

## Psychometric Testing of the MOS Social Support Survey on a Taiwanese Sample

Yea-Ing Lotus Shyu<sup>a,b\*</sup>, Woung-Ru Tang<sup>c</sup>, Jersey Liang<sup>d,e</sup>, Li-Jen Weng<sup>f</sup>

<sup>a</sup>Professor, Center for Gerontological Research, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan, Taoyuan 333, Taiwan

<sup>b</sup>Professor, School of Nursing, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan, Taoyuan 333, Taiwan

<sup>c</sup>Assistant Professor, Graduate Institute of Nursing, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan, Taoyuan 333, Taiwan

<sup>d</sup>Professor, School of Public Health, University of Michigan, 1420 Washington Heights, Ann Arbor, MI 48109, USA

<sup>e</sup>Senior Research Scientist, Institute of Gerontology, University of Michigan, 1420 Washington Heights, Ann Arbor, MI 48109, USA

<sup>f</sup>Associate Professor, Department & Graduate Institute of Psychology, National Taiwan University, No.1, Sec. 4, Roosevelt Road, Taipei 106, Taiwan

\*Corresponding author:

Tel: +886-3-2118800 ext. 5275

Fax: +886-3-2118400

E-mail address: [yeaing@mail.cgu.edu.tw](mailto:yeaing@mail.cgu.edu.tw) (Y. I. L. Shyu)

## **Acknowledgements**

This work was funded by the National Health Research Institute, Taiwan and Chang Gung Memorial Hospital, Taiwan.

## Abstract

**Background:** The Medical Outcomes Study (MOS) Social Support Survey was a multidimensional self-administered instrument to assess various functional dimensions of social support. Less is known regarding its value for a Chinese population.

**Objectives:** To assess the psychometric properties of the MOS Social Support Survey on an adult sample in Taiwan.

**Method:** Data from samples of two studies were compiled for this study. The first sample ( $n = 90$ ) was from a sample of caregivers for hip fractured elders, and the second sample ( $n = 265$ ) was from a sample of caregivers for cancer patients. A total of 355 adult subjects completed the MOS Social Support Survey which was used for this study.

**Results:** Similar standard deviations among all items, and Cronbach's alpha coefficients being above 0.80 for all subscales supported the scaling assumptions. However, the discrimination among subscales is not clear since the item-own subscale correlations are close to the item-other subscale correlations (44% being 0.7 or above), and the inter-subscale correlations ranged from 0.60 to 0.88. A two-factor model, tangible support and emotional support, accounting for 68.96%, was found by using exploratory factor analysis. The goodness of fit summary for the 2-factor model was similar with the 4 and 5-factor models and with a lower inter-factor correlation (0.76). The 2-factor model appeared to have similar reliability and validity and better discrimination between different subscales than the original 5-factor model.

**Discussion:** The MOS Social Support Survey demonstrated good reliability and validity when applied to an adult sample in Taiwan. Different from the population in Western countries, a 2-factor model instead of a 5-factor model was found for this sample. Exploring the two factor model in relation to related concepts is suggested for future studies.

**Key Words:** Emotional social support; Factor analysis; Tangible social support

## **Introduction**

The importance of social support when protecting individuals from major illness and stressful situations has been addressed extensively in the literature (Berkman & Syme, 1979; Blazer, 1982; House, Robbins, & Metzner, 1982; Sherbourne, 1988). Therefore, the assessment of social support is important to understand and predict health outcomes of an individual. The construct of social support is a meta-concept, and methods used to assess social support are varied due to different conceptualizations of social support (Donald & Ware, 1984; House & Kahn, 1985; Hutchison, 1999; O'Reilly, 1988). The concept has been studied primarily from three perspectives: network structure, support functions and the nature of relationships (Hutchison, 1999). The network structure refers to the existence and the quantity of interpersonal relationships and the interconnectedness of a person's social relationships. This approach may measure concepts that were unrelated to support such as the need for contact or how busy a person is (Sherbourne & Stewart, 1991). In recent years, perceived availability of a functional component of social support has been emphasized (Cohen & Wills, 1985; House & Kahn, 1985; Sherbourne & Stewart, 1991). This approach emphasizes the functions of interpersonal relationship, such as emotional support, instrumental support, informational support, social companionship and appraisal support (Cohen & Hoberman, 1983; House, 1981; Wills, 1985).

The Medical Outcomes Study (MOS) Social Support Survey is a multidimensional self-administered instrument to assess various functional dimensions of social support including emotional/informational, tangible, affectionate, and positive interaction for patients in the Medical Outcomes Study (Sherbourne & Stewart, 1991). In Sherbourne and Stewart's (1991) study, its reliability and validity in patients with chronic illness in the United States was established. It has also been used to measure the social support for patients with breast carcinoma and those that received a bone marrow transplant in Western countries where it

demonstrated good reliability (Heinonen, Volin, Uutela, Zevon, Barrick, & Ruutu, 2001; Kornblith, Herndon, Weiss, Zhang, Zuckerman, Rosenberg et al., 2003). However, little is known about the validity and reliability of the MOS Social Support Survey for a Chinese population. Taiwan differs substantially from Western countries in health care system, clinical practice, case-mix, culture, and social organization. For example, different from the United States, Taiwan has a national health insurance and individuals have the choice to visit clinics in a medical center without referrals. In addition, in Taiwan around ninety percent of dependent elderly persons are being cared for by their family members (Directorate-General of Budget, Accounting and Statistics, Executive Yuan & Ministry of Interior, R.O.C., 1997). Chinese culture emphasizes devotion to parents, social orientation and interdependence, whereas Western culture values autonomy and independence and does not encourage over sacrifice for parents (Dai & Dimond, 1998). These differences may cause a different presentation of social support in Taiwan and in Western countries.

Since psychometric properties are sample dependent, the performance of a measure in a specific application is especially important (McHorney, Ware, Lu, & Sherbourne, 1994). For a further comparison of the nature and role of social support in health outcomes across nations and cultures, we believe that it is necessary to establish the validity and reliability of the MOS Social Support Survey among Taiwanese adults. The purpose of this study is, therefore, to describe the psychometric properties of the MOS Social Support Survey, Taiwan version, on an adult population. Formal psychometric tests of the assumptions underlying the item scoring and the construction of multi-item scales were conducted. In addition, we provide evidence related to the concurrent validity by examining associations among the social support scales and selected concepts to see if the relationships were consistent with plausible hypotheses. We hypothesized that the mental and social aspects of health outcomes would have a stronger relationship with the social support than would the physical related

aspects. Also, the construct validity was examined by using exploratory and confirmatory factor analysis to confirm and propose the dimensionality of the MOS Social Support Survey in a Taiwanese sample. After we identified and proposed a 2-factor instead of the original 5-factor solution, we further examined the psychometric testing and concurrent validity for the 2-factor approach in this sample.

## **Method**

### *Study Setting and Sample*

The data from the samples of two studies were compiled for this study. The first sample ( $n = 90$ ) was from a sample of caregivers for hip-fractured elders and the second sample ( $n = 265$ ) was from a sample of caregivers for cancer patients. Both samples were relatively healthy middle-aged adults, and were assessed with the MOS Social Support Survey. The two samples were combined ( $n = 355$ ) for testing the psychometric scaling assumptions and dimensionality. At the same time, health related quality of life was only collected from the first sample which consisted of caregivers of hip fractured elders. Therefore, the first sample was used to test the criterion-related validity of the social support items and the concepts of physical functioning (PF), role limitations-physical (RP), mental health (MH), role limitation-emotional (RE), social functioning (SF), vitality (VT) and general health (GH). Spirituality and physical well-being was only collected from the second sample which consisted of caregivers of cancer patients. Therefore, the second sample was used to test criterion-related validity of the social support items and the concepts of spirituality and physical well-being.

The sample of caregivers of hip fractured elders was collected from the families with a patient discharged from the trauma wards of a 3000-bed teaching medical centre in northern Taiwan. Sample inclusion criteria were as follows: 1) being the primary family caregiver for the hip fractured elder receiving surgery of internal fixation or arthroplasty; 2) being of age

18 or older; and 3) living in the geographical area of northern Taiwan.

The sample of caregivers to cancer patients was gathered from four different hospitals in the north, middle, and south regions of Taiwan. Sample inclusion criteria were: 1) be the primary family caregivers for patients with cancer, and 2) be age 18 or older.

### *Procedures*

Human Subjects Approval was obtained from the medical centers for both studies. For the first study of caregivers of hip fractured elders, the family caregivers were contacted and invited to participate in the study after their care receiver had received surgery but before being discharged from the hospital. After the informed consent was obtained, face-to-face interviews were then conducted at the first month after the discharge of the patients via home visits. For the study of caregivers of cancer patients, the primary family caregivers were contacted and invited to participate in the study after their care receiver had received either palliative care or active treatment for at least one week in a hospital, and data were collected at hospitals through self-reported questionnaires.

### *Instruments*

*MOS social support survey.* A total of 19 functional support items hypothesized to measure emotional, informational, tangible, affectionate support, and positive social interaction was developed to assess the perceptions of the availability of different functional aspects of support (Sherbourne & Stewart, 1991). Emotional support contains 4 items: measuring the expression of positive affect, empathetic understanding, and encouragement feeling expressions. Information support contains 4 items measuring the provisions of advice, information, guidance or feedback. Tangible support contains 4 items measuring the offering of material aid or behavioral assistance. Affectionate support contains 3 items measuring the expressions of love and affection. Positive social interaction contains 4 items measuring the availability of other persons to do fun things with you. For each item, the respondent was

asked to indicate how often each support was available to them if they needed them. 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). For each scale, simple algebraic sums were computed, and then the raw scale scores were transformed into a scale of 0 to 100. The higher the score, the better the perception of social support. The reliability and validity of the measure in an American population of adults with chronic illness has been established (Sherbourne & Stewart, 1991).

The MOS Social Support Survey, Taiwan version, was identical to the original version. Translation and back translation was used to ensure the language equivalence of the original language and the target language.

*Health outcomes (criterion measures).* The MOS SF-36 Taiwan version was used to measure different dimensions of perceived health outcomes, and to examine the concurrent validity of the MOS Social Support Survey in the first sample. In addition, instruments measuring spirituality and general health status were also used to examine the concurrent validity of the MOS Social Support Survey in the second sample.

The SF-36 Taiwan version was translated, and it demonstrated good reliability and validity in a healthy adult sample (Lu, Tseng, & Tsai, 2003; Tseng, Lu, & Tsai, 2003). The SF-36 Taiwan version is identical to the original SF-36. It measures concepts of physical functioning (PF, 10 items), role limitations due to physical health problems (RP, 4 items), bodily pain (BP, 2 items), general health (GH, 5 items), vitality (VT, 4 items), social functioning (SF, 2 items), role limitations due to emotional problems (RE, 3 items) and mental health (MH, 5 items). For each scale, reverse items were recoded, simple algebraic sums were computed and then the raw scale scores were transformed into a scale of 0 to 100. The higher the score, the better the implied health related quality of life. In this study, Cronbach's alphas from 0.71 to 0.90 were found for the first sample of caregivers of hip

fractured elders.

*Spirituality (criterion measure).* The Spiritual Well-Being Scale (SWBS; Paloutzian & Ellison, 1982) was used to measure spirituality and to assess the construct validity of the MOS-SS in the second sample by using hypothesis testing. According to the literature, spirituality has a positive association to social support, and a negative association to loneliness (Pace & Stables, 1997). Reliability and validity of SWBS were tested in many studies (Coleman & Holzemer, 1999; Fernsler, Klemm, & Miller, 1999; Isaia, Parker, & Murrow, 1999; Mickley & Soeken, 1993), and national norms were obtained on SWBS across a variety of studies (Bufford, Paloutzian, & Ellison, 1991). The Chinese version of SWBS had been tested on a population with lung cancer and proved to retain good psychometric properties (Su, 2002). In this study, Cronbach's alphas of 0.88 were found for the second sample of caregivers of cancer patients.

*General health status (criterion measures).* A single item indicator that is commonly used in many researches (Hays, Kallich, Mapes, Coons, & Carter, 1994; Hays, Sherbourne, & Mazel, 1993; Jenkinson, Lawrence, McWhinnie, & Gordon, 1995; Tang, 2001) to measure an individual's general health status was selected to measure the general health status for the second sample. Internal consistency reliability is unavailable for this single item indicator. However, validity was supported by its association with pain intensity ( $r = 0.56, p < 0.001$ ), physical performance status ( $r = 0.53, p < 0.001$ ), and physical well-being ( $r = -0.61, p < 0.001$ ) for a caregiver population taking care of terminally ill patients (Tang, 2001).

#### *Data Analysis*

Mean, standard deviation, item-scale correlation, Cronbach's alpha and inter-scale correlations were used to examine whether the scores satisfied the scaling assumptions of the original MOS Social Support Survey. Convergent validity of items in a hypothesized scale of the original MOS Social Support Survey was examined by item-own scale correlation.

Divergent validity of items, in relation to other scales that one expects to be independent was examined by item-other scale correlation. The Pearson product moment correlation of the MOS Social Support Survey with physical functioning, role limitations/physical, bodily pain, general health, vitality, social functioning, role limitations/emotional, mental health, spirituality, and physical well-being was used to test the hypothesized relationship between social support and related concepts (Crocker & Algina, 1986). We expected that a moderately positive correlation existed between social support and concepts containing a perception of mental health and both physical and mental health. The lowest correlations were expected between support and measures of physical health (physical functioning, role limitations/physical and bodily pain) (Sherbourne & Stewart, 1991). All of the data were coded and entered into a computer and analyzed by SPSS WINDOWS 10.0.

Exploratory and confirmatory factor analysis was used to examine the dimensionality of the social support measure. Confirmatory factor analysis was used to test whether a hypothesized factor structure was consistent or inconsistent with the data. Several indices were used to assess the goodness of fit of the model. The chi-square statistic tests the null hypothesis for the model fitting the data. Root mean square residual (RMSR) reflects the average deviation between the observed covariances and their estimates. This number can range between 0 and 1, with smaller numbers indicating a better fit of the model to the data. The adjusted goodness of fit index (AGFI) reflects the general fit of the data to the hypothesized model after adjusting for degree of freedom of the model. AGFI ranges from 0 to 1, with 1 representing a perfect fit of the model and data. The comparative goodness of fit index (CGFI) compares the hypothesized model to a model that assumes that there are no relationships in the data. As CGFI approaches 1, the fit of the model improves. Values over 1 indicate models that over-fit the data. The EQS 5.7 software package for Windows was used for confirmatory factor analysis in this study.

## Results

Table 1 presents the characteristics of the sample. The sample of caregivers of hip fractured elders (sample 1) was older, more likely to be married and less educated.

### *Psychometric Analysis of the Scaling Assumptions*

The percentage of missing data, response option frequency distribution, the mean, standard deviation and skewness of each item were grouped under each hypothesized subscale (Table 2). The missing-value rates ranged from 0.3% to 2.5%. Item response-option frequency distributions were relatively symmetrical, and the skewness was between -1.0 to +1.0 for all items. All items had similar standard deviations, which supports the scaling assumptions on the equal item variance when measuring the same concept.

Item-subscale correlation of the original subscales are presented in Table 3 (Sherbourne & Stewart, 1991). The correlations between an item and its hypothesized subscale were all above 0.80, with only one being 0.79. This result indicates that most items met the scaling assumption of internal consistency. The item discriminant validity was demonstrated by item-own subscale correlation being higher than item-other subscale correlation for all items, except item 17. Item 17 (someone to turn to for suggestions) was hypothesized in emotional support, but had a slightly higher correlation (0.851) with the informational support subscale than item 3 (someone to listen to you) that was hypothesized in informational support with the informational support subscale (0.846). In general, although the item-own subscale association is higher than the item-other subscale association for most items, the item-other subscale association ranged from 0.42 to 0.85 with around 44% of them being 0.7 and 0.8. The discrepancies among items in different subscale are very small, and the item-own subscale correlations are close to the item-other subscale correlations for all items.

Table 4 shows the Cronbach's alpha coefficients of internal reliability and inter-subscale correlation among all original hypothesized subscales. The Cronbach's alpha coefficients

were all above 0.80 for all hypothesized subscales. The correlations among subscales were lower than the scale internal reliability coefficient for all subscales. However, the correlations among subscales were very close to the scale internal reliability ranging from 0.60 to 0.88, with 6 out of 10 correlations being above 0.75.

The ranges of scores for the 5 dimensions of social support demonstrated good variability (Table 5). The skewness of all scales was within the recommended range of -1 to +1. Floor effects around 1% , and ceiling effects around 10% to 15% were found.

#### *Concurrent Validity*

The relationships between the MOS Social Support Survey overall scale and original subscales and criterion measures are shown in Table 6. It was found that the physical function subscale in MOS SF-36 and physical well-being had insignificant and the weakest associations (mostly below 0.1) with the social support subscales and the overall scale. Better role performance related health outcomes, including higher scores in role physical and role emotion subscale in MOS SF-36, were found to have a stronger association with a higher score in the tangible social support subscale than with other types of social support. The remaining health outcomes subscales in MOS-SF-36 including bodily pain, general health, vitality, social function and mental health had significant and mild correlations (mostly 0.2 or 0.3) with each social support subscale and the overall MOS Social Support Survey. Better health outcomes in bodily pain, general health, vitality, social function and mental health were found to relate to better performance in each type and overall social support. Spirituality was found to have a significant but weak association with affective ( $r = 0.189, p < .01$ ) and positive social interaction subscales ( $r = 0.122, p < 0.05$ ) suggesting that subjects who had higher spirituality had better affective and positive social interaction social support.

#### *Exploratory Factor Analysis*

Exploratory factor analysis is mainly used as a means of exploring the underlying factor

structure without prior specification of the number of factors (Bollen, 1989). Due to the close differences between item-own subscale and item-other subscale correlations for items in the MOS Social Support Survey, the exploratory factor analysis was used first to explore and interpret the underlying factors. Two initial eigenvalues from a principal components analysis were found to be greater than 1 (11.75, 1.35). A two-factor solution that accounted for 68.96% was found (Table 7). After using the common factor model followed by an Oblique rotation, patterns of high and low loadings across variables were examined to define factor labels. Items originally hypothesized to be in a subscale of tangible support, including availability of someone to help if confined to bed, take to doctor, prepare meals, and help with daily chores loaded high on the second factor. The remaining items of the MOS Social Support Survey were found to be loading high on the first factor. The first factor (emotional support) accounted for 61.87% and the second factor (tangible support) accounted for 7.10% of the total variance.

The inter-factor correlation was 0.56. As perceived availability of emotional support improved, so did tangible support. To further examine the internal consistency of the two-factor solution, the Cronbach's alpha coefficient was found to be 0.91 for emotional support, and 0.83 for tangible support.

#### *Confirmatory Factor Analysis*

The analysis tested the two-factor model found in the exploratory factor analysis, the five-factor model originally hypothesized, and the four-factor model that combined the emotional and informational support items (Sherbourne & Stewart, 1991). The factors were hypothesized to be correlated in each model. The goodness-of-fit summary of these three models is presented in Table 8, and they were all less than satisfactory. Although a statistical comparison of the two, four and five factor models is not possible, goodness-of-fit measures are very close in these three models. For the five factor model, the absolute magnitude of the

factor loading ranged from 0.71 to 0.90, and the interfactor correlations ranged from 0.74 to 0.98, that among the 10 interfactor correlations, with 6 of them being above 0.90. For the four factor model, the absolute magnitude of the factor loading ranged from 0.70 to 0.90, and the interfactor correlations ranged from 0.70 to 0.94, and among the 6 interfactor correlations, 3 of them were above 0.90. For the two factor model, the absolute magnitude of the factor loadings ranged from 0.70 to 0.88 with an interfactor correlation of 0.76. Due to the fact that the model fit was close among three models and equal or over half of the interfactor correlations were above 0.90 for the four and five factor model, we decided to modify the model based on the two factor model. For the modified two factor model, we made the item “someone who shows love and affection, “someone who hugs you,” and “someone to get together with to relax” to load on both factors (tangible and emotional support) according to the suggestions of the Lagrange multiplier test for adding parameters. The goodness-of-fit summary of the modified two factor models is shown in Table 8. The 2-factor model is nested in the modified 2-factor model. In other words, the 2-factor model is a subset of the modified 2-factor model (Kelloway, 1998). This procedure permitted comparison of the two models with a chi-square difference test, and the result was significant (chi-square diff = 39.3,  $df = 3$ ,  $p < 0.01$ ). However, the GFI increased only from 0.81 to 0.83, the RMR decreased from 0.05 to 0.04, and the remaining indexes did not differ between the two models. In addition, it is difficult to theoretically justify the loading of the three observed variables on tangible support. Therefore, we decided to select the original 2-factor model that is based on the exploratory factor analysis to be our final model. Table 9 presents the standardized solution for the two-factor model. The results of the factor analysis suggest that the MOS Social Support Survey measured two inter-related components: tangible and emotional social support.

#### *Psychometric Testing and Criterion Validity for the 2-factor Model*

We further examined the item-subscale correlation of the 2-factor model (Table 10). The correlations between an item and its hypothesized subscale ranged from 0.76 to 0.88, and item other subscale correlation ranged from 0.42 to 0.68. Discrepancies among items in different subscales appeared to be more distinguishable than in the original hypothesized subscales (Sherbourne & Stewart, 1991). The Cronbach's alphas of the 2-factor subscales were 0.87 (tangible support) and 0.97 (emotional support) and the correlation between the two scales was 0.70.

The variability, skewness, floor and ceiling effect of the 2-factor model are similar to the original hypothesized 5-factor model (Sherbourne & Stewart, 1991). The mean  $\pm$  standard deviation of scores for the 2-factor model was  $69.37 \pm 23.38$  for tangible support, and  $64.35 \pm 22.07$  for emotional support. The skewness was -0.736 for tangible support, and -0.0305 for emotional support, and the skewness for both subscales were within the recommended -1.0 to +1.0. Floor effects were 1.4% for tangible support and 0.6% for emotional support, and the ceiling effect was 13.8% for tangible support and 5.1% for emotional support.

In terms of the criterion-related validity, the 2-factor model solution appeared to have a similar performance with the original hypothesized 5-factor model (Table 11). Similarly, physical function and physical well-being had the weakest and an insignificant association with both tangible and emotional social support. Mild correlations (0.23 to 0.33) were found between better health outcomes in bodily pain, general health, vitality, social function and mental health subscales of SF-36, and both better tangible and emotional social support. Role performance related subscales of MOS SF-36 including role emotion and role physical appeared to have a higher correlation with the tangible support subscale (RE = 0.37; RP = 0.41) than with the emotional support subscale (RE = 0.18; RP = 0.26). similar as the 5-factor model, spirituality was found to have a positively significant but weak association with emotional support ( $r = 0.15$ ;  $p < 0.05$ ), but not tangible support.

In summary, the 2-factor model of the MOS Social Support Survey appeared to improve the differentiation between the different subscales of the 5-factor model. At the same time, item-scale correlations, Cronbach's alpha, variability, skewness, floor and ceiling effect and criterion-related validity for each subscale were similar with the 5-factor model.

In terms of criterion-validity, the 2-factor approach solution, and both the tangible support and emotional support subscales had mild correlations with the bodily pain, vitality, social function and mental health subscales of SF-36. Role performance related subscales of MOS SF-36 including role emotion and role physical appeared to have a higher correlation with the tangible support subscale than with the emotional support subscale. On the other hand, physical functioning and physical well-being did not correlate with either of the social support subscales.

### **Discussion**

This study provides information on psychometric properties of the MOS Social Support Survey in an adult sample in Taiwan. The evaluation of scaling assumptions and score reliability are very important when applied to a particular sample. In this study, the MOS Social Support Survey demonstrated good evidence to support the scaling assumptions when administered to an adult sample in Taiwan. Relatively high variance and symmetric distributions of item response frequencies of all items supported the ability of items in this scale in measuring the variability of the phenomena (DeVellis, 1991). Equal item variance in measuring the same concept was supported by a similar standard deviation of all items. Internal consistency was supported by Cronbach's alpha coefficients being above 0.70 for all subscales. The high Pearson item-scale correlation between each item and the hypothesized subscale support the scaling assumption of internal consistency of each subscale (DeVellis, 1991). However, the small differences among item-own subscale correlation and item-other subscale correlations for all items failed to achieve the item discriminant validity for the

original hypothesized five subscales. Good variability, symmetric distribution and acceptable floor and ceiling effect of the subscale score was found for each subscale. Thus, we can conclude that the reliability of the MOS Social Support Survey was established in an adult sample in Taiwan.

In terms of the criterion-related validity of the MOS Social Support Survey, the weakest association was found between physical health status, such as between physical function/physical well-being, and each type of social support; and higher correlations were found between mentally related health measures and social support, which was supported by Sherbourne and Stewart's study (1991). As hypothesized, tangible support that was defined as the provision of material aid or behavioral assistance was found to have a higher correlation with role performance related health measures such as limitation in role performance due to pain or physical functioning than emotional related social support. .

In terms of the factor structure of the MOS Social Support Survey, the two-factor model with similar goodness of fit with other models, factor loadings from 0.70 to 0.88 and an interfactor correlation of 0.76 was selected. According to the comparison of psychometric testing results of the 2-factor model with the original 5-factor model, the theoretical structure of factors containing tangible and emotional social supports appeared to be more empirically distinguishable with similar validity and reliability in a Taiwanese sample. Previous studies have also found that the social support components are too highly correlated to be differentiated empirically (Norbeck, Lindsey, & Carrieri, 1981; House & Kahn, 1985; Sherbourne & Stewart, 1991). As stated by Sherbourne and Stewart (1991) the emotional and informational support both indicated support communication, and they suspected that what they labeled "affection" is really emotional support. In a recent paper published by Stewart et al. (1999), the authors specified tangible and emotional support as social support in a conceptual model for factors affecting quality and length of life of dying patients and their

families. However, positive interaction, affection, and informational support were not listed specifically in the model. Whether the 2-factor model is culture specific will need to be further studied.

In summary, these findings provide a preliminary basis for the use of the MOS Social Support Survey in a Taiwanese sample. The small convenience sample limits the generalizability of the results. The fact that all the subjects were family caregivers might influence their perception about social support, and therefore careful considerations might need to be paid to the generalization of the study results before applying them to non-caregiver adult populations. The related concepts for examining criterion-related validity were not measured in the total sample, but only in the sub-sample was another limitation of this study. A more representative and larger sample using structural equation modeling to further explore the underlying concepts in relation to related concepts is suggested for future studies. In its current form, the MOS Social Support Survey demonstrated good reliability and validity as applied to an adult sample in Taiwan. The study results may be applicable to other countries with Chinese populations, and can provide a reference for instrumentation of social support measures in other Chinese populations.

## References

- Berkman, L. F., & Syme, S. L. (1979). Social networks, host resistance and mortality: A nine-year follow-up study of Alameda County residents. *American Journal of Epidemiology*, *109*, 186-204.
- Blazer, D. G. (1982). Social support and mortality in an elderly community population. *American Journal of Epidemiology*, *115*, 684-694.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: John Wiley.
- Bufford, R. K., Paloutzian, R. F., & Ellison, C. W. (1991). Norms for the spiritual well-being scale. *Journal of Psychology & Theology*, *19*, 56-70.
- Cohen, S., & Hoberman, H. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology*, *13*, 99-125.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*, 310-357.
- Coleman, C. L., & Holzemer, W. (1999). Spirituality, psychological well-being, and HIV symptoms for African Americans living with HIV disease. *Journal of the Association of Nurses in AIDS Care*, *10*, 42-50.
- Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York: Holt, Rinehart & Winston.
- Dai, Y. T., & Dimond, M. F. (1998). A cross-cultural comparison and its implications for the well-being of older parents. *Journal of Gerontological Nursing*, *24*(3), 13-18.
- DeVellis, R. F. (1991). *Scale development: Theory and applications*. Newbury Park, CA: Sage.
- Directorate-General of Budget, Accounting and Statistics, Executive Yuan & Ministry of Interior, R.O.C. (1997). *Report on the old status survey: Taiwan area, Republic of China*. Taipei, Taiwan: Author. (in Chinese).

- Donald, C. A., & Ware, J. E. Jr. (1984). The measurement of social support. In R. Greenley. (Ed), *Research in community and mental health* (pp. 325-370). Greenwich, CT: JAI Press.
- Fernsler, J. I., Klemm, P., & Miller, M. A. (1999). Spiritual well-being and demands of illness in people with colorectal cancer. *Cancer Nursing*, 22(2), 134-140.
- Hays, R. D., Kallich, J. D., Mapes, D. L., Coons, S. J., & Carter, W. B. (1994). Development of the kidney disease quality of life (KDQOL) instrument. *Quality of Life Research*, 3, 329-338.
- Hays, R. D., Sherbourne, C. D., & Mazel, R. M. (1993). The RAND 36-Item Health Survey 1.0. *Health Economics*, 2(3), 217-227.
- Heinonen, H., Volin, L., Uutela, A., Zevon, M., Barrick, C., Ruutu, T. (2001). Quality of life and factors related to perceived satisfaction with quality of life after allogeneic bone marrow transplantation. *Annals of Hematology*, 80(3), 137-143.
- House, J. S. (1981). *Work, stress and social support*. Reading, MA: Addison-Wesley.
- House, J. S., & Kahn, R. L. (1985). Measures and concepts of social support. In S. Cohen & L. Syme (Eds.), *Social support and health* (pp. 83-108). San Francisco: Academic Press.
- House, J. S., Robbins, C., Metzner, H. L. (1982). The association of social relationship and activities with mortality: Prospective evidence from the Tecumseh community health study. *American Journal of Epidemiology*, 116, 123-140.
- Hutchison, C. (1999). Social support: factors to consider when designing studies that measure social support. *Journal of Advanced Nursing*, 29, 1520-1526.
- Isaia, D., Parker, V., & Murrow, E. (1999). Spiritual well-being among older adults. *Journal of Gerontological Nursing*, 28(5), 15-21.
- Jenkinson, C., Lawrence, K., McWhinnie, D., & Gordon, J. (1995). Sensitivity to change of health status measures in a randomized controlled trial: Comparison of the COOP charts and the SF-36. *Quality of Life Research*, 4(1), 47-52.

- Kelloway, E. K. (1998). *Using LISREL for structural equation modeling: A researcher's guide*. Thousand Oaks, CA: Sage.
- Kornblith, A. B., Herndon, J. E. 2nd, Weiss, R. B., Zhang, C., Zuckerman, E. L., Rosenberg, S., Mertz, M., Payne, D., Jane Massie, M., Holland, J. F., Wingate, P., Norton, L., Holland, J. C. (2003). Long-term adjustment of survivors of early-stage breast carcinoma, 20 years after adjuvant chemotherapy. *Cancer*, 98, 679-689.
- Lu, J. R., Tseng, H. M., & Tsai, Y. J. (2003). Assessment of health-related quality of life in Taiwan (I): Development and psychometric testing of SF-36 Taiwan version. *Taiwan Journal of Public Health*, 22(6), 501-511.
- McHorney, C. A., Ware, J. E., Lu, R., & Sherbourne, C. D. (1994). The MOS 36-item Short-Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Medical Care*, 32(1), 40-66.
- Mickley, J., & Soeken, K. (1993). Religiousness and hope in Hispanic and Anglo-American women with breast cancer. *Oncology Nursing Forum*, 20(8), 1171-1177.
- Norbeck, J. S., Lindsey, A. M., & Carrieri, V. L. (1981). The development of an instrument to measure social support. *Nursing Research*, 30(5), 264-269.
- O'Reilly, P. (1988). Methodological issues in social support and social research. *Social Science & Medicine*, 26(8), 863-873.
- Pace, J. C., & Stables, J. L. (1997). Correlates of spiritual well-being in terminally ill patients with AIDS and terminally ill patients with cancer. *Journal of the Association of Nurses in AIDS Care*, 8(6), 31-42.
- Paloutzian, R. F., & Ellison, C. W. (1982). Loneliness, spiritual well-being, and quality of life. In L. A. Peplau (Ed.), *Loneliness: A sourcebook of current theory, research and theory* (pp. 224-237). New York: John Wiley & Sons.
- Sherbourne, C. D. (1988). The role of social support and life stress events in use of mental

- health services. *Social Science & Medicine*, 27(12), 1393-1400.
- Sherbourne, C. D., & Stewart, A. L. (1991). The MOS social support survey. *Social Science & Medicine*, 32(6), 705-714.
- Stewart, A. L., Teno, J., Patrick, D. L., & Lynn, J. (1999). The concept of quality of life of dying persons in the context of health care. *Journal of Pain & Symptom Management*, 17(2), 93-108.
- Su, S. F. (2002). *Psychometric assessment of spiritual well-being scale in Taiwan*. Unpublished master's thesis, Chang Gung University, Taoyuan, Taiwan.
- Tang, W. R. (2001). Terminally ill patients and their caregivers' quality of life. *Dissertation Abstracts International*, 62(04), 1810B. (UMI No. 3013516).
- Tseng, H. M., Lu, J. R., & Tsai, Y. J. (2003). Assessment of health-related quality of life (II): norming and validation of SF-36 Taiwan version. *Taiwan Journal of Public Health*, 22(6), 512-518.
- Wills, T. A. (1985). Supportive functions of interpersonal relationships. In S. Cohen & S. L. Syme (Eds.), *Social support and health* (pp. 61-82). Orlando, FL: Academic Press.

Table 1

*The Demographic Characteristics of the Two Samples and Overall Sample Used in this Analysis and the Complied Sample*

	Sample 1: hip fracture (n = 90)	Sample 2: cancer (n = 265)	P value	Total (n = 355)
Gender (%)			0.602	
Male	33 (36.7)	105 (39.8)		138 (39)
Female	57 (63.3)	159 (60.2)		216 (61)
Age, years	52.58 ± 12.82	42.14 ± 13.62	0.000	44.79 ± 14.15
Marital status (%)			0.000	
Single	3 (3.4)	59 (22.4)		62 (17.6)
Married	83 (93.3)	181 (68.8)		264 (75)
Not married but live with a partner	0 (0)	3 (1.1)		3 (0.9)
Separated	0 (0)	3 (1.1)		3 (0.9)
Widowed	1 (1.1)	7 (2.7)		9 (2.6)
Divorced	2 (2.2)	10 (3.8)		11 (3.1)
Educational background			0.002	
Illiterate	10 (11.5)	20 (7.6)		30 (8.5)
Primary school	27 (31)	38 (14.4)		65 (18.5)
High school	30 (34.5)	127 (48.1)		157 (44.7)
College or above	20 (23)	79 (29.9)		99 (28.3)

Table 2

*Missing Data, Response Option Frequency Distribution, the Mean, Standard Deviation and Skewness of Each Item in MOS-Social Support Survey Grouped Under a Hypothesized Subscale (N = 355)*

Scale	Item	Response option frequency									Mean	SD	Skew
		Missing		distribution (%)									
		N	%	1	2	3	4	5					
Tangible	2	4	1.1	4.2	4.8	21.1	41.1	0.3	3.84	1.02	-0.914		
	5	1	0.3	3.9	6.5	21.4	35.2	32.7	3.86	1.07	-0.832		
	12	3	0.8	5.1	11.5	18.9	33.5	30.1	3.73	1.16	-0.693		
	15	2	0.6	5.6	11.8	20.0	34.4	27.6	3.67	1.17	-0.651		
Emotional	9	3	0.8	3.4	12.1	28.5	30.7	24.5	3.61	1.09	-0.401		
	16	3	0.8	7.3	15.8	28.7	31.3	16.1	3.33	1.14	-0.322		
	17	1	0.3	2.8	11.8	29.3	33.8	22.0	3.60	1.04	-0.385		
	19	3	0.8	5.1	12.4	34.1	27.9	19.7	3.45	1.10	-0.292		
Affective	6	3	0.8	2.5	5.9	21.1	38.9	30.7	3.90	0.99	-0.803		
	10	9	2.5	10.7	16.3	25.6	23.7	21.1	3.29	1.28	-0.245		
	20	2	0.6	3.4	5.9	27.9	33.0	29.3	3.79	1.04	-0.632		
Positive social interaction	7	4	1.1	3.1	9.9	25.9	33.5	26.5	3.71	1.06	-0.537		
	11	4	1.1	4.2	12.4	30.1	31.0	21.1	3.53	1.09	-0.370		
	14	4	1.1	7.6	16.3	29.6	26.5	18.9	3.33	1.18	-0.247		
Informational	18	4	1.1	4.8	12.4	27.0	34.1	20.6	3.54	1.10	-0.461		
	3	1	0.3	3.7	11.0	28.2	36.1	20.8	3.60	1.05	-0.477		
	4	1	0.3	3.1	9.0	28.7	39.7	19.2	3.63	0.99	-0.529		
	8	3	0.8	2.8	8.7	30.7	34.9	22.0	3.65	1.01	-0.441		

	13	2	0.6	3.4	9.0	29.3	36.6	21.1	3.63	1.02	-0.504
Information and	3	1	0.3	3.7	11.0	28.2	36.1	20.8	3.60	1.05	-0.477
emotional	4	1	0.3	3.1	9.0	28.7	39.7	19.2	3.63	0.99	-0.529
	8	3	0.8	2.8	8.7	30.7	34.9	22.0	3.65	1.01	-0.441
	13	2	0.6	3.4	9.0	29.3	36.6	21.1	3.63	1.02	-0.504
	9	3	0.8	3.4	12.1	28.5	30.7	24.5	3.61	1.09	-0.401
	16	3	0.8	7.3	15.8	28.7	31.3	16.1	3.33	1.14	-0.322
	17	1	0.3	2.8	11.8	29.3	33.8	22.0	3.60	1.04	-0.385
	19	3	0.8	5.1	12.4	34.1	27.9	19.7	3.45	1.10	-0.292

---

Table 3

*The Pearson Item-subscale Correlation between Each Item and the Original Hypothesized Subscale*

		<i>Social support scale</i>				
		Positive social				
Scale	Item	Tangible	Emotional	Affective	interaction	Informational
Tangible	2	<b>0.789</b> ***	0.497***	0.488***	0.478***	0.593***
	5	<b>0.849</b> ***	0.586***	0.577***	0.529***	0.599***
	12	<b>0.869</b> ***	0.572***	0.541***	0.549***	0.560***
	15	<b>0.883</b> ***	0.596***	0.555***	0.568***	0.564***
Emotional	9	0.596***	<b>0.881</b> ***	0.786***	0.762***	0.801***
	16	0.581***	<b>0.906</b> ***	0.703***	0.776***	0.763***
	17	0.612***	<b>0.911</b> ***	0.714***	0.774***	0.851***
	19	0.608***	<b>0.908</b> ***	0.765***	0.762***	0.769***
Affective	6	0.681***	0.742***	<b>0.853</b> ***	0.722***	0.727***
	10	0.424***	0.671***	<b>0.874</b> ***	0.694***	0.624***
	20	0.565***	0.710***	<b>0.839</b> ***	.658***	0.666***
Positive social	7	0.589***	0.749***	0.774***	<b>0.889</b> ***	0.732***
	11	0.514***	0.740***	0.723***	<b>0.887</b> ***	0.705***
interaction	14	0.564***	0.731***	0.629***	<b>0.886</b> ***	0.705***
	18	0.569***	0.817***	0.756***	<b>0.901</b> ***	0.740***
Informational	3	0.550***	0.718***	0.668***	0.686***	<b>0.846</b> ***
	4	0.566***	0.730***	0.626***	0.634***	<b>0.866</b> ***

8	0.621 <sup>***</sup>	0.773 <sup>***</sup>	0.703 <sup>***</sup>	0.719 <sup>***</sup>	<b>0.856<sup>***</sup></b>
13	0.607 <sup>***</sup>	0.815 <sup>***</sup>	0.690 <sup>***</sup>	0.745 <sup>***</sup>	<b>0.877<sup>***</sup></b>

---

<sup>\*\*\*</sup> $P < 0.001$ .

Table 4

*Cronbach's Alpha Coefficient of Each Subscale in MOS Social Support Survey and Inter-subscale Correlations (N = 355)*

Scale	<i>Social support scale</i>				
	Tangible	Emotional	Affective	Positive social interaction	Informational
Tangible	0.87				
Emotional	0.664 <sup>***</sup>	0.924			
Affective	0.637 <sup>***</sup>	0.823 <sup>***</sup>	0.818		
Positive social interaction	0.627 <sup>***</sup>	0.852 <sup>***</sup>	0.807 <sup>***</sup>	0.913	
Informational	0.680 <sup>***</sup>	0.881 <sup>***</sup>	0.780 <sup>***</sup>	0.808 <sup>***</sup>	0.884

<sup>\*\*\*</sup>  $P < 0.001$ .

Table 5

*Missing Percentage Floor & Ceiling Effect, Mean, SD, and Skews of Each Subscales in the MOS Social Support Survey (N = 355)*

Scale	Percentage		Mean	SD	Skew
	Floor effect	Ceiling effect			
Tangible	1.4	13.8	69.37	23.38	-0.736
Emotional	1.4	11.8	62.51	24.57	-0.296
Affective	1.1	15.5	66.52	23.47	-0.374
Positive social interaction	1.1	12.4	63.19	24.55	-0.323
Informational	1.1	10.1	65.69	21.88	-0.404
Informational and emotional	0.8	6.5	64.10	22.53	-0.368

Table 6

*Correlation between the Subscales of the MOS Social Support Survey and the Different Health Outcomes*

Scale	Social support scale				
	Tangible	Emotional	Affective	Positive social interaction	Informational
BP	0.331 <sup>**</sup>	0.307 <sup>**</sup>	0.333 <sup>**</sup>	0.278 <sup>**</sup>	0.331 <sup>**</sup>
GH	0.227 <sup>*</sup>	0.252 <sup>*</sup>	0.271 <sup>**</sup>	0.251 <sup>*</sup>	0.294 <sup>**</sup>
VT	0.244 <sup>*</sup>	0.236 <sup>*</sup>	0.311 <sup>**</sup>	0.304 <sup>**</sup>	0.278 <sup>**</sup>
SF	0.268 <sup>*</sup>	0.300 <sup>**</sup>	0.330 <sup>**</sup>	0.17	0.290 <sup>**</sup>
RE	0.374 <sup>***</sup>	0.152	0.094	0.153	0.260 <sup>*</sup>
MH	0.254 <sup>*</sup>	0.271 <sup>**</sup>	0.246 <sup>*</sup>	0.340 <sup>**</sup>	0.334 <sup>**</sup>
PF	0.047	0.091	0.213 <sup>*</sup>	0.052	0.128
RP	0.413 <sup>***</sup>	0.217 <sup>*</sup>	0.250 <sup>*</sup>	0.204	0.292 <sup>**</sup>
Spirituality	0.082	0.106	0.189 <sup>**</sup>	0.122 <sup>*</sup>	0.081
Physical wellbeing	0.056	0.046	0.125	0.112	0.054

*Note.* BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitations due to emotional problems; MH = mental health; PF = physical functioning; RP = role limitations due to physical health problems.

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

Table 7

*The Standardized Solution for the Two-Factor Model*

Support item	Emotional	Tangible
Turn to for suggestions (17)	0.874	
Do something enjoyable with (18)	0.872	
Confide in (9)	0.866	
Understand your problems (19)	0.862	
Share worries with (16)	0.851	
Have good time with (7))	0.845	
Get together for relaxation (11)	0.837	
Give advice you really want (13)	0.837	
Give you information (8)	0.815	
Do things (14)	0.800	
Show love and affection (6)	0.791	
Hugs you (10)	0.788	
Listens to you (3)	0.779	
Gives you good advice (4)	0.764	
Loves you (20)	0.748	
Helps with daily chores (15)		0.885
Prepares meals (12)		0.858
Takes you to doctor (5)		0.836
Helps if confined to bed (2)		0.782

Table 8

*Goodness of Fit Summary for 5, 4, 2, and Modified 2-Factor Model*

	$\chi^2$	df	$\chi^2/df$	GFI	AGFI	CFI	RMR	SRMR	RMSEA
5-factor	582.9	142	4.1	0.84	0.79	0.93	0.05	0.04	0.09
4-factor	592.1	146	4.0	0.83	0.79	0.93	0.05	0.04	0.09
2-factor	707.6	151	4.6	0.81	0.77	0.91	0.05	0.04	0.10
Modified 2-factor	668.3	148	4.5	0.83	0.77	0.91	0.04	0.04	0.10

Table 9

*Standardized Solution for the Two-Factor Model*

Standardized solution	Tangible support	Emotional support
Help if confined to bed		0.698*
Listens to you	F2	0.759*
Gives you good advice	F2	0.753*
Takes you to doctor		0.791*
Shows love and affection	F2	0.795*
Have good time with	F2	0.826*
Gives you information	F2	0.812*
Confide in	F2	0.853*
Hugs you	F2	0.714*
Get together for relaxation	F2	0.797*
Prepare meals		0.827*
Give advice you really want		0.836*
Do things		0.783*
Help with daily chores	F1	0.851*
Share worries with	F2	0.844*
Turn to for suggestions	F2	0.877*
Do something enjoyable with	F2	0.854*
Understands your problems	F2	0.856*
Loves you	F2	0.741*

Table 10

*The Pearson Item-subscale Correlation between Each Item and Two-Factor Subscale*

Scale	Item	Two-factor solution	
		Tangible	Emotional
Tangible	2	<b>0.789</b> <sup>***</sup>	0.550 <sup>***</sup>
	5	<b>0.849</b> <sup>***</sup>	0.612 <sup>***</sup>
	12	<b>0.869</b> <sup>***</sup>	0.596 <sup>***</sup>
	15	<b>0.883</b> <sup>***</sup>	0.613 <sup>***</sup>
Emotional	3	0.550 <sup>***</sup>	<b>0.783</b> <sup>***</sup>
	4	0.566 <sup>***</sup>	<b>0.767</b> <sup>***</sup>
	6	0.681 <sup>***</sup>	<b>0.808</b> <sup>***</sup>
	7	0.589 <sup>***</sup>	<b>0.844</b> <sup>***</sup>
	8	0.621 <sup>***</sup>	<b>0.819</b> <sup>***</sup>
	9	0.596 <sup>***</sup>	<b>0.867</b> <sup>***</sup>
	10	0.424 <sup>***</sup>	<b>0.756</b> <sup>***</sup>
	11	0.514 <sup>***</sup>	<b>0.82</b> <sup>***</sup>
	13	0.607 <sup>***</sup>	<b>0.842</b> <sup>***</sup>
	14	0.564 <sup>***</sup>	<b>0.800</b> <sup>***</sup>
	16	0.581 <sup>***</sup>	<b>0.850</b> <sup>***</sup>
	17	0.612 <sup>***</sup>	<b>0.877</b> <sup>***</sup>
	18	0.569 <sup>***</sup>	<b>0.866</b> <sup>***</sup>
	19	0.608 <sup>***</sup>	<b>0.862</b> <sup>***</sup>
	20	0.565 <sup>***</sup>	<b>0.761</b> <sup>***</sup>

<sup>\*\*\*</sup>  $P < 0.001$ .

Table 11

*Correlation between the 2-Factor Subscale of the MOS Social Support Survey and the Different Health Outcomes*

Scale	Social support scale	
	Tangible support	Emotional support
BP	0.331 <sup>**</sup>	0.333 <sup>**</sup>
GH	0.227 <sup>*</sup>	0.286 <sup>**</sup>
VT	0.244 <sup>*</sup>	0.302 <sup>**</sup>
SF	0.268 <sup>*</sup>	0.286 <sup>**</sup>
RE	0.374 <sup>***</sup>	0.181
MH	0.254 <sup>*</sup>	0.325 <sup>**</sup>
PF	0.047	0.121
RP	0.413 <sup>***</sup>	0.256 <sup>*</sup>
Spirituality	0.082	0.153 <sup>*</sup>
Physical wellbeing	0.056	0.087

*Note.* BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitations due to emotional problems; MH = mental health; PF = physical functioning; RP = role limitations due to physical health problems.

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