Evidence-based Risk Factors for Adverse Health Outcomes in Older Patients after Discharge Home and Assessment Tools: A Systematic Review

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The current health care system is discharging elderly patients "quicker" and "sicker" from acute care facilities. Consequently, hospital readmission is common; however, readmission may be only one aspect of adverse outcomes of importance to social work discharge planners. The early recognition of risk factors might ensure a successful transition from the hospital to the home. A systematic review was conducted to identify factors associated with adverse outcomes in older patients discharged from hospital to home. Using a content analysis, factors were characterized in five domains: demographic factors, patient characteristics, medical and biological factors, social factors, and discharge factors. The most frequently reported risks were depression, poor cognition, comorbidities, length of hospital stay, prior hospital admission, functional status, patient age, multiple medications, and lack of social support. A systematic search identified four discharge assessment tools for use with the general population of elderly patients. Practice and research implications are offered.

KEYWORDS Discharge planning, adverse outcomes, elderly patients, systematic review

Social work clinicians in acute care settings spend a considerable portion of their day working with older patients and their families. Older patients are consuming an increasingly large portion of health care expenditures

(Fox, 1993) heightening concerns about hospital readmission. Readmission is common; however, it is only one aspect of adverse outcomes of importance to social work practitioners. Adverse health outcomes post-discharge have been defined as the occurrence of mortality, admission to an institution, or a clinically significant decline in physical functioning within the six months post-discharge (McCusker et al., 1999). There may be, in fact, a wide range of risk factors associated with adverse outcomes, and employing a risk assessment too, may facilitate planning for and preventing adversity. The purpose of the authors in this review was to develop a profile of risk factors for adverse health outcomes after older patients have been discharged from an acute care setting to their homes. A second purpose was to identify and assess discharge assessment tools that could identify these risk factors a priori.

LITERATURE REVIEW

Discharge planning involves a continuum of services that ideally begin at preadmission to ensure successful adjustment in post-discharge environment. Discharge planning includes a considerable array of tasks including counseling, provision of concrete resources (Kadushin & Kulys, 1993), and coordination with community resources. The purpose of discharge planning is to facilitate the adjustment from hospital to community living by addressing the patients' needs to hopefully prevent adverse outcomes post-discharge. As the population ages, discharge planners are increasingly dealing with older patients. Furthermore, patients discharged to a home environment as opposed to another care facility may be more vulnerable due the absence of supports provided by facilities, and they are likely to have different characteristics. Indeed, a recent profile of older patients discharged from an acute care facility to their home suggests that adverse outcomes do occur (Preyde & Chapman, 2007) despite planning efforts.

Discharge assessment may facilitate the development of a strategy that will allow the needs of targeted patients to be met when transitioning from the hospital to the home (Morrow–Howell, Proctor, & Mui, 1991). Discharge planners are being pressured to speed up this discharge process resulting in later admittance and shorter stays in the hospital setting (Peterson, 1987). Elderly patients are being discharged "quicker" and "sicker" (Morrow–Howell et al., 1991; Oktay, Steinwachs, Bone, & Fahey, 1992) making the process more difficult for the social workers and the patients themselves (Lockery, Dunkle, Kart, & Coulton, 1994).

Many different types of adverse outcomes post-discharge from an acute care facility are possible. Mortality may be considered the worst possible outcome. Readmission is often reported as the main problem (Thomas & Holloway, 1991) possibly due to the resource implications for acute care facilities. There have been many reasons cited for why older patients are fre-

quently readmitted to hospitals including falls, incontinence, and confusion (Andrews, 1986). There are also numerous medical risks, such as exacerbation of the medical problem and development of secondary conditions. Other risks include psychological distress, financial concerns, and living instability (Preyde & Chapman, 2007). The early recognition of both risk and protective factors has been reported to "optimize the successful transition" from the hospital to the home (Esche & Tanner, 2005, p. 221), and enhance delivery of effective intervention (Leeper, 1996), modify the risk factors (Leeper, 1996; Berkman, Walter, Bonander, & Holmes, 1992), delay physical deterioration, and subsequent re-hospitalization (Lockery et al., 1994), and prevent the adverse events in general, following discharge.

Some older patients with chronic health or cognitive conditions may experience a lifetime of risk, while others may have episodic periods of transient risk. There may be expectations that certain patients will move toward independence, and for others the best hope may be for a slow decline. While some risks may not be predictable, some may be both anticipated and preventable. Conversely, the adversity can also affect hospital staff: they may be required to address complaints or experience anxiety or guilt, or a sense that something more should have been done to prevent the adversity. The utilization of an assessment tool may aid in the identification of risks considered important in discharge planning.

Many assessment tools employed in hospital settings to screen patients and identify risks primarily for prolonged hospital stays and the need for discharge planning resources currently exist; however, the comprehensiveness of these tools is unknown. These tools assist the discharge planner in developing "a plan to meet the patient's needs in the post hospital environment" (Morrow–Howell et al., 1991, p. 6). Most assessment tools consist of a list of criteria and a rating scale to flag the need for additional services. These criteria typically include such factors as the patient's age, living status, number of active medical problems, number of medications and so forth (Blaylock & Cason, 1992). What appear to be absent are the psychosocial factors important to functioning and adaptation, such as the presence of distress or depression. The main problems identified with the discharge process include: a lack of coordination of the discharge process; lack of a designated discharge planner; ineffective communication between disciplines, health care professionals, and patients or caregivers; unmet medical or social needs; and ineffective preparation of patient and caregiver for discharge to the home, for example, certain tools did not address the patient's depression (Bull, 2000; Charles et al., 1994; Mistiaen, Duijnhouwer, Wijkel, deBont, & Veeger, 1997; McWilliam & Sangster, 1994). Additionally, there is considerable evidence that their transition home is strained, resulting in poorer quality of life, or readmission to hospital (Mistiaen et al., 1997). Furthermore, patients have indicated that their pain, tiredness, loss of mobility, and grief were frequent; however, little was done to help patients deal with these sequelae to their

medical illness (Grimmer, Moss, & Falco, 2004). It has been suggested that the use of an appropriate assessment tool could address some of these problems identified with the discharge process (Preyde, MacAulay, & Dingwall, 2009).

There are many factors that aid one in distinguishing between an adequate hospital discharge assessment tool and one that is poor. Only some assessment tools evaluate both the patient's medical and psychosocial needs (Morrow–Howell et al., 1991). Furthermore, psychosocial needs may influence health outcomes. For example, patient's functional, cognitive, and social status (Chiovenda, Vincentelli, & Alegiani, 2002) may affect autonomy and quality of life. In fact, it has been proposed that standardized assessment tools, which focus specifically on a patient's quality of life (QOL), can be quite invaluable in the discharge process (Van Hook, Berkman, & Dunkle, 1996) and are growing in importance in the social working field (Berkman et al., 1999). The vast majority of elderly patients require complex and comprehensive discharge assessments when leaving an acute hospital setting. They are not only prone to physical decline after discharge (Berkman & Abrams, 1986), but are also at risk for experiencing psychological distress which may additionally lead to hospital readmission (Preyde & Chapman, 2007; Berkman & Abrams, 1986). Moreover, by providing a comprehensive assessment to patients, their length of stay in the acute hospital setting has been shown to decline (Boone, Coulton, & Keller, 1981).

Since many elderly patients experience adversity post-discharge from acute care settings (Preyde & Chapman, 2007), it is very important to understand what types of issues and challenges these patients will face when they are discharged from the acute hospital setting. Identifying these issues in advance via the use of a risk assessment tool will enable the discharge planner to prepare the patient for the challenges that they may encounter upon release, assist the family in care planning for the patient (Berkman et al., 1999) and tailor a more comprehensive discharge plan based of the patient's needs, and perhaps drawing on the patient's strengths. That is, identifying protective factors may facilitate the discharge process. Therefore, a sufficient assessment tool would help the discharge planner identify both the patient's risk and protective factors. This would enable the planner to recognize what resources the patient already has access to and which resources are needed to ensure a successful discharge from the hospital.

No systematic reviews of risk factors for adverse outcomes or tools for identifying at-risk elderly patients discharged from an acute care facility to their home could be located. The present systematic review is a comprehensive examination of risk factors for adverse outcomes in elderly patients discharged from an acute care facility and a systematic review of discharge assessment tools for use with a general population of elderly patients. The purpose of this systematic review was to ascertain the risk factors associated with adverse health outcomes at discharge from an acute care facility for the elderly population and to evaluate discharge assessment tools.

METHODS

For the purposes of this study, adverse outcomes was defined as the occurrence of one of three events within 6 months post-discharge from an acute care setting: mortality, readmission to an acute care setting, or clinically significant decline in physical or psychosocial functioning. A comprehensive search of the MEDLINE, CINAHL, Health Sciences, Science Citation Index, Social Sciences Citation Index, and Abstracts in Social Gerontology databases was conducted to locate relevant articles, written in English, and published between the years of 1977 to 2007. Keyword and title search terms included discharg*, risk*, risk factor*, advers*, outcome*, predict*. The inclusion criteria were as follows: (a) older patient population, (b) risk factors for patients discharged from hospital to home, (c) non-psychiatric care, (d) discharge from an acute care setting, and (e) research article; that is, the study had to have a stated purpose, research question, methods, data analyses, results, and conclusion. All non-research-based articles or unpublished articles were excluded. Simultaneously, a systematic search for discharge assessment tools was conducted. Keyword and title search terms included discharg*, assess*, tool*, instrument, and index.

The search for research articles was conducted independently by two researchers (MP and KB). The inclusion criteria were applied and all articles that were clearly irrelevant were excluded. There was 90% agreement, and disagreements were settled by consensus. Statistically or clinically significant risk factors for adverse health outcomes and discharge assessment tools were identified.

RESULTS

The initial search for factors associated with adverse outcomes post-discharge yielded 2,588 articles of which 128 abstracts were reviewed. Forty-three research articles that identified statistically significant risk factors associated with an unsuccessful discharge from an acute care facility were included in the analysis. The risks associated with adverse health outcomes after discharge included demographic factors, patient characteristics, medical factors, socio-environmental factors, and discharge factors (Table 1).

Demographic Factors

Advanced age (Celkan, Ustunsory, Daglar, Kazaz, & Kocoglu, 2005; Marcantonio et al., 1999; Paratz, Thomas, & Adsett, 2005; Shipton, 1996) was identified as a major risk factor for adverse outcomes in the post-discharge environment. While advanced age emerged as an independent risk factor, its association with other factors heightens concern during discharge planning.

TABLE 1 Risk Associated with Adverse Health Outcomes

Author(s)	Study	Risk factor(s)
Shipton, S (1996)	(1) Risk factors associated with multiple hospital readmissions	• Dependence • patient age • stage of illness • length of hospital stay • prior hospitalization • care after discharge • mobility status
Moser, D. K., Doering, L. V. & Chung, M. L. (2005)	(3) Vulnerabilities of patients recovering from an exacerbation of chronic heart failure	• depression • anxiety • poor quality of life • functional impairment • poor symptom status • sub-optimal living situation • cormobidity • poor adherence
Gray, S. L., Mahoney, J. E. & Blough, D. K. (2001)	(4) Medication adherence in elderly patients receiving home health services following hospital discharge	• over/under adherence • poor/low education • poor cognition
Gray, S. L., Mahoney, J. E. & Blough, D. K. (1999)	(5) Adverse drug events patients receiving home health services following hospital discharge	• lower cognition • discharged with several new medications
Marcantonio, E. R., McKean, S., Goldfinger, M., Kleefield, S., Yurkofsky, M. & Brennan, T. A. (1999)	(6) Factors associated with unplanned hospital readmission among patients 65 years of age and older in a Medicare managed care plan	• age 80 or older • previous admission within 30 days • five or more medical comorbidities • history of depression • lack of documented patient or family education
Macmillian, M. S. (1994)	(7) Hospital staff's perceptions of risk associated with the discharge of elderly people from acute hospital care	• medical factors • mobility • social surroundings • personality • habits • lack of social support • external factors
Cummings, S. M. (1999)	(8) Adequacy of discharge plans and re-hospitalization among hospitalized dementia	• patients gender • heavy care • deny functional impairment • deny prognosis • insufficient support • unrealistic caregiver
Weaver, C., Schiech, L., Held–Warmkessel, J., Kedziera, P., Haney, E., DiLullo, G., Babb, J. S., Ruth, K. & Dell, D. (2006)	(10) Risk for unplanned hospital readmission of patients with cancer: results of a retrospective medical record review	• those with gastrointestinal cancer • nausea within 24 hours of discharge • financial and insurance concerns • caregiver difficulty • living alone
Lee, J. (2006)	(11) An imperative to improve discharge planning predictors of physical function among residents of a Medicare skilled nursing facility	• Low physical function on admission • Documentation of pressure ulcer • Loss of memory • History of falls • Length of hospital stay
Paratz, J., Thomas, P. & Adsett, J. (2005)	(12) Re-admission to intensive care: Identification of risk factors	• Older than 65 years of age • Colonization • Weakness • Comorbities of cardiac and/or respiratory disease • depression

TABLE 1 (*Continued*)

Author(s)	Study	Risk factor(s)
Schwarz, K. A. & Elman C. S. (2003)	(14) Identification of factors predictive of hospital readmissions for patients with heart failure	• interaction among cardiac illness and functional status • interaction of caregiver stress and depression
Islamoglu, F., Apaydin, A. Z., Ozbaran, M., Yuksel, M., et al. (2002)	(15) Predictors of outcome after coronary bypass surgery in patients with left ventricular dysfunction	• advanced age • severe angina • functional symptom status
Douglas, S. L., Daly, B. J., Brennan, P. F., Gordon, N. H. & Uthis, P. (2001)	(16) Hospital readmission among long-term ventilator patients	• length of the index hospital stay
Fasken, L. L., Wipke–Tevis, D. D. & Sagehorn, K. K. (2001)	(17) Factors associated with unplanned readmissions following cardiac surgery	• gender • race • longer length of stay due to complications
Fortinsky, R. H., Madigan, E. A., Sheehan, T. J., Tullai–McGuinness, S. & Fenster, J. R. (2006)	(18) Risk factors for hospitalization among Medicare home care patients	• dyspnea severity • functional disability level • skin or wound problems • diabetes • case mix score • guarded rehabilitation prognosis
Kronish, I. M., Rieckman, N., Halm, E. A., Shimbo, D., Vorchheimer, D., Haas, D. & Karina, W. (2006)	(19) Persistent depression affects adherence to secondary prevention behaviors after acute coronary syndromes	• depression
Bond, S., Neelson, V. & Belyea, M. J. (2006)	(20) Delirium in hospitalized older patients with cancer	• delirium
Pioli, G., Barone, A., Giusti, A., Oliveri, M. Pizzzonia, M., Razzano, M. & Palummeri, E. (2006)	(21) Predictors of mortality after hip fracture: Results from 1-year follow-up	• comorbidity • functional impairment
Almagro, P., Barreiro, B., Ochoa de Echaguen, A., Quintana, S., Rodriguez, Carballeira, M., Heredia, J. L. & Garau, J. (2005)	(22) Risk factors for hospital readmission in patients with chronic obstructive pulmonary disease	• quality of life • previous hospitalization • hypercapnia
De Rooij, S. E., Govers, A., Korevaar, J. C., Abu-Hanna, A., Levi, M. & De Jonge, E. (2006)	(23) Short-term and long-term mortality in very elderly patients admitted to an intensive care unit	• severity of illness at admission
Testa, J. A., Malec, J. F., Moessner, A. M., & Browt, A. W. (2006)	(24) Predicting family functioning after TBI—Impact of neurobehavioral factors	• dysfunctional problem • continued neurobehavioral problems
Hanlon, J. T., Pieper, C. F., Carl, F., Hajjar, E. R., Sloane, R. J., Richard, J., Lindbald, C. I., Ruby, C. M. & Schmader, K. E. (2006)	(25) Incidence and predictors of all and preventable adverse drug reactions in frail elderly persons after hospital	• use of sedatives and/or hypnotics
Chen, Y. & Narasavage, G. L. (2006)	(26) Factors related to chronic obstructive pulmonary disease readmission in Taiwan	• daily functioning • age • cultural differences • low functioning
Wu, H. Y., Sahadevan, S. & Ding, Y. Y. (2006)	(27) Factors associated with functional decline of hospitalized older persons following discharge from an acute geriatric unit	• tendency to fall • premorbid functional independence • the length of hospitalization • presence of bedsores
Van Wijk, I., Algra, A., Van de Port, I. G., Bevaart, B. & Lindeman, E. (2006)	(28) Change in mobility activity in the second year after stroke in a rehabilitation population: Who is at risk for decline?	• depression
Pedone, C., Ercolani, S., Catani, M., Maggio, D., Ruggiero, C., Quartesan, R., Senin, U., Mecocci, P., Cherubini, A., GIFA Study Group (2005)	(29) Elderly patients with cognitive impairment have a high risk for functional decline during hospitalization: the GIFA Study	• cognitive impairment upon admission
Celkan, M. A., Ustunsory, H., Daglar, B., Kazaz, H., & Kocoglu, H. (2005)	(30) Readmission and mortality in patients undergoing off-pump coronary artery bypass surgery with fast-track recovery protocol.	• age • hypertension

TABLE 1 (*Continued*)

Author(s)	Study	Risk factor(s)
Brantervik, A. M., Jacobsson, I. E., Grimby, A., Wallen, T. C. E. & Bosaeus, I. G. (2005)	(31) Older hospitalized patients at risk of malnutrition: Correlation with quality of life, aid from the social welfare system, and length of stay?	• malnutrition
Cornette, P., D'Hoore, W., Malhomme, B., Van Pee, D., Meert, P., & Swine, C. (2005)	(32) Differential risk factors for early and later hospital readmission of older patients	• previous hospitalization • longer length of stay • pre-admission IADL • prescription number
Forster, A., Murfff, H. J., Peterson, J. F., Gandhi, T. K. & Bates, D. W. (2005)	(33) Adverse drug events occurring following hospital discharge	
Sorensen, C., Brandes, A., Hendricks, O., Thrane, J., Friis–Hasche, E., Haghfelt, T. & Bech, P. (2005)	(34) Psychosocial predictors of depression in patients with acute coronary syndrome	• depression
Kimura, K., Minematsu, K., Kazui, S. & Yamaguchi, T. (2005)	(35) Mortality and cause of death after hospital discharge in 10, 981 patients with ischemic stroke and transient ischemic attack.	• pneumonia
Foust, J. B., Naylor, M. D., Boling, P. A. & Cappuzzo, K. A. (2005)	(36) Opportunities for improving post-hospital home medication management among older adults	• older adults • complex medication regimens
Chu, C. M., Chan, V. L., Lin, A. W. N., Wong, I. W. Y., Leung, W. S. & Lai, C. K. W. (2004)	(37) Readmission rates and life threatening events in COPD survivors treated with non-invasive ventilation for acute hypercapnic respiratory failure	• swallowing dysfunction • current smoking • lower ADL scores • use of tranquilizers
Rockx, M. A. J., Fox, S. A., Stitt, L. W., Lehnhardt, K. R., McKenzie, F. N., Quantz, M. A., Menkis, A. H. & Novick, R. J. (2004)	(38) Is obesity a predictor of mortality, morbidity, and readmission after cardiac surgery?	• obesity
Tyden, P., Hansen, O., Engstrom, G., Hedblad, B. & Janzon, L. (2002)	(39) Myocardial infarction in an urban population: worse long term prognosis for patients from less affluent residential areas.	• socioeconomic environment
Romanelli, J., Fauerbach, J. A., Bush, D. E. & Ziegelstein, R. C. (2002)	(40) The significance of depression in older patients after myocardial infarction.	• depression • comorbididty
Pettersen, R., Dahl, T. & Wyller, T. B. (2002)	(41) Prediction of long-term functional outcome after stroke rehabilitation	• urinary incontinence • concomitant chronic disabling disorders • recurrent strokes
Connerney, I., Shapiro, P. A., McLaughlin, J. S., Bagiella, E. & Sloan, R. P. (2001)	(42) Relation between depression after coronary artery bypass surgery and 12-month outcome: A prospective study	• depression
Rea, T. D., Heckbert, S. R., Kaplan, R. C., Pstay, B. M., Smith, N. L., Lemaitre, R. N. & Lin, D. (2001)	(43) Body mass index and the risk of recurrent coronary events following acute myocardial infarction	• excess adiposity
Miller, E. F. R., McElnay, J. C., Watt, N. T., Scott, M. G., McConnell, B. J. (2001)	(44) Factors affecting the unplanned hospital readmission of elderly patients with cardiovascular disease—a predictive model	• multiple medications added at discharge • taking certain cardiovascular drugs • length of hospital stay
Rosenburg, A. L. & Watts, C. (2000)	(45) Patients readmitted to ICUs: A systematic review of risk factors and outcomes.	• unstable vital signs
Gray, S. L., Sager, M., Lestico, M. R. & Jalaluddin, M. (1998)	(46) Adverse drug events in hospitalized elderly	• cognitive status • in-patient medications
Covinsky, K. E., Forinsky, R. H, Palmer, R. M., Kresevic, D. M. & Landefeld, C. S. (1997)	(47) Relation between symptoms of depression and health status outcomes in acutely ill hospitalized older persons	• depression

Elderly patients are also at increased risk for adverse outcomes after discharge from complications involving their medication (Foust, Naylor, Boling, & Cappuzzo, 2005), falls (Aronovitch, 2006; Lehtola, Koistenen & Luukinen, 2006) and poor nutrition (Brantervik, Jacobson, Grimby, Wallen, & Bosaeus, 2005). These three factors are further discussed below. In relation to cardiac surgery, gender and race were also found to be associated with risk post-discharge. Specifically, the female gender (Connerney, Shapiro, McLaughlin, Bagiella, & Sloan, 2001; Faskin, Wipke–Tevis, & Sagehorn, 2001) and African American race (Fasken et al., 2001) were associated with adversity post-discharge, while males (Schwarz & Elman, 2003) were at increased risk for heart failure.

Patient Characteristics

Depression appears to have received considerable attention from researchers in the investigations of factors associated with adverse outcomes. A history of depression and depression at and after discharge were found to be major risk factors for older patients in several studies (Connerney et al., 2001; Covinsky, Forinsky, Palmer, Kresevic, & Landefeld, 1997; Kronish et al., 2006; Marcantonio et al., 1999; Moser, Doering, & Chung, 2005; Paratz et al., 2005; Romanelli, Fauerbach, Bush, & Ziegelstein, 2002; Schwarz & Elman, 2003; Sorensen et al., 2005; Van Wijk, Algra, Van de Port, Bevaart, & Lindeman, 2006). Depression is a very prevalent mental health issue in the older adult population (Hustey & Smith, 2007). It not only negatively affects one's overall mood but can also lead to poor retention of educational content (Moser et al., 2005) and poor adherence to behaviors (such as diet or medication regimes) that may prevent certain medical complications (Kronish et al., 2006). Depression is also predictive of functional (Van Wijk et al., 2006) and nutritional decline as well as deterioration during and after hospitalization and decreased likelihood of improving (Covinsky et al., 1997). Depression is a considerable risk factor and is a main determinant for other complications that lead to adverse health outcomes post-discharge. One might wonder if treating depression would improve the other patient outcomes that are affected by depression.

Cognitive impairment is another risk factor for adverse health events at discharge in the elderly population (Gray, Sager, Lestico, & Jalaluddin, 1998; Gray, Mahoney & Blough, 2001; 1999; Pedone et al., 2005). It makes pain assessment more challenging to perform (Frondini, Lanfranchi, Minardi, & Cucinotta, 2007), making it more difficult to control physical pain. Further, in patients who experienced heart failure, it is associated with disability (Zuccala et al., 2001). Cognitive impairment is associated with a noteworthy decrease in a quality of life of the patient, and can also lead to a great deal of distress for caregivers (Dubois & Hebert, 2006). Other associated risk factors are delirium—a mental disturbance of relatively short duration

usually reflecting a toxic state, marked by illusions, hallucinations, delusions, excitement, restlessness, and incoherence (Dorland's Pocket Medical Dictionary, 1982) and dementia—an organic loss of intellectual function (Dorland's Pocket Medical Dictionary). Perhaps not technically considered cognitive impairment, distress personality was found to be a risk factor for adverse health outcomes post-discharge. Cognitive impairment at preadmission, upon admission, or at discharge presents as a challenge for social work discharge planners. Memory loss (Lee, 2006) is another significant risk factor for adverse outcomes post-discharge, the presence of which has implications for adherence to a medical regime and other instructions.

Elderly patients are also at heightened risk for malnutrition (Brantervik et al., 2005), which is associated with increased risk for mortality and hospital readmission (Alibhai, Greenwood, & Payette, 2005). There are several health conditions, such as diabetes and hypertension, that require specific nutritional assessment and patient education (Glanz, 1985), and dieticians have many assessment tools at their disposal (e.g., Guigoz, Lauque, & Vellas, 2002; Keller & Hedley, 2000). For the purposes of discharge planning, coordination of information from various specialty areas, such as dietetics, is imperative. Furthermore, discharge assessment should include a component on nutrition risks in the event that these risks were not identified or dealt with prior to discharge. Malnutrition has been cited as a common occurrence in the geriatric population (Izawa et al., 2006, Hewitt, Ismail, Patterson, & Draper, 2006). It has been considered a key risk factor for a lengthy recovery riddled with challenges in elderly patients (Brantervik et al., 2005) and needs to be given precedence in order to prevent many possible negative outcomes (Hewitt et al., 2006). Callen and Wells (2005) have suggested that one may be able to predict the possibility of malnutrition of elderly patients by assessing their mental health (e.g., presence of depression) and their food intake. Signs and symptoms of malnutrition in the elderly have also been listed. Such manifestations as disease, tooth loss, economic hardship, reduced social contact, multiple medications, and involuntary weight change, may be indicative of nutritional issues (Callen & Wells).

Functional status was examined in several studies, and appears to be a major risk factor. Premorbid functional dependence, poor preadmission functioning in instrumental activities of daily living, and dependence with activity of daily living (Chen & Narasavage, 2006; Chu et al., 2004; Cornette et al., 2005a; Islamoglu et al., 2002; Moser et al., 2005; Pioli et al., 2006; Shipton, 1996) have been shown to be risk factors for adversity post-discharge. Reduced mobility status (Shipton, 1996) was found to contribute to adversity post-discharge. It has been recognized as a widespread issue that affects the elderly (Callen, Mahoney, Wells, Enlow, & Hughes, 2004) and is also recognized as being related to precarious discharges (Macmillian, 1994) and to be predictive of one's overall health status (Scanaill et al., 2006). Also, many adverse outcomes that community-dwelling elderly adults experience

(e.g., poor physiological and functional outcomes) can be attributed in part to immobility (Callen et al., 2004). Mobility, as one would expect, was also associated with another risk, falling in the community (Liu–Ambrose, Pang, & Eng, 2007).

The risk of falling (Lee, 2006; Wu, Sahadevan, & Ding, 2006) is a substantial concern. In the older patient population, falls are common, and may result in injury, or exacerbate existing conditions (Bates, Pruess, Souney, & Platt, 1995). Falls are also associated with anxiety, depression, and loss of confidence (Vetter & Ford, 1989). In a recent systematic review (Oliver, Daly, Martine, & McMurdo, 2004), consistently emerging risks factors associated with falling were gait instability, agitated confusion, urinary incontinence, history of falls, and certain medications (namely sedatives or hypnotics). Falls are common occurrences in elderly people (Oliver et al., 2004) and are cited as the leading cause of injury (Soffer et al., 2006). Specifically, falls have been linked to increased mortality and morbidity rates among the aging population (Aronovitch, 2006; Soffer et al., 2006) and the risk increases as one's age increases (Aronovitch, 2006; Lehtola et al., 2006). It has been proposed that by employing assessment tools that evaluate one's risk of falling, the rate of falls can be decreased (Aronovitch, 2006).

Perhaps not surprisingly, obesity (Rockx et al., 2004), and excess adiposity (Rea et al., 2001) have also been the focus of enquiry and implicated in adverse outcomes after discharge. Obesity (Rockx et al., 2004) was associated with a risk of early hospital readmission, and excessive adiposity (Rea et al., 2001) was associated with recurrent coronary events especially for patients who were obese. Obesity was related to a number of other health problems such as diabetes, hypertension, and dyslipidemia which accounted for 43% of the risks.

Medical and Physical Factors

There were a number of risks identified in the present review related to medication including adverse drug events (Forster, Murfff, Peterson, Gandhi, & Bates, 2005; Gray et al., 1998), multiple medications (Foust et al., 2005) and specific cardiovascular medications (Miller et al., 2001). Adverse drug events (ADE) in hospital settings can occur in the process of ordering, transcribing, dispensing, and administrating medication to patients (von Laue, Schwappach, & Koeck, 2003). In a recent systematic review (Kanjanarat et al., 2003), it was reported that the most preventable ADE occurred during the prescribing of medications, and the ADE were principally related to dosage and inappropriate patient monitoring. Adverse outcomes were commonly identified as allergic reactions, or hepatic or renal, cardiovascular, hematologic and central nervous system problems. Error reduction has been noted with the use of sophisticated computer techniques and the inclusion of pharmacists in the prescribing process. ADE are a separate issue from

the difficulties patients face at and after discharge when they must manage their own medication. This can become especially problematic if they are prescribed new medications during their hospital stay and when they take more than five medications (Hebert, Bravo, Korner–Bitensky, & Voyer, 1996). The number of prescriptions (Forster et al., 2005), complex medication regimens (Foust et al., 2005), use of hypnotics, sedatives, or tranquilizers (Chu et al., 2004; Hanlon et al., 2006), and poor adherence (Gray et al., 1999; Moser et al., 2005) are among the risk factor related to medication.

Medical and physical factors that were associated with an increased risk at discharge were identified as length of hospital stay, prior hospital admissions, and multiple medications. Length of hospital stay has been frequently reported as a risk factor for older adults (Cornette et al., 2005a; Douglas, Daly, Brennan, Gordon, & Uthis, 2001; Fasken et al., 2001; Miller et al., 2001; Lee, 2006; Shipton, 1996; Wu et al., 2006). The length of stay also has implications when considering functional status and patient age. Elderly patients are being released "quicker" and "sicker" (Morrow–Howell et al.; Oktay et al., 1992) so one might assume that shorter length of stay may be a risk factor. However, long-term hospitalized elderly patients spend a significant amount of time bed ridden, which has been associated with undesirable health outcomes such as physical decline (Callen et al., 2004). Functional status has also been established as a factor that increases poor outcomes for the older population (Chen & Narasavage, 2006; Lee, 2006; Moser et al., 2005; Schwarz & Elman, 2003; Islamoglu et al., 2002; Fortinsky, Madigan, Sheehan, Tullai–McGuinness, & Fenster, 2006; Pioli et al., 2006) and quite often, elderly individuals experience varying degrees of functional impairment when discharged from the hospital (Wu et al., 2006); that is, patient age and functional status enhance the severity of other risks. Furthermore, prior hospital admissions have also been recognized as a factor that increases the risk for poor health outcomes (Cornette et al., 2005a; Marcantonio et al., 1999; Almagro et al., 2005; Shipton, 1996).

Comorbidity is a factor that puts patients who are ready to be discharged at risk as well (Moser et al., 2005; Marcantonio et al., 1999; Paratz et al., 2005; Fortinsky et al., 2006; Pioli et al., 2006; Romanelli et al., 2002). Comorbidity is a "common situation in which an individual meets the criteria for more than one diagnostic condition" which can be medical and psychological in nature (Firestone & Marshall, 2003, p. 483). Cormorbidity is a major risk for the elderly and while the research has clearly shown medical comorbidities to be a risk factor, it is possible that social work clinicians consider the possibility of comorbidity with medical issues and problems that are psychological, psychosocial, or functional in nature. For example, Schwartz & Elman (2003) found the interaction of cardiac illness and functional status to be a significant risk factor.

The severity of illness is a significant risk factor for adversity post-discharge (Fortinsky et al., 2006; Islamoglu et al., 2002). Severity of ill-

ness throughout the patients' hospital stay is important, yet the finding that severity at admission is also a risk factor has implications for social work preadmission screening and discharge planning.

Social Factors

Social work clinicians have much training and experience with various vulnerabilities in older hospitalized patients, and low socioeconomic status is one with which social work is well acquainted. Indeed, a poor socioeconomic environment (Tyden, Hansen, Engstrom, Hedblad, & Janzon, 2002) including the receipt of social assistance, financial and insurance concerns, and living conditions in the home after discharge, most notably sub-optimal living conditions, were found to be risks associated with adversity. The lack of social support can put the elderly at risk for adverse health outcomes when released from an acute care facility (Cummings, 1999; Moser et al., 2005; Shipton, 1996; Weaver et al., 2006). There are a number of risk factors related to the support available identified in the present review. Living alone and the availability of care after discharge were significant risk factors, as were caregiver depression, caregiver stress, and caregiver difficulty. One last factor related to the caregiver was having an unrealistic caregiver (Cummings, 1999). Caregiver availability and characteristics were noted, but so too was the interaction of caregiver stress and patient depression (Schwartz & Elman, 2003). Risk factors related to the degree and quality of support available in the discharge environment and the fit, type, and amount of care required after discharge were also evident from the review.

In addition to the various types of support (financial, support, caregivers) poor or low education (Gray et al., 2001) and quality of life (e.g., Almagro et al., 2005; Brantervik et al., 2005) were also noteworthy social factors associated with adversity post-discharge. The elderly population often depends on community resources and their family for support when discharged to their home but when these social supports are not available, complications may arise including hospital readmission (Preyde & Chapman, 2007; Preyde et al., 2009). The broader socio-cultural context was explored in one study in which the need to evaluate cultural differences was reinforced (Chen & Narasavage, 2006), which may be beneficial to address in the discharge process.

Discharge Factors

Although the review was not specifically focused on discharge activities or decisions, discharge factors were significantly associated with adverse outcomes post-discharge. A lack of documented family or patient education (Marcantonio et al., 1999) was found to significantly relate to readmission. This finding is consistent with other research identifying patient and family

needs at discharge and one week post-discharge as important considerations for successful discharge planning. Tseng, Shyu, See, and Chen (2001) indicated that need for health care information, health and concrete resource services, and emotional counseling were central to optimal discharges from hospital to home. Other significant factors revealed in the present review were limited social work involvement at admission, post-discharge patient stress, and unresolved medical problems at discharge.

In summary, the most frequently cited risk factors associated with adverse health outcomes after discharge were depression, poor cognition, comorbidities, length of hospital stay, prior hospital admission, functional status, patient age, multiple medications, and lack of social support. It is important to note that although these factors can be separated into discrete categories, many are interrelated (for example, see Schwarz & Elman, 2003), and some factors intuitively can be seen to enhance the degree of risk associated with other factors. For example, cognitive instability can interfere with patients' management of their medications.

Assessment Tools

The search for comprehensive discharge assessment tools yielded 131 articles, of which four tools were identified for general use in hospital discharge from an acute care facility. Three other tools were developed for use in emergency departments (High Risk Discharge Assessment Instrument: Yeaw & Burlingame, 2003; Triage Risk Screening Tool: Fan, Worster, & Fernandes, 2006; Identification of Seniors at Risk: McCusker, Cole, Dendukuri, & Belzile, 1999) and 20 other discharge assessment tools were identified for use with specific patients (e.g., Hemispheric Stroke Scale: Franka, Schlote, Hasenbeina, & Wallesch, 2006; Stroke Assessment: Valach, Signer, Hartmeier, Hoder, & Steck, 2003; Delirium Index: McCusker et al., 2004) or specific indicators such as nutrition (e.g., SCREEN: Keller & Hedley, 2000) or falls (e.g., STRATIFY: Smith, Forster, & Young, 2006; Tinetti, 1986) and will not be furthered reviewed here.

Of the general discharge assessment tools, only one tool could be located that was developed and published by professionals in social work. Boutin Foster, Euster, Rolon, and Motal (2005) developed a six-item assessment tool, Social Work Admission Assessment Tool (SWAAT), for use at admission to identify patients who may have complicated discharge needs that would require social work involvement to facilitate discharge planning. The items are related to ambulation, current social services, living situation, mental health, need of assistance when going home, and self-perceived need for additional services, and can detect patients in low, intermediate, and high need for social work services. This tool was not specifically designed to assess discharge needs of elderly patients; however, it was tested using samples of older patients (e.g., mean age of 57 and 63 years). In comparison

to length of stay the sensitivity (90%) of the SWAAT was good; however, there were concerns with specificity (30%). Sensitivity of a discharge assessment tool refers to the probability that a high-risk patient will be identified as such, and specificity refers to the probability that a patient who is truly at risk will be identified as such (Rothman & Greenland, 1998). This short tool (6-item) has the advantage of ease of incorporation into routine admission process, though it appears to miss many of the important risk factors, such as discharge, medical, and social factors.

Another tool for use at admission was the SHERPA (Score Hospitalier d'Evalution du Risque de Perte d'Autonomie; Cornette et al., 2005b) which was designed to identify older patients at risk for functional decline within three months post-discharge. The tool included five factors: age, impairment in premorbid instrumental activities of daily living (ADLs), falls in the year before hospitalization, cognitive impairment, and poor self-rated health. This tool was developed in a prospective cohort study in which the items reflect areas of risk and can stratify patients into high, moderate, mild, and low risk. The tool has good sensitivity (67.9%) and specificity (70.8%); however, its brevity appears to neglect a number of important risks including medical, social support, and discharge factors.

The Blaylock Risk Assessment Screening Score (BRASS; Blaylock & Cason, 1992) was developed to ensure continuity of care by identifying patients in need of discharge planning. The index contains ten items: age, living situation/social support, number of previous admissions/emergency visits, number of active medical problems, number of drugs, cognition, functional status, behavior pattern (e.g., wandering, agitated), mobility, and sensory deficits. The BRASS has been reported to have high specificity (78% to 100%) but low sensitivity (19% to 56%) and is therefore questionable for clinical use (Mistiaen et al., 1997). This index appears to be comprehensive and easy to use; however, it may not capture all the important risk factors, such as depression.

The Uniform Needs Assessment Instrument (UNAI; Westra et al., 1998) was developed for hospital discharge with older patients. Specifically, the UNAI was developed to assess the continuing care needs of elderly patients post-discharge, and determine who should receive home care (and who qualifies for reimbursement for home care). The risk domains were cognitive/emotional/behavioral status, ADL, instrumental activities of daily living (IADL), environmental factors in post-discharge care, assistive devices, finances, and skilled care requirements such as nutrition/hydration, respiration, counseling, and medication administration. This tool was found to be comprehensive and have high sensitivity and specificity (>85% respectively); however, the authors noted some difficulties (Westra et al., 1998). There were concerns noted regarding the reliability of information gathered as part of the assessment. For example, there was difficulty with using consistent definitions for some terms such as abuse/neglect, prognosis, and uncertainty about

abilities to perform IADLs. Similarly, there was a concern about reliance on self-report of cognitive status, as well as length of time for tool completion. When patients completed the form, it required 45 to 75 minutes; however, when administered by Registered Nurses, it took an average of 16 minutes. In sum, this may be a comprehensive tool, but it might not assess all the risk factors identified in this review, for example, caregiver availability, and there may be ambiguities related to the information derived from the assessment.

DISCUSSION

Two findings evoke concern. The paucity of published research by the social work profession is a serious concern. In this era of evidence-based practice, social work professionals must display their evidence of effective practice. It was encouraging to locate one assessment tool developed by social work professionals; however, the profession could benefit from greater concentration of resources to produce evidence and subject it to peer-review for publication. A second concern was the inconsistency between the prominence of some risk factors, such as depression and caregiver well-being, and their absence in assessment tools.

This systematic review was conducted in order to synthesize the medical and physical, psychological, and social risk factors associated with adverse health outcomes at discharge for the aging population. Although many factors were identified throughout the literature, the most commonly mentioned risks were depression, poor cognition, the number of comorbidities, length of hospital stay, prior hospital admission, functional status, patient age, multiple medications, and lack of social support. Some of the most concerning risk factors relate to the combination of medical frailty, psychological functioning, and the lack of social support.

There may be some limitations due to the inclusion of only English-language, published studies in this review. If unpublished (i.e., grey) literature and articles published in a different language were included in this study, then it may have been possible to uncover additional risk factors associated with adverse health outcomes in the older adult population at discharge. There are also limitations with respect to the scope of the original studies; that is, this review can only reflect the risk factors chosen by the authors of the original studies. Thus, there may be some factors that have so far been overlooked in the research literature.

The results obtained by conducting this systematic review, can affirm the identification of risk factors as an important component of the discharge assessment process and should inform discharge needs assessment. The results of this review suggest important target areas for discharge planning. Elderly patients are at an increased risk for adverse health outcomes after discharge from an acute care facility and would appear to benefit from

a comprehensive discharge assessment that identifies risk factors, and addresses modifiable risk factors where possible in order to avoid or delay adverse events following discharge from the hospital. Identifying these risks will aid the discharge planner to better prepare the patient and family for the challenges that may ensue in the patient's transition from hospital to home.

A well-developed assessment tool may streamline the discharge planning process and lead to effective discharge practices. However, some patients may have very complex health and social care needs and a well-developed assessment tool may augment clinical involvement (dialogue with the patient) and clinical judgment. That is, assessment tools can facilitate the process and add to the clinical value of getting to know patients and their strengths and weaknesses. Furthermore, tools developed for use with specific populations (e.g., vascular brain injury) or function (e.g., nutrition or falls), may work well in large, teaching hospitals. However, social workers in community hospitals may find a general or comprehensive assessment tool better suits their needs in serving a wide range of health problems.

There are important implications for social work practice and research. Social work discharge planners who already use an assessment tool may consider evaluating the comprehensiveness of the tool or evaluate whether the most common risks can be identified with its use. Hospital policies on discharge planning may also be enhanced by stipulations regarding discharge assessment tools. Increasing evidence supports the need for discharge planners to conduct a comprehensive assessment of risk factors identified in this study when elderly patients are discharged from an acute care facility to their home. The research suggests that assessment of multiple risk factors, such as depression and falls, are important considerations in a comprehensive assessment. Social work researchers may consider revising tools for comprehensiveness, and test their sensitivity, specificity, and ease of use.

In conclusion, in this systematic review a comprehensive set of risk factors for adverse outcomes in older patients discharged from acute care settings was identified. Four discharge assessment tools could be located that were developed for use in general units in acute care settings; however, none of the tools contained items for all of the risk factors identified in this review. Though more research is needed to determine the effectiveness of various assessment tools, a comprehensive and efficient tool may facilitate discharge practice. Effective discharge planning may enhance the alignment of the patient to effective intervention, delay deterioration, prevent readmission and adverse outcomes, and lead to improved quality of life.

REFERENCES

Alibhai, S., Greenwood, C., & Payette, H. (2005). An approach to the management of unintentional weight loss in elderly people. *Canadian Medical Association Journal, 172*, 773–779.

Almagro, P., Barreiro, B., Ochoa de Echaguen, A., Quintana, S., Rodriguez Carballeira, M., Heredia, J. L., & Garau, J. (2005). Risk factors for hospital readmission in patients with chronic obstructive pulmonary disease. *Respiration: International Review of Thoracic Diseases, 73*, 311–317.

Andrews, K. (1986). Relevance of readmission of elderly patients discharged from a geriatric unit. *Journal of the American Geriatrics Society, 34*, 5–11.

Aronovitch, S. A. (2006). Falls and patient safety for older adults. *Ostomy Wound Management, 52*, 22–43.

Bates, D., Pruess, K., Souney, P., & Platt, R. (1995). Serious falls in hospitalised patients; Correlates and resource utilization. *American Journal of Medicine, 99*, 137–143.

Berkman, B., & Abrams, R. D. (1986). Factors related to readmission of elderly cardiac patients. *Social Work, 31*, 99–103.

Berkman, B., Chauncey, S., Holmes, W., Daniels, A., Bonander, E., Sampson, S., & Robinson, M. (1999). Standardized screening of elderly patients' needs for social work assessment in primary care: Use of the SF-36. *Health & Social Work, 24*, 9–16.

Berkman, B., Walter, S., Bonander, E., & Holmes, W. (1992). Early unplanned readmissions to social work of elderly patients—Factors predicting who needs follow up services. *Social Work in Health Care, 17*, 103–119.

Blaylock, A., & Cason, C. (1992). Discharge planning: Predicting patients' needs. *Journal of Gerontological Nursing, 18*, 5–10.

Bond, S., Neelson, V., & Belyea, M. J. (2006). Delirium in hospitalized older patients with cancer. *Oncology Nursing Forum, 33*, 1075–1083.

Boone, C., Coulton, C., & Keller, S. (1981). The impact of early and comprehensive social work services on length of stay. *Social Work in Health, 7*, 1–9.

Boutin Foster, C., Euster, S., Rolon, Y., & Motal, A. (2005). Social work admission assessment tool for identifying patients in need of comprehensive social work evaluation. *Health & Social Work, 30*, 117–125.

Brantervik, A. M., Jacobsson, I. E., Grimby, A., Wallen, T. C. E., & Bosaeus, I. G. (2005). Older hospitalized patients at risk of malnutrition: Correlation with quality of life, aid from the social welfare system and length of stay? *Age and Aging, 34*, 444–449.

Bull, M. J. (2000). Discharge planning for older people: A review of the current research. *British Journal of Community Nursing, 5*, 70–74.

Callen, B. L., Mahoney, J. E., Wells, T. J., Enlow, M., & Hughes, S. (2004). Admission and discharge mobility of frail hospitalized older adults. *Medsurg Nursing, 13*, 156–164.

Callen, B. L., & Wells, T. J. (2005). Screening for nutritional risk in community-dwelling old-old. *Public Health Nursing, 22*, 138–146.

Celkan, M. A., Ustunsory, H., Daglar, B., Kazaz, H., & Kocoglu, H. (2005). Readmission and mortality in patients undergoing off-pump coronary artery bypass surgery with fast-track recovery protocol. *Heart and Vessels, 20*, 251–255.

Charles, C., Gauld, M., Chambers, L., O'Brien, B., Haynes, R. B., & Labelle, R. (1994). How was your hospital stay? Patients' reports about their care in Canadian hospitals. *Canadian Medical Association Journal, 159*, 1813–1822.

Chen, Y., & Narasavage, G. L. (2006). Factors related to chronic obstructive pulmonary disease readmission in Taiwan. *Western Journal of Nursing Research, 28*, 105–124.

Chiovenda, P., Vincentelli, G. M., & Alegiani, F. (2002) Cognitive impairment in elderly ED patients: Need for multidimensional assessment for better management after discharge. *The American Journal of Emergency Medicine, 20*, 332–335.

Chu, C. M., Chan, V. L., Lin, A. W. N., Wong, I. W. Y., Leung, W. S., & Lai, C. K. W. (2004). Readmission rates and life threatening events in COPD survivors treated with non-invasive ventilation for acute hypercapnic respiratory failure. *Thorax, 59*, 1020–1025.

Connerney, I., Shapiro, P. A., McLaughlin, J. S., Bagiella, E., & Sloan, R. P. (2001). Relation between depression after coronary artery bypass surgery and 12-month outcome: A prospective study. *Lancet, 358*, 1766–1771.

Cornette, P., D'Hoore, W., Malhomme, B., Van Pee, D., Meert, P., & Swine, C. (2005a). Differential risk factors for early and later hospital readmission of older patients. *Aging clinical and experimental research, 17*, 322–328.

Cornette, P., Swine, C., Malhomme, B., Gillet, J., Meert, P., & D'Hoore, W. (2005b). Early evaluation of the risk of functional decline following hospitalization of older patients: Development of a predictive tool. *European Journal of Public Health, 16*, 203–208.

Covinsky, K. E., Forinsky, R. H, Palmer, R. M., Kresevic, D. M., & Landefeld, C. S. (1997). Relation between symptoms of depression and health status outcomes in acutely ill hospitalized older persons. *Annals of Internal Medicine, 126*, 417–425.

Cummings, S. M. (1999). Adequacy of discharge plans and rehospitalization among hospitalized dementia. *Health and Social Work, 24*, 249–259.

De Rooij, S. E., Govers, A., Korevaar, J. C., Abu–Hanna, A., Levi, M., & De Jonge, E. (2006). Short-term and long-term mortality in very elderly patients admitted to an intensive care unit. *Intensive Care Medicine, 32*, 1039–1044.

Dorland's Pocket Medical Dictionary (23rd ed.). Philadelphia, PA: W. B. Saunders Company.

Douglas, S. L., Daly, B. J., Brennan, P. F., Gordon, N. H. & Uthis, P. (2001). Hospital readmission among long-term ventilator patients. *Chest, 120*, 1278–1286.

Dubois, M., & Herbert, R. (2006). Cognitive-impairment-free life expectancy for Canadian seniors. *Dementia and Geriatric Cognitive Disorders, 22*, 327–333.

Esche, C., & Tanner, E. (2005). Resiliency: A factor to consider when facilitating the transtition from hospital to home in older adults. *Geriatric Nursing, 26*, 218–222.

Fan, J., Worster, A., & Fernandes, C. M. B. (2006). Predictive validity of the triage screening tool for elderly patients in a Canadian emergency department. *American Journal of Emergency Medicine, 24*, 540–544.

Fasken, L. L., Wipke–Tevis, D. D., & Sagehorn, K. K. (2001). Factors associated with unplanned readmissions following cardiac surgery. *Progress in Cardiovascular Nursing, 16*, 107–115.

Firestone, P., & Marshall, W. L. (2003) *Abnormal Psychology: Perspectives* (2nd. ed.). Toronto, ON: Pearson Education Canada Inc.

Forster, A. J., Murff, H. J., Peterson, J. F., Gandhi, T. K., & Bates, D. W. (2005). Adverse drug events occurring following hospital discharge. *Journal of General Internal Medicine: Official Journal of the Society For Research and Education in Primary Care Internal Medicine, 20*, 317–323.

Fortinsky, R. H, Madigan, E. A., Sheehan, T. J., Tullai–McGuinness, S., & Fenster, J. R. (2006). Risk factors for hospitalization among Medicare home care patients. *Western Journal of Nursing Research, 28*, 902–917.

Foust, J. B., Naylor, M. D., Boling, P. A., & Cappuzzo, K. A. (2005). Opportunities for improving post-hospital home medication management among older adults. *Home Health Care Services Quarterly, 24*, 101–122.

Fox. G. N. (1993). Resource use by younger and older patients. *Family Practice Research Journal, 13*, 283–290.

Franka, B., Schlote, A., Hasenbeina, U., & Wallesch, C. W. (2006). Prognosis and prognostic factors in ADL-dependent stroke patients during their first in-patient rehabilitation—a prospective multicentre study. *Disability and Rehabilitation, 28*, 1311–1318.

Frondini, C., Lanfranchi, G., Minardi, M., & Cucinotta, D. (2007). Affective, behavior and cognitive disorders in the elderly with chronic musculoskeletal pain: The impact on an aging population. *Archives of Gerontology and Geriatrics, 44*, 167–171.

Glanz, K. (1985). Nutrition education for risk factor reduction and patient education: A review. *Preventive Medicine, 14*, 721–752.

Gray, S. L., Mahoney, J. E., & Blough, D. K. (1999). Adverse drug events patients receiving home health services following hospital discharge. *The Annals of Pharmacotherapy, 33*, 1147–1153.

Gray, S. L., Mahoney, J. E., & Blough, D. K. (2001). Medication adherence in elderly patients receiving home health services following hospital discharge. *The Annals of Pharmacotherapy, 35*, 539–545.

Gray, S. L., Sager, M., Lestico, M. R., & Jalaluddin, M. (1998). Adverse drug events in hospitalized elderly. *The Journals of Gerontology, 53*, M59–M63.

Grimmer, K., Moss, J., & Falco, J. (2004). Experiences of elderly patients regarding independent community living after discharge from hospital: A longitudinal study. *International Journal for Quality in Health Care, 16*, 465–472.

Guigoz, Y., Lauque, S., & Vellas, B. J. (2002). Identifying the elderly at risk for malnutrition. The Mini Nutritional Assessment. *Clinical Geriatric Medicine, 18*, 737–757.

Hanlon, J. T., Pieper, C. F., Carl, F., Hajjar, E. R., Sloane, R. J., Richard, J., . . . Schmader, K. E. (2006). Incidence and predictors of all and preventable adverse drug reactions in frail elderly persons after hospital. *The Journals of Gerontology, 61*, 511–515.

Hebert, R., Bravo, G., Korner–Bitensky, N., & Voyer, L. (1996). Predictive validity of a postal questionnaire for screening community-dwelling elderly individuals at risk of functional decline. *Age & Aging, 25*, 159–167.

Hewitt, G., Ismail, S., Patterson, P., & Draper, A. (2006). The nutritional vulnerability of older Guyanese in residential homes. *West Indian Medical Journal, 55*, 334–339.

Hustey, F. M., & Smith, M. D. (2007). A depression screen and intervention for older ED patients. *The American Journal of Energy Medicine, 25*, 133–137.

IIzawa, S., Kuzuya, M., Okada, K., Enoki, H., Koike, T., Kanda, S., & Iguchi, A. (2006). The nutritional status of frail elderly with care needs according to the mini-nutritional assessment. *Clinical Nutrition, 25*, 962–967.

Islamoglu, F., Apaydin, A. Z., Ozbaran, M., Yuksel, M., Telli, A., & Durmaz, I. (2002). Predictors of outcome after coronary bypass surgery in patients with left ventricular dysfunction. *Anadolu Kardiyoloji Dergisis, 2*, 26–34.

Kadushin, G., & Kulys, R. (1993). Discharge planning revisited: What do social workers actually do in discharge planning? *Social Work, 38*, 713–726.

Kanjanarat, P., Winterstein, A. G., Johns, T., Hatton, R., Gonzales–Rothi, R., & Segal, R. (2003). Nature of preventable adverse drug events in hospitals: A literature review. *American Journal of Health Systems Pharmacy*, *60*, 1750–1759.

Keller, H. H., & Hedley, M. R. (2000). Development of SCREEN—seniors in the community: Risk evaluation for eating and nutrition. *Canadian Journal of Dietetic Practice Research*, *61*, 67–72.

Kimura, K., Minematsu, K., Kazui, S., & Yamaguchi, T. (2005). Mortality and cause of death after hospital discharge in 10,981 patients with ischemic stroke and transient ischemic attack. *Cerebrovascualr Diseases, 19*, 171–178.

Kronish, I. M., Rieckman, N., Halm, E. A., Shimbo, D., Vorchheimer, D., Haas, D., & Karina, W. (2006). Persistent depression affects adherence to secondary prevention behaviors after acute coronary syndromes. *Official Journal of the Society for Research and Education in Primary Care Internal Medicine, 21*, 1178–1183.

Lee, J. (2006). An imperative to improve discharge planning predictors of physical function among residents of a Medicare skilled nursing facility. *Nursing Administration Quarterly, 30*, 38–47.

Leeper, B. (1996). AACN nursing scan in critical care. *Journal of Cardiovascular Nursing, 10*, 30–50.

Lehtola, S., Koistenen, P., & Luukinen, H. (2006). Falls and injurious falls late in home-dwelling life. *Archives of Gerontology and Geriatrics, 42*, 217–224.

Lockery, S. A., Dunkle, R. E., Kart, C. S., & Coulton, C. J. (1994). Factors contributing to the early rehospitalization of elderly people. *Health & Social Work, 19*, 182.

Lui–Ambrose, T., Pang, M. Y. C., & Eng, J. J. (2007). Executive function is independently associated with performances of balance and mobility in community-dwelling older adults after mild stroke: Implications for falls prevention. *Cerebrovascular Diseases, 23*, 203–210.

Macmillian, M. S. (1994). Hospital staff's perceptions of risk associated with the discharge of elderly people from acute hospital care. *Journal of Advanced Nursing, 19*, 249–256.

Marcantonio, E. R., McKean, S., Goldfinger, M., Kleefield, S., Yurkofsky, M., & Brennan, T. A. (1999). Factors associated with unplanned hospital readmission among patients 65 years of age and older in a Medicare managed care plan. *The American Journal of Medicine, 107*, 13–17.

McCusker, J., Bellavance, F., Cardin, S., Trepanier, S., Verdon, J., & Ardman, O. (1999). Detection of older people at increased risk of adverse outcomes after an emergency visit: The ISAR screening tool. *Journal of the American Geriatric Society, 47*, 1229–1237.

McCusker, J., Cole, M. G., Dendukuri, N., & Belzile, E. (2004). The delirium index, a measure of the severity of delirium: New findings on reliability, validity and responsiveness. *Journal of the American Geriatrics Society, 52*, 1744–1749.

McWilliam, C. L., & Sangster, J. R. (1994). Managing patients' discharge to home: The challenges of achieving quality of care. *International Journal for Quality in Health Care, 6*, 147–161.

Miller, E. F. R., McElnay, J. C., Watt, N. T., Scott, M. G., McConnell, B. J. (2001). Factors affecting the unplanned hospital readmission of elderly patients with cardiovascular disease—A predictive model. *Clinical Drug Investigation, 21*, 705–714.

Mistiaen, P., Duijnhouwer, E., Wijkel, D., deBont, M., & Veeger, A. (1997). The problems of elderly people at home one week after discharge from an acute care setting. *Journal of Advanced Nursing, 25*, 1233–1240.

Morrow–Howell, N., Proctor, E. K., & Mui, A. C. (1991). Adequacy of discharge plans for elderly patients. *Social Work Research & Abstracts, 27*, 6–13.

Moser, D. K., Doering, L. V., & Chung, M. L. (2005). Vulnerabilities of patients recovering from an exacerbation of chronic heart failure. *American Heart Journal, 150*, 984 e.7–984 e.13.

Oktay, J. S., Steinwachs, J. M., Bone, L. R., & Fahey, M. (1992). Evaluating social work discharge planning for elderly people: Access, complexity, and outcome. *Health & Social Work. 17*, 290–298.

Oliver, D., Daly, F., Martine, F. C., & McMurdo, M. E. T. (2004). Risk factors and risk assessment tools for falls in hospital in-patients: A systematic review. *Age and Ageing, 33*, 122–130.

Paratz, J., Thomas, P., & Adsett, J. (2005). Re-admission to intensive care: Identification of risk factors. *Physiotherapy Research International, 10*, 154–163.

Pedone, C., Ercolani, S., Catani, M., Maggio, D., Ruggiero, C., Quartesan, R., . . . GIFA Study Group (2005). Elderly patients with cognitive impairment have a high risk for functional decline during hospitalization: The GIFA Study. *The Journals of Gerontology, 60*, 1576–1580.

Peterson, K. J. (1987). Changing needs of patients and families in the acute care hospital: Implications for social work practice. *Social Work in Health Care, 13*, 1–14.

Pettersen, R., Dahl, T., & Wyller, T. B. (2002). Prediction of long-term functional outcome after stroke rehabilitation. *Clinical Rehabilitation, 16*, 149–159.

Pioli, G., Barone, A., Giusti, A., Oliveri, M. Pizzzonia, M., Razzano, M., & Palummeri, E. (2006). Predictors of mortality after hip fracture: Results from 1-year follow-up. *Aging Clinical and Experimental Research, 18*, 381–387.

Preyde, M., & Chapman, T. (2007). Psychosocial profile of elderly patients discharged from a community hospital. *Social Work in Health Care, 45*, 77–95.

Preyde, M., MacAulay, C., & Dingwall, T. (In press). Discharge planning from hospital to home for elderly patients: A meta-analysis. *Journal of Evidence-based Social Work.*

Rea, T. D., Heckbert, S. R., Kaplan, R. C., Pstay, B. M., Smith, N. L., Lemaitre, R. N., & Lin, D. (2001). Body mass index and the risk of recurrent coronary events following acute myocardial infarction. *Amercian Journal of Cardiology, 88*, 467–472.

Rockx, M. A. J., Fox, S. A., Stitt, L. W., Lehnhardt, K. R., McKenzie, F. N., Quantz, M. . . . Novick, R. J. (2004). Is obesity a predictor of mortality, morbidity and readmission after cardiac surgery? *Canadian Journal of Surgery, 47*, 34–38.

Romanelli, J., Fauerbach, J. A., Bush, D. E., & Ziegelstein, R. C. (2002). The significance of depression in older patients after myocardial infarction. *Journal of the American Geriatrics Society, 50*, 817–822.

Rosenburg, A. L., & Watts, C. (2000). Patients readmitted to ICUs: A systematic review of risk factors and outcomes. *Chest, 118*, 492–502.

Rothman, K. J., & Greenland, S. (1998). *Modern Epidemiology* (2nd ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.

Scanaill, C. N., Carew, S., Barralon, P., Noury, N., Lyons, D., & Lyons, G. M. (2006). A review of approaches to mobility telemonitoring of the elderly in their environment. *Annals of Biomedical Engineering, 34*, 547–563.

Schwarz, K. A., & Elman C. S. (2003). Identification of factors predictive of hospital readmissions for patients with heart failure. *Heart & Lung, 32*, 88–99.

Shipton, S. (1996). Risk factors associated with multiple hospital readmissions. *Home Care Provider, 1*, 83–85.

Smith, J., Forster, A., & Young, J. (2006). Use of the STRATIFY falls risk assessment in patients recovering from acute stroke. *Age and Ageing, 35*, 138–143.

Soffer, D., Klausner, J., Szold, O., Schulman, C., Halpern, P., Savitsky, B., . . . Peleg, K. (2006). Non-hip fracture-associated trauma in the elderly population. *Israel Medical Association Journal, 8*, 635–640.

Sorensen, C., Brandes, A., Hendricks, O., Thrane, J., Friis–Hasche, E., Haghfelt, T., & Bech, P. (2005). Psychosocial predictors of depression in patients with acute coronary syndrome. *Acta Psychiatrica Scandinavica, 111*, 116–124.

Testa, J. A., Malec, J. F., Moessner, A. M., & Browt, A. W. (2006). Predicting family functioning after TBI—Impact of neurobehavioral factors. *Journal of Head Trauma Rehabilitation, 21*, 236–247.

Thomas, J. W., & Holloway, J. J. (1991). Investigating early readmission as an indicator for quality of care. *Medical Care, 29*, 377–394.

Tinneti, M. F. (1986). Performance-oriented assessment of mobility problems in elderly people. *Journal of the American Geriatric Society, 34*, 119–126.

Tseng, M., Shyu, Y. L., See, L., & Chen, S. (2001). Changes in discharge needs and satisfaction of family caregivers of frail elders during the discharge transition. *Journal of Nursing Research, 9*, 311–321.

Tyden, P., Hansen, O., Engstrom, G., Hedblad, B., & Janzon, L. (2002). Myocardial infarction in an urban population: Worse long term prognosis for patients from less affluent residential areas. *Journal of Epidemiology and Community Health, 56*, 785–790.

Valach, L., Signer, S., Hartmeier, A., Hofer, K., & Steck, G. C. (2003). Chedoke–McMaster stroke assessment and modified Barthel Index self-assessment in patients with vascular brain damage. *International Journal of Rehabilitation Research, 26*, 93–99.

Van Hook, M. P., Berkman, B., & Dunkle, R. (1996). Assessment tools for general health care settings: PRIME-MD, OARS, and SF-36. *Health & Social Work, 21*, 230–235.

Van Wijk, I., Algra, A., Van de Port, I. G., Bevaart, B., & Lindeman, E. (2006). Change in mobility activity in the second year after stroke in a rehabilitation population: Who is at risk for decline? *Archives of Physical Medicine and Rehabilitation, 87*, 45–50.

Vetter, N., & Ford, D. (1989). Anxiety and depression scores in elderly fallers. *International Journal of Geriatric Psychology*, *4*, 168–173.

von Laue, N. C., Schwappach, D. L. B., & Koeck, C. M. (2003). The epidemiology of preventable adverse drug events: A review of the literature. *Wiener Klinische Wochenschrift*, *115*, 407–415.

Weaver, C., Schiech, L., Held–Warmkessel, J., Kedziera, P., Haney, E., DiLullo, G., . . . Dell, D. (2006). Risk for unplanned hospital readmission of patients with cancer: Results of a retrospective medical record review. *Oncology Nursing Forum, 33*, E44–E52.

Westra, B. L., Holland, D. E., Aufenthie, J., Cullen, L., Finley, J., Griebenow, L., . . . Wollan, P. (1998). Testing the Uniform Needs Assessment Instrument for hospital discharge planning with older adults. *Journal of Gerontological Nursing*, *24*, 42–46.

Wu, H. Y., Sahadevan, S., & Ding, Y. Y. (2006). Factors associated with functional decline of hospitalized older persons following discharge form an acute geriatric unit. *Annals Academy of Medicine Singapore, 35*, 17–23.

Yeaw, E. M. J., & Burlingame, P. A. (2003). Identifying high-risk patients from the emergency department to the home. *Home Healthcare Nurse, 21*, 473–480.

Zuccala, G., Onder, G., Pedone, C., Cocchi, A., Carosella, L., Cattel, C., . . . Bernabei, R. (2001). Cognitive dysfunction as a major determinant of disability in patients with heart failure: Results from a multicentre survey. *Journal of Neurology, Neurosurgery and Psychiatry, 70*, 109–112.