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Community-based case management and outcomes in Medicare beneficiaries

Jee Young Joo
University of Iowa

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COMMUNITY-BASED CASE MANAGEMENT AND OUTCOMES
IN MEDICARE BENEFICIARIES

by
Jee Young Joo

An Abstract

Of a thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Nursing
in the Graduate College of
The University of Iowa

May 2013

Thesis Supervisor: Professor Diane L. Huber

ABSTRACT

This study evaluated the effect of community-based case management (CM) intervention on patient outcomes in Medicare beneficiaries with chronic illness in a rural Midwest region from 2002 to 2004. The relationships between 252 patients' access and clinical outcomes (the number of hospitalizations, length of stay (LOS), and emergency department (ED) visits) and CM were investigated. CM services were provided as four types: high home, high clinic, high telephone, and mixed-care services by nurse case managers. A descriptive, repeated-measurement design was used, and a secondary analysis of a data set containing longitudinal community-based CM data was conducted. The transitional care model and transition theory served as the theoretical background for the study. Descriptive statistics and frequency analysis, *t*-test, and a repeated-measure ANOVA analysis were used to analyze the data.

Characteristic profiles of the patients were analyzed with their self-care Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) scores. The patients in this study were relatively healthy on their self-care functional status at the beginning of the study. The four types of CM services were compared with patient-reported clinical outcomes (the self-care ADL, IADL, symptom control, quality-of-life, and personal well-being scores) in each year. Analyses showed that patients' clinical outcomes were similar regardless of the type of CM services in each year. Two years of longitudinal CM intervention greatly affected patient's clinical outcomes and access outcomes. The study found that CM significantly reduced the number of hospital days and influenced patients' quality of life and symptom control. The impact of CM on LOS and ED visits was indeterminate. Further research is needed—including the effect of type and dosage of CM services and outcomes and the development of a comprehensive CM model—to guarantee CM as a core intervention in health care reconfiguration.

Abstract Approved: _____
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Graduate College
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CERTIFIED OF APPROVAL

PH.D. THESIS

This is to certify that the Ph.D. thesis of

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To my mother

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CHAPTER I

INTRODUCTION

Significance

The dual trends of a growing population with chronic disease and increasing Medicare expenditures have been serious problems in the United States (Anderson & Horvath, 2004; Potetz, Cubanski, & Neuman, 2011). Medicare spending is expected to increase at an average of 7% each year from 2010 to 2018, which could cost at least \$879 billion per year (Thorpe, Ogden, & Galactionova, 2010). The growing population with chronic disease is the major cause of the growth of Medicare spending (Thorpe et al., 2010). Medicare beneficiaries with multiple chronic illnesses require medical care and social services (Brown, 2009, p. 2). Because chronic illnesses are complex, they cannot be treated completely in one hospital visit or by an episode of care; instead, they require continuous, long-term care in outpatient settings because these settings drive better care coordination. Care coordination, which is “the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services”, seeks to meet patient needs and deliver high-quality care (Agency for Healthcare Research and Quality [AHRQ], 2011a, p. 4). Lack of such care correlated with recurrent visits to the emergency department and re-hospitalization (Brokel, Cole, & Upmeyer, 2012).

One of the major problems for chronically ill Medicare beneficiaries is the high rate of readmission due to fragmented transitional care (Brock et al., 2013; Center for Medicare & Medicaid Services [CMS], 2011). One-fifth (19.6%) of chronically ill Medicare beneficiaries were rehospitalized within 30 days after a hospital discharge (Jencks, Williams, & Coleman, 2009). Any Medicare beneficiaries who have suffered illnesses receive care services from multiple health care professionals and in multiple health care settings; and for this reason, they risk transmission error and rehospitalizations (Brock et al., 2013). In 2009, the US government announced that

“targeting and reducing hospital readmission rates has become a top priority for the Medicare program” (Mullin, 2012). The focus is on reducing readmission rates because they are considered to be an indicator of ‘the quality of health and medical care patients received during hospitalization and after discharge (Berry et al., 2013).

The current state of chronic care management is suboptimal (Keckley & Hoffmann, 2010). Norris et al. (2002) reported in their systematic review that care was disorganized, duplicated, fragmented, and focused on managing acute disease and complications. However, in the review there was little attention to patient-centered care and individualized care in current health care delivery structures. In fact, community-based case management (CM) has been identified as a major care coordination intervention and has been pivotal as a way of delivering continuous care and reducing fragmentation of care to avoid readmissions.

Within nursing, CM is identified as a Nursing Intervention Classifications (NIC) intervention (Bulechek, Butcher, Dochterman, & Wagner, 2013; Bulechek & Dochterman, 2004). CM is a method of ensuring high-quality, patient-centered treatment and care (Wulff, Thygesen, Søndergaard, & Vedsted, 2008). CM can be an effective care model for accountable, continuous, and patient-centered care in both hospital and community-based settings. However, CM services for Medicare beneficiaries have not been reimbursed nor do they cover the costs of care. Additionally, the Medicare benefits for CM have not been well funded.

Statement of the Problem

The high level of Medicare spending is due to a small percentage of Medicare beneficiaries with multiple chronic conditions (Brown, 2009). For example, in 2002, “half of Medicare beneficiaries had been treated for 5 or more conditions but accounted for a disproportionately large 75% of Medicare spending” (Peikes, Chen, Schore, & Brown, 2009, p. 603; Thorpe & Howard, 2006). According to Kaiser Family Foundation (2012), 10% percent of people on Medicare account for 57% of Medicare spending.

Patients with chronic illnesses have complex symptoms, high costs, and reduced quality of life; and they lack disease stability. The problems of the current care delivery system include its focus on acute and episodic problems, lack of team-based care, absence of patient support, and the complexity of the health care system (Dorr et al., 2006). Over the past decade, innovations in the care management process have been developed, but many patients could not receive benefits and fewer received appropriate treatments (Coleman, Austin, Brach, & Wagner, 2009; Rundall et al., 2002). For these reasons, it is imperative to prioritize effective, continuous, and accountable care for Medicare recipients with chronic illnesses.

CM has been shown to be effective in many aspects of chronic illness care. For example, the practice of CM has been proven effective for chronic disease management over time (Freund, Kayling, Miksch, Szecsenyi, & Wensing, 2010; Norris et al., 2002). However, CM practice is not well conceptualized and still lacks standardization as an intervention (Park & Huber, 2009). CM activities vary by situation, and it has been challenging to document such activities in health care records. At the same time, many studies have used different protocols with a CM intervention. Finally, there are few studies that fully describe an accurate CM working intervention and analysis of outcomes of CM services (Huber, Sarrazin, Vaughn, & Hall, 2003; Park, Huber, & Tahan, 2009).

Because of these problems in case management, an accurate level of services and an evaluation of outcomes are imperative. Accurate CM practice is important for the evidence-based practice of CM because it provides greater rigor and precision. Given accurate documentation, nurse case managers (NCMs) can better understand their patients' health care status and can match it to required services, quality of care, and cost indicators to choose the right level of intervention. Yet few studies have examined the association between CM mode and patient outcomes (Huber et al., 2003; Slaughter & Issel, 2011). This research seeks to examine the impact of a community-based CM intervention on patients' clinical and access outcomes.

Purpose of the Study

The purpose of this study was to evaluate the effect of a community-based case management intervention on patient outcomes in Medicare beneficiaries with chronic illness in a community-based CM service in a rural Midwest region. The overall goals of this study were: (a) to describe the profiles of patients with chronic diseases who have had community-based CM; (b) to describe CM care delivery services; (c) to determine whether there is a statistically significant relationship—at baseline, 12-month, and 24-month intervals—between patient outcomes and interventions of community-based CM. A descriptive, repeated measurement design was used, and a secondary analysis of a data set containing longitudinal community-based CM data was conducted.

Research Questions

There were three research questions in this study:

1. What were the self-care (Activities of Daily Living and Instrumental Activities of Daily Living) characteristic profiles of selected Medicare beneficiaries who received this intervention?
2. Were there significant differences in patients' clinical outcomes (ADL, IADL, symptom control, quality of life, and personal well-being) among four categorized modes (high home, high clinic, high telephone, mixed modes) of case-management care delivery services?
3. What was the difference among patients' access outcomes (number of hospitalizations, length of stay, and emergency department visits), patients' clinical outcomes (symptom control, quality of life, and personal well-being) and a community-based case-management intervention over time (at baseline, 12 months, and 24 months)?

Variables

The study's independent variables were CM modes, which were the four categorized modes (high home, high clinic, high telephone, and mixed) of care delivery.

The dependent variables in this study were self-care, symptom control, quality of life, personal well-being, number of hospitalizations, length of stay (LOS), and number of emergency department (ED) visits. Self-care, symptom control, quality of life, and personal well-being were patient-reported and nurse-assessed clinical outcome variables. The number of hospitalizations, LOS, and ED visits were access (health service utilization) outcome variables. These variables were compared with longitudinal analysis at baseline, 12 months, and 24 months.

Definition of Terms

The conceptual and operational definitions of this study follow.

Case management (CM)

Conceptual

Case management is a “collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy for options and services to meet an individual’s and family’s comprehensive health needs through communication and available resources to promote quality cost-effective outcomes” (Case Management Society of America [CMSA], 2010, p. 8). In this study, CM consists of comprehensive activities such as assessment, care, and evaluation by nurse case managers (NCMs) when patients are discharged from the hospital and follow-up care with NCMs in community-based settings. According to Brokel et al. (2012), CM aims “to help such patients manage their symptoms and alleviate the negative outcomes associated with poor self-management” (p. 138). CM endeavors to have an impact on self-management.

Operational

In this study, CM was guided by the CMSA definition, and NCMs demonstrated coordinated care and advocated for patients (Brokel et al., 2012). According to Brokel et al. (2012), NCMs who took on the role of care coordinator met with “patients in their home, complete comprehensive assessments, make diagnoses, identify barriers with the healthcare system, help patients recognize symptoms, and set long-term goals—thus

coordinating a plan that, overall, reduces costly services” (Brokel et al., 2012, p. 139; Peikes et al., 2009). CM was categorized into four modes of care delivery, such as high dominant home, high dominant clinic, high dominant telephone, and mixed-care services by each NCM. In this study, “high care” refers to intense and extended care.

CM mode of care delivery

Conceptual

The “modes of delivering care” concept is “which care characteristic of the bureaucratic practice mode are functional nursing (task allocation) and team nursing and they are mass production models of service delivery” (Pontin, 1999, p. 585). Therefore, the “mode of care” is “a way of organizing nursing cares in institutions so that professional nursing practice can be exercised” (Pontin, 1999, p. 584). In this study, CM mode of care was delivered as home, clinic, and telephone care services by each NCM. All modes (home, clinic, telephone) were provided by NCMs in community-based settings to participants who were Medicare beneficiaries with chronic illnesses. However, these modes of services were provided in different percentages by individual NCM: one NCM delivered a high proportion of home care services, the other NCM delivered a high proportion of telephone care services. These varied by NCM and year.

Operational

Four modes of CM care delivery were computed per mode of care delivery, such as high home, high clinic, high telephone, and mixed care services, by each NCM. In this study, “high home care services” were services delivered as more than 50% of home care in year. This means that the NCM provided more than 50% of care services via home care. Similarly, there were “high telephone care services” and “high clinic care services.” There was also a “mixed” one which was delivered as a similar percentage of home, telephone, and clinic care services.

Self-Care

Conceptual

Self-care is defined as “personal care accomplished without technical assistance, such as eating, washing, dressing, using the telephone, and attending to one’s own elimination, appearance, and hygiene” (Mosby, 1998, p. 1469). Self-care refers to “individual responsibilities for healthy lifestyle behaviors required for human development and functioning as well as those activities required coping with health conditions” (Omisakin & Ncama, 2011, p. 1734).

Operational

In this study, self-care was measured with the Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) scales. The ADL scale includes 10 items: eating, dressing, toileting, bathing, grooming, hygiene, oral hygiene, walking, wheelchair mobility, and transferring (Brokel et al., 2012). Each item of the scale was scored from 1 to 5, the sum of the ADL scores ranged from 10 to 50, and the mean scores ranged from 1 to 5. The IADL contains 17 items, including the ability to shop and perform household chores (Brokel et al., 2012). Each item of the IADL scales were scored from 1 to 5, the sum of the IADL scores ranged from 17 to 85, and the mean ranged from 1 to 5. Both ADL and IADL items were measured with Likert scales (1 = severely compromised, 2 = substantially compromised, 3 = moderately compromised, 4 = mildly compromised, and 5 = not compromised), with higher scores indicating greater level of performance. The mean scores of the ADL and IADL were used in this study.

Symptom control

Conceptual

Symptom control is defined as “the personal actions to minimize perceived adverse changes in physical and emotional functioning” (Harris et al., 2009, p. 1798).

Operational

In this study, symptom control was measured by the Symptom Distress Scale (SDS) for Medicare beneficiaries. The SDS was developed to measure a symptom of distress, or “the degree of discomfort from the specific symptom being experienced as reported by the patient” (McCorkle & Young, 1978, p. 374). In this study, the scale consisted of two items: “monitors symptom variation” and “uses preventive measure.” Each item of the symptom control scales are scored from 1 to 5, the sum of the scale scores ranged from 2 to 10, and the mean ranged from 1 to 5. The scale was measured with a Likert scale (1 = never demonstrated, 2 = rarely demonstrated, 3 = sometimes demonstrated, 4 = often demonstrated, and 5 = consistently demonstrated; Brokel et al., 2012). The mean score was computed from the items on the scale.

Quality of life

Conceptual

Quality of life is “the degree of satisfaction an individual has regarding a particular style of life” (Harkreader, 2003, p. 1490).

Operational

Quality of life was assessed by examining six indicators of self-concept: pervasive mood, close relationships, health status, economic status, and achievement of life goals. It was measured with the Satisfaction With Life Scale (SWLS). In this study, the scale consisted of six items, each indicator of the scale was scored from 1 to 5, the sum of the scale scores ranged from 6 to 30, and the mean ranged from 1 to 5. The six indicators were assessed with a Likert scale (1 = not at all satisfied, 2 = somewhat satisfied, 3 = moderately satisfied, 4 = very satisfied, and 5 = completely satisfied). The mean score was computed for each of the six indicator items on the scale, and this study used the mean scores.

Personal well-being

Conceptual

Personal well-being is “the extent of positive perception of one’s health status” (Harris et al., 2009, p. 1434). In this study, personal well-being was assessed by measuring patients’ social relationships, spiritual life, cognitive status, ability to cope, ability to relax, level of happiness, and ability to express emotions.

Operational

Personal well-being was assessed by measuring seven indicators of patients’ social relationships: spiritual life, cognitive status, ability to cope, ability to relax, level of happiness, and ability to express emotions on the Psychological General Well-Being Index (PGWB). In this study, the scale consisted of seven items, each indicator of the scale was scored from 1 to 5, the sum of the scale scores ranged from 7 to 35, and the mean ranged from 1 to 5. The seven indicators were measured with a Likert scale (1 = not at all satisfied, 2 = somewhat satisfied, 3 = moderately satisfied, 4 = very satisfied, and 5 = completely satisfied; Brokel et al., 2012). The mean score was computed for this study.

Number of hospitalizations

Conceptual

Hospitalization means “the placing of a patient in a hospital” (Harkreader, 2003, p. 846).

Operational

In this study, the number of hospitalizations was measured as a patient’s admissions to a hospital during two years of interventions by NCMs and was measured as the total number of actual events.

Length of stay (LOS)

Conceptual

Length of stay is “the period of time a patient remains in a hospital or other health care facility as an inpatient” (Harris et al., 2009, p. 1069).

Operational

In this study, length of stay was calculated as the total number of days of hospitalization during two years of intervention by NCMs.

Number of Emergency Department (ED) visits

Conceptual

An emergency department is “(in a health care facility) a section of an institution that is staffed and equipped to provide rapid and varied emergency care, especially for those who are stricken with sudden and acute illness or who are the victims of severe trauma. The emergency department may use a triage system of screening and classifying clients to determine priority needs for the most efficient use of available personnel and equipment” (Harris et al., 2009, p. 626). “ED visits” defines patients’ stops in the ED due to an emergency situation.

Operational

In this study, the number of ED visits was the total number of days spent in the emergency room during two years of interventions by NCMs. It was calculated as the total number of trips to the ER during the two years.

Summary

This chapter introduced the significance of the study, the problem it addresses, the purpose of the research, and the study’s research questions. It also introduced the study’s variables and defined terminology. The next chapter will review the relevant literature.

CHAPTER II

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Theoretical Framework

The transitional care model and transitions theory provide the theoretical background of this study. A modified transitions theory supplies a framework that encompasses community-based care, nursing case management therapeutic concepts, and clinical and access outcomes.

The Transitional Care Model

Transitions of care have become more imperative than ever before in current health care reform. Transitions of care focus on reducing re-hospitalization rates and enhancing post-discharge care, according to the Centers for Medicare and Medicaid Services (CMS) and the Institute of Medicine (Agency for Healthcare Research and Quality [AHRQ], 2011b; Brock et al., 2013). The definition of transition of care is “a set of actions designed to ensure the coordination and continuity of health care as patients transfer between different locations or different levels of care within the same location” (AHRQ, 2011b, p. 1).

Despite numerous efforts to increase quality of care, the current health care system is still fragmented and suboptimal (Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011a). The US health care system cannot fulfill the needs of patients for transition care and continuum of care (National Transitions of Care Coalition [NTOCC], 2010). Vulnerable chronically ill people and elderly people with multiple chronic illnesses experience multiple changes of health care settings and providers (Brock et al., 2013; Naylor et al., 2011a; Parrish, O’Malley, Adams, Adams, & Coleman, 2009). The care they have received has been episodic and uncoordinated (Thorpe, Ogden & Galactionova, 2010). Insufficient care transition planning and gaps in care continuity increase the probability of readmission and psychological distress for patients, especially the elderly (Huber & McClelland, 2003). Poor transitions place a financial burden on patients,

family caregivers, and the health care system and correlate to patient dissatisfaction and emotional stress (NTOCC, 2010).

The transitional care model features strong evidence of care coordination, which can reduce costs and hospitalizations (Brown, 2009). The model was developed by Naylor and colleagues in the early 1980s at the University of Pennsylvania School of Nursing; and it was tested, refined, and delivered by clinical multidisciplinary teams and researchers for more than 20 years (Naylor, 2012). The aim of the model is: “provides comprehensive in-hospital planning and home follow-up for chronically ill high-risk older adults hospitalized for common medical and surgical conditions” (Naylor, 2012, p. 117). The model consists of eight components of (1) screening, (2) engaging patient and caregiver, (3) managing symptoms, (4) educating and promoting self-management, (5) collaborating, (6) assuring continuity, (7) coordinating care, and (8) maintaining relationships. The patient and caregivers exist at the center of the model. Figure 1 shows the principal components of this model.



Figure 1. Transitions care model

Source: Transitional Care Model. (2008). *The transitional care model (TCM)*. Retrieved from <http://www.transitionalcare.info/Abou-1783.html>

The model emphasizes interdisciplinary team-based care, but a transitional care nurse leads the team as a primary coordinator. The transitional care nurse coordinates knowledge, skills, and evidence-based practice to provide comprehensive planning of care and home follow-up. The nurse collaborates with the patient, family, physician, social worker, and other clinicians to meet the patient's complex care needs (Naylor et al., 2011a).

The transitional care model emphasizes early identification of health care risks and symptoms to avoid adverse events. The transitional care nurse initiates screening when patients with multiple or chronic conditions are hospitalized. Within 24 hours of enrollment in the transitional care program, the transitional care nurse conducts a comprehensive assessment (Transitional Care Model, 2008). The model then requires engaging patient and caregivers with the multidisciplinary team. At this stage the team works with the patient and family to identify their goals. Then, the team focuses on mapping symptoms. Each patient's needs and preferences are identified and an evidence-based care plan is programmed by well-trained health care practitioners (Coleman & Boulton, 2003). The plan should emphasize avoiding hospital readmission.

The fourth component of the model emphasizes education. Patients and caregivers are instructed both in the hospital and in the transition. During hospital days, patients and caregivers are hardly able to absorb what they are taught. The transitional care nurse reviews the discharge instructions and verifies the patients' and caregivers' understanding. In this process, the transitional care nurse collaborates and communicates with patients and caregivers, physicians, and other health care providers.

The transitional care model stresses continuity of follow-up care. For example, a transitional care nurse visits each patient's home within 24 to 48 hours of discharge from the hospital and is available to patients by telephone after discharge from the hospital. The nurse also facilitates the patient's visits to primary-care physicians and providers after transition (Transitional Care Model, 2008). Patients and caregivers also receive

coordinated care in which care is individualized and resources are identified so that patients are willing to follow through (Transitional Care Model, 2008). Finally, transitional care nurses maintain relationships by continuing home visits and telephone support post-discharge. They actively support patients and their families an average of two months after discharge (Naylor, 2012). The eight components ultimately improve health outcomes and patient satisfaction.

To date, the transitional care model is highlighted as an impressive model that is able to minimize rehospitalization and reduce total health care costs (Brown, 2009). Its strengths have been supported by empirical studies (Bixby, Konick-McMahon, & McKenna, 2000; Bradway et al., 2012; Brock et al., 2013; Naylor et al., 2004; Williams, Akroyd, & Burke, 2010). Because it works to reduce fragmented care and health care costs and to increase patient and family satisfaction, the transitional care model fits into organizing and delivering health and nursing care in new care delivery structures.

Transitions Theory

Transitions theory is generally used to explain how patients and nurse case managers (NCMs) take action and respond during a transition from a hospital to a community-based setting. Transition is defined as “a passage or movement from one state, condition, or place to another” (Meleis, 2010, p. 25). Transitions theory was first developed by Meleis in the 1960s. Subsequently, she focused her research on unhealthy and ineffective transitions. In her earliest work, unhealthy transition related to the role of insufficiency, so she tried to develop a role to supplement therapeutic nursing. After that, she became interested in the human experience of transition for immigrants and healthy people who become ill. She and her colleagues later developed a middle range theory of transition (Im, 2009; Meleis, Sawyer, Im, Messias, & Schumacher, 2000; Meleis, 2010).

The Meleis transitions theory is illustrated in Figure 2. The theory includes four closely related concepts: (1) the nature of transitions, (2) transition conditions (facilitators and inhibitors), (3) process and outcome indicators, and (4) nursing therapeutics (Im,

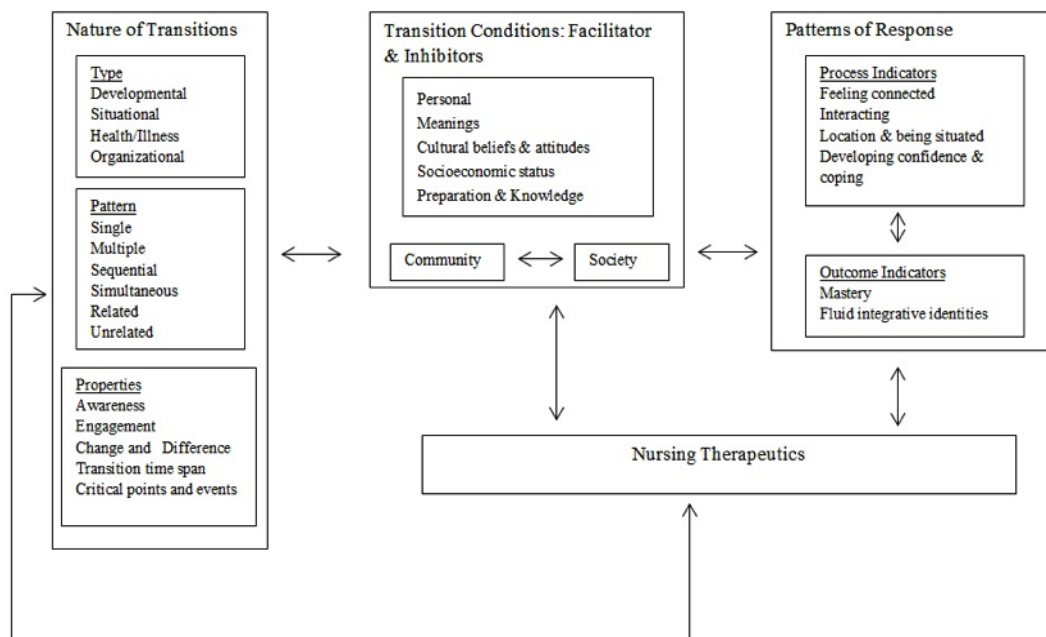


Figure 2. Transitions theory

Source: Meleis, A. I. (2010). *Transitions theory: Middle-range and situation-specific theories in nursing research and practice*. New York, NY: Springer.

2009; Meleis, 2010). *The nature of transitions* defines the types, patterns, and properties of transitions. Types of transition include development (e.g. birth, death), health-illness (e.g. discharge from the hospital and transition to community or home follow-up, diagnosis of chronic disease), and situation (e.g. immigration). Patterns of transition identify how experience shapes transition, such as when people experience single or multiple transitions, simultaneous or sequential transitions. Meleis et al. (2000) asserted that people usually experience multiple transitions at the same time. The properties of transition include awareness, engagement, change and difference, time span, and critical point and events. These properties are not distinguishable from each other, but they are interrelated (Meleis et al., 2000).

Transition conditions are the personal, community, and societal environments that influence a transition. These conditions can facilitate or inhibit healthy transitions. A

personal condition includes an individual's beliefs, attitudes, and socioeconomic status. "Community resources and societal conditions" (e.g. marginalization) can facilitate or hinder transitions. "The pattern of response" includes process and outcome indicators. With "nursing therapeutics" and "transition conditions," healthy responses can be detected.

Transitions theory considers "the values of continuity, resident and family centeredness, holism and wellness; provides direction for nursing assessment and nursing therapeutics in practice; and suggests interesting avenues for nursing research such as exploring relationships between patterns of transitions and effective nursing interventions" (Young, Sikma, Johnson Trippett, Shannon, & Blachly, 2006, p. 348). To test the transitional care model, Naylor et al. (2011) studied transitional care for chronic illness among elderly Medicare recipients with comprehensive transitional care and telephone case management. They found that transitional care was associated with decreased rehospitalization, a reduced number of total days spent in the hospital, and reduced short-term health care costs. The study noted that total health care costs were decreased by \$439 per member per month at three months, with cumulative savings of \$2,170 per person at one year ($p < 0.037$) (Naylor et al., 2011b). According to Ahmed and Rak (2010), transitional CM programs reduce readmission rates within 30 days.

When the Community-Based Care Transitions Program (CCTP) was established under the Patient Protection and Affordable Care Act (section 3026), it made transitional care an important issue in health care reform. The program's purpose is "to reduce hospital readmissions, test sustainable funding streams for care transition services, maintain or improve quality of care, and document measureable savings to the Medicare program" (CMS, 2011). Further, the Centers for Medicare and Medicaid Services set a goal of a 20% reduction in hospital readmission rates, which would save \$15 billion (Kocher & Adashi, 2011). Inadequate transitions, such as fragile support systems in the community, may be associated with the risk of unintended and unplanned readmissions

(HealthCare.gov, 2011). Well-defined transitional care is likely to save health care expenditures and reduce readmission rates.

Theory Application

This study modified Meleis’s transitions theory to better address both chronic-illness transitional care and community-based care in case management (see Figure 3). This study used the four concepts of Melies’s theory—the nature of transitions, transition conditions, patterns of response, and nursing therapeutics—but modified the components of each concept. As shown in the model in Figure 2, there are three concepts in the middle box, “nature of transitions.” This study deleted the types of the nature of transitions and modified the components of patterns and properties to better fit this study. In “transition conditions,” the personal component was deleted, and “society” was substituted for “health system.” Also, *nursing therapeutics* was substituted as community-based CM with four modes of care services. Lastly, *patterns of response* were modified to fit the two categories of outcomes (health service outcomes and clinical

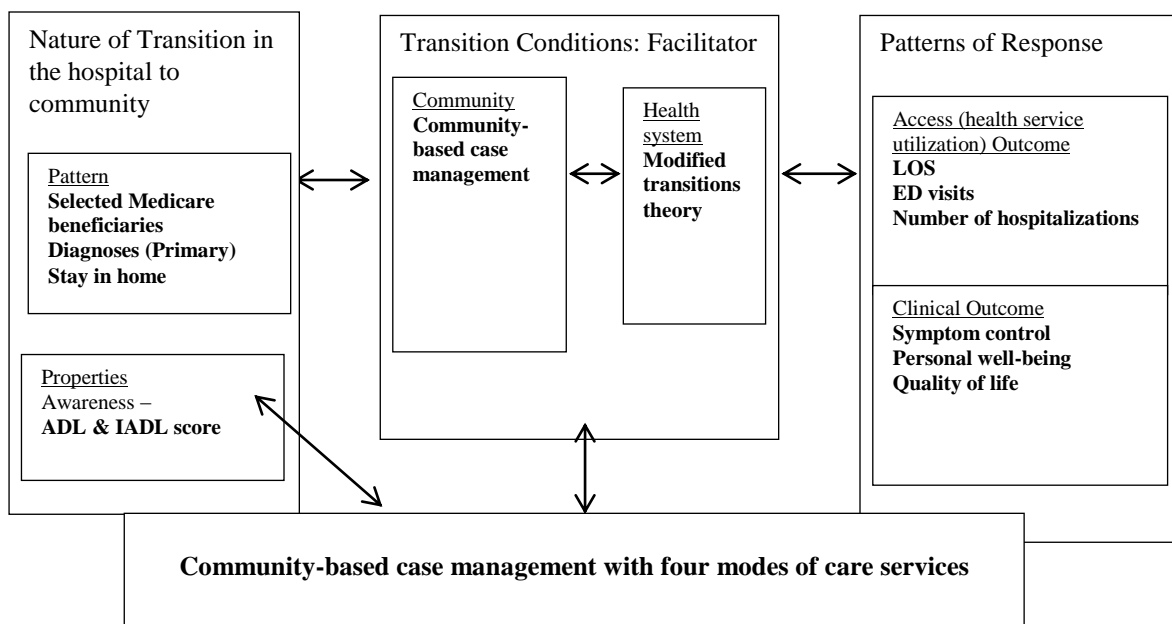


Figure 3. The modified transitions theory

outcomes; see Figure 3). The modified transitions theory in this study, however, has the same flow and direction as the original one.

The modified transitions theory used in this study was used to examine community-based CM intervention with patients' clinical and access outcomes. All study participants were patients with multiple chronic illnesses or single chronic illnesses; they also were Medicare beneficiaries. In the study, transition began during patients' discharge from a hospital and continues with follow-up care in a community setting. When patients contracted to participate in the CM program, they reported a severity score for their illness(es). As shown in the model in Figure 3, the "Transition Conditions: Facilitator" box shows the transition conditions of community-based CM; a modified transitions theory can be seen as a facilitators in transition conditions. With these facilitated transitional conditions and coordinated care by NCMs, access and clinical outcomes appear as patterns of response and are considered to be the two categories of outcomes.

The modified transitions theory had the same flow and direction as the original. The three research questions in this study and this modified theoretical model were linked to each other.

Case Management

Case Management and Disease Management

Case management is a "collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy for options and services to meet an individual's and family's comprehensive health needs through communication and available resources to promote quality cost effective outcomes" (CMSA, 2010, p. 8). CM delivers "client education, monitoring, surveillance, and care coordination" (Huber & Craig, 2007, p. 134) and is "one therapeutic nursing intervention in which nursing plays a major interdependent role that is also interdisciplinary in use" (Huber et al., 2001, p. 120). CM is an intervention that provides disease care services where care is discontinuous and fragmented (Schaefer & Davis, 2004).

Case management is sometimes confused with disease management (DM). According to Coleman et al. (2009), the terms CM and DM have been used interchangeably. According to Huber (2005), CM and DM are two sides of the same coin and seem to be complementary. Norris et al. (2002) developed an analytic framework of CM and DM (see Figure 4). They noted that “case management can be implemented along with disease management, as a single intervention, or with other interventions” (p. 17). Because of the confusion in the literature, CM and DM are sometimes used interchangeably. In Norris et al. (2002) model, DM is really what is now called population health management, with CM as a subset. Population health management is best suited to transitions in community health. However, to improve care, CM and DM need to be clarified and distinguished. With better use of the terminology and components of each intervention, a provider might be better able to make the right decision to meet a patient’s needs (Coleman et al., 2009).

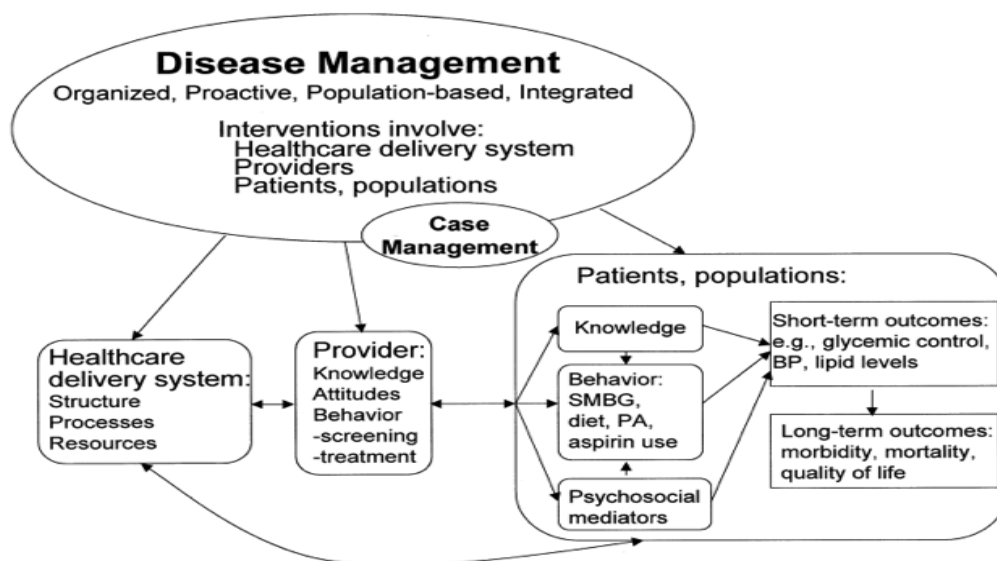


Figure 4. Case and disease management analytic framework

Source: Norris, S. L., Nichols, P. J., Caspersen, C. J., Glasgow, R. E., Engelgau, M. M., & Jack, L. (2002). The effectiveness of disease and case management for people with diabetes: A systematic review. *American Journal of Preventive Medicine*, 22(4), 15-38.

Community-Based Case Management

Community-based case management is defined as “a process of interacting within a service network to arrange and coordinate clients’ services in a supportive, efficient and cost-effective manner” (McWilliam, Stewart, Desai, Wade, & Galajda, 2000, p. 37). NCMs in community settings focused on “identified high-risk, vulnerable patients and followed them in the community after discharge with the goal of offering non-reimbursable nursing services that would help to stabilize their condition” (Forbes, 1999, p. 28). CM in a community setting is an intervention that encompasses the responsibility for providing patients with related information and referrals to substitute community resources (Prentice et al., 2011). The role of a case manager is not solitary or completely independent; NCMs collaborate with other disciplinary areas such as physiotherapy, social work, dietetics, and occupational therapy to maximize patient wellness (Prentice et al., 2011). In the community, the roles of NCMs are: health educator, health counselor, referral agent, coordinator, support group leader and developer, mentor, team member, advocate, administrator/leader/manager, researcher, and evaluator (Fero, Herrick, & Hu, 2011). Due to increased numbers of chronically ill patients, CM also has become integrated with community prevention and care coordination specialties (Thorpe et al., 2010). As health care delivery systems in the United States change to develop more client-centered approaches, the need for community-based CM has increased (McWilliam et al., 2000; Butcher, 2012).

Recently, primary care with a patient-centered medical home model has emerged as a popular intervention and model for chronic disease (Butcher, 2012). The medical home model emphasizes the coordination of care; whole person care, including appropriate referrals; and seamless transitional care. Butcher (2012) announced that “a medical home coordinates care across the health care system; uses information technology to make sure patients get the right care; emphasizes quality and safety; and enhances access by expanded hours, open scheduling or other means” (p. 43). In addition,

many incentive programs have been developed to adopt the medical home model and care coordination (Butcher, 2012). An incentive program and a medical home model could improve quality of patients' care and reduce the costs of care.

When NCMs receive a referral, they thoroughly assess the patient's status from the standpoint of his or her functional, historical, and environmental well-being. They also listen to patients' needs and goals. NCMs promote patient and family participation in decision making and develop a patient and family-centered care plan. With this holistic assessment and plan, NCMs provide services incorporating evidence-based guidelines. During services, NCMs continuously identify the patient's needs, evaluate the plan of care, link the patient to relevant community resources, and give feedback to the interdisciplinary team. NCMs also record the outcome of the patient's data. Successful outcomes are the right amount of services, the appropriate services, reductions in hospital or ED visits, achievement of patient goal(s), and increased satisfaction (Prentice, Graeme Fincke, Miller, & Pizer, 2011).

Additionally, NCMs provide services supporting patients' self-management and self-care management (Brokel et al., 2012). The concept of self-management is not clearly distinct from that of self-care (Omisakin & Ncama, 2011; Richard & Shea, 2011). Self-management involves health care providers and patients collaborating and communicating to assess a problem, set a goal, and encourage self-care. Specifically, self-management refers to "the ability of the individual, in conjunction with family, community and healthcare professionals to manage symptoms, treatments, lifestyle changes and psychosocial, cultural, and spiritual consequences of chronic diseases, an ability and process that individuals use in conscious attempts to gain control of his or her disease, rather than being controlled by it" (Omisakin & Ncama, 2011, p. 1735). Thus, self-management support emphasizes patients' central role in dealing with chronic illness (Dorr et al., 2006). NCMs can empower patients' self-management skills to help them better adhere to their medication regimens, control their symptoms, and live quality,

independent lives. Developing such skills can enhance patients' satisfaction with their lives and reduce preventable readmission rates and ED visits. In fulfilling this component, NCMs educate patients about self-management and teach life skills in the community and in the health system. Several empirical studies have shown that a self-management education supported by a nurse case manager holds promise as an effective strategy for controlling chronic illnesses such as diabetes and COPD (Brown et al., 2011; Sedeno, Nault, Hamd, & Bourbeau, 2009).

Community-Based Case Management and Chronic Illness Outcomes

Case management has been proven effective by many studies in chronic disease. Peikes et al. (2009) identified several criteria for successful community programs in Medicare. Successful programs correlate with at least one in-person contact with the patient per month, educate patients about their medication regimen, manage transitional care to prevent short-term readmission, and promote frequent interaction among providers. Outcomes of community-based CM studies cluster into two categories: access outcomes and client-focused outcomes. Access outcomes relate to the number of hospitalizations, rate of readmission, length of stay, and ED visits. Client-focused outcomes link to patient quality of life, satisfaction, and personal well-being. The expected outcomes of CM services are improved patient satisfaction, coordinated care, better quality of care, and reduced cost (Huber et al., 2003; Vann, 2006).

Number of Hospital Readmissions

According to the CMS (2011), "hospitalizations account for approximately 33% of total Medicare expenditures and represent the largest program outlay." Readmissions are a major problem for chronically ill patients and contribute to the escalation of US health care costs (Brock et al., 2013; Brown, 2009; Hennessey & Suter, 2011). Approximately one-fifth of Medicare beneficiaries who were admitted and discharged from a hospital were readmitted to the hospital within 30 days (Brown, 2009; Hennessey

& Suter, 2011). According to Hennessey and Suter (2011), “the average stay of re-hospitalized patients was 0.6 days longer than that of other patients in the same diagnostic-related group” (p. 219). The high rate of preventable readmission rates are due to insufficient transitional care and follow-up care, limited medication regime education, and inappropriate post-discharge self-care education (Brown, 2009). According to the CMS, \$12 billion per year are spent on preventable readmissions for Medicare beneficiaries (CMS, 2010). Beginning in October 2012, a new readmission policy penalizes hospitals that have high readmission rates (Fontanarosa & McNutt, 2013; Medicare Payment Advisory Commission [MedPAC], 2012). In the positive, the Patient Protection and Affordable Care Act (2009, section 3026) founded the Community Care Transitions Program, which has been recruiting and funding hospitals and community-based entities to provide follow-up care and transitional care and to reduce preventable readmissions as an outcome for Medicare beneficiaries (Fontanarosa & McNutt, 2013).

In 2002, the CMS conducted a longitudinal study to evaluate the Medicare Coordinated Care Demonstration (MCCD) program. The purpose of the MCCD program was to test the effectiveness of CM or DM and present evidence of patient outcomes for Medicare beneficiaries with multiple chronic illnesses (Brown, Peikes, Chen, Ng, Schore, & Soh, 2007). The CMS selected 15 programs nationwide. The programs’ interventions varied, but most of the programs focused on “patient education, communication between patients and providers, services and resource arrangement, ongoing monitoring, and quality management and outcome measurement” (Brown et al., 2007, p. xxiv). For the first two years of the study, one program reported a significant reduction in hospitalizations. This result was due to preventive care incorporating case managers and patient education.

Several other studies have shown that CM often results in cuts in the number of hospitalizations and readmissions. In a meta-analysis, Kim and Soeken (2005) found a 6% decrease in readmission rates for chronically ill patients who received CM

interventions. Duke (2005) found that, in a one-year community-based CM intervention, hospital admissions of frail elderly patients decreased by 13%. Bernabei et al. (1998) also found that after one year of intervention with community CM services, hospital admissions in the intervention group were less common than in the control group receiving conventional care (hazard ratio 0.69). Lim, Lambert, and Gray (2003) reported that hospitalization was significantly lower in a six-month follow-up with a CM services group. Another study showed that after one year of CM intervention, the hospitalization rates of the intervention group significantly decreased compared with the usual care group (Boyd, Fisher, Davidson, & Neilsen, 1996). Oliva (2010) analyzed the CM dose and outcomes with community-dwelling elderly adults. She noted that “there was no specific dose that was found to be associated with individual NCMs and congestive heart failure patients’ associated readmission risk” (p. 98). Allen (1999) found that hospital admission and nursing facility admission were significantly less in the intervention group receiving community-based CM by nurses. Before the program, the intervention group had less ADL independence and more functional and environmental limitations. After the program, the group had significantly fewer hospitalizations than non-CM recipients after one year of intervention (Allen, 1999). Overall, there has been found to be a reduction in hospitalizations and readmissions with community-based CM as an intervention.

Length of Stay (LOS)

LOS is another factor positively affected by CM interventions. Duke (2005) found that LOS was decreased by 22% after 1 year of community-based CM intervention with frail elderly patients. Kim and Soeken (2005) studied the effect of CM on hospital LOS and readmission rates using a meta-analysis. Among twelve studies, results of LOS varied by disease. CM was significantly effective for patients with heart failure (effect size of 0.241); however, it was ineffective for frail elderly and stroke patients. Hammer (2001) reported positive outcomes of a community-based CM program in rural areas.

Compared with the previous noncase-managed year, LOS dropped by 9% for patients who received CM services for 12 months or more.

Emergency Department (ED) visits

Reducing the need for and cost of ED visits is a major focus of CM interventions. After one year of comparison study between case-managed and noncase-managed chronically ill elderly patients, Boyd et al. (1996) found that ED visits were significantly decreased in the case-managed group ($p < 0.05$). Bernabei et al. (1998) also reported that at a one-year follow-up assessment, ED visits decreased in a CM intervention group compared with the control group ($p < 0.025$).

Client-Focused Outcomes

CM intervention increased patients-centered outcomes. Watt (2001) noted that community-based CM programs that promote well-being in the elderly need empirical evidence for their effectiveness. In the literature, client-focused outcomes include patients' continuum of wellness, satisfaction with the intervention program, and quality of life. Client-focused outcomes aim to understand patients' self and functional deficiencies, offer CM services, and link to community resources (Hammer, 2001). Patients' self-reported health status, such as functional health as measured by ADL and IADL, are also useful concepts in assessing and treating via nursing interventions (Chow et al., 2008).

Lowenstein (2000) found that client satisfaction as well as quality of life was increased for elderly patients and their caregivers as a result of community-based CM. (Lowenstein, 2000). Bernabei et al. (1998) found that functional status—ADL and IADL—deteriorated in the control group, while the functional status of the intervention group receiving CM was increased after one year of following-up with community-dwelling elders. Hammer (2001) also reported that the functional health as measured by ADL and IADL was improved after one year of intervention. Hammer (2001) further

noted that clients' quality of life was enhanced when case managers provided eligible services and met clients' needs.

Overview of Original Study

The parent study was conducted by Brokel et al. (2012) to examine the outcomes of chronically ill Medicare beneficiaries who were receiving care from a community-based CM service in a rural Midwest region from 2002 to 2007. The rationale was described in the initial Institutional Review Board application: "few studies have examined the true effectiveness of patient-centered outcomes with community-based case management and used electronic health records (EHR) to monitor longitudinal outcomes" (Brokel, 2007). Their specific original study aims were:

1) to develop a comprehensive, multiple strategy approach to effectively screen the Medicare beneficiary population for high-risk patients with chronic diseases, who will benefit from case management services using three types of patient visit types, 2) to develop successful, coordinated case management services, which will improve clinical outcomes, quality of life, self-care management, and service satisfaction of chronically, high-risk Medicare patient with patient visit types, and 3) to create a replicable model which integrates effective case management interventions into the Medicare fee-for-service environment without increasing costs.

The original study was designed to determine

whether case management interventions truly improve clinical outcomes, quality of life, and self-care of chronically ill patients and tried to develop a comprehensive, multiple strategy approach to effectively screen the Medicare beneficiary population for high-risk patients with chronic diseases, who will benefit from case management services. Additionally, the original study sought to develop a system to standardize a CM intervention and integrate it with the use of EHR. (Brokel, 2007)

Brokel (2007) said:

Before the initial original study, the pilot program was conducted. The pilot program in 2000 was inclusive of 459 people of Medicare beneficiaries. The people were referred to the case management program from a variety of sources including physicians, discharge planners, emergency room staff, utilization review staff, home-care nurses and patients themselves. The case managers had previously reviewed referrals and identified those with chronic illness, problems coping with health issues, inpatient

and/or emergency room visits within six months. This case management pilot program was described to consist of a team of 11 nurse case managers, one social worker, hospice intake coordinators, a home health intake coordinator, a dietitian, and a pastoral care provider with services provided to homes and clinic settings as well as telephone consult care. This initial program was involved within a demonstration project in April 2002.

The parent study was supported by the Centers for Medicare and Medicaid Services (CMS), Medicare Coordinated Care Demonstration (MCCD) Project by cooperative agreement 95-C-91340/7-01. In, January 2002, 15 demonstration programs were selected by the CMS to test whether CM and disease management (DM) programs were able to reduce health care costs and improve patient outcomes and well-being (Brown et al., 2007).

Study Design (Original)

A longitudinal descriptive study was conducted in the Midwest over four years to examine seven outcomes with chronically ill Medicare beneficiaries who were receiving care from community-based CM services. The study investigated changes from baseline, at 6 months, and annually. The CM services provided to patients followed the Nursing Intervention Classifications intervention of case management (Bulechek et al., 2013; Bulechek & Dochterman, 2004).

Setting and Sample (Original)

The population of the original study was Medicare beneficiaries who registered at a rural hospital in the Midwest. The total sample at baseline was 512 patients. The cohort of beneficiaries receiving case management services was randomly selected from a larger group of beneficiaries who were identified as people with chronic illnesses as outlined by the Centers for Medicare and Medicaid Services. The participants had to live at home; those who went to a nursing home were excluded. The sample for the study was patients who were provided community-based CM services in 14 surrounding counties. The original study monitored patients for four years; but beyond three years, 168 cases were eligible to be analyzed. Figure 5 illustrates the sampling process. Approximately

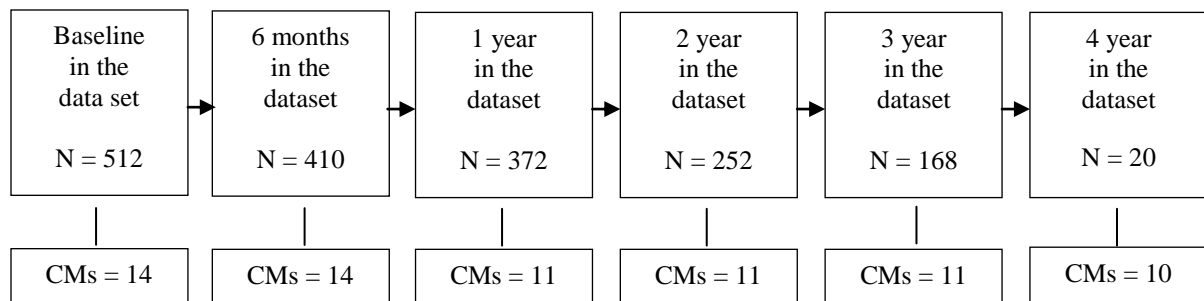


Figure 5. The sampling process (original study)

32% (n = 198) were 65 to 74 years old, and 46% (n = 252) were 75 to 84 years old. The majority of the sample was white (91.1%, n = 556); 0.6% (n = 36) were Hispanic, and 0.4% (n = 18) were nonwhite. About 43% (n = 263) had some high school education, and 60% (n = 367) had incomes of less than \$20,000 per year. The patients in the sample were older than 65 years and had one or more chronic diseases, such as coronary artery disease (68.6%, n = 419), congestive heart failure (65.2%, n = 399), chronic obstructive pulmonary disease (COPD, 53.8%, n = 329), renal failure, arteriosclerosis vascular disease, stroke/cerebral vascular disease, respiratory failure, and liver disease (Brokel et al., 2012; Brown et al., 2007).

Data Collection (Original)

Brokel and colleagues (2012) noted “The parent study collected aggregated patient demographic information at the beginning of the study (Brokel et al., 2012). Case managers first determined if a patient’s diagnoses were related to indicate diseases for CM services. After that, case managers collected patients’ outcomes. Seven patient outcomes—bowel continence, personal well-being, quality of life, self-care ADL, self-care IADL, symptom control, and urinary continence—were collected by 13 experienced nurse case managers (NCMs) and one social worker to examine changes at baseline, at 6

months, and annually. NCMs used the interval measurement scales (1st to 5th) for all seven outcomes (Brokel et al., 2012). In addition, the data set included a site generated code for a patient case, an admit date, a discharge date, encounter type (emergency or inpatient), principle diagnosis, length of stay in days, and an assigned case manager were collected.”

Each case manager was given latitude to manage patients over a period of four years, using any of three different types of patient visits—telephone consultation, clinic visit, and home visit—chosen at random. The case managers altered visit type over time, so tracking by the dates helps to align a case manager’s type of visit with a patient’s encounters—if any encounters occurred—during the same year. All modes (home, clinic, telephone) were provided by NCMs in community-based settings to Medicare beneficiaries. All NCMs provided all modes, but no two NCMs provided any of the modes of care in the same ratio.

The original study used coded data. The computer data set used to collect the data provided guidance to programmers on report construction to eventually extract data for outcome evaluation. Thus, the parent study tested whether their EHR system captured a patient’s outcomes (Brokel et al., 2012). Over the years, the same outcomes were collected with seven measurements and periodically (Brokel et al., 2012).

Findings (Original)

Over three years of intervention, the original study identified 168 patients for receiving CM services; all demonstrated the seven measurements. At the beginning of the study, more than 500 patients were enrolled, but 14% to 15% of them expired and/or moved away from the county’s regions or nursing homes. These participants were excluded (Brokel et al., 2012).

The original study found that patients receiving CM reported significant satisfaction with quality of life and personal well-being and had better symptom control over three years of interventions. The patients also demonstrated significant improvement

with quality of life ($p = 0.003$) and personal well-being ($p = 0.003$). CM services provided care for patients' health status, mood status, and life goals—all directly related to patients' symptom control. These interventions contributed to improvements in patients' quality of life scores. In addition, NCMs provided services addressing patients' spiritual life, cognitive functioning, and ability to relax. These services correlated with well-being. The symptom control score was improved but not significantly from baseline ($p = 0.119$). This improvement occurred because CM services were attributed to patients' recognition of their symptom variation.

The self-care abilities of the cohort were either not compromised (self-care ADL = 4.82) or mildly compromised (self-care IADL = 4.22) when services began. Overall, for functional health and self-care, both ADL ($p = 0.049$) and IADL ($p = 0.001$) significantly declined because patients deteriorated over the four year time frame. However, bowel continence and urinary continence were not affected over time (Brokel et al., 2012).

Summary

This chapter reviewed related literature on theoretical frameworks, the concept of case management, clinical and access outcomes with CM among the chronically ill population. An overview of the original study was provided. In the literature, many studies looked at the effectiveness and outcomes of CM interventions. A few studies described mode analysis of CM services and connected this to outcomes.

CHAPTER III

METHODOLOGY

The greatest share of Medicare spending is due to a small percentage of Medicare beneficiaries with multiple chronic conditions (Brown, 2009). Effective, continuous, and accountable care should be prioritized for chronic illnesses in the Medicare population. Case management (CM) has been shown to be effective in many aspects of chronic illness care. However, CM is a behavioral intervention, and its specific delivery of services often varies on a case-by-case basis. Limited studies have shown that an accurate description of CM intervention yields a positive outcome. There are few studies that fully describe an accurate CM working intervention and analysis of outcomes of CM services (Huber et al., 2003; Park et al., 2009).

The purpose of this study was to evaluate the effect of a community-based CM intervention on patient outcomes in Medicare beneficiaries with chronic illness in a community-based CM service in a rural Midwest region. The study addressed the following research questions:

1. What were the self-care (Activities of Daily Living and Instrumental Activities of Daily Living) characteristic profiles of selected Medicare beneficiaries who receiving this intervention?
2. Were there significant differences in patients' clinical outcomes (ADL, IADL, symptom control, quality of life, and personal well-being) among four categorized modes (high home, high clinic, high telephone, mixed modes) of case-management care delivery services?
3. What was the difference among patients' access outcomes (number of hospitalizations, length of stay, and emergency department visits), patients' clinical outcomes (symptom control, quality of life, and personal well-being) and a community-based case-management intervention over time (at baseline, 12 months, and 24 months)?

To answer these questions, a descriptive, repeated measurement design was used, and a secondary analysis of a data set containing longitudinal community-based CM data, originally collected from 2002 to 2007, was conducted. The total selected 252 Medicare beneficiaries were analyzed to answer the first and third research questions. A subsample of 94 patients at the first period of Year 1 and 85 patients at the second period of Year 2, who received each of four different modes of CM services, were used to answer the second research question.

Secondary Analysis

Previously collected data, especially large datasets, can be a rich source of information and knowledge generation. Research questions can be investigated using a secondary analysis design. According to Burns and Groves (2009), “secondary analysis design involves studying data previously collected in another study” (p. 271). Secondary analysis means that “data are reexamined with the use of different organizations of the data and different statistical analyses from those previously used” (Burns & Groves, 2009, p. 271). “Sometimes researchers perform a secondary analysis, which is the use of data gathered in a previous study—often by other researchers—to test new hypotheses or address new research questions” (Polit, Beck, & Hungler, 2001, p. 262).

Present Study Design

This study is a descriptive study, a repeated measures analysis, and a secondary analysis of a precollected data set. From the total sample in the original dataset (N = 512), the extracted dataset, collected from 2002 to 2004 (N = 252), was analyzed to describe self-care characteristic profiles of Medicare beneficiaries at baseline (Research Question 1). The data from 11 NCMs who delivered CM activities from 2002 to 2004 was analyzed to describe the four categorized modes (high home, high clinic, high telephone, and mixed) of CM care delivery services (Research Question 2). Finally, the data from patients’ outcomes in each year was analyzed (Research Question 3). Figure 5 from Chapter II illustrates the sampling process. It was not possible to analyze the

demographics of the present study's secondary analysis sample (N = 252) due to the structure of the original data collection not having these data linked to individual participants. This was not done due to privacy and confidentiality restrictions from the original site. The original study's demographic profile was used as a proxy.

Data Collection

The sample for this secondary analysis study includes selected chronically ill Medicare beneficiaries who received community-based CM services in a rural hospital in the Midwest. The data set population was 252 over two years' follow-up. The study took the whole population as the sample. Table 1 illustrates the sampling process, by mode of service, for the current study. Based on Cohen's (1988) power analysis, using G*power program for calculating sample size, $\alpha=0.05$, power $(1-\beta)$ 0.8, medium effect size, when statistical power was computed for repeated measurement ANOVA, the total sample size yielded 24. Therefore, the sample size of this study was adequate to get a desired level of power.

In this study, "experienced case managers (nurse practitioners and bachelor of science in nursing-registered nurses) systematically collected data, at intervals, for the patient's computerized record" (Brokel et al., 2012, p. 141). Each case manager had been given patients over a period of two years using home visit, clinic visit, and telephone consultation services. All modes (home, clinic, telephone) were provided by NCMs in community-based settings to participants who were Medicare beneficiaries with chronic illnesses. All NCMs provided all modes, but no two NCMs provided any of the modes of care in the same ratio. The modes were classified into four categories post hoc, meaning that NCMs classified their services after providing it. Data were precollected, but the modes were determined during the data analysis. Thus, CM mode of care was categorized into four dominant modes of services: high home, high clinic, high telephone, and mixed-care. For each NCM for each year, high home care means more than 50% of care was home visits, high telephone means more than 50% of care was telephone consultations,

and high clinic care means more than 50% of care was clinic visits. With mixed-care services, all three modes of care were provided with similar percentages.

According to the original study, the NCMs had reviewed referrals and identified those with chronic illnesses, problems coping with health issues, and inpatient and/or emergency room visits before initiating them into the original study. After that, 11 NCMs delivered care and services randomized by mode. There was a protocol, training manual, or both for how the mode was done.

Table 1
Sampling Process by Mode of Service for the Current Study

Modes of CM Care Services	Year 1		Year 2	
	Patients	NCMs	Patients	NCMs
High home	n = 56	n = 6	n = 50	n = 6
High clinic	n = 7	n = 1	n = 6	n = 1
High telephone	n = 8	n = 1	n = 13	n = 2
Mixed-care	n = 23	n = 3	n = 16	n = 2
Total	N = 94	N = 11	N = 85	N = 11

Instruments

Instruments are important for measuring patient outcomes. This section describes each scale, the background of the scale, and the reliability and validity of the scale used to measure these outcomes. Each instrument's reliability, validity, and scale rating is also shown in Table 2. Reliability is defined as "the ability of an instrument to measure phenomena in a consistent manner" and validity refers to "the ability of an instrument to measure the phenomena it is supposed to be measuring" (McCorkle, Cooley, &

Table 2
Instruments

Construct	Instrument	Reliability Support	Validity Support	Scale	Scale Rating
Self-care ADL	Index of Activities of Daily Living (Katz Index of ADL)	Internal consistency: $\alpha = 0.87$ (Ciesla et al., 1993); Cronbach's $\alpha = 0.94$ (Hamrin & Lindmark, 1988)	Construct (factorial) (Ciesla et al, 1993); Correlation with Activity index = 0.95 (Hamrin & Lindmark, 1988)	Compromised	5 = not compromised 4 = mildly compromised 3 = moderately compromised 2 = substantially compromised 1 = severely compromised
Self-care IADL	Index of Independence in Activities of Daily Living (Lawton Index of IADL)	Inter-rater reliability at 0.85 (Lawton & Brody, 1969); Internal consistency: $\alpha > 0.70$; Alpha = 0.94 (Vergara et al., 2010)	Construct (factorial) (Lawton & Brody, 1969; Vergara et al., 2010)	Compromised	5 = not compromised 4 = mildly compromised 3 = moderately compromised 2 = substantially compromised 1 = severely compromised
Symptom Control	Symptom Distress Scale (SDS)	Coefficient: $\alpha = 0.82$ (McCorkle & Young, 1978); Test-retest = 0.78 (McCorkle & Quint-Benoliel, 1983); Internal consistency: $\alpha = 0.87$ (Holmes, 1989)	Construct (McCorkle & Quint-Benoliel, 1983; Holmes, 1989)	Demonstrated	5 = consistently demonstrated 4 = often demonstrated 3 = sometimes demonstrated 2 = rarely demonstrated 1 = never demonstrated
Quality of Life	Satisfaction with Life Scale (SWLS)	Alpha reliability of 0.87; test-retest = 0.82 (Diener et al., 1985); Internal consistency: $\alpha = 0.78$ (Neto, 1993)	Construct (Diener et al., 1985; Neto, 1993)	Satisfaction	5 = completely satisfied 4 = very satisfied 3 = moderately satisfied 2 = somewhat satisfied 1 = not at all satisfied
Personal Well-Being	Psychological General Well-Being Index (PGWB)	Cronbach's alpha = 0.92 (Dupuy, 1984); Cronbach's alpha coefficients = 0.93 – 0.96 (Revicki et al., 1996)	Construct (Dupuy, 1984; Revicki et al., 1996)	Satisfaction	5 = completely satisfied 4 = very satisfied 3 = moderately satisfied 2 = somewhat satisfied 1 = not at all satisfied

Shea, 1988, p. 5). These psychometric properties, such as reliability and validity, represent the adequacy and rigor of measurements (Cook & Beckman, 2006).

Self-Care

Self-care was measured by both ADL and IADL instruments. Self-care means “personal care accomplished without technical assistance, such as eating, washing, dressing, using the telephone, and attending to one’s own elimination, appearance, and hygiene” (Mosby, 1998, p. 1469).

Self-Care ADL Instrument

The self-care ADL instrument was developed to measure the ability to perform basic physical tasks (Brokel et al., 2012; Bulechek et al., 2013; Bulechek & Dochterman, 2004; Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). The instrument was made by Katz et al. (1963) to observe a large number of elderly patients with hip fractures as they performed activities (Bulechek et al., 2013; Bulechek & Dochterman, 2004; Katz et al., 1963). The test was later given to healthy elders and the chronically ill has since become a standard instrument for elder research (Ciesla, Shi, Stoskopf, & Samuels, 1993; Katz et al., 1963; Wallace & Shelkey, 2008). The ADL scale score measures performance in eating, dressing, bathing, grooming, walking, and transferring (Katz et al., 1963).

There is no formal reliability and validity of the Katz ADL in the literature (Wallace & Shelkey, 2008). Since the ADL instrument was developed, the scale has been used to measure functional status of elders (Wallace & Shelkey, 2008). There are some studies which reported psychometric properties of the self-care ADL. Internal consistency reliability of the ADL was 0.87 (Ciesla et al., 1993) and 0.94 (Hamrin & Lindmark, 1988). Hamrin and Lindmark (1988) investigated the psychometric validity as high and reported correlation of 0.95 with Activity index. The instrument has also shown construct validity (Ciesla et al, 1993).

In this study, the ADL instruments included 10 activities: eating, dressing, toileting, bathing, grooming, hygiene, oral hygiene, walking, wheelchair mobility, and

transferring (Brokel et al., 2012; Bulechek et al., 2013; Bulechek & Dochterman, 2004).

The ADL scores range from 10 to 50.

Self-Care IADL Instrument

The self-care IADL means “the ability to perform independently activities needed to function in the home or community, with or without an assistive device” (Brokel et al., 2012, p. 140; Bulechek et al., 2013; Bulechek & Dochterman, 2004). The self-care ADL instrument was developed by Lawton and Brody (1969) to measure the ability of managing one’s finances and transportation. The IADL scale is measuring more complex activities of daily living than the Katz ADL index (Graf, 2008). Lawton and Brody (1969) established an inter-rater reliability at 0.85. The validity of the index was tested and supported, and all correlations were at the 0.01 or 0.05 level (Lawton & Brody, 1969; Graf, 2008). There are few other studies that report psychometric properties of the self-care IADL. Internal consistency ($\alpha = 0.94$) within factors has been supported (Vergara et al., 2012).

In this study, the IADL instrument contains 17 activities: shops for groceries, clothing, and household supplies; prepares and serves meals; operates telephone; handles written communication; opens containers; performs housework, household repairs, and yard work; manages money and business affairs; travels on public transportation; drives own car; does own laundry; and manages own medication (Brokel et al., 2012; Bulechek et al., 2013; Bulechek & Dochterman, 2004). The IADL scores range from 17 to 85.

Both ADL and IADL items were measured with Likert scales (1-5, 1 = severely compromised, and 5 = not compromised, see Table 2), with higher scores indicating greater level of performance.

Symptom Control

In this study, symptom control was measured by the Symptom Distress Scale (SDS). Symptom control is defined as “the personal actions to minimize perceived adverse changes in physical and emotional functioning” (Harris et al., 2009, p. 1798).

The Symptom Distress Scale was developed by McCorkle and Young (1978) to measure “the degree of discomfort from the specific symptom being experienced as reported by the patient” (McCorkle & Young, 1978, p. 374). The SDS had an alpha reliability of 0.82 (McCorkle & Young, 1978). Test-retest reliability was 0.78 and internal consistency was 0.78 – 0.79 (McCorkle & Quint-Benoliel, 1983). McCorkle and Quint-Benoliel (1983) demonstrated the discriminate validity between cancer and heart patients. Few studies report psychometric properties of the SDS. Holmes (1989) addressed high internal consistency ($\alpha = 0.97$) and supported the construct validity of the SDS (Holmes, 1989).

In this study, the scale was assessed using two items: monitors symptom variation and uses preventive measures with Likert scales (range 1–5) (Brokel et al., 2012; Bulechek et al., 2013; Bulechek & Dochterman, 2004). The two items of the scale ranged from 2 to 10, and a higher score indicated greater level of symptom distress (Brokel et al., 2012). In this study, the mean score of two items was used to measure symptom distress (range 1–5) (Brokel et al., 2012).

Quality of Life (QoL)

Quality of life was measured with the Satisfaction with Life Scale (SWLS). Quality of life is “the degree of satisfaction an individual has regarding a particular style of life” (Harkreader, 2003, p. 1490). The original SWLS was developed by Diener and colleagues (1985) to measure global life satisfaction (Diener, Emmons, Larson, & Griffin, 1985). Diener et al. (1985) demonstrated that the SWLS is narrowly focused on life satisfaction with cognitive judgment processes. The scale yielded an alpha reliability of 0.87, a test-retest reliability of 0.82, and it showed construct validity (Diener et al., 1985). Evidence supporting the internal consistency ($\alpha = 0.78$) and factor analysis on single common factor showed high factor loadings (Neto, 1993).

In this study, the scale contained six scale indicators: self-concept, health status, pervasive mood, economic status, close relationships, and achievement of life goals (Brokel et al., 2012; Bulechek et al., 2013; Bulechek & Dochterman, 2004). The items

were measured with a Likert scale; a higher score indicated higher satisfaction (Brokel et al., 2012; Diener et al., 1985). The total range of the scale was 6–30, and the mean score of six indicators was used as the measure of QoL (range 1–5).

Personal Well-Being

Personal well-being is “the extent of positive perception of one’s health status” (Harris et al., 2009, p. 1434). Well-being was measured with the Psychological General Well-Being Index (PGWB) developed by Dupuy (1984). The PGWB was designed to “measure self-representations of intrapersonal affective or emotional states reflecting a sense of subjective well-being or distress” (Revicki, Leidy, & Howland, 1996). For internal consistency, Cronbach’s alpha was 0.92 and validity was supported (Dupuy, 1984). Revicki et al. (1996) addressed Cronbach’s alpha coefficients (0.93–0.96). Also, Revicki et al. (1996) evaluated validity between a revised version of the PGWB and the original PGWB and found no significant difference in total scale scores.

In this study, personal well-being was assessed by measuring patients’ social relationships, spiritual life, cognitive status, ability to cope, ability to relax, level of happiness, and ability to express emotions (Brokel et al., 2012; Bulechek et al., 2013; Bulechek & Dochterman, 2004). It was tested with the Psychological General Well-Being Index (PGWB). The items were measured with a Likert scale (range 1–5), with a higher score indicative of more well-being (Brokel et al., 2012). The scores range from 7 to 35, and the mean score was used to represent items on the scale (range 1–5).

Number of Hospitalizations

Hospitalizations were defined as “the placing of a patient in a hospital” (Harkreder, 2003, p. 846). More specifically for this study, a hospitalization was defined as an admission of a Medicare beneficiary to a hospital and a stay in the hospital (measured by payment claims) during two years of CM intervention. The number of hospitalizations were referred to as the total number of actual events but excluded ED visits.

The hospitalization data set was obtained from each de-identified patient case; and an admit date, discharge date, and encounter type (inpatient) were extracted. After that, the total number of hospitalization events were counted, and the count was the total number of hospitalizations.

Length of Stay (LOS)

Length of stay (LOS) referred to the total days of hospitalization during two years of CM intervention services and the period of days the participants of study remained as an inpatient in the hospital. In this study, LOS data were obtained from each de-identified patient case; and an admit date, a discharge date, and encounter type (emergency) from 2002 to 2004 were extracted. Emergency department visits were considered as one day.

Number of ED Visits

ED visits were defined as patients' stops in the ED due to an emergency. The number of ED visits in this study referred to the total count of patients' stops in the ED during two years of interventions by NCMs. These data were obtained from each de-identified patient case and patient's encounter type (emergency or inpatient) was extracted.

Data Analysis

The variables, level of measurement, and statistical analysis used in this study are identified in Table 3 and matched to the research questions, concepts and definitions. Data were analyzed using SPSS 19 software (SPSS Inc, Chicago, Illinois). Descriptive statistics and repeated measures ANOVA were applied. Mean scores within groups were used as substitutes for missing data (Roth, 1994). Roth (1994) announced that "mean substitution allows researchers to use the mean value of a variable in place of missing data values for that same variable" (p. 540).

For Research Question 1, descriptive statistics and frequency analysis, including means, standard deviations, and percentages, were computed to describe the self-care characteristics of patients. The cohort distribution was assumed normality. The mean

Table 3
Measurement of Variables

Research Question	Concept	Variables	Definition	Scale	Statistical Analysis
Research Question 1	Profile with self-care ADL & IADL	Self-care score with ADL & IADL score	Personal care accomplished without technical assistance	Interval	Descriptive statistics (frequency, percentile, mean, and standard deviation)
Research Question 2	CM services	Four dominant modes of CM care services	Four type of dominant CM intervention: high home-, high clinic-, high telephone-, and mixed-care services by eleven case managers	Interval	Descriptive statistics, <i>F</i> test, Scheffé test
Research Question 3	Access (health service utilization) outcome	Number of hospitalizations	The number of patients' hospitalization during two years of intervention	Ratio	Descriptive statistics, <i>F</i> test, Post hoc test
		Length of stay	The number of days of being hospitalized	Ratio	
		Number of ED visits	The number of patients' stop in the ED due to an emergency situation	Ratio	
	Clinical outcome	Symptom control	Health knowledge and behavior of patients' personal control of chronic disease	Interval	
		Quality of life	The extent of positive perception of current life circumstances of patients' personal control of chronic disease	Interval	
		Personal well-being	The extent of positive perception of one's health status of patients' personal control of chronic disease	Interval	

Note. ADL = activities of daily living; CM = case management; ED = emergency department visits; IADL = instrumental activities of daily living.

scores of the ADL and IADL instruments were used to answer how the cohort described themselves at baseline. The mean is useful for knowing approximately normal distribution of the sample and for giving a group's value "an appropriate measure of central tendency for approximately normally distributed populations with variables measured at the interval or ratio level" (Burns & Grove, 2009, p. 472). Average scores were representative of the entire participant set; however, the mean score is problematic due to its vagueness (Burns & Grove, 2009). This means that the mean scores of two scales could not describe the self-care characteristics of patients. Moreover, the mean scores could not show each indicator of functional status. Therefore, the frequency analysis and percentile score of 10 items of the ADL and 17 items IADL were used to profile and characterize the self-care ability of the patients at baseline. Frequency analysis made it possible to see a characteristic distribution (Burns & Grove, 2009). Thus, frequency analysis and a percentile score for each item were able to identify patients' various self-care abilities and indicate patients' self-care characteristics profile.

For Research Question 2, an ANOVA and post hoc test with Scheffé test were computed to compare the mean differences among CM care delivery services. An analysis of variance compares two or more means (Polit, 2009). In this study, a one-way ANOVA was used. To determine the mean differences, an *F*-test was computed. Differences among the four means in each year were used to answer whether there is a difference among four modes of CM delivery services.

The independent variable was four different modes of service. Dependent variables were self-care ADL, self-care IADL, symptom control, quality of life, and personal well-being. This analysis was useful to describe which mode of delivery is effective and beneficial to patients. When the *F*-test identifies a statistically significant mean difference, the Scheffé test was used as a post hoc test.

Finally, for Research Question 3, to study the differences among patients' access outcomes (number of hospitalizations, length of stay, and ED visits), a paired *t*-test was

used to compare at 12 months and 24 months. Baseline data of the access outcomes were not investigated in the original data. A paired *t*-test was computed to describe the differences in patients' access (health service-utilization) outcomes at the first period of year and second period of year. A repeated-measures ANOVA with post hoc analysis was used to analyze clinical outcomes (symptom control, quality of life, and personal well-being) at baseline, 12 months, and 24 months. A repeated-measures ANOVA, which is used in split-plot factorial design, is "a statistical technique to analyze the separate and interactive effects of two or more independent variables on a dependent variable" (Sidani & Lynn, 1993, p. 283). It was assumed that there was equal variance. If this were shown not to be the case, the Greenhouse–Geisser correction would have been used to adjust the degrees of freedom (Greenhouse & Geisser, 1959). When the *F*-test identifies a statistically significant mean difference, a post hoc test with paired *t*-test was used to identify where the differences exist exactly (Polit, 2009). This study used 0.05 as the statistical significance level. For post hoc tests, adjusted α was used for the family-wise error rate.

Protection of Human Rights

For this study, precollected data were provided by the original research site, which used de-identification procedures of removing the individual patients' identifiers and using a secured and de-identified numbering method before provision of data to the College of Nursing at the University of Iowa. The original subject identifiers were not within any data that were provided to the College of Nursing at the University of Iowa. This was their condition for data sharing. The individuals that participated in the original study had previously consented via an IRB approved informed consent process of data collection and participated in the collection of data for research on case management services and outcomes. The data obtained for this project contained no identifying information or links to identifying information, and therefore it is impossible for the researcher to identify and contact individuals in the data set to obtain consent for this

secondary analysis. The research site had removed the individuals' identifiers and used a secured numbering method before provision of data to the College of Nursing. The admission data and discharge data were needed to align the year with the type of services provided by the case managers. No new data were collected for the present study. The data used for this study did not contain identifying information or links to identifying information, and the data were retained by the UI College of Nursing under the agreement with the original data collection site.

All precollected data sets were stored with the Excel files. The subject identifiers were not controlled by the research site and not within any data that was provided to the College of Nursing at The University of Iowa. The computer that was used for the study analysis and storage of the study data was located in a secure place. The type of computer was desktop, and ownership of the computer was by the University of Iowa. The computer was locked and was able to be logged on with PI's University ID and password. The data were stored on the H-drive, which was the data storage site for the University. The H-drive was only able to be accessed by the PI, and this H-drive storage was the security measure used to protect the data. The excel files had password protection as well. The computer was not connected to any network. This study was approved by the Institutional Review Board at the University of Iowa on July 19, 2012 (IRB ID: 201206742).

Assumptions

The assumptions of this study were as follows:

1. The patients who participated in the original study represent the Medicare beneficiaries in the United States, and the sample represents the population.
2. Case managers' interventions followed the Nursing Interventions Classification and CMSA's standards of care descriptions.
3. Case management practice was provided consistently during the intervention and data collection period.

Limitations

This study has limitations to its generalizability and rigor. The first limitation is about generalizability due to geography. The study participants were Medicare beneficiaries who lived in the rural Midwest. The participants may not be representative of the entire population of United States Medicare beneficiaries or of specific geographic regions outside the Midwest. The Medicare beneficiaries receiving CM services were randomly selected from a larger group of Medicare beneficiaries who were identified as people with chronic illnesses, as outlined by the Centers for Medicare and Medicaid Services. However, the study only included participants who had to live at home; patients who went to nursing homes were excluded from participation. Including more participants is needed to improve the generalizability of the study.

Additionally, this study is a secondary analysis of a precollected dataset. The database collection from the original study was not designed for this secondary research, which may limit the exploration of associated factors or selected comparisons. For example, the study had no data on health services utilization before the CM intervention; therefore, a before-and-after comparison of CM effectiveness on patients' access outcomes was unable to be done.

Third, this study could not rigorously divide the four modes of intervention. The division of four modes of services was not well-defined. Someone who received "high home care services" may also have received clinic care services and telephone care services. Due to this limitation, this study could not get significant outcome results among the four modes of services. There is a need for strict modes of intervention to compare effectiveness among the modes.

Fourth, the study had no usual care group which could be used as a control group. The original study could not collect usual care group outcome data. The original study collected patient outcomes with computerized electronic records. However, the usual care group had no electronic record, thus no data were collected. The comparison between the

intervention groups who received community-based CM and the group that did not were limited.

Additionally, the original study was unable to use the electronic patient records due to an unreimbursable service fee. Since then, secure computerized systems have been designed for use across the rural area (Brokel et al., 2012).

Finally, this study could not collect and analyze personal demographic data. The original study did not collect personal demographic data from participants but used aggregated demographic data from the rural area as a proxy. However, this study analyzed the self-care ADL and IADL scores to identify characteristics of participants. This analysis may represent more meaningful data for NCMs to assess the patients.

Summary

This study was descriptive, a repeated measurement, and a secondary analysis of a precollected database from the rural Midwest. The study used the transitional care model and the Transitional Theory as a theoretical framework. From 2002 to 2007, the original study was conducted to examine the outcomes of chronically ill Medicare beneficiaries who were receiving care from a community-based CM service. This data set was appropriate, both to provide an evidence base for a study of the effectiveness of CM intervention for patient health and health-services utilization outcomes and to suggest strategies for aspects of health care reconfiguration in the United States, because the data were: (1) collected in patient-centered contexts, (2) conducted with transitional continuous care from hospital to community-based settings, and (3) had continuous care for patients with complex disorders.

CHAPTER IV

RESULTS

Chronically ill Medicare beneficiaries have high rates of readmission and account for high percentages of Medicare spending because the current health care for these populations is episodic, fragmented, not patient-centered, and disorganized. The poor quality of continuous care results in dissatisfaction of patients and discontinuity of symptom control. Moreover, health system support of transitional care and continuous care has been limited. However, because the population of patients who are Medicare beneficiaries and have chronic illnesses is growing, there is significant need for continuous long-term care in community settings. Community-based case management is a promising method of health care service which may be able to reduce the fragmentation of care and reinforce transitional care and the continuum of care. However, there has been a lack of evidence about what levels of community CM services produce effective outcomes in terms of health care use and patient functional status. This study aimed to evaluate the effectiveness of a community-based CM intervention on patient outcomes in Medicare beneficiaries with chronic illnesses in a rural Midwest region. The following three research questions were proposed in this study:

1. What were the self-care (Activities of Daily Living and Instrumental Activities of Daily Living) characteristic profiles of selected Medicare beneficiaries who received this intervention?
2. Were there significant differences in patients' clinical outcomes (ADL, IADL, symptom control, quality of life, and personal well-being) among four categorized modes (high home, high clinic, high telephone, mixed modes) of case-management care delivery services?
3. What was the difference among patients' access outcomes (number of hospitalizations, length of stay, and emergency department visits), patients' clinical outcomes (symptom control, quality of life, and personal well-being)

and a community-based case-management intervention over time (at baseline, 12 months, and 24 months)?

To support the aims of this study, a secondary analysis of preexisting data from Brokel et al. (2012), which was a part of the Medicare Coordinated Care Demonstration (MCCD) Project by the CMS, was used. Original data were collected from 2002 to 2007 in order to examine the outcomes of a community-based CM service in chronically ill Medicare beneficiaries. The total sample of this study was 252 Medicare beneficiaries. Descriptions of patient self-care characteristics, features of categorized CM services, and the results of outcome variables were done to answer the research questions for this study. The results are described in the following sections.

Characteristics of Medicare Beneficiaries

“What are the self-care (Activities of Daily Living and Instrumental Activities of Daily Living) characteristic profiles of selected Medicare beneficiaries who received this intervention?” was the first research question of this study. Descriptive statistics and frequency analysis reflect patients’ characteristics and profiles. Approximately 32% (n = 198) were 65 to 74 years old, and 46% (n = 252) were 75 to 84 years old. The majority of the sample was white (91.1%, n = 556); 0.6% (n = 36) were Hispanic, and 0.4% (n = 18) were nonwhite. The patients in the sample were older than 65 years and had one or more chronic diseases (Brokel et al., 2012; Brown et al., 2007). Because the original data were not tied to individual participants, the frequency of self-care ADL and IADL scores of Medicare beneficiaries at baseline was analyzed to describe self-care characteristic profiles. These profiles, which are the voice of the patient, are imperative in interpreting patient-centered care by nurse case managers.

Characteristics with Self-Care ADL Scores

Self-care ADL is composed of 10 indicators of individual healthy lifestyle behaviors and functions. Table 4 presents the average ADL scores and the average scores of 10 indicators of ADL in the total sample of Medicare beneficiaries (N = 252). The

average score of self-care ADL was 4.82 (SD = 0.26). The average score of eating was 4.96, dressing was 4.90, toileting was 4.98, bathing was 4.82, and grooming was 4.94. The calculated mean of hygiene was 4.98, while oral hygiene was 4.96. Walking was 4.65, wheelchair mobility was 4.05, and transfer performance was 4.95. Among the 10 items, walking (SD = 0.84) and wheelchair mobility (SD = 1.6) had larger standard deviations than the others. The results of self-care ADL showed that the sample of Medicare beneficiaries had mildly compromised to not compromised abilities to perform personal care activities at baseline.

Table 4
Characteristic Profiles with Self-Care ADL at Baseline (N = 252)

	Mean \pm SD (Min – Max)
Self-Care ADL	4.82 \pm 0.26 (3.6 – 5)
Eating	4.96 \pm 0.22 (3 – 5)
Dressing	4.90 \pm 0.41 (2 – 5)
Toileting	4.98 \pm 0.15 (3 – 5)
Bathing	4.82 \pm 0.59 (1 – 5)
Grooming	4.94 \pm 0.27 (3 – 5)
Hygiene	4.98 \pm 0.13 (4 – 5)
Oral hygiene	4.96 \pm 0.34 (1 – 5)
Walking	4.65 \pm 0.84 (1 – 5)
Wheelchair mobility	4.05 \pm 1.60 (1 – 5)
Transfer performance	4.95 \pm 0.25 (3 – 5)

Table 5 presents the results of frequency and percentile scores of 10 items of self-care ADL at baseline (N = 252). Among the total sample, 245 patients (97.2%) were not compromised by self-care eating, 234 patients (92.9%) were not compromised by self-care dressing, 249 patients (98.8%) were not compromised by self-care toileting, 225 patients (89.3%) were not compromised by self-care bathing, 239 patients (94.8%) were not compromised by self-care grooming, 248 patients (98.4%) were not compromised by self-care hygiene and oral hygiene, and 242 patients (96%) were not compromised by transfer performance. In self-care walking ability, 206 patients (81.7%)

were not compromised, 20 patients (7.9%) were mildly compromised, 15 patients (6.0%) were moderately compromised, 7 patients (2.8%) were substantially compromised, and 4 patients (1.6%) were severely compromised. This walking ability did vary within the cohort. In self-care wheelchair mobility, 179 patients (71.1%) were not compromised, 13 patients (5.1%) were mildly compromised, 6 patients (2.4%) were moderately compromised, 4 patients (1.6%) were substantially compromised, and 50 patients (19.8%) were severely compromised. The wheelchair mobility was varied. As a result, the total sample (N = 252) were able to perform personal care independently at eating, dressing, toileting, bathing, grooming, hygiene, and transfer performance. There was a variable amount of compromise with walking and wheelchair mobility.

Table 5
Profiles of Medicare Beneficiaries with Self-Care ADL at Baseline

Scale	1	2	3	4	5
Eating	0(0)	0(0)	2(0.8)	5(2.0)	245(97.2)
Dressing	0(0)	1(0.4)	6(2.4)	11(4.4)	234(92.9)
Toileting	0(0)	0(0)	1(0.4)	2(0.8)	249(98.8)
Bathing	1(0.4)	3(1.2)	10(4.0)	13(5.2)	225(89.3)
Grooming	0(0)	0(0)	2(0.8)	11(4.4)	239(94.8)
Hygiene	0(0)	0(0)	0(0)	4(1.6)	248(98.4)
Oral hygiene	1(0.4)	1(0.4)	1(0.4)	1(0.4)	248(98.4)
Walking	4(1.6)	7(2.8)	15(6.0)	20(7.9)	206(81.7)
Wheelchair mobility	50(19.8)	4(1.6)	6(2.4)	13(5.1)	179(71.1)
Transfer performance	0(0)	0(0)	2(0.8)	8(3.2)	242(96.0)

Note. Baseline Total N (%) = 252 (100.0). Scale Rating: 1 = severely compromised, 2 = substantially compromised, 3 = moderately compromised, 4 = mildly compromised, 5 = not compromised.

Characteristics with Self-Care IADL Scores

Self-care IADL includes 17 indicators. Table 6 shows the average IADL scores for each indicator in the total sample of Medicare beneficiaries at baseline (N = 252). The mean score of self-care IADL was 4.16 (SD = 0.85), which means mildly compromised

of ability. The indicators of IADL were grouped by the following abilities: shopping, performing household chores, managing, and transporting. The cohort had mildly compromised shopping ability, moderately compromised performing household chores ability, mildly compromised managing ability, and mildly compromised transporting ability. However, the indicators of the IADL showed very large standard deviations. For example, the mean of performing yard work was 2.90 and the standard deviation was 1.72; patients had large differences regarding performing this skill.

Table 6
Characteristic Profiles with Self-Care IADL at Baseline (N = 252)

	Mean \pm SD (Min – Max)
Self-Care IADL	4.16 \pm 0.85 (1.41 – 5)
Shops for groceries	4.07 \pm 1.38 (1 – 5)
Shops for clothing	4.09 \pm 1.33 (1 – 5)
Shops for household supplies	4.04 \pm 1.37 (1 – 5)
Prepare meals	4.33 \pm 1.15 (1 – 5)
Serves meals	4.35 \pm 1.18 (1 – 5)
Operates phone	4.87 \pm 0.61 (1 – 5)
Handles written communication	4.74 \pm 0.79 (1 – 5)
Opens containers	4.56 \pm 0.94 (1 – 5)
Performs housework	3.98 \pm 1.27 (1 – 5)
Performs household repairs	3.07 \pm 1.70 (1 – 5)
Performs yard work	2.90 \pm 1.72 (1 – 5)
Manages money	4.52 \pm 0.96 (1 – 5)
Manages business affairs	4.49 \pm 0.96 (1 – 5)
Travels on public transportation	3.98 \pm 1.46 (1 – 5)
Drives own car	4.19 \pm 1.55 (1 – 5)
Does own laundry	4.00 \pm 1.46 (1 – 5)
Manage own nonparenteral medication	4.57 \pm 0.96 (1 – 5)

Table 7 shows the percentile and frequency of 17 indicators with self-care IADL at baseline (N = 252). The highest percentile of indicators was scale 5, which means not compromised by activities; but the distributions of scales were various. Among the total sample, 85 patients (33.7%) were severely compromised in performing household repairs; and 97 patients (38.5%) were severely compromised by performing yard work.

Although the total sample's performance of self-care IADL score was only mildly compromised, there existed some patients who were partially, severely, or substantially compromised in their ability to perform these activities independently.

Table 7
Profiles of Medicare Beneficiaries with Self-Care IADL at Baseline

Scale	1	2	3	4	5
Shops for groceries	24(9.5)	16(6.3)	37(14.7)	17(6.7)	158(62.7)
Shops for clothing	19(7.5)	19(7.5)	42(16.7)	14(5.6)	158(62.7)
Shops for household supplies	25(9.9)	13(5.2)	42(16.7)	20(7.9)	152(60.3)
Prepares meals	13(5.2)	8(3.2)	37(14.7)	20(7.9)	174(69.0)
Serves meals	14(5.6)	11(4.4)	29(11.5)	19(7.5)	179(71.0)
Operates phone	4(1.6)	2(0.8)	2(0.8)	6(2.4)	237(94.0)
Handles written communication	5(2.0)	2(0.8)	17(6.7)	6(2.4)	222(88.1)
Opens containers	6(2.4)	8(3.2)	19(7.5)	26(10.3)	193(76.6)
Performs housework	13(5.2)	22(8.7)	61(24.2)	18(7.1)	138(54.8)
Performs household repairs	85(33.7)	9(3.6)	52(20.6)	15(6.0)	91(36.1)
Performs yard work	97(38.5)	12(4.8)	45(17.9)	16(6.4)	82(32.5)
Manages money	7(2.8)	2(0.8)	37(14.7)	14(5.6)	192(76.2)
Manages business affairs	7(2.8)	1(0.4)	40(15.9)	18(7.1)	186(73.8)
Travels on public transportation	36(14.3)	17(6.8)	26(10.3)	43(17.0)	130(51.6)
Drives own car	46(18.3)	1(0.4)	5(2.0)	7(2.8)	193(76.6)
Does own laundry	35(13.9)	8(3.2)	35(13.9)	18(7.1)	156(61.9)
Manages own nonparenteral medication	6(2.4)	8(3.2)	24(9.5)	14(5.6)	200(79.4)

Note. Baseline Total N (%) = 252 (100.0). Scale Rating: 1 = severely compromised, 2 = substantially compromised, 3 = moderately compromised, 4 = mildly compromised, 5 = not compromised.

Thus, the self-care ADL and IADL scores encompass patients' self-care characteristics and suggest self-care categories for NCMs to use to customize patient-centered care.

Modes of CM Services and Patients' Clinical Outcomes

The second research question of this study was "Are there significant differences in patients' clinical outcomes (ADL, IADL, symptom control, quality of life, and

personal well-being) among four categorized modes (high home, high clinic, high telephone, mixed modes) of case-management care delivery services?” First, the four modes of CM services in each year are described. Second, the difference in patients’ clinical outcomes among the four categories of CM is presented.

A one-way ANOVA statistical technique was used to answer Research Question 2. Patients’ clinical outcome scores—the difference between the mean of patients’ yearly scores and the mean of patients’ baseline scores—were used. The differences between the means for patients’ clinical outcomes scores in each year and the means for baseline data were analyzed for each of the four categorized modes of CM care delivery services. These scores made it possible to evaluate the effect of one or two years of CM intervention.

Descriptive Summary

Because of missing data and secondary analysis, the samples of the first year (N = 94) and the second year (N = 85) are different. This also means that the subgroups differed across the years. For these reasons, it was not possible to explore movement of modes from Year 1 to Year 2 because the database did not have data that were identified to specific individuals.

The total sample sizes were not equal in each year because there were missing data from assigned NCMs. After excluding these missing data, 94 patients received case-management services in the first year (from April 2002 to March 2003) and 85 patients received case management services in the second year (from April 2003 to March 2004). The community-based CM program was delivered in four major modes of care services (high home, high clinic, high telephone, and mixed modes). In the first year (N = 94), 56 patients (59.6%) had high home care services, 7 patients (7.4%) had high clinic care services, 8 patients (8.5%) had high telephone care services, and 23 patients (24.5%) had mixed care services. In the second year (N=85), 50 patients (58.8%) had high home care services, 6 patients (7.1%) had high clinic care services, 13 patients (15.3%) had high

telephone care services, and 16 patients (18.8%) had mixed care services (see Table 8).

These were unequal sample sizes within the four modes, in both years.

Table 8
Average Modes of Care Delivery Services in Year 1 and Year 2

Modes of CM Care Services	Year 1 Total N(%)	Year 2 Total N(%)
	94(100.0)	85(100.0)
High Home	56(59.6)	50(58.8)
High Clinic	7(7.4)	6(7.1)
High Telephone	8(8.5)	13(15.3)
Mixed Mode	23(24.5)	16(18.8)

Patients' Clinical Outcomes by CM Category

Self-care ADL Scores

Table 9 and Table 10 present the four groups' self-care ADL mean scores in each year, subtracted mean scores, and the results of a one-way ANOVA analysis in each year.

Table 9
Differences in Patients' Self-Care ADL among Four Modes of CM Care in Year 1 (N = 94)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 1	Baseline	Year 1–Baseline		
High Home	56	4.67 \pm 0.35	4.78 \pm 0.28	-0.11 \pm 0.36	0.613	0.609
High Clinic	7	4.29 \pm 0.59	4.51 \pm 0.21	-0.22 \pm 0.68		
High Telephone	8	4.60 \pm 0.26	4.84 \pm 0.32	-0.23 \pm 0.34		
Mixed	23	4.90 \pm 0.19	4.98 \pm 0.07	-0.08 \pm 0.18		

* $p < 0.05$.

Table 10
Differences in Patients' Self-Care ADL among Four Modes of CM Care in Year 2 (N = 85)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 2	Baseline	Year 2–Baseline		
High Home	50	4.63 \pm 0.35	4.76 \pm 0.25	–0.13 \pm 0.30	1.76	0.161
High Clinic	6	4.43 \pm 0.42	4.50 \pm 0.22	–0.07 \pm 0.55		
High Telephone	13	4.54 \pm 0.23	4.83 \pm 0.34	–0.29 \pm 0.27		
Mixed	16	4.90 \pm 0.22	4.94 \pm 0.11	–0.04 \pm 0.25		

* $p < 0.05$.

When comparing the mean scores of the first year to the scores when services began, the patients' ADL scores declined in all four modes. The scores decreased the most for patients in high telephone care services (–0.23), second was high clinic care services (–0.22), then high home care services (–0.11), and finally mixed care services (–0.08). ADLs were diminished a little with the mixed care mode of services. Meanwhile, high clinic care services showed very high standard deviations (SD = 0.68; see Table 9). Finally, the one-way ANOVA test revealed there were no CM modes with statistically significant differences in self-care ADL at the $p < 0.05$ level in Year 1, as shown in Table 9. Therefore, although the mixed care services minimally reduced ADL ability in the first year of intervention, this is not significant ($p = 0.609$).

ADL scores for the second year decreased from baseline in all four modes of CM services. High telephone care services decreased the most (–0.29) and mixed care services decreased the least (–0.04), as shown in Table 10. However, the test results yielded that the differences in the four modes of service within second years were not significant ($p = 0.161$).

Thus, the self-care ADL decreased the least with mixed care services, but all four modes of CM had similar effectiveness with regard to patients' self-care ADL in Year 1 ($p = 0.609$) and in Year 2 ($p = 0.163$). The high clinic care services mode showed the largest standard deviations over the same time periods (SD = 0.68; SD = 0.55).

Self-care IADL Scores

The IADL scores decreased in Years 1 and 2 for all four modes of CM services (see Table 11 and Table 12). The IADL scores had large standard deviations in all four modes of service and across years.

In Year 1, there were reductions in high clinic care services (−0.39), mixed care services (−0.35), high telephone services (−0.24), and high home care services (−0.22). High home care showed the least decrease. There was no statistically significant difference in self-care IADL in the first year among the four modes ($p = 0.795$).

Table 11
Differences in Patients' Self-Care IADL among Four Modes of CM Care in Year 1 (N = 94)

Mode of CM	Number	Mean ± SD			F	p-value
		Year 1	Baseline	Year 1–Baseline		
High Home	56	3.88 ± 0.90	4.12 ± 0.78	−0.22 ± 0.66	0.342	0.795
High Clinic	7	3.24 ± 0.70	3.63 ± 0.84	−0.39 ± 0.80		
High Telephone	8	3.59 ± 1.08	3.83 ± 1.21	−0.24 ± 0.65		
Mixed	23	4.02 ± 0.88	4.38 ± 0.82	−0.35 ± 0.44		

* $p < 0.05$.

Table 12
Differences in Patients' Self-Care IADL among Four Modes of CM Care in Year 2 (N = 85)

Mode of CM	Number	Mean ± SD			F	p-value
		Year 2	Baseline	Year 2–Baseline		
High Home	50	3.63 ± 1.00	4.07 ± 0.92	−0.44 ± 0.89	0.809	0.494
High Clinic	6	2.93 ± 1.09	3.70 ± 0.89	−0.76 ± 0.66		
High Telephone	13	3.39 ± 1.17	3.73 ± 1.15	−0.34 ± 0.54		
Mixed	16	4.03 ± 0.90	4.29 ± 0.80	−0.26 ± 0.55		

* $p < 0.05$.

In Year 2, high clinic care services showed the greatest decrease (-0.76), and mixed care services showed the least decrease (-0.26). Among the four CM modes, there was no statistically significant difference in self-care IADL in the second year ($p = 0.494$). These results reflect that patients' IADL scores were affected no differently across the four modes.

Symptom Control Scores

The modes of CM services positively and negatively changed patients' perceived symptom control. The standard deviations for all modes and years were high (see Table 13 and Table 14).

Table 13

Differences in Patients' Symptom Control among Four Modes of CM Care in Year 1 (N = 94)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 1	Baseline	Year 1–Baseline		
High Home	56	4.07 \pm 1.08	4.13 \pm 0.92	-0.06 \pm 1.10	0.307	0.820
High Clinic	7	4.00 \pm 0.82	3.79 \pm 0.91	0.21 \pm 0.70		
High Telephone	8	4.50 \pm 0.71	4.31 \pm 0.65	0.19 \pm 0.46		
Mixed	23	3.91 \pm 0.89	3.87 \pm 0.92	0.04 \pm 0.52		

* $p < 0.05$.

Table 14

Differences in Patients' Symptom Control among Four Modes of CM Care in Year 2 (N = 85)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 2	Baseline	Year 2–Baseline		
High Home	50	4.21 \pm 1.08	4.00 \pm 0.94	0.21 \pm 1.09	0.521	0.669
High Clinic	6	3.92 \pm 0.66	3.92 \pm 0.92	0.00 \pm 0.71		
High Telephone	13	4.31 \pm 0.99	4.47 \pm 0.69	-0.15 \pm 0.94		
Mixed	16	4.00 \pm 0.73	3.88 \pm 0.85	0.13 \pm 0.53		

* $p < 0.05$.

Patients who received high clinic, high telephone, and mixed care services improved their demonstration of symptom control behavior within the first year of services (Table 13). However, there were no modes that were statistically significant in patient symptom control scores at the $p < 0.05$ level in Year 1 (see Table 14).

After two years of intervention, among the four groups of patients, the high home care services group demonstrated the most perceived symptom control (+0.21), followed by the mixed care services (+0.13). There was no change in perceived demonstration of symptom control by the high clinic care group (see Table 14). Analysis showed no difference among the four modes of care services with patients' perceived symptom control ($p = 0.669$).

According to patients' reported outcomes of symptom control, the four modes of services did not appear to be associated with a statistically significant increase in behavioral demonstration of symptom control in either year. In Year 1, the satisfaction score for symptom control decreased for patients in high home care groups. In Year 2, the high telephone care groups had decreased their symptom control. These findings suggest that longitudinal studies of the modes of services may be needed to better illuminate the effect of CM on symptom control.

Quality of Life Scores

The mean of four modes of CM services, the subtracted mean scores, and the results of the analysis are presented in Table 15 and Table 16. The modes of CM services resulted in various quality of life outcomes. Standard deviations for all modes and years were very high.

Table 15
Differences in Patients' Quality of Life among Four Modes of CM Care in Year 1 (N = 94)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 1	Baseline	Year 1–Baseline		
High Home	56	3.90 \pm 0.63	3.87 \pm 0.66	0.03 \pm 0.96	1.543	0.209
High Clinic	7	3.55 \pm 1.13	4.10 \pm 0.53	-0.55 \pm 1.10		
High Telephone	8	3.88 \pm 0.69	3.39 \pm 0.90	0.48 \pm 1.07		
Mixed	23	3.90 \pm 0.57	4.01 \pm 0.65	-0.11 \pm 0.89		

* $p < 0.05$.

Table 16
Differences in Patients' Quality of Life among Four Modes of CM Care in Year 2 (N = 85)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 2	Baseline	Year 2–Baseline		
High Home	50	4.03 \pm 0.71	3.86 \pm 0.69	0.17 \pm 0.65	0.655	0.582
High Clinic	6	4.42 \pm 0.39	4.28 \pm 0.42	0.14 \pm 0.68		
High Telephone	13	4.10 \pm 0.67	3.85 \pm 0.89	0.26 \pm 0.67		
Mixed	16	4.00 \pm 0.57	4.04 \pm 0.47	-0.04 \pm 0.42		

* $p < 0.05$.

Patients reported moderate to high satisfaction with their quality of life at baseline (see Table 15). After one year of CM intervention, the group who received high telephone care services by NCMs had the greatest increase in satisfaction (+0.48). The group with high clinic care services (-0.55) and the group with mixed care services (-0.11) showed decreases in satisfaction. Among the four mode groups, there was no statistically significant difference in patients' quality of life scores in Year 1 ($p = 0.209$).

After two years of CM, all four groups were very satisfied prior to intervention (Table 16), but the mixed care groups' perception decreased from baseline (-0.04). The results of one-way ANOVA analysis showed that no modes of care had different

outcomes in quality of life ($p = 0.582$). There were improved outcomes, but not for all modes, and the improvements were not significant from baseline.

Personal Well-Being Scores

As shown in Table 17, patients' average personal well-being scores increased in all four modes of CM services. After Year 1, the patients reported that they were very satisfied with their care. The high telephone care group (+0.43) and the mixed care group (+0.42) improved most. Despite this improvement, there were no groups with statistically a significant difference in patients' personal well-being scores in the first year ($p = 0.375$).

In Year 2, the test results showed that the four modes of CM services had no statistically significant impact on patients' personal well-being scores ($p = 0.576$), as summarized in Table 18. The high clinic care group's mean scores had the largest increase.

Table 17
Differences in Patients' Personal Well-Being among Four Modes of CM Care from Baseline and Year 1 (N = 94)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 1	Baseline	Year 1–Baseline		
High Home	56	4.14 \pm 0.56	4.05 \pm 0.53	0.09 \pm 0.78	1.048	0.375
High Clinic	7	4.43 \pm 0.55	4.16 \pm 0.72	0.26 \pm 0.76		
High Telephone	8	4.18 \pm 0.72	3.75 \pm 0.81	0.43 \pm 0.85		
Mixed	23	4.20 \pm 0.60	3.78 \pm 0.68	0.42 \pm 0.95		

* $p < 0.05$.

Table 18
Differences in Patients' Personal Well-Being among Four Modes of CM Care from Baseline and Year 2 (N = 85)

Mode of CM	Number	Mean \pm SD			F	p-value
		Year 2	Baseline	Year 2–Baseline		
High Home	50	4.14 \pm 0.64	4.07 \pm 0.65	0.06 \pm 0.99	0.665	0.576
High Clinic	6	4.69 \pm 0.38	4.10 \pm 0.62	0.60 \pm 0.75		
High Telephone	13	4.20 \pm 0.63	3.98 \pm 0.56	0.22 \pm 0.77		
Mixed	16	4.15 \pm 0.53	4.12 \pm 0.62	0.04 \pm 0.95		

* $p < 0.05$.

The data analyses for the second research question showed that there were no statistically significant differences in patients' clinical outcomes among four categorized modes of CM services. From this it can be concluded that either the four categorized modes of care delivery provide similar effectiveness to patients or the NCMs were skilled at matching services to patients' needs such that no difference was detected.

Case Management Intervention and Patients' Outcomes

The third research question was "What is the difference among patients' access outcomes (number of hospitalizations, length of stay, and emergency department visits), patients' clinical outcomes (symptom control, quality of life, and personal well-being) and a community-based case-management intervention over time (at baseline, 12 months, and 24 months)?" First, the results of the descriptive statistics for patients' access and clinical outcomes in each year are described. Second, the differences in patients' access outcomes in the first and second periods of Year 1 and Year 2 are presented. The paired *t*-test technique was used to find the difference among patients' access outcomes. Third, the differences in patients' clinical outcomes at baseline as compared to the first and second years are presented.

For this analysis, repeated-measure ANOVA was used. A post hoc test with a paired *t*-test was used after discovering a significant difference in the data.

Access Outcomes

Table 19 presents the mean of patients' access outcomes (N = 252). Baseline data for the access outcomes were not investigated in the original data and thus not available. Therefore, the access outcomes for Year 1 and Year 2 were analyzed. One visit to an ED was considered similarly to hospitalization. The first access outcome, the mean number of hospitalizations, was 0.62 day (SD = 0.95, Minimum = 0, Maximum = 6) in Year 1 and 0.47 day (SD = 0.84, Minimum = 0, Maximum = 6) in Year 2. Total length of stay in hospitals was 3.05 days (SD = 6.12, Minimum = 0, Maximum = 56) in Year 1 and 2.28 days (SD = 5.35, Minimum = 0, Maximum = 55) in the second year. This was a statistically significant reduction. The average number of ED visits were 0.38 time (SD = 0.87, Minimum = 0, Maximum = 6) in Year 1 and 0.36 time (SD = 0.78, Minimum = 0, Maximum = 5) in Year 2. These results showed that all three access outcomes were decreased within the first year of CM services.

Table 19
Average Days of Patients' Access Outcomes over Years 1 and 2 (N = 252)

Patients' Outcomes	Mean \pm SD (Min – Max)		<i>t</i>	<i>p</i> -value
	Year 1 (2002–2003)	Year 2 (2003–2004)		
Number of Hospitalizations	0.62 \pm 0.95 (0 – 6)	0.47 \pm 0.84 (0 – 6)	2.015	0.045*
Total Length of Stay (LOS)	3.05 \pm 6.12 (0 – 56)	2.28 \pm 5.35 (0 – 55)	1.540	0.125
Number of ED visits	0.38 \pm 0.87 (0 – 6)	0.36 \pm 0.78 (0 – 5)	0.318	0.751

**p* < 0.05.

The differences in patients' access (health service utilization) outcomes in Year 1 and Year 2 are presented in Table 19. The paired *t*-test results showed that there was a statistically significant difference in the number of hospitalizations at $p < 0.05$. This means that there were fewer hospitalizations during the two years of CM intervention ($p = 0.045$). However, there were no statistically significant data on total length of stay and number of ED visits at the $p < 0.05$ level from Year 1 to Year 2. By Year 2, the total length of stay in hospitals was reduced (-0.77) but not significantly from the first year ($p = 0.125$). The number of ED visits were decreased during two years of CM services (-0.02) but not significantly decreased ($p = 0.751$).

Clinical Outcomes

Patients' overall clinical outcome scores increased within the initial two years of CM services. Descriptive statistics of patients' clinical outcomes (symptom control, quality of life, personal well-being) are presented in Table 20. The mean symptom control score was 4.07 (SD = 0.86) at baseline, 4.19 (SD = 1.00) at Year 1 and 4.27 (SD = 1.01) at Year 2. Initially, patients reported frequent demonstrations of symptom control (4.07), and this score was improved (+0.2) by the second year of CM services. The quality-of-life score was 3.89 (SD = 0.69) at baseline, 4.01 (SD = 0.68) at Year 1 and 4.03 (SD = 0.67) at Year 2. The patients reported that they were moderately satisfied (3.89) with their life at baseline, and this score was increased (+0.14) during the two years of intervention. The mean personal well-being score was 4.09 (SD = 0.60) at baseline, 4.13 (SD = 0.65) at Year 1, and 4.14 (SD = 0.66) at Year 2. Patients reported their personal well-being as very satisfied initially, and this indicator increased gradually with CM services.

Table 20
Average Scores of Patients' Clinical Outcomes for Baseline and Years 1 and 2 (N=252)

Patients' Outcomes	Mean \pm SD (Min – Max)		
	Baseline	Year 1	Year 2
Symptom Control	4.07 \pm 0.86 (1.50 – 5.00)	4.19 \pm 1.00 (1.50 – 5.00)	4.27 \pm 1.01 (1.50 – 5.00)
Quality of Life	3.89 \pm 0.69 (1.83 – 5.00)	4.01 \pm 0.68 (2.17 – 5.00)	4.03 \pm 0.67 (2.17 – 5.00)
Personal Well-Being	4.09 \pm 0.60 (2.43 – 5.00)	4.13 \pm 0.65 (1.71 – 5.00)	4.14 \pm 0.66 (2.14 – 5.00)

Symptom Control

The repeated-measures analysis showed statistically significant symptom control scores over two years at the $p < 0.05$ level ($F = 5.09$; see Table 21). The indicators for monitoring symptom variation contributed to symptom control score improvements. Due to sphericity, the Greenhouse-Geisser correction test was used; it supported the conclusion that two years of CM services improved patients' symptom control. Finally, post hoc testing revealed that any mean difference with symptom control scores rapidly increased ($p < 0.01$; see Table 22).

Table 21
Patients' Symptom Control for Baseline and Years 1 and 2 (N=252)

Clinical Outcomes	Baseline	Year 1	Year 2	F	p
Symptom Control	4.07	4.19	4.27	5.09	0.009 ^a
Monitors Symptom Variation	4.10	4.24	4.35	10.26	0.000
Uses Preventive Measures	4.04	4.14	4.10	1.21	0.295

^aGreenhouse-Geisser corrected tests of within-subjects power 0.886 for 0.05.

Table 22
Post Hoc Test for Patients' Symptom Control (N = 252)

	<i>p</i> -Values in Post Hoc Test		
	Baseline SC	Year 1 SC	Year 2 SC
Baseline SC	–	0.00*	0.00*
Year 1 SC	–	–	0.00*

* $p < 0.01$.

Quality of Life

As shown in Table 23, the average quality-of-life score was statistically significantly increased with two years of CM intervention ($F = 3.55$; $p < 0.05$). There were six indicators for satisfaction with quality of life, and the indicators for self-concept and pervasive mood contributed to that satisfaction. Most indicators did improve during the two years. The correction test was used to calculate the p value. The mean difference with post hoc testing concluded that only in the second year did quality-of-life scores greatly increase over the baseline data ($p < 0.01$; Table 24). However, there is insufficient evidence to conclude that there was a significant difference between baseline and Year 1 or Year 1 and Year 2 (see Table 24).

Table 23
Patients' Quality of Life for Baseline and Years 1 and 2 (N = 252)

Clinical Outcomes	Baseline	Year 1	Year 2	<i>F</i>	<i>p</i>
Quality of Life	3.90	4.01	4.03	3.55	0.038 ^a
Health Status	3.26	3.43	3.42	2.75	0.070
Economic Status	3.79	3.96	3.96	1.92	0.152
Close relationships	4.41	4.42	4.40	0.03	0.962
Achievement of Life Goal	4.06	4.09	4.16	0.97	0.372
Self-concept	3.96	4.10	4.14	3.47	0.035
Pervasive Mood	3.90	4.04	4.10	4.05	0.019

^aGreenhouse-Geisser corrected tests of within-subjects power 0.833 for 0.05.

Table 24
Post Hoc Test for Patients' Quality of Life (N = 252)

	<i>p</i> -Values in Post Hoc Test		
	Baseline QoL	Year 1 QoL	Year 2 QoL
Baseline QoL	–	0.501	0.00*
Year 1 QoL	–	–	0.97

* $p < 0.01$.

Personal Well-Being

Patients were very satisfied at the beginning of CM services, and their well-being was not significantly improved with two years of intervention ($F = 0.96$, $p = 0.382$; see Table 25). However, the seven indicators did increase gradually, and these were correlated to improvement of well-being scores. The correction tests supported this result.

Table 25
Patients' Personal Well-Being for Baseline and Years 1 and 2 (N = 252)

Clinical Outcomes	Baseline	Year 1	Year 2	<i>F</i>	<i>p</i>
Personal Well-Being	4.09	4.13	4.14	0.96	0.382 ^a
Social Relationships	4.03	4.00	4.05	0.28	0.756
Spiritual Life	4.30	4.36	4.38	1.09	0.336
Cognitive Status	4.08	4.10	4.10	0.09	0.913
Ability to Cope	4.12	4.12	4.15	0.21	0.811
Ability to Relax	4.06	4.10	4.18	1.82	0.165
Level of Happiness	4.12	4.25	4.19	2.79	0.063
Ability to Express Emotions	3.95	3.98	3.94	0.16	0.845

^aGreenhouse-Geisser corrected tests of within-subjects power 0.970 for 0.05.

Summary

This study used a secondary analysis of a pre-existing data set from the Medicare Coordinated Care Demonstration Project by the CMS and Brokel et al. (2012) to answer three research questions. The Medicare beneficiaries in the study were mildly compromised with their self-care ADL and IADL ability at the beginning of CM services. They were able to eat, dress, bathe and groom themselves, and walk without difficulty.

Most of the cohort could also shop, operate tools, manage business affairs, and manage medication on their own. But variations were large for the self-care abilities of performing housework, traveling on public transportation, and driving cars. These profile data show the patient's self-care characteristics at baseline.

Second, the four dominant modes of CM services were analyzed, by applying a one-way ANOVA test, to compare which mode of services was the most effective in achieving positive clinical outcomes. The mixed care services were found likely to be the most effective for patients with declining self-care in both years of intervention. However, none of the four modes of CM demonstrated significant differences in patients' self-care outcomes. All four modes of service yielded positive changes in patients' perceived symptom control, quality of life, and well-being. High clinic care services and high home care services tended to have the most positive outcomes in symptom control. Similarly, high telephone care services resulted in great improvements in quality-of-life scores, but test results identified no difference in effectiveness among the four modes of services. Finally, not all changes were positive. Quality-of-life scores decreased in the high clinic and mixed care services. These results suggested the need for a longitudinal intervention with a large population to identify the most effective modes and mix of care services.

Lastly, the effectiveness of community-based CM was verified in longitudinal analysis using repeated measures. Over two years, CM tended to reduce the number of hospitalizations, total length of stay, and the number of ED visits among the selected Medicare beneficiaries. Importantly, patients' perceived outcomes, as measured by symptom control and quality of life, were statistically significantly improved over two years of CM services.

CHAPTER V

DISCUSSION

Section 3026 of the Affordable Care Act created Medicare's Community-Based Care Transitions Programs ([CCTP]; Kind et al., 2012). The CCTP aims to improve transitional care and reduce hospitalizations for high-risk Medicare illnesses (Kind et al., 2012). It makes it possible to create community-based organizations that enact care transitions and evidence-based interventions with the aid of federal funding. Case management has been shown to be effective in many aspects of chronic illness care. Several studies have shown the impact of community-based CM services with transitional care and its outcomes (Eichler, 2013; Glendenning-Napoli, Dowling, Pulvino, Baillargeon, & Raimer, 2012; Naylor, 2012). However, there are few studies that fully describe a working CM intervention and analyze outcomes of CM services, especially in community-based settings. Also, the efficacy of CM has been limited due to its various types of interventions (Schore, Brown, & Cheh, 1999). Therefore, this study examined the impact of a community-based CM intervention on patients' clinical and access outcomes. Specifically, this study evaluated the effect of a community-based CM intervention on patient outcomes in Medicare beneficiaries with chronic illness in a community-based CM service in a rural Midwest region. To address this aims of study, the following three research questions were addressed:

1. What were the self-care (Activities of Daily Living and Instrumental Activities of Daily Living) characteristic profiles of selected Medicare beneficiaries who received this intervention?
2. Were there significant differences in patients' clinical outcomes (ADL, IADL, symptom control, quality of life, and personal well-being) among four categorized modes (high home, high clinic, high telephone, mixed modes) of case-management care delivery services?

3. What was the difference among patients' access outcomes (number of hospitalizations, length of stay, and emergency department visits), patients' clinical outcomes (symptom control, quality of life, and personal well-being) and a community-based case-management intervention over time (at baseline, 12 months, and 24 months)?

To answer these questions, a descriptive, repeated measurement design was used, and a secondary analysis of a data set containing longitudinal community-based CM data, originally collected from 2002 to 2004, was conducted. The total selected 252 Medicare beneficiaries were analyzed to answer the first and third research questions. A subsample of 94 patients at the first period of Year 1 and 85 patients at the second period of Year 2, who received each of four different modes of CM services, were used to answer the second research question. The results are found in Chapter IV. This chapter presents important findings, limitations, and conclusions of this study.

Characteristics of Medicare Beneficiaries

Medicare covers 50 million elderly people with disabilities in the United States (Kaiser Family Foundation, 2012). Nearly 40% of Medicare beneficiaries have at least 3 chronic conditions (Kaiser Family Foundation, 2012). According to the Medicare Current Beneficiary Survey 2002 (MCBS), 45.4% of these were coronary artery disease (CAD) and 45.4% were congestive heart failure (CHF) who lived in the community; 11.7% were stroke patients, 19.7% had diabetes, 16.6% had cancer, and 15% were chronic obstructive pulmonary disease (COPD) (Brown et al., 2007; CMS, 2002).

In this study, the majority of selected Medicare beneficiaries were 65 years old and white (Brown et al., 2007). According to the original report of the MCCD project (Brown et al., 2007) and Brokel et al. (2012), each patient in the study had one or more chronic disease, such as CAD (68.6%), CHF (65.2%), COPD (53.8%), renal failure, arteriosclerosis vascular disease, stroke/cerebral vascular disease, respiratory failure, and

liver disease. The diagnosis of chronic disease in the population of this study was greater than the Medicare average in 2002, which may limit generalizability.

The self-care ADL and IADL instruments have been used as an indicator of functional independence for age-related chronic illnesses (Chumbler, Mann, Wu, Schmid, & Kobb, 2004; Wolinsky et al., 2011). These indicators are important because deterioration of self-care ability in patients results in dependency on other health care providers or caregivers (Brokel et al., 2012). Difficulties with independent daily abilities also increase hospital usage, emergency room visits, and mortality risk (Chumbler et al., 2004). According to recent statistics, 58% of dual-eligible (Medicare- and Medicaid-eligible) adults who are living in community settings reported that they have difficulties in ADLs and need assistance (Komisar, Feder, & Kasper, 2005; Marek, Adams, Stetzer, Popejoy, & Rantz, 2010). Providing information about self-care ability to NCMs and community-health care providers is needed for creating workable health care plans. The self-care ADL and IADL provide that information because the data they collect consist of observable tasks (Wolinsky et al., 2011). Close monitoring of patients' self-care ability helps to prevent exacerbation of chronic illnesses and related complications (Marek, Popejoy, Petroski, & Rantz, 2006).

This study described patients' characteristics using the self-care ADL and IADL instruments. An analysis of the self-care ADL and IADL scores at the beginning of intervention described the Medicare beneficiaries' functional status and provided information to NCMs. The majority of patients were mildly compromised to not compromised when performing ADL such as bathing and dressing (Mean = 4.82, SD = 0.26). The mean of self-care IADL in this study was 4.16 (SD = 0.85), which means patients were mildly compromised in ability. Thus, the participants of this study were able to do their daily activities independently for the most part. Maintaining or improving this would be the goal. Meanwhile, the average ADL scores for Medicare beneficiaries in the nationally representative Survey on Assets and Health Dynamics

among the Oldest Old (AHEAD) from 1993 to 2007 (N = 5,871) were relatively healthy, as shown by ADL and IADL scores at baseline (Wolinsky et al., 2011). The self-care functional status of participants in this study was similar to the national Medicare beneficiaries at baseline.

This study conducted analyses of all indicators of self-care ADL and IADL to develop the patients' profile. All 10 indicators of self-care ADL scores showed that the cohort was mildly compromised to not compromised when eating, dressing, bathing, and performing regular hygiene activities. More than 93% of the participants were able to do ADL independently except walking and moving in a wheelchair. These common results of indicators at baseline make it possible to implement common targeted protocols of CM intervention.

However, the walking ability (Mean = 4.65, SD = 0.84) and wheelchair mobility (Mean = 4.05, SD = 1.60) were varied. Diversity of walking ability/wheelchair mobility is important for delivering and implementing CM intervention. Because the patients' abilities varied so widely (large standard deviations), it was difficult to identify variations of ADL after CM interventions. It was also hard to identify who might vary from a standard protocol of intervention. Therefore, careful and individualized assessment of the participants was needed for implementing CM interventions.

The 17 indicators of the self-care IADL were more diverse. As with the results of the self-care ADL, careful assessment of these categories is imperative. The mean scores of shopping abilities were more than 4, which means mildly compromised, and approximately 60% of the sample scored 5, but the distribution and percentile showed that more than 15% were not able to shop independently. The ability of performing household chores varied even more. These results made it hard to implement standard intervention protocols. On the other hand, there were common self-care IADL indicators in the population such as operating phone (Mean = 4.85, SD = 0.61) and handling written

communication (Mean = 4.74, SD = 0.79) at baseline. For these results, it might be possible to set up common protocols for a CM intervention.

Modes of CM Services

It is well known that the range of activities in CM is broad (Huber et al., 2003). Nurse case managers have been practicing and serving in various clinical settings and in individualized care (Vann, 2006). There are also variations in the CM program or intervention (Boult, Rassen, Rassen, Moore, & Robison, 2000; Vann, 2006). Because of this diversity and flexibility, there are few studies that accurately describe a working CM intervention. This makes it hard to assess the analysis of outcomes (Huber et al., 2003). Studies have failed to link the process of CM with outcomes (Park, 2006). Meanwhile, the association of CM type with patients may be beneficial to patients. Yet few studies have examined the association between type of CM services and patient outcomes (Huber et al., 2003; Slaughter & Issel, 2011). To fill this gap, this study divided the modes of CM care delivery into four types—high home, high clinic, high telephone, and mixed care services—and evaluated the impact of these types of CM on patient outcomes. The study operationally defined *high care* as “strong, intense, and extended care than other modes of care.”

Lacking guidance from previous studies, this study compared the four modes of CM services and the following patient-reported clinical outcomes: the index of self-care ADL, IADL, symptom control score, quality of life score, and personal well-being. Because of missing data and secondary analysis, the sample of the first year (N = 94) and the second year (N = 85) were different and thus analyzed separately with baseline data.

As found in this study, the highest modes of services in Year 1 (N = 94) were high home care for 59.6% of patients, mixed care for 24.5%, high telephone for 8.5%, and high clinic care for 7.4%. In Year 2 (N = 85), 58.5% of patients received high home care, 18.8% received mixed care, 15.3% received high telephone, and 7.1% received high clinic. It was quite natural that high home care services received the highest percentages

of CM intervention because the study was held in community-based settings. In future research, it would be beneficial to precisely define the actual case management intervention dosage (Huber et al., 2003) and then use the dosage of the CM intervention to analyze outcomes and effectiveness.

Four Modes of CM Intervention and the Self-Care Outcomes

Regardless of the type of CM intervention, the score of self-care ADL and IADL in this study deteriorated slightly in both years. Thus, the type of intervention did not appear to make any significant changes in patients' self-care level. However, patients receiving mixed care services deteriorated less in self-care than those receiving other modes of services. This result can be interpreted to mean that the self-care functions rely on comprehensive care coordination, meaning that interventions which expose patients to multiple methods of care could be effective in minimizing the decline of functional status. In the literature, functional declines such as deterioration of the self-care ADL and IADL are generally considered as part of the aging process and inevitable; but comprehensive coordinated care contributed better functional outcomes (Marek et al., 2006).

Meanwhile, the mixed care group's mean ADL and IADL scores at baseline were higher than other three groups, and the high clinic care group's mean was lower than the other groups at baseline. However, the cohorts were mildly compromised to not compromised with their self-care ADL. Due to this high independent functional status, NCMs might have given less attention to caring for patients' self-care and therefore limited improvements with these indexes were demonstrated. It is possible that NCMs made continuous modifications to the mix of CM services that kept patients more stable but masked the effects of the CM intervention by masking large differences in outcomes. It is possible that "no difference" means stability and therefore is an important clinical outcome of CM in chronic care.

The high telephone care groups showed the greatest decline in self-care ADL in both years. Providers delivering distance services such as telehealth care may have had limited access to patients' functional status and thus were not able to make timely interventions. Finally, the high clinic care groups showed large standard deviations at both self-care ADL and IADL subtracted data. Perhaps these variations resulted from the small sample size (7 in Year 1 and 6 in Year 2). Thus, this study suggests further exploration with larger sample sizes to identify effectiveness in different modes of services.

This study provides evidence that all four types of community-based CM services are associated with preventing deteriorations of self-care ADL and IADL. Furthermore, mixed care—that is, comprehensive cares with home, clinic, and telephone follow up services—may result in patients functioning better. However, the study could not find significant differences among the four modes of CM care services. To strengthen the study, long-term research into interventions and evaluation is recommended.

Four Modes of CM and Patient Clinical Outcomes

In this study, patients' symptom control, quality-of-life, and personal well-being scores were compared between the four modes of CM services. Patients' clinical outcomes were similar across all four modes. No mode of CM services was significantly related to patients' clinical outcomes at the $p < 0.05$ criterion. This result may be because the four types of care services were not clearly separated from each other. Therefore, the results might not clearly show the differences among the four modes.

Nurse case managers in this study offered patients emotional support, symptom monitoring support, education, and decision-making support (Brokel et al., 2012). The original study named these kinds of support and intervention as “self-efficacy enhancement” and “environmental management” (Brokel et al., 2012). NCMs also assessed more subjective patient outcomes, such as quality of life, perceived symptom control, and general well-being. These patient-reported outcomes rely on interactive

effects with respondent status (Wolinsky et al., 2011). To identify the most effective mode of services, this study compared the four modes of services and patients' clinical outcomes, but none of the modes of services made significant changes in patients' symptom control, quality of life, or well-being scores.

Although none of the four modes of CM services caused significant change in all three clinical outcomes, some modes had greater effect on some outcomes. The mixed care services increased symptom control scores gradually in both years (Table 13, Table 14). NCMs offered interventions such as teaching patients how to do self-modification assistance and functional health pattern screenings (Brokel et al., 2012). These interventions operated to improve symptom control and were offered while the NCMs did home visits (Brokel et al., 2012). The symptom control score increased the most in the high home care group in Year 2. However, the same conclusion did not hold with the first year intervention result because the symptom control score with the high home care group decreased. Although the mixed care services had positive impact on patients' disease control, further evaluation is necessary to understand what produces significant results.

Patients' quality of life was influenced by positive self-perceptions and positive life circumstances. This is subjective patient-reported data that is influenced by personal economic status. To support patients' quality of life, NCMs provided emotional support, family support, financial resource management, and self-esteem enhancement to the patients (Brokel et al., 2012). Among the four modes, the high telephone care services increased patient's quality of life most in both years of the study. This result is consistent with the literature that telephone nurse case management enhances health-related quality of life in peritoneal dialysis patients and patients with diabetes (Chow & Wong, 2010; Eichler, 2013; Shea et al., 2006) and empowers patients (Chow & Wong, 2010). Telephone case management seemed to have a positive effect in treating elderly persons with chronic illnesses in this study. However, this study did not find this effect to be

statistically significant. In addition, the scores were both positively and negatively influenced by the modes of services at Year 1, and the score variations were large. Further studies are needed to identify whether and how the modes influence quality of life scores.

Among the interventions, the coping enhancement intervention influenced the patients' personal well-being (Brokel et al., 2012). But the personal well-being scores increased in both years, and the standard deviations were large. The largest standard deviation was 0.99. This might have been caused by the fact that assessment of personal well-being is also associated with patients' "psychological" and "subjective" outcomes.

Several studies have made efforts to measure CM interventions and connect them to patient outcomes, but it is not easy to summarize CM interventions with a single measure due to the complexity of CM (Huber et al., 2003; Oliva, 2010; Slaughter & Issel, 2011). This study contributes to the application of NCMs' diverse types of services in a longitudinal study. This study divided CM into four categories of service and tested them with outcome data. The results showed that the four modes made different degrees of changes in patients' satisfaction. However, the effect of the different modes is yet to be validated. Thus, continued study of modes of CM and its outcomes are encouraged.

Community-Based CM and Outcomes

This research tested a longitudinal analysis of community-based CM intervention with patients' health-service utilization and perceived clinical outcome data. The results showed that the community-based CM intervention is useful in reducing hospitalization and enhancing patients' satisfaction with their lives and health challenges.

CM and Health-Services Use Outcomes

According to the CMS, in fiscal year 2013 hospitals will begin receiving penalties when Medicare patients are readmitted (Eichler, 2013). Health-service use is directly associated with high Medicare expenditures. It is known that a case management program has significant effects on health care usage and costs (Eichler, 2013; Oliva, 2012; Peikes

et al., 2009). Unplanned readmission rates can be improved with transitional care and coordinated care when patients return to their homes and communities (Eichler, 2013). For these reasons, managing patients' health statuses within communities is growing in importance.

As found in this study, the number of hospitalizations, total length of stay, and the number of ED visit were reduced within the initial two years of CM intervention. But this study only found community-based CM to be statistically significantly effective in reducing the number of hospitalizations ($p = 0.045$). The impact of CM on LOS and the number of ED visits is yet to be determined. NCMs' continuous follow-up care services and home visiting services after discharge might influence the reduction in the number of hospitalizations.

In the literature, empirical studies have proved that CM successfully reduced hospitalization, LOS, and ED usage. With a hospital-based CM intervention, a homeless medical illnesses group showed fewer hospital days, ED visits, and reductions in the number of hospitalizations (Sadowski, Kee, VanderWeele, & Buchanan, 2009). Similar results were shown by Glendenning-Napoli et al. (2012) with an uninsured population and by Hurley, Freund, and Taylor (1989) studying Medicaid patients. A systematic review and meta-analysis showed that hospital-based CM interventions had a strong impact on ED visitation and LOS (Kim & Soeken, 2005; Kumar & Klein, in press). This study showed declines in ED visits and LOS, but the reductions were not significant. However, it is important to estimate the impact of CM with Medicare beneficiaries in community-based settings.

CM and Patients' Clinical Outcomes

Psychological health outcomes are good outcomes for evidence of the effect of CM interventions (You, Dunt, Doyle, & Hsueh, 2012). Psychological assessments are especially important for Medicare beneficiaries who require assistance and support. This study compared three points of patients' satisfaction data to evaluate the impact of the

CM services. A repeated-measures analysis of perceived outcomes showed that there was significant increase in patients' satisfaction, especially in their symptom control ($F = 5.09, p = 0.009$) and quality-of-life ($F = 3.55, p = 0.038$) scores, throughout the two years under community-based CM. The effect of CM on the patients' personal well-being ($F = 0.96, p = 0.382$) is yet to be determined.

During the home or clinic visit, NCMs used evidence-based practices and managed patients' symptom monitoring, satisfaction of life, and wellness. These three clinical outcomes were more subjective than objective. It could be claimed that the results depended on each patient's emotions, economic situation, and mood. The results showed that the indicator of patients' symptom monitoring increased significantly ($p < 0.00$), and this result contributed to symptom control improvement (see Table 21). Patients' self-concept ($p = 0.035$) and pervasive mood ($p = 0.019$) also gradually improved. CM interventions and these indicators also improved patients' quality of life (see Table 23).

However, none of the seven indicators of personal well-being increased significantly during two years of intervention. This result is contrary to a systematic review study with community older clients (You et al., 2012), which found that CM had significant effects on clients' health of well-being such as perceived life satisfaction and depression (You et al., 2012). Thus, further research related to patients' personal wellness with CM is needed.

Implications

Implications for Research

This is a secondary analysis study to investigate the effectiveness of community-based case management and patient outcomes. The study gives evidence of the effectiveness of community-based CM as an intervention for Medicare beneficiaries. Also, this study showed that NCMs and CM services—both part of a community-based care coordination and transitions program—may reduce patients' number of hospitalizations and increase their satisfaction. Additionally, the current study

demonstrated that community-based CM is able to meet patient needs and deliver high-quality care. Further study investigating patients' readmission rates is suggested to confirm the intervention effectiveness. With further research, community-based CM services can be implemented more precisely and expand under the Affordable Care Act.

Meanwhile, there exist some patients who are vulnerable to being readmitted to the hospital and use more health services (Brimingham & Mullahy, 2009; Eichler, 2013). This study was unable to analyze the association between patients' diagnosed disease and health-service utilization due to lack of individualized data. This tendency might depend on the patients' specific diagnosed disease. Further research that investigates the type of diagnosis and tendency toward health-service utilization is recommended.

The purpose of Research Question 2 was to examine and compare the different modes of CM services. However, this study could not identify significant differences between the modes, and it was unable to compare across two years of CM interventions because of unclear distinctions among the four modes and incongruence of sample data over two years. Further nursing research, including the identification of clear distinctions between the types of services and the examination of their outcomes, is necessary.

As an extension of Research Question 2, a method for measuring CM interventions is needed. CM interventions need to "characterizes the activities actually delivered as a unique combination of discrete provider actions, at a level of intensity (amount and frequency), over a duration of time" (Huber, Hall, & Vaughn, 2001; p. 122). This concept is the dosage of CM intervention. According to Huber et al. (2003), "the importance of measuring dosage lies in the ability to provide the correct amount of an intervention to ensure that identified outcomes result" (p. 276). CM should be documented and evaluated using the right measure for quality care and cost effectiveness improvements (Huber & Craig, 2007). Moreover, accurate dosage documentation empowers NCMs' concrete and concise activity (Huber & Craig, 2007). However, there are few empirical studies which calculate the dosage of CM interventions with patients'

outcomes. Finally, too little attention is given to measuring dosage in CM interventions (Slaughter & Issel, 2011). In the literature, various activities have been performed under the name of CM practices, but only a few studies have examined CM interventions in detail (Park et al., 2009). Thus, the dosage of CM can be measured as the amount of time, frequency, duration, and breadth of CM services provided by NCMs in community-based settings to participants who are Medicare beneficiaries with chronic illnesses. Effective interventions produce better health outcomes, but interventions such as nursing dosage need to be precise, safe, and accurate (Huber et al., 2001). Nursing dose is directly associated with increased or decreased patient life and health care costs (Brooten & Youngblut, 2006). It has been challenging to measure the actual dosage of CM interventions because CM is a behavioral intervention, which means that it is “more person- and situation-dependent and may be selected based on the provider’s expertise or other personal characteristics” (Huber et al., 2003, p. 277). When measuring the dosage of CM and linking various CM outcomes, the evidence of the effectiveness of CM is stronger.

The participants in this study were randomly selected from a larger group of Medicare beneficiaries who were identified as people with chronic illnesses as outlined by the Centers for Medicare and Medicaid Services. The study was conducted longitudinally. However, this study excluded Medicare beneficiaries who went to nursing homes, was conducted in the Midwest, and removed the usual care group because no data was collected for this group. These could be seen as weaknesses of a study. To overcome these weaknesses in future studies, a randomized controlled trial is encouraged, and including more diverse populations would be desirable.

Furthermore, the Community-based Care Transition Program (CCTP) has been created and is testing its models for high-risk Medicare beneficiaries (CMS, 2011). Patient-centered medical homes have also emerged to provide effective and efficient coordinated care (Butcher, 2012). The findings of this study suggest that community-

based CM can be applied to the CCTP, patient-centered medical home, and other related health care configurations. There is a need to investigate CM's effectiveness in these new health care delivery structures.

Importantly, comprehensive and evidence-based models of CM for clients are urgently needed. With the rapid growth of Accountable Care Organizations (ACOs) and implementation of the Affordable Care Act, health care delivery systems need conceptual frameworks that can address the purposes of care coordination and transitions of care. This study adopted the transitional theory and transitional care models as theoretical background. To apply and develop CM as a core intervention in the new health care environment and to extend evidence-based CM research, a comprehensive mixed model CM may be needed. Further studies developing a model of CM and applying it in empirical research are necessary.

Implications for Practice

There is evidence for the effectiveness of using community-based case management as an intervention for Medicare beneficiaries. The findings of this study showed that NCMs positively affected patients by reducing their use of health-services and increasing their satisfaction.

Nurse case managers should possess particular knowledge, attitudes, and skills for their activities (Park et al., 2009). Much has been published about the roles and functions of case managers (Park et al., 2009; Tahan, Huber, & Downey, 2006; Tahan & Huber, 2006), and the CMSA has developed and periodically updated standards of practice for CM (Fero et al., 2011). This standard of practice provides "scope of practice" and "standardized procedure or protocol" to NCMs (Fero et al., 2011, p. 341). The practice, activities, and roles of case managers are continuously progressing (Park, 2006). Therefore, CM workforce studies should be continued and replicated to expand the evidence base for case manager deployment in case management practice (Park, 2006).

Yet there remain challenges to more precisely identifying CM activities and then matching them to staffing and program planning.

Because of the increasing number of patients with chronic illnesses and their complications, the need for coordinated and continuous care with timely access care is increasing (Butcher, 2012). High-quality transitions and referrals are also needed to meet the Institutes of Medicine's (IOM) aims of safe, effective, efficient, timely, equitable, and patient- and family-centered care, which the IOM (2001) says the US health care system should use to ensure quality care is provided. To meet needs such as these, the role of the NCM as a care coordinator has been growing, not only in hospital-based but also in community-based settings. NCMs promote timely transfer and transitional care from one level to another (Coleman & Boulton, 2003; Naylor et al., 2011b). In this study, NCMs provided timely assessment, transitional and referral services from hospital to community, home care services, monitoring with telephone follow-up services, social support, and psychological support (Brokel et al., 2012).

This study highlights the important role NCMs have in community and transitional care. The assessment was completed by NCMs as patients transitioned from the hospital to their communities. NCMs assessed the clients' independence and self-care abilities with the self-care ADL and IADL instruments. Patients' self-care should be closely assessed by health care professionals to provide the appropriate interventions and to reduce self-care dependency (Brokel et al., 2012; Chumbler et al., 2004). However, many nursing services have been less focused on improving clients' self-care ability (Brokel et al., 2012). Hence, nursing intervention studies about the elderly need a more intense focus on promoting patients' self-care abilities and monitoring these parameters over time.

In the literature, patients' unmet needs contributed to dissatisfaction, but appropriate services from health care providers increased patient's satisfaction and quality of life (Aranda et al., 2005). To reduce complications and increase patient

satisfaction, patient-centered care is pivotal. In this study, NCMs assessed patient wellness scores at the beginning of the intervention and continuously followed-up on patients' health status and well-being scores. This can be referred as patient-centered care. Thus, NCMs worked to meet the patients' needs and listened to their voices when otherwise these care many not have occurred.

Importantly, NCMs should have the capability to use information technology such as an electronic health record (EHR). This informatics system is able to increase continuous care and monitoring of clients, reduce the number of duplicate tests, assist in the consistency of intervention and client referral, and aid in decision making among clinicians (Brokel et al., 2012; Greene, 2010). When NCMs use health information technology, it is possible to provide clients who need complex management appropriate referrals to community services and supportive care services while also increasing patient safety and quality (Schnall, Gordon, Camhi, & Bakken, 2010).

NCMs are key gatekeepers between successful transitional care and community health care providers. This study gives evidence that NCMs in community settings provide coordinated care and achieve patients' positive outcomes. This evidence should be translated into regular nursing and health care practice.

Implications for Education

Academic education needs to be focused on building case management leaders because CM leaders are able to demonstrate the value of CM and plan and deliver quality care and services. There has been an issue identified about the lack of well-qualified case management leadership in organizations (Miodonski & Himes, 2013). Thus, it is important to create a CM leadership program and educate nurse case managers for building this professional specialty (Hospital Case Management, 2012; Miodonski & Himes, 2013).

Nurse educators who teach care coordination and case management courses can use the results of this study to help foster the concept of community-based CM and its

effectiveness for their students. The findings of the present study can contribute to CM education. Because many empirical studies have shown that CM has been used as coordinated care and been shown as effective for chronic illnesses and other diseases, nurse educators should include this scientific evidence in their students' education. This includes content about the effectiveness of a community-based CM intervention.

Nurse educators in hospitals and community health care providers are encouraged to teach their staff nurses transition management and the importance of community-based CM. Through didactic teaching and education to CM leaders, current NCMs, and nursing students, CM can be acquired as an essential intervention in health care reconfiguration. Furthermore, this may lead to an adoption of CM as a vital part of community-based interventions.

Implications for Health Policy

Case management has been shown to be an effective intervention that increases patients' satisfaction and reduces health care costs in Medicare beneficiaries. Community-based CM is a way to improve patient-centered care and transitions of care for Medicare patients with chronic illnesses. Because NCMs have provided home care services, referral to community services, and follow-up care services, CM is able to be used as a major care coordination intervention under health care reform. However, the reimbursement of visiting nurses is very low (Marek et al., 2006). There is little or no reimbursement for coordination activities. Such limited reimbursement results in poor coordinated care for the chronically ill elderly (Marek et al., 2006). Moreover, a community-care program with nurse care coordination may suffer difficulties because the funding is low, the workloads of case managers are large, and the process of care is difficult (Marek et al., 2006). Today, paid-for CM and Medicare benefits for CM have not been well funded.

There is urgent need for support for evidence-based care coordination. The American Academy of Nursing (AAN), who represents and advocates for nurses, recommends to the CMS and business community to:

1. Adopt clear definitions of care coordination and transitional care that are patient, family, caregiver, and population centered that can be used consistently among all stakeholders.
2. Implement payment models expeditiously for evidenced-based care coordination and transitional care services delivered at the community level by teams led by the best professional to coordinate the care, including nurses and other professionals as well as physicians.
3. Ensure replicability and sustainability of care coordination and transitional care models through improved performance analytics and workforce development:
 - a. Expedite funding to develop, implement, and evaluate performance measures that address gaps in effective and efficient care coordination and transitional care.
 - b. Invest in workforce development to better prepare all team members to deliver effective and efficient care coordination and transitional care services (Cipriano, 2012, p. 330).

Since the original study was done in 2008, the ACA was passed and Medicare's reimbursement policy has changed to not pay for bad outcomes—outcomes that CM can fix. The Hospital Readmissions Reduction Program was established which requires CMS to apply the reimbursement penalty based on a hospital's readmission rate (CMS, 2012). And in 2009, the ACA founded the Community Care Transitions Program for funding hospitals and community-based entities to provide follow-up care and transitional care and to reduce preventable readmissions as an outcome for Medicare beneficiaries. Recently, several empirical studies have shown the benefits of community-based services

and transition services that use nursing care coordination on the overall cost of care in the Medicare program (Coburn, Marcantonio, Lazansky, Keller, & Davis, 2012; Marek, Stetzer, Adams, Popejoy, & Rantz, 2012). Because CM is a vital service which provides patient-centered care and transitional management (Hunter, Nelson, & Birmingham, 2012), the ACA represents a good opportunity for CM.

Conclusions

The purpose of this study was to evaluate the effectiveness of community-based CM intervention on patient outcomes in Medicare beneficiaries with chronic illness in a community-based CM service in the rural Midwest. Two years of CM interventions, three patients' clinical outcomes, three health-service utilization outcomes, four categorized modes of CM care services, and 252 Medicare beneficiaries were examined. The study findings showed that a community-based CM had significant effect on reducing patients' number of hospitalizations and increasing patients' symptom control and quality of life. The study had limitations: it was geographically localized, studied selected Medicare beneficiaries, created limited divisions between the four modes of services, and used no demographic data. Nevertheless, this study is unique and meaningful. Its findings suggest that community-based CM can be used as an effective intervention program for Medicare beneficiaries.

This supports the evidence base of CM practice and provides important implications for research, practice, education, and health policy. Community-based CM can be used as a part of the Hospital Readmissions Reduction Program, the purpose of which is to reduce health care costs as well as patient-centered medical homes and other health care reconfigurations. For future research, studies which identify and examine more rigorously the dosage of CM interventions are recommended. This will make the evidence for the effectiveness of CM stronger. NCMs are vital health care professionals in community-based programs and transitional programs, and they provide patient-centered care. For more advanced practice and continuous care, NCMs should use an

information technology in their practice. Finally, the benefits of community-based CM services needs to be used in education and announced to nursing students, health care leaders, and policy makers.

APPENDIX A:

GLOSSARY

ADL: Activities of Daily Living

CM: Case Management

ED: Emergency Department

IADL: Independence in Activities of Daily Living

LOS: Length of Stay

NCM: Nurse Case Manager

APPENDIX B:

DEFINITIONS

Definitions of Terms

Definitions	
Case Management	Case management is a “collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy for options and services to meet an individual’s and family’s comprehensive health needs through communication and available resources to promote quality cost-effective outcomes” (CMSA, 2010, p. 8).
Care Coordination	Care coordination is “the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services”, seeks to meet patient needs and deliver high-quality care (AHRQ, 2011a, p. 4).
Patient-centered Medical Home	“A medical home coordinates care across the health care system; uses information technology to make sure patients get the right care; emphasizes quality and safety; and enhances access by expanded hours, open scheduling or other means” (Butcher, 2012, p. 43).

APPENDIX C:
INSTRUMENTS

Index of Activities of Daily Living

Indicators	1 = severely compromised	2 = substantially compromised	3 = moderately compromised	4 = mildly compromised	5 = not compromised
Eating	1	2	3	4	5
Dressing	1	2	3	4	5
Toileting	1	2	3	4	5
Bathing	1	2	3	4	5
Grooming	1	2	3	4	5
Hygiene	1	2	3	4	5
Oral hygiene	1	2	3	4	5
Walking	1	2	3	4	5
Wheelchair mobility	1	2	3	4	5
Transfer performance	1	2	3	4	5

Index of Independence in Activities of Daily Living

Indicators	1 = severely compromised	2 = substantially compromised	3 = moderately compromised	4 = mildly compromised	5 = not compromised
Shops for groceries	1	2	3	4	5
Shops for clothing	1	2	3	4	5
Shops for household supplies	1	2	3	4	5
Prepares meals	1	2	3	4	5
Serves meals	1	2	3	4	5
Operates telephone	1	2	3	4	5
Handles written communication	1	2	3	4	5
Opens containers	1	2	3	4	5
Performs housework	1	2	3	4	5
Performs household repairs	1	2	3	4	5
Performs yard work	1	2	3	4	5
Manages money	1	2	3	4	5
Manages business affairs	1	2	3	4	5
Travels on public transportation	1	2	3	4	5
Drives own car	1	2	3	4	5
Does own laundry	1	2	3	4	5
Manages own medication	1	2	3	4	5

Symptom Distress Scale (SDS)

	1 = never demonstrated	2 = rarely demonstrated	3 = sometimes demonstrated	4 = often demonstrated	5 = consistently demonstrated
Monitors symptom variation	1	2	3	4	5
Uses preventive measures	1	2	3	4	5

Satisfaction with Life Scale (SWLS)

	1 = not at all satisfied	2 = somewhat satisfied	3 = moderately satisfied	4 = very satisfied	5 = completely satisfied
Self-concept	1	2	3	4	5
Health status	1	2	3	4	5
Pervasive mood	1	2	3	4	5
Economic status	1	2	3	4	5
Close relationships	1	2	3	4	5
Achievement of life goals	1	2	3	4	5

Psychological General Well-Being Index (PGWB)

	1 = not at all satisfied	2 = somewhat satisfied	3 = moderately satisfied	4 = very satisfied	5 = completely satisfied
Social relationships	1	2	3	4	5
Spiritual life	1	2	3	4	5
Cognitive status	1	2	3	4	5
Ability to cope	1	2	3	4	5
Ability to relax	1	2	3	4	5
Level of happiness	1	2	3	4	5
Ability to express emotions	1	2	3	4	5

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