese/Taiwanese immigrants.

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