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Older patients' depressive symptoms 6 months after prolonged hospitalization: Course and interrelationships with major associated factors

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ABSTRACT

The aim of this study was to examine the course of depressive symptoms in older patients 6 months following a prolonged, acute hospitalization, especially the interrelationships among depressive symptoms and its major associated factors. For this study, we conducted a secondary analysis of data from a prospective cohort study of 351 patients aged 65 years and older. Participants were recruited from five surgical and medical wards at a tertiary medical center in northern Taiwan and assessed at three time points: within 48 h of admission, before discharge, and 6 months post-discharge. The course of depressive symptoms was dynamic with symptoms increased spontaneously and substantially during hospitalization and subsided at 6 months after discharge, but still remained higher than at admission. Overall, 26.7% of older patients at hospital discharge met established criteria for minor depression (15-item Geriatric Depressive Scale (GDS-15) scores 5–9) and 21.2% for major depression (GDS-15 scores >10). As the strongest associated factors, functional dependence and nutritional status influenced depressive symptoms following hospitalization. Depressive symptoms at discharge showed significant cross-lagged effects on functional dependence and nutritional status at 6 months after discharge, suggesting a reciprocal, triadic relationship. Thus, treating one condition might improve the other. Targeting the triad of depressive symptoms, functional dependence, and nutritional status, therefore, is essential for treating depressive symptoms and improving the overall health of older adults hospitalized for acute illness.

1. Introduction

Depressive symptoms are common in older patients hospitalized for acute illness. The prevalence of depressive symptoms in these patients has been estimated from 8% to 44% (Cullum, Tucker, Todd, & Brayne, 2006), with approximately one-third having moderate to severe depressive symptoms (Pierluissi et al., 2012). Notably, depressive symptoms are a major risk factor for long-term disability and mortality in older patients (Blazer, Hybels, & Pieper, 2001; Hamer, Bates, & Misbra, 2011), even at subthreshold levels (Vahia et al., 2010).

Treating older patients' depressive symptoms, however, is difficult because late-life depression has different etiologies (Tiemeier, 2003). For example, associated factors for depressive symptoms in late life include health condition, functional status, nutritional status, cognitive status, social support, and other psychosocial factors, in contrast to genetic factors for younger adults (Fiske, Wetherell, & Gatz, 2009; Helvik, Skancke, & Selbaek, 2010; Tsai, 2013). This diversity in associated factors might explain why fewer than half of older patients with major depression achieved remission when treated with pharmacotherapy alone (Wilkins, Kiosses, & Ravdin, 2010).

To improve treatment efficacy for depressed older adults, a focused multimodal, non-pharmacological intervention needs to be developed (Naismith, Norrie, Mowszowski, & Hickie, 2012). However, interrelationships first need to be established among major associated factors and depressive symptoms after a critical event such as acute, prolonged hospitalization. In particular, clinical practice should be informed whether major associated factors, such as functional, cognitive, and nutritional scores predict concurrent and subsequent depressive symptomatology or vice versa, over the course of hospitalization. Thus, the aims of this study were to describe the course of depressive symptoms in older patient from acute, prolonged hospitalization to 6 months after discharge and to determine the directional interrelationships among depressive symptoms and their major associated factors using path analysis.

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2. Methods

2.1. Design and setting

This study was a secondary analysis of data from a prospective, interview-based cohort study of factors associated with functional decline in older hospitalized patients. From 24 med-surgical wards at a 2200-bed medical center in northern Taiwan, three surgical (out of 14) and two medical (out of 10) wards were randomly and proportionally selected after cluster sampling. Participants from those five wards were enrolled and evaluated in face-to-face encounters upon admission, before discharge, and 6 months after discharge (at outpatient clinics) by two trained research nurses. The Research Ethics Committee of the medical center approved the study and every participant provided written informed consent for study participation.

2.2. Study sample

Participants were recruited from older patients consecutively admitted to any of the five study medical-surgical wards between August 2004 and May 2006. These five wards generally enrolled patients with nephrology and endocrine medical conditions, as well patients who are scheduled for upper abdominal and urological surgical procedures. Focusing on the most affected, we recruited only older patients who had prolonged hospitalization, defined as the length of stay (LOS) over 5 days. Participants were not recruited if their expected hospital stay was <5 days ($n = 1091$), their Mini-Mental State Exam (MMSE) score was <20 ($n = 43$), were isolated within the infection control protocol ($n = 56$), were intubated or unable to communicate due to profound sensory loss ($n = 140$). Of 439 eligible subjects, 351 were enrolled (response rate 80.0%). The average LOS was 16.6 ± 12.1 days in this sample. The reasons for nonparticipation included not interested ($n = 57$), not feeling well ($n = 20$), and privacy protection ($n = 11$). The participants ($N = 351$) did not significantly differed from the nonparticipants ($n = 88$) in age ($P = 0.30$), gender ($P = 0.72$), and education levels ($P = 0.43$).

2.3. Data collection and measures

Data on depressive symptoms and its associated factors were collected from 351 participants in face-to-face assessments by two trained research nurses using validated instruments (see below) at three times: admission (T0), before discharge (T1), and 6 months after discharge (T2). Depressive symptoms were measured by the GDS-15 requiring yes/no answers (Yesavage et al., 1982). The summed scores range from 0 (best) to 15 (worst); scores from 5 to 9 are categorized as minor depression, and scores $\geqq 10$ represent major depression (Almeida & Almeida, 1999; Thompson et al., 2011; Wong et al., 2002).

Associated factors for depressive symptoms, which were selected from the literature (Fiske et al., 2009; Helvik et al., 2010; Tam & Lam, 2012; Tiemeier, 2003; Tsai, 2013), included demographics (age, gender, education level, income, and marital status), co-morbidities, medications taken, social support, cognitive status, functional status (performance of activities of daily living [ADL] and role functions; ADL level and functional dependence as two empirical indicators), and nutritional status. Specifically, co-morbidities were assessed by a standardized comorbidity checklist soliciting in 20 self-report conditions including hypertension, diabetes, kidney and lung diseases. The number of comorbidities was used as a proxy for disease burden. In addition, sensory morbidities (visual and hearing impairments), cardiovascular morbidities (coronary heart disease, hypertension, congestive heart failure, and hyperlipidemia), neurological morbidities (stroke and Parkinsonism), and diabetes were further categorized and studied for possible association with depressive symptoms. Medications, i.e., the number of prescription and over-the-counter medications taken currently by participants, were also coded as a numerical variable. Social support was measured by the 6-item Social Support Questionnaire-Short Form (SSQ-SF) (Sarason, Sarason, Shearin, & Pierce, 1987). Cognitive status was measured by the 11-item MMSE (Folstein, Folstein, & McHugh, 1975). ADL level was measured by the 10-item Barthel Index (Mahoney & Barthel, 1965). Functional dependence, defined as needing help from others to perform roles and activities, was measured by the 10-item Enforced Social Dependency Scale (ESDS; Benoliel, McCorkle, & Young, 1980). The ESDS has been used widely, with scores ranging from 10 to 51; higher scores indicate greater functional dependence. Nutritional status was measured by the 18-item Mini-Nutritional Assessment (MNA), the original scoring of which is scaled so higher scores indicate better nutritional status (Guigoz, Vellas, & Garry, 1996). For this study, we re-scaled the MNA so that higher scores indicated poor nutritional status. Thus, higher scores indicated poor status in all measures of our study.

2.4. Statistical analysis

Data were double-checked for accuracy and completeness. Sample characteristics and prevalence of depressive symptoms were analyzed over three time points (admission, discharge, and 6 months after discharge). Interrelationships between depressive symptoms and 12 potential associated factors, including functional status (included ADL level measure by the Barthel Index and functional dependence measured by the ESDS), nutritional status, as well as physiological and cognitive covariates, were examined by path analysis in AMOS. Path analysis has the major benefit of estimating the relative importance of direct and indirect factors so it is robust to examine complex and reciprocal relationships over time (Byrne, 2001; Kline, 2005). Factors for path analysis were selected in three steps. First, we identified factors associated with depressive symptoms at baseline. In this step, 12 variables identified as potential associated factors were evaluated via linear regression. Second, variables significantly associated with baseline depressive symptoms were then regressed with depressive symptoms at each time point, adjusted for demographic covariates. Consistently significant variables at all three time points were then selected for constructing the final model. In the final model building step, depressive symptoms and variables selected in step 2 from all there time points were jointly analyzed. We used path analysis to test a hypothesized directional relationship of depressive symptoms and selected variables over time while controlling for important covariates. To validate the direction of each cross-sectional path, we compared it with an alternative model with reverse direction. If the reverse direction remained significant, the path was correlational (i.e., bidirectional). Goodness of fit was determined by the chi-square value, comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA). Furthermore, parameter values were estimated using maximum likelihood model based on AMOS and data were analyzed using SPSS 17.0 (Chicago, IL, USA) and AMOS 8.0 (Chicago).

3. Results

3.1. Participants

The study sample ($N = 351$) was relatively diverse in age, gender, educational level and income status, while most participants were married. As expected, co-morbidity burden was high