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Effects of a health-social partnership transitional program on hospital readmission: A randomized controlled trial

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ABSTRACT

Hospital readmission is an indicator of care quality. Studies have been conducted to test whether post-discharge transitional care programs can reduce hospital readmission, but results are not conclusive. The contemporary development of post-discharge support advocates a health and social partnership approach. There is a paucity of experimental studies examining the effects of such efforts. This study designed a health-social transitional care management program (HSTCMP) and subjected it to empirical testing using a randomized controlled trial in the medical units of an acute general hospital with 1700 beds in Hong Kong during the period of February 2009 to July 2010. Results using per-protocol analysis revealed that the HSTCMP significantly reduced readmission at 4-weeks (study 4.0%, control 10.2%, $\chi^2 = 7.98$, $p = 0.005$). The intention-to-treat result also showed a lower readmission rate with the study group but the result was not significant (study 11.5%, control 14.7%, $\chi^2 = 1.53$, $p = 0.258$). There was however significant improvement in quality of life, self-efficacy and satisfaction in the study group in both per-protocol and intention-to-treat analyses. The study suggests that a health-social partnership, using volunteers as substitutes for some of the professional care, may be effective for general medical patients.

Introduction

Hospital readmission occurring soon after discharge is an indicator of problems in care quality (Halfon et al., 2002). The readmission rates vary with client groups. A group of home-bound older persons had a 30-day all-cause readmission rate of 16.6% (Ornstein, Smith, Foer, Lopez-Cantor, & Soriano, 2011). Another study focusing on patients with acute myocardial infarction reported a 30-day readmission rate of 18.9% (Krumholz et al., 2011). Surgical patients seem to have a lower readmission rate, 7.5% for a group of general surgical patients (De Mheen, van Duijin-Bakker, & Kievit, 2008) and 9.8% among a group of patients undergoing surgery after hip fracture (Kates, Mendelson, & Friedman, 2011). Patients with dementia were found to have a higher risk of complication of delirium but no explicit relationship with subsequent readmission rate (Kates, Mendelson, & Friedman, 2011). Studies on readmissions tend to focus more on the medical patients (Shepperd et al., 2010) because of their frequent use. In a study that examined thousands of Medicare patients with primary diagnoses related to heart, lung or stroke, the 30-day readmission rate ranged from 8% to 17%, and the risk-adjusted readmission rates remained at the same range from 1991 through 1997 (Baker, Einstadter, Husak, & Cebul, 2004). The tenacity of the readmission rate is also confirmed in another study that examined the trend of a huge population of heart failure patients from 2001 to 2005, finding that the hazard of readmission did not change significantly during the study period with an overall 30-day readmission rate of 22% (Curtis et al., 2008).

In explaining the behavior of hospital utilization, Andersen's model has often been used. There are three components to the model, including predisposing, enabling and need factors (Andersen, 1995). The *predisposing* factors, such as age, gender, ethnic group, and socioeconomic status, are present before service use (Wong, Chow, Chang, Lee, & Liu, 2004). Studies have shown that a mean age of 65 or above (Krumholz et al., 2011; Wong et al., 2002), black minority group (Jonyt, Orav, & Jha, 2011), and those needing public assistance (Wong et al., 2002) are at higher risk for readmission. The *enabling* conditions are resources that are mobilized to support the patients (Wong et al., 2004). Social support (Luttik, Jaarsma, Moser, Sanderman, & vanVeldhuisen, 2005) and intervention programs (Phillips et al., 2004) help reduce

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readmission rates. The *need* for care can be patients' subjective assessment of needs (Finkelstein, 2001) and/or providers' evaluated needs (Wong et al., 2004). Patients' subjective appraisal of their health condition was found to be a significant variable to predict hospital readmission (Wong et al., 2010a). In terms of evaluated needs, patients with chronic respiratory (Camberg et al., 1997) and cardiac (Kwok et al., 2004) conditions were associated with frequent hospitalizations. Andersen (1995) proposes that health care utilization and outcomes are a function of these predisposing, enabling and need factors.

Multiple efforts have been implemented and tested to combat readmission, but results are not conclusive. Some studies have achieved significant reduction (e.g. Philips et al., 2004; Courtney et al., 2009) especially for older people with a medical condition (e.g. Shepperd et al., 2010), some with no significant difference (e.g. Jeffs, Lim, Lim, Berlowitz, & Jackson, 2005; Wong et al., 2008), while some have actually significantly increased readmission (e.g. Crotty, Giles, Halbert, Harding, & Miller, 2008; Wong et al., 2004). In spite of the varied results reported, common features of the more successful post-discharge transitional programs that produced positive effects in reducing hospital readmission can still be identified. These programs tend to be comprehensive and well coordinated (Wong, Mok, Chan, & Tsang, 2005; Yu, Thompson, & Lee, 2006), advocating self-care through patient education (Hammer, 2005; Kutzleb & Reiner, 2006), and patients in these programs are provided with continuous and regular follow-up (McCusker & Verdon, 2006; Wong et al., 2005; Yu et al., 2006). The nurse usually plays a pivotal role, working with a multi-disciplinary team (Hammer, 2005), negotiating care with multiple providers and providing direct nursing interventions as appropriate (Naylor et al. 2004). These direct interventions include teaching self-administered treatment techniques, counseling on appropriate health behavior, reinforcing medication adherence, and symptom management (Wong et al., 2008). The most critical period requiring support occurs within the first 48 h and continues for 4 weeks post-discharge (Brooten et al., 2002).

The contemporary trend in post-discharge support services advocates health and social partnership (Hudson, 2005). In the United Kingdom, the integration of health and social care services is driven by national policies (Hickey, 2008; Rummery & Coleman, 2003). In Sweden, there is also legal reinforcement prescribing that the County Councils and municipalities need to jointly create a written discharge plan for a patient's continuing health and social care (Petersson, Springett, & Blomqvist, 2009). There is literature discussing the importance and challenges of the health-social partnership, but there is a paucity of research studies reporting the effects of such efforts. To fill this knowledge gap, this study was launched to explore the outcomes of a health-social partnership program on post-discharge medical patients.

Methods

Setting and subject recruitment

The study took place in the medical units of an acute general hospital with 1700 beds in Hong Kong during the period of February 2009 to July 2010. We estimated the sample size based on the primary outcome variable, the readmission rate. Based on the study of Naylor et al. (2004), we assumed that the average readmission rate, P_0, was 15% and the expected readmission rate, P_1, 9.0%. With a statistical significance level of 5%, $v = 1.96$ and power = 80%, $u = 0.84$, the sample size required for the study was 246 (NQuery, 2000). Allowing for a 30% drop-out rate, a sample size of 320 (246×1.3) participants was needed. The random assignment schedule, generated by computer, was prepared by a research team member who was not involved in subject recruitment. The group assignments were placed in sealed envelopes and opened sequentially at the time of randomization. The research assistant after successfully recruited a subject, called the site investigator for the random assignment. The site investigator had no knowledge of the identity of the subject. In all, 810 participants were assessed for eligibility, but 124 were excluded from the randomization because patients left the hospital before randomization, were not living in the service area, were unable to communicate, or refused to participate. Finally, 686 were randomized, with 131 clients lost to follow-up for different reasons (see Fig. 1).

The subject inclusion criteria were: (a) being aged 60 or above, (b) MMSE >20, (c) ability to speak Cantonese, (d) living within the hospital service area, and (e) ability to be contacted by phone. The exclusion criteria were: (a) having been discharged for institutionalized care, (b) being followed up by a designated disease management program, (c) inability to communicate, and (d) dying. As informed by Wong et al.'s (2002) study, the lower limit of age 60 was appropriate to capture subjects who tend to be frequent users of hospital services. Other criteria were set to ensure that the subjects were alert and available to receive services provided.

Ethical considerations

The study was approved by the Research Ethics Committees of the study hospital and the university with which the principal investigator was affiliated. The potential subjects were provided with a full explanation of the study and reassured that their normal care would not be affected by their decision not to participate in the study. Participants could withdraw from the study at any time. All data were identified only by a case number so that the participants would remain anonymous. Consent forms were signed.

Study design

This study was a randomized controlled trial. The control group received usual discharge care and the intervention group received both usual care and a health-social partnership transitional care management program at discharge. Usual discharge care included basic health advice, instructions on medications and fee settlement, arrangements for out-patient follow-up and support services if indicated.

Intervention

The intervention involved a health-social partnership transitional care management program (HSTCMP), delivered by the nurse case manager (NCM) and trained volunteers (TVs) supported by social workers. The arrangement of the HSTCMP is as follows:

Pre-discharge phase

The *NCM* conducted a pre-discharge assessment of the patient using the Omaha system. The Omaha system was originally used in the United States (Martin, 2005). In Hong Kong, the research team has used the Omaha system in multiple patient groups (Wong et al., 2004, 2008) and found it comprehensive and valid to be used for community care.

Post-discharge phase

First week - the NCM and TVs conducted a home visit together
Second week - the NCM made a telephone follow-up call
Third week - the TVs conducted a home visit in pairs
Fourth week - the NCM made the final telephone follow-up call