Opening the black box of integrated care

The underlying mechanisms of integrated care delivery to hospitalized elderly

Jacqueline Hartgerink

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OPENING THE BLACK BOX OF INTEGRATED CARE
The underlying mechanisms of integrated care delivery to hospitalized elderly

HET OPENEN VAN DE 'BLACK BOX' VAN INTEGRALE ZORG
De onderliggende mechanismen van integrale zorgverlening aan ouderen in het ziekenhuis

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Chapter 1

General Introduction

INTRODUCTION

The rapid increase in the prevalence of multiple chronic diseases in older people has irrevocably altered medical care. Previous studies have shown that between 65% and 88% of those aged 65 years or older suffer from more than one chronic disease (Hoffman, Rice, & Sung, 1997; Wolff, Starfield, & Anderson, 2002). These older patients suffer from a mixture of problems in multiple life domains, concerning not only physical health, but also social and psychological well-being (Rowe & Kahn, 1997). Hospitalisation is a risk for this vulnerable group of patients: about 35% of people aged 70 and over admitted to the hospital function less well after discharge than before their admission. This percentage increases with age (Covinsky et al., 2003). Once admitted to the hospital, older patients are at an increased risk of poor outcomes such as readmission, increased length of stay, iatrogenic complications, and nursing home placement (Forster, Murff, Peterson, Gandhi, & Bates, 2003; Palmer, 1998). As a result, hospitalisation is often followed by a decline in the ability to perform activities of daily living (Sager et al., 1996; Wu et al., 2000). To retain their ability to cope and their quality of life, it is necessary to prevent loss of function among older patients. Since only 20% of these losses in function are related to hospital diagnosis (Covinsky et al., 2003), one of the most important starting points to prevent function loss among older patients is encapsulated in care delivery itself.

The organisation and delivery of elderly care is often described as fragmented, duplicated, and directed at acute disease (World Health Organization, 1996). In response, integrative approaches towards care based on holistic and personalised care have been introduced (Grol, 2000; Moyle, Borbasi, Wallis, Olorenshaw, & Gracia, 2010). These approaches aim to enhance quality of care and provide better levels of service - one that is more sensitive to the personal circumstances and wishes of the individual patient (Kodner & Spreeuwenberg, 2002). Moreover, the organisational structures of care delivery are altered by coordinating all activities and information around the needs of the patient, placing the older patient in the centre of the care process (Ouwens, Wollersheim, Hermens, Hulscher & Grol, 2005; Wagner et al., 2001; Wagner, Austin, & Von Korff, 1996). Typical attributes of hospital care, such as case management, support systems, multidisciplinary teamwork, and treatment plans, have long been used. Yet the key to integrated care delivery is the integration of these interrelated care delivery components, such that informed patients and their caregivers can interact with proactive professional teams (Ouwens et al., 2005; Wagner et al., 2001; Wagner et al., 1996). By combining these interacting components, integrated care programs have begun to receive greater support to reduce fragmentation and achieve improved quality of

care (Grol, 2000; Villagra, 2004). As a result, complications and re-hospitalisations are prevented, and patient quality of life is enhanced (Ouwens et al., 2005; Wagner, 2000).

The willingness to deliver integrated care implies a major change in the way hospital care is organised and the way teams function. Integrated care delivery is based on the coordinated response of all activities and information to the needs of the older patient in a manner that is organised through horizontal work processes rather than functional profiles. Moreover, it places a different set of demands on professionals. The complementary role of each professional and the interdependency among them are important features of integrated care delivery (Batalden & Mohr, 1997; McCormack, Mitchell, Cook, Reed, & Childs, 2008). Interprofessional collaboration and coordination of tasks among professionals of different disciplines is therefore crucial (Ouwens et al., 2005; Liedtka & Whitten, 1998; Wagner et al., 2001; Wagner et al., 1996). For these processes to operate effectively, it is important that professionals are aware of the demand for care of individual patients. Individual treatment plans are made by integrating information coming from a variety of sources into a coherent whole. In this way, the older patient is placed in the centre of the care process. There is a wealth of literature emphasising the importance of organising care around patient needs and demands by using multidisciplinary coordination (Grol, 2001; Ouwens et al., 2005; Wagner et al., 2001). However, insight into the black box that explains which mechanisms support coordination is currently lacking.

In this thesis, an integrated care program implemented within a Dutch hospital is evaluated. The Prevention and Reactivation Care Program (PReCaP) was developed in 2010 as a means to reduce hospital-related functional decline among elderly patients by offering interventions that are multidisciplinary, integrated, and goal-oriented at the physical, social, and psychological domains of functional decline. The program combines existing treatment methods and innovative care paths for patient reactivation into a comprehensive care package that fits the individual needs of older patients. In contrast to traditional care models, the PReCaP integrates the treatment of the medical condition and the reactivation of the older patient (de Vos et al., 2012). The PReCaP was performed in the Vlietland hospital in The Netherlands from 2011 to 2013. Two other Dutch hospitals, the Sint Franciscus hospital and Ruwaard van Putten hospital, served as control groups and performed care as usual.

Although a good deal of evidence on the effectiveness of integrated care programs is available, many questions still remain. The evaluation of complex multicomponent interventions is a challenge because developing, identifying, and understanding the intervention is difficult (Campbell et al., 2000). Furthermore, evaluation studies hardly

ever address the underlying mechanisms that explain *how* integrated care delivery affects processes and outcomes of care. In this thesis, a theory-based evaluation of integrated care delivery is performed. This contrasts with other studies on complex interventions that are often defined pragmatically and have limited theoretical basis (Campbell et al., 2007). As part of this dissertation, a review was performed to explore relevant theory and to identify the underlying mechanisms that might influence integrated care delivery. Next, a framework was developed to decipher what it is about integrated care delivery that causes the intended outcome. Within this framework, the underlying mechanisms of integrated care delivery are identified through an analysis of the behaviour and cognitions of the professionals delivering care. This approach contrasts with most integrated care models that focus on organisational change instead of the processes performed by the individual professional (Ouwens et al., 2005; Wensing, Wollersheim, & Grol, 2006). It is hypothesised that a deeper understanding of the actions professionals take while delivering care and the way diverse information is combined enables focus to be given to how professionals coordinate their tasks in ways that meet the demands for care of individual patients. This is expected to eventually result in better patient outcomes. These theoretically expected associations were tested in cross-sectional and longitudinal studies. To do so, professional and patient data was collected from the Vlietland hospital, where the PReCaP was implemented, and the two control hospitals. In this way, the professional as well as patient perspectives on integrated care delivery and the mechanisms responsible for its effectiveness were assessed. This opened the way to identify associations between the process of care delivery, integrated care, and outcomes of care.

The overall aim of this thesis was therefore to identify the underlying mechanisms of integrated care delivery and to understand how they operate and interact, so that integrated care programs could enhance quality of care delivery and eventually improve patient outcomes. The leading research questions were as follows: (i) What does an evaluative framework that provides insight into the underlying mechanisms of integrated care delivery look like? (ii) Do the underlying mechanisms explain differences in the level of integrated care delivery? (iii) Are the patients' experiences with integrated care delivery associated with patient outcomes?

Outline of the dissertation

To determine the underlying mechanisms of integrated care delivery, the evaluative framework is introduced in Chapter 2. The evaluation of complex interventions can pose a considerable challenge due to a lack of understanding of the underlying mechanisms that produce a favourable outcome. What is needed is insight into the processes of integrated care delivery by drawing on existing theory and evidence.

Therefore, an evaluation model based on behavioural and cognitive components of working in a multidisciplinary context is presented to link integrated care delivery with the underlying mechanisms by which they influence outcomes. The framework can be used to evaluate a wide range of integrated care programs in hospitals and enables comparison among them.

Chapters 3 to 6 put the model to the test. In Chapter 3, the underlying behavioural components of working in a multidisciplinary context with integrated care delivery were tested. The concept of relational coordination was therefore introduced. The relationships between the informal process of interaction between professionals for the purpose of task integration with the way care was delivered were studied. Chapter 4 provides details on the organisational constructs that could be of value for this behavioural component. Associations were investigated between multidisciplinary team meetings, team climate, and relational coordination.

Next, in Chapter 5, the cognitive components of the evaluative framework were included. Besides relational coordination, the relationship between situational awareness and integrated care delivery was studied. The understanding of the individual patients' situation by professionals was expected to influence how care is coordinated between various disciplines. Differences in perceptions of the level of integrated care delivery between the intervention hospital (Vlietland hospital, which implemented the PReCaP), and the control sites (the Sint Franciscus and Ruwaard van Putten hospitals) were investigated.

A patient perspective on integrated care delivery and its effect on outcomes are described in Chapter 6. We investigated whether older patients' perception of quality of integrated care delivery and satisfaction with hospital care are important for their quality of life. In addition, we tested the relationship between social, cognitive, and physical functioning and self-management abilities and well-being in Chapter 7. We investigated which older patients benefit most from interventions that aim to enhance self-management abilities to cope with functional losses as they age further. A detailed description of the methods used for each study is included in each chapter.

A summary and reflection on the main findings and methodological issues are presented in Chapter 8. In this chapter, we also address recommendations for future research and the practical implications of the current work.

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Chapter 2

A framework for understanding outcomes of integrated care programs for the hospitalized elderly

Hartgerink, J.M., Cramm, J.M., van Wijngaarden, J.D.H., Bakker, T.J.E.M., Mackenbach, J.P., & Nieboer, A.P. (2013).

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ABSTRACT

Introduction: Integrated care has emerged as a new strategy to enhance quality of care for hospitalized elderly. Current models do not provide insight into the mechanisms underlying integrated care delivery. Therefore, we developed a framework to identify the underlying mechanisms of integrated care delivery. We should understand how they operate and interact, so that integrated care programs can enhance quality of care and eventually patient outcomes.

Theory and methods: Interprofessional collaboration among professionals is considered to be critical in integrated care delivery due to many interdependent work requirements. A review of integrated care components brings to light a distinction between the cognitive and behavioral components of interprofessional collaboration.

Results: Effective integrated care programs combine interacting components of care delivery. These components affect professionals' cognitions and behavior, which in turn affect quality of care. Insight is gained into how these components alter the way care is delivered through mechanisms such as combining individual knowledge and actively seeking new information.

Conclusion: We expect that insight into the cognitive and behavioral mechanisms will contribute to the understanding of integrated care programs. The framework can be used to identify the underlying mechanisms of integrated care responsible for producing favorable outcomes, allowing comparisons across programs.

INTRODUCTION

Population aging presents a great challenge to our society. Since the incidence of chronic disease increases with age (Wolff, Starfield, & Anderson, 2002), the number of elderly requiring hospitalization for chronic diseases is expected to increase proportionally (World Health Organization, 2010). Once admitted to the hospital, older adults are at an increased risk for poor outcomes such as readmission, increased length of stay, functional decline, iatrogenic complications, and nursing home placement (Forster, Murff, Peterson, Gandhi, & Bates, 2003; Palmer, 1998). Given that 34-50% of hospitalized older adults have been found to experience functional decline (Inouye et al., 1993; Lau, Scandrett, Jarzebowski, Holman, & Emanuel, 2007), it is likely that traditional healthcare delivery does not meet the needs of an aging population. The complex needs of older patients ask for the coordination of health and social care with related services delivered by multiple providers (Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005). Hospital care that does not address the functional needs, psychosocial issues, and altered response of older patients to illness and treatment (Hart, Birkas, Lachmann, & Saunders, 2002; Moyle, Olorenshaw, Wallis, & Borbasi, 2008), puts older patients at risk for receiving fragmented or poor-quality care (Leichsenring, 2004; World Health Organization, 1996). Recognition of the shortcoming has led to new strategies of care delivery such as integrated care programs (Kodner & Kyriacou, 2000), which are expected to resolve many problems surrounding elderly care.

Quality improvement programs in hospitals usually focus on isolated interventions, such as medication supply or multidisciplinary cooperation, rather than integrated programs that incorporate the total care process (Grol, 2000). The World Health Organization (WHO, 1996) defined integrated care as a holistic and personalized approach to multidimensional health needs. It reduces the duplication and fragmentation of care while improving coordination and continuity by placing the elderly central to the health care delivery process (Kodner & Kyriacou, 2003; Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005). With the integration of interrelated care delivery components (e.g. case management, support systems, multidisciplinary teamwork, treatment plans), the system is reformed such that informed patients and their caregivers can interact with proactive professional teams. Such a reform positively affects the quality of care and patient outcomes (Ouwens et al., 2005; Wagner et al., 2001; Wagner, Austin, & Von Korff, 1996). De Morton and colleagues (2007) found that multidisciplinary interventions resulted in an increased proportion of discharged patients, shorter hospital stays for elderly patients with acute conditions, and lower hospital costs. No similar effect was found with implementing a single intervention. In addition, Caplan and colleagues (2004) found that a comprehensive geriatric assessment followed by implementation of integrated care with multidisciplinary team

interventions improved the health outcomes of elderly patients at risk of physical deterioration during hospitalization (Boyd et al., 2008; Covinsky et al., 2003). The hospital treatment of vulnerable elderly patients currently focuses on diagnostics; it should also focus on the integration of health and social care with related services in a multidisciplinary context (Ouwens et al., 2005).

Little is known about the underlying mechanisms that explain the effectiveness of integrated care for elderly patients. Theories of integrated care have two opposing strategies: gradual and radical redesign in the steps of providing integrated care, by comprehensive, organization-wide efforts to improve quality (Grol, Bosch, Hulscher, Eccles, & Wensing, 2007). Regardless of the strategy, however, the complexity and multidisciplinary settings of integrated care programs pose difficulties for implementation. Like other quality improvement interventions, they are complicated by the variety of approaches among organizations and multidisciplinary teams within the same organization (Hulscher, Laurant, & Grol, 2003). Each professional's individual care delivery and adherence to clinical guidelines adds more variation.

Integrated care must be organized such that the services intended to produce the desired outcome can and will be provided (Ouwens et al., 2005). Too often, interventions are evaluated without first gathering data that describe the processes mediating improvements (Hulscher et al., 2003). Current measures of quality in health care, such as the structure-process-outcome model, do not clarify the underlying mechanisms governing the components of integrated care (Donabedian, 1988, 2005; Zinn & Mor, 1998). The relationship between structure and outcome often remains unclear because a sound analytical method for evaluating the outcomes of integrated care programs, which would provide insight into why and where they are effective, is lacking. In this article, we provide a framework to increase our understanding of the relation between structure and outcomes by explaining the underlying mechanisms of the process of integrated care delivery to elderly provided by professionals within hospitals. The overall aim of this framework is to identify the underlying mechanisms of integrated care delivery and to understand how they operate and interact, so that integrated care programs can enhance quality of care delivery and eventually patient outcomes.

Pillars of integrated care delivery

Interprofessional collaboration among professionals from a variety of disciplines is considered to be critical in integrated care delivery due to the many interdependent work requirements (Anderson, Allred, & Sloan, 2003; Cramm & Nieboer, 2011; Liedtka & Whitten, 1998; Young et al., 1998). To provide integrated care that is holistic and patient-centered responding to the multidimensional health needs of older patients more is needed than professionals who each work within their particular scope of

practice and interact formally (multidisciplinary teamwork), but rather professionals who have some overlapping of professional roles, communicate and coordinate together in their care of older patients and share problem solving and decision making (interprofessional collaboration) (D'Amour, Ferrada-Videla, San Martin Rodriguez, & Beaulieu, 2005; Mariono, 1989; Sheehan, Robertson, & Ormond, 2007). In this way, the coordinated response of all activities and information to the needs of older patients is organized through horizontal work processes, rather than through functional profiles, creating interdisciplinary instead of multidisciplinary care delivery.

The literature provides some indications of what interprofessional collaboration entails, yet it demonstrates that we have limited understanding of the complexity of relationships between professionals and underlying mechanisms of the delivery of care to elderly provided by professionals in a multidisciplinary context (Drinka & Clark, 2000; Schofield & Amodeo, 1999; Zwarenstein, Goldman, & Reeves, 2009). A review of the delivery of integrated care components by professionals brings to light a key distinction between the cognitive and behavioral components of interprofessional collaboration. Effective integrated care programs often involve new professional collaborations, task reallocation, communication improvements, case management, and the use of new types of professionals (Ouwens et al., 2005; Wagner et al., 1996). Such changes in care provision affect the cognition and behavior of professionals, which in turn affect the quality of their delivery of care to patients (Elsbach, Barr, & Hargadon, 2005; Lave, 1988). We thus expect that cognitive and behavioral perspectives on the delivery of integrated care through interprofessional collaboration will contribute to our understanding of the effects of such changes. While both perspectives share the same objective, their processes vary. The cognitive perspective explains changes in care delivery in terms of the mental states of professionals (Mohammed, Ferzandi, & Hamilton, 2010; Schneider & Angelmar, 1993); the behavioral perspective holds that changes in care delivery result from interaction among professionals (Kazdin, 1975; Kennedy, 2002). The closely-related situated cognition and behavior influence each other, just as cognition and behavior are influenced by team (Bower, Campbell, Bojke, & Sibbald, 2003) and organizational (Detmer, 2000; Greenberg & Baron, 1997; Liedtka & Whitten, 1998; Schein, 1985) contexts.

DEVELOPMENT OF THE FRAMEWORK

Our framework is based on the principles of program theory, which consists of a set of statements that describe a particular program, explain why, how, and under what conditions the program effects occur, predicts the outcome of the program, and specifies what needs to be done to bring about the desired outcomes (Rossi, Lipsey, & Freeman,

2004; Sidani & Sechrest, 1999). A review of literature on integrated care programs (Bergman et al., 1997; Eng, Pedulla, Eleazer, McCann, & Fox, 1997; Johri, Beland, & Bergman, 2003; Kodner & Kyriacou, 2000) allowed us to define the presenting problem and to unravel the changes in care delivery that are expected and the way in which change is to be achieved. The theory of organizational knowledge creation helps to understand the process of making knowledge available and amplifying knowledge created by individuals as well as connecting it to others' knowledge (Nonaka, van Krogh, & Voelpel, 2006). This theory allowed us to identify the cognitive and behavioral mechanisms underlying interprofessional collaboration and integrated care delivery. By identifying the underlying mechanisms of integrated care delivery we may increase our understanding of how they operate and interact in order to enhance quality of care and eventually patient outcomes. The main purpose of the evaluation model is to test the program theory, and to identify what it is about the program that causes the intended outcomes. The evaluation model incorporates variables that reflect theoretical concepts of integrated care evaluation for elderly in hospital settings. In the following sections, we conceptualize integrated care processes to identify the mechanisms responsible for producing intended outcomes. Such a theoretical structure selects outcomes that correspond to improved service delivery (aligning care with the needs of elderly patients, coordination and collaboration, resource utilization (Kodner & Kyriacou, 2000)) and reflect the primary goal of integrated care, namely, enhancing patients' quality of life (Figure 1).

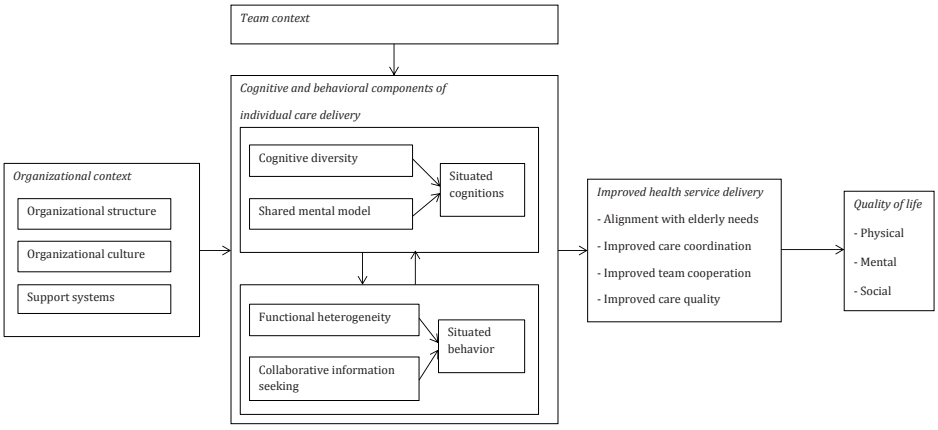

Figure 1. Evaluation model for integrated care programs for elderly in hospitals

First, the cognitive components of the framework are outlined. These components consist of mechanisms that alter the way of thinking by professionals delivering care to older patients. Next the behavioral components are explained, which consist

of mechanisms that explain how professionals actively share and combine patient information from various sources. Since professionals do not work in isolation but operate in teams, they are affected by the team in which they work. Teams working in cardiology, for example, may work differently together compared to teams in the geriatric or orthopedic departments. Furthermore, team functioning is expected to be influenced by the organizations in which they work. Research indeed demonstrated that team functioning is affected by organizational characteristics (Coleman, Austin, Brach, & Wagner, 2009; Salver & Wan, 2003; Thornton Bacon, & Mark, 2009).

Cognitive components of individual care delivery are cognitive diversity and a shared mental model, which together result in situated cognitions. Examining situated cognition awareness of team members leads to an important perspective for a system design that supports teams' complex interrelated activities. Endsley (1995) has defined team-situated cognition awareness as the degree to which every team member possesses the situated cognition awareness required for his or her responsibilities. Effective integrated care requires that each team member possess the knowledge required for optimal patient care and interventions designed to integrate discrete areas of expertise (Wagner et al., 1996). Cognitive diversity reflects the differences in team members' knowledge, beliefs, preferences, and perspectives (Miller, Burke, & Glick, 1998). The integration of these diverse cognitions within interdisciplinary teams, reflecting the knowledge and skills of different disciplines, increases the likelihood of new knowledge development (Miller et al., 1998; Mitchell & Nicholas, 2006). An integrated approach is particularly suitable to complex health problems, such as comorbid and frail elderly hospital patients. Ideally, each interdisciplinary team member knows the diverse points of view held by all other professionals on the team, and trusts them to deliver the necessary care. Critical elements of care are expected to be completely delivered by combining the existing and capabilities of each team member (Wagner, 2000).

Situated cognition awareness is also influenced through shared mental models of interdisciplinary team members. Researchers have provided substantial evidence that mental models have strong effects on perceptual processes and organizational outcomes (Boland et al., 2001; Carson, Madhok, Varman, & John, 2003; Heracleous & Barrett, 2001). Endsley and Jones (1997) define shared situated cognition awareness as "the degree to which team members possess a shared understanding of the situation with regard to their shared situated cognition awareness requirements." Measureable shared cognitive perceptions of organizational policies, practices, and procedures can be manipulated to enhance the effectiveness of a team (Bower et al., 2003; Davis & Taylor-Vaisey, 1997). Shared objectives, commitment, and support positively relate to the continuous delivery of high-quality care (Bower et al., 2003; Campbell et al., 2001).

This connection is primarily based on the understanding that, through the integration of diverse knowledge, teams have the potential to overcome the factors constraining the development of new knowledge by social relations (Mitchell & Nicholas, 2006). By extended interaction and shared practice team members have identical experiences and, eventually, comparable interpretations of those experiences, with the added value of team members knowing "who knows what" (Mitchell & Nicholas, 2006; Yoo & Kanawattanachai, 2001). The development of such a shared mental model enables team members to form the same psychological representations, resulting in accurate explanations and expectations of others' actions (Castellan, 1993). Interdisciplinary team members who share the same mental model are expected to excel at aligning care with the needs of elderly patients as they are better able to provide a thorough problem description and needs assessment, and to develop common treatment goals and standards that coordinate care delivery. We hypothesize that the added value of cognitive diversity and the combined value of a shared mental model improve interprofessional collaboration and lead to more effective integrated care delivery.

The integration of cognitive diversity and a shared mental model leads to the situated cognition awareness required to deliver high quality integrated care. This arises from interactions of existing cognitive structures within the multidisciplinary team context (Elsbach et al., 2005). Because the hospital context is both social and dynamic, situated cognitions tend to be transitory, formed by the interaction of existing cognitive structures and treatment of a specific patient. The cognitions of an individual professional adapt to specific contexts of individual patients, making it possible to align care to the specific needs of each elderly patient. We hypothesize that the effects of integrated care delivery result from situated cognitions, which originate with cognitive diversity and shared mental models of health care professionals' interaction with patients.

Behavioral components of individual care delivery. Effective integrated care requires optimal professional behavior. Behavioral components of individual care delivery - functional heterogeneity and collaborative information-seeking - combine to result in the development of situated behavior.

The integration of the behavior of diverse professionals within a team is central to the success of integrated care (Anderson & McDaniel, 2000). Interdisciplinary teams, which embody heterogeneous roles, express more diverse opinions about the tasks, procedures, and appropriate actions than homogeneous teams (Jackson, 1996; Pelled, Eisenhardt, & Xin, 1999). Functional heterogeneity defines teams that are diverse in terms of the occupational background and encourages individuals to adapt their behavior to that of other disciplines represented by the team, in order to provide a complete overview of the elderly situation. Professionals provide each other with

feedback regarding appropriate care. As a result, multidisciplinary treatment plans are expected to form a coherent whole in which individual professionals' actions are combined and new types of professionals can be introduced. In doing so, interdisciplinary teams help elderly patients navigate the complexities of multiple health problems, while receiving less fragmented and duplicated care (Wagner, 2000).

Multidisciplinary team meetings constitute the basic prerequisite for collaboration (Mathieu, Maynard, Rapp, & Gilson, 2008; McGrath, 1991). Professionals are thereby involved in collaborative information-seeking to address a specific problem, and use each other as information sources (McGrath, 1991; Hansen & Järvelin, 2005), facilitating the coordination of appropriate actions in the delivery of care to elderly patients. Clinical information from different disciplines is transferred more effectively, enhancing the early detection of health problems and the adaptation of care delivery actions. Functional heterogeneity and collaborative information seeking are both expected to be underlying mechanisms leading to effective integrated care programs. Social and behavioral theories are useful for gaining an understanding of the influence of behavioral processes within multidisciplinary teams. Activity theory, for example, states that the division of labor in an activity creates a distinct position for each team member. Members bring diverse histories to the team; the activity system contains multiple layers. This multi-vocality is multiplied in networks of interacting activity systems, which may lead to collaborative envisioning and a deliberate effort to bring about collective change (Engeström, 2001). Clinical information-seeking practices have been shown to be distributed throughout the professional team through the process of collectively seeking, interpreting, and assessing information, especially in the case of multiple care components (Reddy & Spence, 2008; Sonnenwald & Pierce, 2000). We hypothesize that the added value of functional heterogeneity and collaborative information-seeking will improve interprofessional collaboration and lead to more effective integrated care delivery.

An adequate behavioral response emerges as the interaction of individual and team behavior with the environment. A common goal of an integrated care intervention is to increase the knowledge and expertise necessary for the care of elderly patients; the behavior of professionals must be adapted to each medical situation. Such situated behavior emerges when the mechanisms of functional heterogeneity and collaborative information-seeking are aligned with the needs of elderly patients. Professionals' behavioral intentions will thereby be affected, which we expect to lead to improved health service delivery and enhanced quality of life.

Team context. The cognitions and behavior of professionals are influenced by team context: its history, duration, performance record, resources, leader stability, member abilities, size, and level of diversity (Bower et al., 2003). Interdisciplinary teams - di-

verse in terms of occupation and function - are likely to be diverse in other ways as well. Evidence for the influence of team context mechanisms supports the reasoning that care delivery benefits from teamwork. A team context, however, must support teamwork in a way that integrates cognition and behavior into a coherent system.

Organizational context. Supportive organizational systems, structure, and culture are known to promote effective integrated care delivery for older patients (Detmer, 2000; Greenberg & Baron, 1997; Schein, 1985). Activities like integrated care can only grow out of individuals interacting with the organizational context (Lave, 1988). Organizational theorists define structure as the configuration of relationships with respect to responsibilities, authority, and task allocation (Greenberg & Baron, 1997; Jones, 1995). Health care organizations are typically characterized by centralized authority, work regulation, and formalization (Cohen, 2003). Such structuring consists of separate chains of control for different professionals (West & Poulton, 1997). In contrast, integrated care delivery requires a more organic mode of structuring that incorporates flexible working processes, enabling the introduction of new instrumental and technical working methods. Effectiveness arises from identification with the new professional role within the interdisciplinary team (Gautam, Van Dick, & Wagner, 2004). An organizational structure in which flexible task structuring and information sharing are facilitated should thus yield to the integration of professional cognition and behavior, thereby increasing the quality of care delivery.

Organizational culture is expressed by the pattern of shared assumptions - invented, discovered, or developed by an organization as it learns to cope with problems - that are taught to new members as the correct way to act (Schein, 1985, 1990; Trice & Beyer, 1993; Trompenaars & Hampden-Turner, 1998). Organizations benefit most from integrated care programs when teamwork, coordination, and customer focus are emphasized. Formal structuring and regulations appear to be negatively associated with quality improvement activities (Ferlie & Shortell, 2001; Scott, Mannion, Marshall, & Davies, 2003; Shortell et al., 1995). Professionals working in interdisciplinary teams face the relatively new and unfamiliar position of defending their established professional work domains, in contrast to the well-defined hierarchical power structure of traditional, physician-controlled cultures (Turner, 1995; Watson, 2008; Witz, 1992). The diversity among interdisciplinary team members challenges the established hierarchy's power and authority.

Support systems (e.g. information, communication, clinical guidelines) improve the planning of care delivery based on clinical investigations and outcomes (Hunt, Haynes, Hanna, & Smith, 1998). An integrated care program often involves the construction of new support systems that change the instrumental and technical aspects of care delivery. They allow patients and professionals to be properly informed and

can improve quality of care by facilitating the provision of feedback to professionals on outcomes (Detmer, 2000; O'Conner, 1999). Timely information about patients has been proven to be a common feature of effective care (Wagner, 2000). The most basic need is to establish a registry that includes information on the performance of various aspects of guideline-informed care. Interdisciplinary teams with access to such a registry can deliver proactive care, receive feedback, implement reminder systems, generate tailored treatment plans, and provide patient- or provider-specific messages to facilitate integrated care delivery (Glasgow, Orleans, Wagner, Curry, & Solberg, 2001). Information and communication systems facilitate the integration of services to improve overall performance (Porter, 1985).

Improved health service delivery and quality of life. Research shows that integrated care results in improved delivery of care aligned to individual needs of patients (Ouwens et al., 2005; Wagner et al., 2001; Wagner et al., 1996). Collective learning theories emphasize that mental models, such as cognitive diversity and shared mental models, are used as a basis for modifying and optimizing the mechanisms underlying the effectiveness of integrated care delivery (Hayes & Allinson, 1998; Swieringa & Wierdsma, 1992). Although much remains to be learned about the influence of such cognitive models in a hospital setting, some empirical evidence is currently available. Medical facilities that excel in providing diagnostic and procedural information have been shown to exhibit a shared mental model through similar conceptions of guidelines (Hysong, Best, Pugh, & Moore, 2005). This finding is consistent with previous research using cognitive models, which has linked cognitive diversity and shared mental models to improved team cooperation and coordination (Mathieu, Goodwin, Heffner, Salas, & Cannon-Bowers, 2000; Stout, Cannon-Bowers, Salas, & Milanovich, 1999). Improved cooperation and coordination result in more effective evaluation and planning of elderly patients' needs. Our framework illustrates that professional situated cognitions and behaviors position the complex holistic needs of the elderly central to health service delivery. The added value of the cognitive and behavioral components for interprofessional collaboration is expected to result in enhanced coordination and cooperation, better quality of care, and alignment with elderly patients' needs (Kodner, 2006; Ouwens et al., 2005; Wagner et al., 2001; Wagner et al., 1996). The interrelated components of team cooperation, care coordination, quality of care, and alignment with elderly patients' needs are integrated through situated cognition and behavior. We hypothesized that the integration of holistic and personalized health care improves a patient's quality of life. Integrated care is known to provide these opportunities (Battersby, 2005; Béland et al., 2006; Bernabei, 1998; Caplan, Williams, Daly, & Abraham, 2004; de Morton, Keating, & Jeffs, 2007; Kodner & Kyriacou, 2000).

Example of an application of the evaluation model: Evaluating an integrated care program for the hospitalized and vulnerable elderly. About 35% of elderly patients admitted to hospitals function less well after discharge than prior to admission (Covinsky et al., 2003). The loss of function is associated with the disorder for which the patient was admitted, but the hospital stay itself also leads to health problems. The Prevention and Reactivation Care Program (PReCaP), an integrated care program, was designed to prevent loss of function in elderly patients due to hospitalization, targeting patients 65 years or older who are vulnerable to function loss after discharge. The program supports a multifaceted and multidisciplinary approach to elderly care. The care is organized around several core components, including screening for vulnerability, early detection of health problems, multidisciplinary teamwork, and case management (Asmus-Szepesi et al., 2011). The framework provides a valuable starting point for understanding the underlying mechanisms of the PReCaP responsible for producing a favorable outcome (Figure 2).

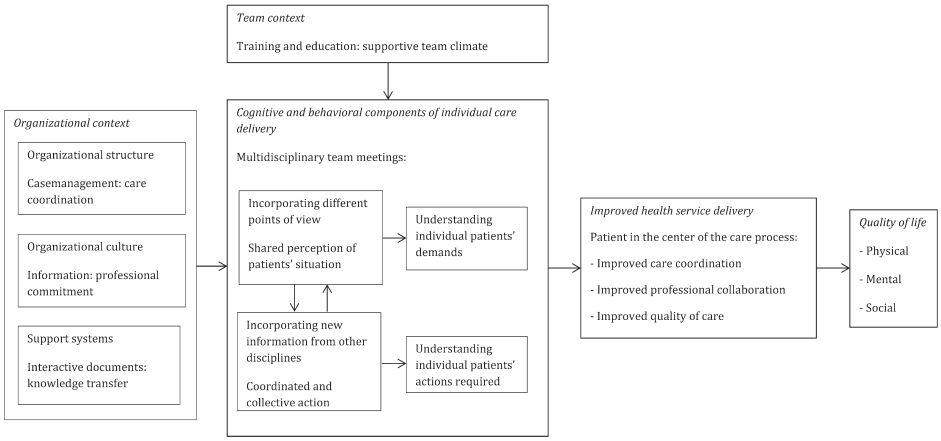

Figure 2. Example of an application of the evaluation model on an integrated care program for the hospitalized and vulnerable elderly

Organizational context

- *Structure:* Within 48 hours of admission, the level of vulnerability of the elderly patient is determined with a screening instrument. Through Goal Attainment Scaling (GAS), an individual treatment plan is formulated. A case manager, who places the elderly and their caregivers central to the health care delivery process, is assigned to the patient throughout the integrated care spectrum, from hospital to nursing and home care. The organizational structure is characterized by the case manager's representation of the elderly within interdisciplinary teams and frequent patient interaction, which facilitates information sharing and provides

input for the development of professional cognitions and behavior. In this way, the case manager serves as a care coordinator between professionals, as well as between patients and professionals.

- *Culture:* Information booklets describing the program and corresponding protocols are distributed among hospital professionals. Formal arrangements of face-to-face discussion stimulate professionals to share new ideas and insights and keep professionals up-to-date about developments (Robertson & Hammersley, 2001). The periodic presentation of program results is expected to create a stimulating learning and supportive environment for program implementation. In this way, professional commitment is achieved.
- *Support systems:* Support systems are designed to enhance information transfer among professionals. Available interactive documents include individualized support for professional practices and several practical implementation tools (patient assessment, GAS scores, individual treatment plans, chart stickers/vital sign stamps, and advice scripting). The use and content of this information system provides an indication of program implementation.

Individual care delivery by interdisciplinary teams

- *Cognitive component:* Effective integrated care requires every team member to possess the situated cognition awareness required for his or her responsibilities. This dynamic understanding of "what's going on" makes it possible to organize care around patient needs. The functional diagnosis in relation to the medical diagnosis of the elderly is discussed by the geriatrician, nursing home physician, social worker, and case manager. An individual treatment plan that emphasizes patients' functional status is formulated by incorporating team members' different points of view. Multidisciplinary team meetings enhance the formation of common goals and treatment standards. Instead of incorporating only their own viewpoints of the patients' situation, this generates a shared mental model of the patient's situation. The greater the degree to which team members possess this mental model, the better their ability to interpret information similarly and make accurate projections regarding each other's action. Using clinical guidelines and protocols for integrated care treatment promotes shared cognitive perceptions, practices, objectives, and procedures. As a result, their shared perception of the actual situation of the patient (e.g. awareness of the current health condition), in combination with a comprehension of what might be necessary for the patient (e.g. knowledge about different treatment options), and a projection of what might happen (e.g. how to react to sudden deterioration) allows professionals to better respond to each patient's personal needs (Mosier & Fischer, 2010; Reader et al., 2011; Wright & Endsley, 2008).

- *Behavioral component:* Multidisciplinary team meetings enhance information sharing. Emphasis on the value of professional feedback and individual input during these multidisciplinary team meetings, which can be scored directly, increases effective interprofessional collaboration. Professionals who are provided with the opportunity to connect with other professionals through formal activities are expected to expand their professional knowledge and skills (McDermott & O'Dell, 2001). In addition, it is important that professionals also timely inform others when new patient information emerges (Gittell, 2006). These formal communication methods and the relational dynamics provide the basis for coordinated collective action that places the elderly in the center of the care process (Hartgerink, et al., 2012, 2013). As a result, professional actions are combined through sharing diagnostic and clinical patient information, and the number of consulted professionals is likely to increase. In this way, care delivery is less fragmented and duplicated. Individual health problems are detected early, avoiding complications and future health problems. Case management enhances such processes by gathering information about the patient from different professionals. Combining these diverse information sources is a criterion for adapting professional actions to the elderly patient's needs.

Team context

- A case manager is assigned to each elderly patient and is responsible for this patient in the total process of care, which promotes leader stability. Team member performance, resources, and abilities improve through specialized training and education. This results in a supportive climate for teamwork, as team members are more willing to share resources, perceptions, policies, practices, and procedures (Schein, 1990). As such, a team climate may encourage social interaction and draws the interpretations by professionals of events and objects closer together (Ford & Seers, 2006; Schneider & Reichers, 1983).

Health service delivery

- Cognitive diversity and shared mental models facilitate coordination and cooperation between interdisciplinary team members, by creating a dynamic understanding of the individual patients' situation. Situated cognition awareness and behavior results in team members' checking each other for conflicting information or perceptions. Tasks are coordinated and prioritized, and contingency planning is established, placing the patient in the center of the care process.
- Shared situated cognitions and behavior leads to timely, accurate, demand-driven care aligned with needs of the elderly patient. Intermediate outcomes are thus also defined to reflect changes in health service delivery resulting from the im-

provements. Improved coordination in care delivery and professional cooperation decreases duplication and fragmentation of care.

Quality of life for elderly patients

The integration of diverse cognitions and shared mental models within interdisciplinary teams is translated into multidisciplinary treatment plans that describe the care needed by an individual patient. Integrated care delivery has shown to improve quality of care due to patient involvement in planning of care, better patient education, more staff time with patients and improved communication between professionals (Williams, Roberts, & Rigby, 1993). In this way, the perceived quality of integrated care by the patient affects patient outcomes (Hartgerink et al., under review). Providing care with a holistic and personalized integrated care approach prevents loss of function in elderly patients due to hospitalization, aligns care with their needs, and enhances their quality of life.

DISCUSSION AND CONCLUSION

Integrated care programs in hospitals are assumed to be a systematic and comprehensive approach to improve the management of complex health problems. Evidence for these improvements is currently lacking and a sound analytical method for evaluating the outcomes of integrated care programs has to this date been unavailable. Our framework provides a valuable starting point for doing so. The theory of organizational knowledge creation is used to explain how knowledge is made available, how it is amplified, and how knowledge from different professionals is connected (Nonaka, van Krogh, & Voelpel, 2006). Because interprofessional collaboration is the core component influencing the effectiveness of integrated care delivery, professionals' cognitions and behaviors are of primary importance. Program evaluation should thus focus on the combined effects of these behavioral and cognitive components in relation to the specific needs of elderly patients. Program theory shows that team and organizational support are also indispensable. The use of supplementary interventions on these levels strengthens the effect of the programs.

Most models and theories are based on the same principles for the successful implementation of changes in health care delivery: a systematic and sequential approach, commitment of the relevant population, process monitoring, and implementation planning (Davies, Nutley, Mannion, 2000; Ferlie & Shortell, 2001; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Grol, 1992; Grol & Grimshaw, 2003; Øvretveit, 1999; Robertson, Baker, & Hearnshaw, 1995). We know that successful interventions provide the patient with case management, professional feedback,

explicit protocols, support systems and reorganization to better meet patient needs within a multidisciplinary context (European Foundation for Quality Management, 2003; Minkman, Ahaus, Fabbricotti, Nabitz, Huijsman, 2009; Ouwens et al., 2005; Wagner et al., 2001; Wagner et al., 1996). Yet there exists no explanatory theory of the mechanisms by which integrated interdisciplinary teamwork affects care outcomes. Lemmens and colleagues (2008) tried to open this black box by conceptualizing the change mechanisms of the patient and professionals. But they did not make explicit the professionals' cognitions and behaviors in interprofessional collaboration, or the combined effects of these components in relation to the specific needs of elderly patients. Our evaluation framework elucidates the mechanisms underlying the working components of integrated care interventions within an elderly care setting. Situated cognitions focus on the process of thinking and acting by individual professionals. A dynamic understanding of patients' specific situation and needs places the elderly person in the center of the care process, making it possible to consider and balance different treatments to each patient. Situated behavior assumes a continuous interaction among the professional, his or her performance, and the elderly, which reinforce one another in changing behavior. The actions professionals take while delivering care and the way diverse information is combined enables a focus on how professionals coordinate their tasks in ways that meet the individual patients' demand for care. The identification of these mechanisms, rooted in cognitive and organizational psychology, facilitated the construction of the evaluation framework. What this framework adds to current models and theories is a deeper understanding not only of the integrated care interventions but also of the underlying mechanisms responsible for producing a favorable outcome. Besides understanding these underlying mechanisms, it is of importance for the evaluation of integrated care programs, to understand the degree to which suggested integrated interventions are actually performed. A fidelity study can be used to determine the extent to which the intervention was delivered as intended (de Vos et al., 2013).

In testing the relations presented in the framework we found empirical evidence that the behavioral components of professionals delivering care to older patients are indeed of importance for integrated care delivery (Hartgerink et al., 2012). In addition, we found that, consistent with our evaluative framework, the cognitive components of professionals delivering care to older patients are associated with integrated care delivery (Hartgerink et al., under review). Furthermore, team context and organizational context affect interprofessional collaboration and integrated care delivery (Hartgerink et al., 2013; Hartgerink et al., under review). These are important findings and support our expectations that the underlying behavioral and cognitive mechanisms are important for integrated care delivery to older patients.

Implications of findings

Earlier research discussed the importance of providing insight into why interventions for older patients are effective (Singer et al., 2011; Zin & Mor, 1998). The current framework suggests that the underlying cognitive and behavioral components, and team and organizational context are important for the effectiveness of integrated care programs in hospitals. The theoretically derived relations should be tested in empirical research. Programs can then be analyzed by deconstructing the framework's components, allowing cross-comparison of different programs. Consistent use of the framework will therefore enable valid comparison of the outcomes of integrated care programs. To do so, integrated care programs should be evaluated systematically, by e.g. developing integrated care specific indicators (Stein & Rieder, 2009).

In an era plagued by ever-tightening health care resources and characterized by an aging population, it is of utmost importance to identify interventions that add value to the quality, efficiency, and effectiveness of care for vulnerable elderly patients and understand the underlying mechanisms of why interventions work. The current framework provides an essential first step, by examining how integrated care delivery affects processes and outcomes of care.

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Chapter 3

The importance of relational coordination for integrated care delivery to older patients in the hospital

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ABSTRACT

Aim: This study investigated relational coordination among professionals providing healthcare to hospitalized older patients and assessed its impact on integrated care delivery.

Background: Previous studies have shown that relational coordination is positively associated with the delivery of acute, emergency, and trauma care. The effect of relational coordination on integrated care delivery to hospitalized older patients remains unknown.

Methods: This cross-sectional study was part of an examination of integrated care delivery to hospitalized older patients. Data were collected using questionnaires distributed to hospital professionals (192 respondents; 44% response rate).

Results: After controlling for demographic variables, regression analyses showed that relational coordination was positively related to integrated care delivery ($\beta = 0.20$; $p \leq 0.05$). Relational coordination was lower among professionals in the same discipline, and higher between nurses and others than between medical specialists and others. Relational coordination and integrated care delivery were significantly higher in geriatrics than in other units (both $p \leq 0.001$).

Conclusions: The enhancement of relational coordination among healthcare professionals is positively associated with integrated care delivery to older patients.

Implications for nursing management: Relational coordination should be improved between medical specialists and others and higher levels of relational coordination and integrated care delivery should be achieved in all hospital units.

INTRODUCTION

The proportional increase in the aging population is resulting in an ever-growing percentage of older hospitalized patients. Individuals older than 65 years of age are more likely than those in other age groups to be admitted to acute care from the emergency department. Once admitted, they are at an increased risk for poor outcomes such as readmission, increased length of stay, functional decline, iatrogenic complications, and nursing home placement (Palmer, 1998). Schwarz (2000) found a 33% rate of readmission within three months for older patients, which is consistent with other studies of readmission rates among these patients. Complications associated with hospitalization, such as acute confusion and nosocomial infection, are common among older patients, resulting in increased morbidity and mortality. Lefevre and colleagues (1992) found that 58% of older patients experienced at least one iatrogenic complication. Loss of function and independence is another common consequence of hospitalization for older patients. Wu and colleagues (2000) found that one or more limitations developed within 2 months in 42% of older patients with no baseline dependency at admission. Sager and colleagues (1996) found that the ability to perform one or more activities of daily living had declined in 32% of older patients at the time of discharge. This amount of functional decline has an impact on discharge planning and the level of subsequent care required for older patients. Given that 34-50% of hospitalized older patients have been found to experience functional decline resulting in increased length of hospital stay, mortality, nursing home placement, and healthcare costs (Inouye et al., 1993; McCusker, Kakuma, & Abrahamowicz, 2002), it is likely that current healthcare is not meeting the needs of acutely ill older patients. If acute care is not designed to address the functional needs, psychosocial issues, and altered response of these patients to illness and treatment (Hart, Birkas, Lachmann, & Saunders, 2002; Moyle, Olorenshaw, Wallis, & Borbasi, 2008), older patients are at significant risk for hospital-acquired complications and loss of functionality.

Fortunately, many of the described complications are preventable (Fletcher, 2007; Jacelon, 1999; Lefevre et al., 1992). The healthcare delivery system is a major factor contributing to poor outcomes for hospitalized older adults (Boyd et al., 2005; Cowdell, 2010; Reuben, 2000). The organization and delivery of hospital care is fragmented, uncoordinated, and duplicated (World Health Organization, 1996). Furthermore, most interventions in the clinical and organizational processes of hospital care are isolated, focusing on issues such as medication supply or multidisciplinary coordination. The literature strongly suggests, however, that holistic and personalized integrated care delivery encompassing the total care process is required (Grol, 2000; Moyle, Borbasi, Wallis, Olorenshaw, & Gracia, 2010; World Health Organization, 1996).

Older patients have complex medical, social, and psychological problems that are expected to benefit from integrated care delivery (World Health Organization, 1996), which is based on the coordinated response of all activities and information to the needs of these patients in a manner that is organized through horizontal work processes, rather than through functional profiles. The complementary role of each professional and the interdependency among them are important features of integrated care (Batalden & Mohr, 1997; McCormack, Mitchell, Cook, Reed, & Childs, 2008). Coordination among professionals of different disciplines is thus a crucial element of effective integrated care delivery for older patients (Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005; Wagner et al., 2001; Wagner, Austin, & Von Korff, 1996). Coordination is a relational process among team members that is based on task interdependencies (Bechky, 2006; Gittell, 2002a, 2002b; Van de Ven, Delbecq, & Koenig, 1976; Weick & Roberts, 1993). One of these relational perspectives - relational coordination - identifies specific dimensions of relationships that are integral to the coordination of work. The effectiveness of coordination is determined by the quality of communication among professionals in a work process, which depends on the quality of their underlying relationships (Gittell, 2006). The quality of their relationships, in turn, reinforces the quality of their communication. According to this theory, coordination that occurs through frequent, high-quality communication supported by relationships of shared goals, shared knowledge, and mutual respect enables an organization to better achieve the desired outcomes (Gittell, 2006). Defined as "a mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration" (Gittell, 2002b, p. 301), relational coordination is a type of professional relationship that is particularly relevant for coordinating work that is highly interdependent, uncertain, and time-constrained (Gittell et al., 2000).

The emphasis on relationships among roles, rather than on those among individual actors, is found in the management of flight departures, acute and emergency care, trauma units, nursing homes, hospital care, and disease-management programs (Cramm & Nieboer, 2011; Gittell, 2002a, 2002b; Gittell, Weinberg, Pfefferle, & Bishop, 2008; Havens, Vasey, Gittell, & Wei-Ting, 2010; Young et al., 1998). However, in the healthcare sector this focus has been applied primarily to nurses providing care to a general patient population. We argue that relational coordination among multiple professionals, not only among nurses, is an important element in the delivery of high-quality integrated care to hospitalized older patients. The provision of such care is a complex undertaking that requires input from and high levels of interdependency among professionals from various disciplines (Grol, 2000). The uncertain and interdependent work requirements limit the utility of simple standardized care processes. Feedback among professionals from a variety of disciplines as new patient information emerges is considered to be a critical mode of coordination in integrated

care delivery for older patients (Anderson, Allred, & Sloan, 2003; Young et al., 1998). Relational coordination among professionals providing care to older patients is therefore expected to improve the delivery of integrated care by enhancing the exchange of relevant information for each older patient and by strengthening shared goals and the degree of mutual respect among diverse professionals.

This study had three objectives; the first was to investigate whether relational coordination among hospital professionals was positively associated with the delivery of high-quality integrated care to older patients. The second aim of the study was to compare relational coordination and integrated care delivery between the geriatric unit and other hospital units. Because professionals in the geriatric unit are more familiar with older patients and their complex needs, we expected that relational coordination and integrated care delivery among professionals working in the geriatric unit would be higher than in other hospital units. The third objective of this study was to increase our understanding of relational coordination in hospital teams through the investigation of the relative levels of relational coordination among nurses, between nurses and other professionals, among medical specialists, and between medical specialists and other professionals. The effectiveness of integrated care for older patients depends on the ability to coordinate beyond individual tasks to more fully encompass the entire range of care (Wolff, Starfield, & Anderson, 2002), which underscores the need for coordination among professionals of different disciplines (Shortell, Gillies, Anderson, Mitchell, & Morgan, 1993; Shortell, Gillies, & Devers, 1995; Shortell et al., 1995). Because nurses and medical specialists are the main coordinators of integrated care for hospitalized older patients, we were especially interested in examining the degree of relational coordination between these two professional roles and others.

METHODS

Setting and design

This cross-sectional study was performed as part of a larger evaluation study examining the delivery of integrated care to hospitalized older patients in The Netherlands (Asmus-Szepesi et al., 2011). Data were collected in 2010 by means of questionnaires distributed in the hospital. Professionals involved in the delivery of care to older patients were invited to complete the questionnaire (192 respondents; 44% response rate).

Questionnaire

In addition to collecting demographic information, the questionnaire incorporated instruments that have demonstrated reliability and validity in prior research.

The relational coordination measure was aggregated from six survey questions, including three questions about communication (frequency/timeliness, accuracy, and problem solving) and three questions about relationships (shared goals, shared knowledge, and mutual respect). The questionnaire was originally developed to measure airline operations (Gittell, 2001) and has been applied in hospitals (Gittell et al., 2000; Havens et al., 2010). A four-point scale was used to measure professionals' perceptions of relational coordination by asking about communication and relationships with others involved in delivering care to hospitalized older patients: medical specialists, nurses, physical/speech therapists, dieticians, social workers, transfer nurses, case managers, and family physicians (Gittell et al., 2008; Relational Coordination Research Collaborative, 2011). The Cronbach's alpha coefficient of the scale was 0.96, indicating excellent reliability.

The Assessment of Chronic Illness Care (ACIC) addresses self-management support (four items), delivery system design (six items), decision support (four items), and clinical information systems (five items) (Cramm, Strating, Tsiachristas, & Nieboer, 2011; MacColl Institute for Healthcare Innovation, 2000). The ACIC was originally developed to measure the degree to which a healthcare system adheres to elements of the Chronic Care Model (CCM) (Bonomi, Wagner, Glasgow, & VonKorff, 2002), and the integration effect that occurs when all model elements are engaged. The instrument has been validated and used for the evaluation of hospital care (Bonomi et al., 2002; Lemmens, Strating, Huijsman, & Nieboer, 2009; Minkman, Ahaus, & Huijsman, 2007; Wagner et al., 2001). Since chronic illness care is a complex intervention that contains several interacting components, partly performed within the hospital (Campbell et al., 2000), we generalized the ACIC to the current setting of integrated care delivery for hospitalized older patients. Responses were structured on a scale of 0 to 11, with higher scores indicating more complete integrated care delivery. The ACIC is responsive to the system changes made by teams and correlates well with other measures of productivity in system change (Bonomi et al., 2002; Glasgow, Orleans, Wagner, Curry, & Solberg, 2001; Wagner et al., 2001). The Cronbach's alpha coefficient of this instrument was 0.87, indicating good reliability.

Statistical analysis

Since the professionals are nested in hospital units we tested for the influence of hospital unit-level on integrated care delivery using a multilevel model. Results indicated that the hospital unit-level did not influence our results (-2 loglikelihood 493.991 *vs.* 491.687; $p = 0.13$). Therefore, we use individual-level data only. Descriptive statistics were used to analyze professionals' gender, occupation, and organizational work history. Correlation analysis was used to investigate the relationship between relational coordination and integrated care delivery. We also tested the relative levels of rela-

tional coordination and integrated care delivery in the geriatric unit and in other hospital units. The degree to which differences in relational coordination existed among medical specialists and other professionals and among nurses and other professionals was assessed through a series of paired-sample *t*-tests. Multiple regression analyses were used to determine whether relational coordination predicted integrated care delivery. Data were analyzed using the SPSS software package (ver. 18.0 for Windows; SPSS Inc., Chicago, IL, USA). A significance level of 0.05 was used for all statistical tests.

RESULTS

The eligible study population consisted of 440 professionals, 192 of whom completed the questionnaire (44% response rate). Table 1 displays the descriptive characteristics of the study sample. Of those who completed the questionnaire, the majority was female (76%) and worked as a nurse (64%) or medical specialist (27%). Most of the respondents worked on the wards of internal medicine (15%), cardiology (13%), neurology (9%), surgery (8%) and geriatrics (7%).

Table 1 Characteristics of professionals participating in the delivery of care to hospitalized older patients

Characteristics		%
Sex	Female	76
Profession	Medical specialist	27
	Nurse	64
	Paramedic	9
Years working in the organization	> 1 year	96

On a 1-4 scale, mean overall relational coordination was 2.57 (± 0.95). Subscale scores indicating the extent to which the professionals felt that they delivered integrated care ranged from 5.13 (± 2.01) for decision support to 6.20 (± 2.00) for delivery system design. The overall mean score for all elements was 5.58 (± 1.79), indicating that basic support for integrated care was present.

As expected, we found that the level of integrated care delivery for older patients was significantly higher (more than 1/3 standard deviation) in the geriatric unit than in other hospital units (mean 6.23 *vs*. 5.58; $p \leq 0.001$). Relational coordination was also significantly higher among professionals working in the geriatric unit than among those working in other units (mean 3.02 *vs*. 2.57; $p \leq 0.001$), namely more than 1/2 standard deviation.

Relational coordination among healthcare professionals

Tables 2 and 3 display the levels of relational coordination between medical specialists and other professionals and between nurses and other professionals. These results show that relational coordination was much higher between nurses and other professionals than between medical specialists and other professionals. We found a higher degree of relational coordination among medical specialists (mean 2.74) than between medical specialists and other professionals, including nurses (mean 2.38), physical/speech therapists (mean 1.98), dieticians (mean 1.79), social workers (mean 1.97), transfer nurses (mean 1.94), and general practitioners (mean 2.50; $p \leq 0.001$ for all; Table 2). Relational coordination was also higher among nurses (mean 3.34) than between nurses and other professionals, including medical specialists (mean 3.10), physical/speech therapists (mean 2.96), dieticians (mean 3.09), social workers (mean 2.91), transfer nurses (mean 3.06), and general practitioners (mean 1.62; $p \leq 0.001$ for all; Table 3). These findings indicate that relational coordination plays a larger role among healthcare professionals in the same discipline than among those in different disciplines. In general, relational coordination scores were higher among nurses than among medical specialists.

Table 2 Relational coordination among medical specialists vs. between medical specialists and other professionals (n = 48)

	Mean	SD
Among medical specialists	2.74	1.07
Between medical specialists and nurses	2.38*	1.18
Between medical specialists and physical/speech therapists	1.98*	1.12
Between medical specialists and dieticians	1.79*	0.97
Between medical specialists and social workers	1.97*	1.08
Between medical specialists and transfer nurses	1.94*	1.09
Between medical specialists and general practitioners	2.50*	1.00

Note. *$p \leq 0.001$; SD = standard deviation.

Table 3 Relational coordination among nurses vs. between nurses and other professionals (n = 113)

	Mean	SD
Among nurses	3.34	0.99
Between nurses and medical specialists	3.10*	1.00
Between nurses and physical/speech therapists	2.96*	1.10
Between nurses and dieticians	3.09*	1.06
Between nurses and social workers	2.91*	1.06
Between nurses and transfer nurses	3.06*	1.13
Between nurses and general practitioners	1.62*	0.84

Note. *$p \leq 0.001$; SD = standard deviation.

Relational coordination and integrated care delivery to older patients

Correlation analysis revealed a positive relationship between relational coordination and the overall ACIC score ($r = 0.21$; $p \leq 0.01$). The results of multiple regression analyses performed to identify predictors for the delivery of integrated care demonstrated that integrated care delivery was positively influenced by relational coordination ($\beta = 0.20$; $p \leq 0.05$), even after controlling for demographic variables (Table 4). No significant relationship was found between occupation or number of years working in the current organization and integrated care delivery.

Table 4 Multiple regression analyses of the effects of background characteristics and relational coordination on chronic care delivery

	ß	B	SE
Background characteristics			
Nurse	-0.03	-0.12	0.40
Paramedic	-0.13	-0.85	0.62
Gender	0.02	0.07	0.39
Numbers of years working in the current organization	-0.07	-0.61	0.75
Relational coordination			
Overall relational coordination	0.20*	0.44	0.22
Adjusted R^2 for equation	0.11		
F	3.071		

Note. *$p \leq 0.05$; SE = standard error.

DISCUSSION

Given the aging population and especially the rapid increase in the 'oldest-old' segment expected in the next few decades (World Health Organization, 1996), health issues related to the care of older patients pose an urgent challenge. Older patients need integrated care, but the present system is far from satisfactory. As our population ages, healthcare professionals face the challenge of working with a variety of professionals to reshape care delivery so that it is more integrated and responsive to the needs and desires of older patients. Relational coordination among healthcare professionals in the hospital is expected to be a useful tool for the achievement of this goal. Indeed, the results of this study provide support for the theoretically proposed positive associations between relational coordination among healthcare professionals and integrated care delivery to older patients in the hospital.

Our finding that levels of relational coordination and integrated care delivery were higher among professionals in the geriatric unit than among those in other units confirmed our expectation that these professionals are familiar with the process of

working together to provide holistic integrated care to older patients that meets their complex needs. However, these results also indicate that there is room for improvement in both relational coordination and the delivery of integrated care to older patients. The challenge for the future is to expand geriatric awareness and competence to other hospital units. This finding is in agreement with those of previous research, which have suggested that geriatric nurses are in a position to provide expertise and leadership within interdisciplinary groups to improve the care provided to older adults in acute care settings. The provision of coordinated, geriatric-specific care to support physicians who do not specialize in caring for older adults can minimize complications and improve outcomes (Tucker et al., 2006).

Finally, the effectiveness of integrated care delivery for older patients depends on the ability of professionals in different disciplines to coordinate in the holistic provision of care (Wolff et al., 2002). We found higher levels of relational coordination among nurses and among medical specialists, both of whom are the main coordinators of integrated care for hospitalized older patients, than between each of these professionals and others. This finding is in agreement with those of previous research, which have shown higher levels of relational coordination among healthcare professionals in the same discipline (Havens et al., 2010; O'Leary et al., 2010). The higher relational coordination scores we found among nurses than among medical specialists indicate that the former play an active, central role in integrated care delivery. Thus, our findings suggest that frequent, high-quality communication supported by relationships of shared goals, shared knowledge, and mutual respect among medical specialists and nurses plays an important role in integrated care delivery; however, there is room for improvement in relational coordination among medical specialists in hospitals who provide care to older patients.

This study has several limitations. First, the cross-sectional design allowed us to identify associations but not to determine causality. Longitudinal data would provide the opportunity to disentangle the dynamic relationships among relational coordination and integrated care delivery. We were not able to control for all possible confounders such as personality traits. A confounding factor that may have influenced this research has to do with a more positive attitude of some professionals towards coordination as well as integrated care delivery. The philosophy of care and nursing model could also be a confounding factor in the current research. If team nursing does not support coordinated care delivery with other professionals, relational coordination may not fully develop. Differences in coordination may in part reflect these different personality, team and organizational characteristics, rather than differences in relational competence. To explore these possibilities, further research has to be performed. Finally, although we examined the relationship between relational coordination among professionals and integrated care delivery to older patients, further

research is necessary to assess the effects of relational coordination on patient experiences and outcomes.

Despite these limitations, our results have important implications for theory and practice. Our findings support the importance of coordination in the effectiveness of integrated care delivery and suggest that better relations, communication, and coordination among healthcare professionals from various disciplines can improve integrated care delivery to hospitalized older patients. The coordinated response of activities and information through supportive relationships is an important feature of effective and efficient care delivery (Batalden & Mohr, 1997; Ouwens et al., 2005; Wagner et al., 2001; Wagner et al., 1996). Special attention is needed to improve relational coordination among medical specialists and professionals from other disciplines in providing care to older patients.

Several practical implications can be drawn from the results of this study. The relational coordination perspective focuses on connections among professionals and their impact on organizational outcomes (Gittell, 2006). Human resource theories argue that healthcare team effectiveness depends not only on objective outcomes (e.g. patients' functional status, adherence to medicine, costs), but also on team members' perceptions and attitudes (Cohen & Bailey, 1997; Lemieux-Charles & McGuire, 2006). The results of our research indicate that the development of effective relationships and coordination among professionals is of utmost importance. Professionals who deliver integrated care to older patients should be encouraged to communicate and interact, thereby enabling the recognition of others' perspectives, understanding of others' visions, and respect for others' input in providing such care. These findings are consistent with a patient-centered approach, which aims to bring together multiple members of professional teams and others with significant relationships to the patient. In such an approach, the patient not only has strong one-on-one connections with each professional involved in the delivery of care, but professionals themselves are connected in a web of supportive relationships. In previous interventions, nursing homes have attempted to create holistic care through a phased and deliberate effort by the nursing homes' leadership to rethink how care is provided and how staff relate to each other (Lynch, McCormack, & McCance, 2011; Stone et al., 2002). To give care in such a holistic way that encompasses physical and psychosocial dimensions (Bowers, Fibich, & Jacobson, 2001), requires that coordination among professionals is carried out through relationships of shared goals, shared knowledge, and mutual respect. Current findings provide support for models of patient-centered care and suggest that relational coordination may be a component of their effectiveness.

The challenge for the future is however to expand the high levels of relational coordination and integrated care delivery observed in geriatric unit to other hospital units. Training programs should be integrated and should target professionals in diverse

disciplines so that all providers can come to a better understanding of their interdependence in care delivery to older patients. Continuing education programs should target on currently practicing professionals and will have to present new integrated perspectives and concepts, new approaches for understanding old issues, or new responses that are chosen for their power to address the challenges facing professionals (Clark, 2002). This can be operationalized in discussion sessions, panels, and workshops following theme-setting lecture-based presentations. Additionally, topics reflecting current realities and issues in the healthcare system in general and in geriatrics in particular should be chosen for a directed discussion in which participants express their own observations and recommendations on promoting coordination. To maximize the effect of these education programs, the focus should be on interprofessional collaboration, creating the possibility of different groups of professionals with multiple backgrounds to learn from each other (Morrison & Glenny, 2012). In this way, the goals and objectives for teamwork training should be redefined from the old way of thinking about training as education in group processes and development to a much more flexible and dynamic conceptualization of teamwork (Clark, Leinhaas, & Filinson, 2002), focusing on both relational and functional competence.

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Chapter 4

The importance of multidisciplinary teamwork and team climate for relational coordination among teams delivering care to older patients

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ABSTRACT

Aim: The aim of this study was to identify predictors of relational coordination among professionals delivering care to older patients.

Background: Relational coordination is known to enhance quality of care in hospitals, by influencing the quality of communication and coordination between professionals. The underlying mechanisms, however, remain poorly understood.

Design: This cross-sectional study was part of a larger evaluation study examining the possibility to prevent loss of function in older patients due to hospitalization in The Netherlands.

Methods: This study was performed in spring 2010 among team members delivering care to older hospitalized patients (192 respondents; 44% response rate). Relational coordination was measured by the Relational Coordination survey; team climate by the Team Climate Inventory and questions were asked about participation in multidisciplinary team meetings and disciplines represented in these meetings. To account for the hierarchical structure, a multilevel analysis was performed.

Results: Correlation analysis revealed a positive relationship between being female, being a nurse and relational coordination; medical specialists showed a negative relationship. The number of disciplines represented during multidisciplinary team meetings and team climate were positively related with relational coordination. The multilevel analysis showed a positive relationship between the number of disciplines represented during multidisciplinary team meetings and team climate with relational coordination.

Conclusions: The enhancement of team climate and attendance of diverse professionals during multidisciplinary team meetings are expected to improve relational coordination among professionals delivering care to hospitalized older patients. Furthermore, this study underscores the importance of enhancing relational coordination between medical specialists and other professionals.

INTRODUCTION

With the aging population healthcare professionals are increasingly dealing with older patients suffering from multiple chronic diseases, which has contributed to the complexity of many tasks performed during care delivery (Kodner & Kyriacou, 2000). Patients with complex needs use more health services than the general population; receive care from different health professionals, and in multiple settings. Their intense use of health services puts older adults at greater risk of receiving fragmented or poor-quality care (Leichsenring, 2004; Nolte & Mckee, 2008; World Health Organization, 1996). Once admitted to hospital, older adults are at an increased risk for poor outcomes such as readmission, increased length of stay, functional decline, iatrogenic complications, and nursing home placement (Forster, Murff, Peterson, Gandhi, & Bates, 2003; Palmer, 1998). Given that 34-50% of hospitalized older adults have been found to experience functional decline (Inouye et al., 1993; Lau, Scandrett, Jarzebowski, Holman, & Emanuel, 2007), it is likely that current healthcare is not meeting the needs of ill older patients. Complex needs ask for the coordination of health and social care with related services provided by multiple providers (Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005). In response to this complexity, relational coordination may be an effective approach.

Background

The theory of relational coordination argues that the effectiveness of coordination is determined by the quality of communication among professionals in a work process (measured by its frequency, timeliness, accuracy and focus on problem solving), and the quality of their relationships, particularly the extent to which shared goals, shared knowledge, and mutual respect are expressed (Gittell, 2006). Relational coordination is defined as "a mutually, reinforcing process of interaction between communication and relationships carried out for the purpose of task integration" (Gittell, 2002b, p. 301), it is a type of professional relationship that is particularly relevant for coordinating work that is highly interdependent, uncertain, and time-constrained (Gittell et al., 2000).

The emphasis on relationships among roles, rather than on those among individual actors, is found in the management of flight departures, acute and emergency care, trauma units, nursing homes, hospital care, and disease-management programs (Cramm & Nieboer, 2011, 2012; Gittell, 2001; Gittell, 2002a; Gittell, Weinberg, Pfefferle, & Bishop, 2008; Havens, Vasey, Gittell, & Wei-Ting, 2010; Young et al., 1998). In nursing homes, relational coordination among professionals was positively associated with resident quality outcomes (Gittell et al., 2008). Relational coordination among medical specialists, nurses, physical therapists, social workers and case managers

predicted quality and efficiency outcomes for hospitalized patients (Gittell, Seidner, & Wimbush, 2009). In addition, it was shown that patient functioning was significantly improved by the frequency of communication, strength of shared goals, and the degree of mutual respect between professionals (Gittell et al., 2000). Since the provision of care to older adults is a complex undertaking that requires input from and high levels of interdependency among professionals from various disciplines (Grol, 2000), relational coordination among professionals has been shown to improve care delivery by enhancing the exchange of relevant information and by strengthening shared goals and the degree of mutual respect among diverse professionals.

Although there is evidence that relational coordination improves quality of care (Cramm & Nieboer, 2012; Gittell et al., 2000; Gittell et al., 2009; Gittell et al., 2008), the underlying mechanisms that promote relational coordination among professionals delivering care to hospitalized older patients remain poorly understood. We do know that multidisciplinary teamwork is considered a core component of effective care delivery (Ouwens et al., 2005; Wagner et al., 2001; Wagner, Austin, & Von Korff, 1996), which may also enhance relational coordination among professionals. According to organization design theory, multidisciplinary team meetings are central for multidisciplinary teamwork. These meetings increase performance of interdependent work processes by facilitating interaction among professionals and are increasingly effective under conditions of high uncertainty (Galbraith, 1974). Ideally, each team member knows the diverse points of view held by all other team members and trusts others to deliver care that is appropriate to their respective background. Since multidisciplinary team meetings have high information processing capability, they are expected to facilitate communication and coordination among professionals in a work process (Gittell, 2006). We therefore expect that multidisciplinary team meetings may enhance relational coordination by providing the possibility for frequent, timely, accurate and problem solving behaviour to develop.

Previous research also showed that team climate was positively related to continuously delivering high quality care through professionals sharing objectives, commitment and support (Bower, Campbell, Bojke, & Sibbald, 2003; Campbell et al., 2001). Team climate refers to professionals' shared perceptions of the types of behaviors and actions that are rewarded and supported by the team policies, practices and procedures (Schein, 1990). When a team has a climate for teamwork, team members are willing to provide and share resources. In this way, a team climate which encourages social interaction draws the interpretations by professionals of events and objects closer together (Ford & Seers, 2006; Klein, Conn, Smith, & Sorra, 2001; Schneider & Reichers, 1983; Rentsch, 1990; Weick, 1979). Consequently, professionals working in such teams freely coordinate and communicate with each other regarding their tasks and expertise (West & Anderson, 1996). Since coordination and communication

between professionals is influenced by team climate, it is believed to increase relational coordination by enhancing the quality of underlying relationships, expressed by shared goals, shared knowledge, and mutual respect.

Besides these team-level constructs, individual characteristics could also affect relational coordination. Cross and Madson (1997) showed in their review on gender differences that while women often describe themselves more in terms of relationships with others, men have a stronger tendency to describe themselves in terms of separateness of others. In addition, women tend to rate themselves more highly on interdependence, while men rate themselves higher on independency.

Given the focus on multidisciplinary teamwork, we also investigate relational coordination between professionals with different occupational backgrounds. Nurses play an active, central role in the provision of hospital care to older patients, which may result in differences in relational coordination between nurses and medical specialists.

Relational coordination among healthcare professionals in the hospital is expected to be a useful tool for professionals to reshape care delivery so that it is more responsive to the needs and desires of older patients (Gittell, 2001; Gittell et al., 2000, Gittell et al., 2008; Weinberg, Lusenhop, Gittell, & Kautz, 2007). There is, however, a lack of research investigating the underlying mechanisms that promote relational coordination. Therefore, this study aims to investigate the relationship between individual characteristics, multidisciplinary team meetings, team climate and relational coordination among professionals delivering care to hospitalized older patients.

THE STUDY

Aim

The aim of this study was to identify predictors of relational coordination by professionals delivering care to older patients.

Design

This cross-sectional study was based on a pilot study among professionals involved in the care for vulnerable older patients prior to implementation of the Prevention and Reactivation Care Program (PReCaP). The PReCaP was designed to prevent loss of function in older patients due to hospitalization (Asmus-Szepesi et al., 2011). The results of the pilot study have been used to identify possible practical implementation problems in preparation for the main evaluation study. In the participating Vlietland hospital, multidisciplinary team meetings were organized twice a week to discuss new elderly patients, develop individual treatment plans and evaluate the progress of patients. At least one medical specialist was present during these meetings, comple-

mented by other professionals involved in the care delivery to older patients (e.g. nurse practitioner, social worker, transfer nurse) (de Vos et al., 2012).

Participants

The potential participants comprised 440 professionals involved in the delivery of care to older patients in the Vlietland hospital. These professionals consisted of medical specialists, nurses (registered according to the Dutch regulations for nursing practices) and paramedics (physiotherapists, speech therapists, dieticians, and social workers). Most of the participants worked on the internal medicine ward (15%), cardiology (13%), neurology (9%), surgery (8%) and geriatrics (7%).

Data collection

Data were collected in 2010 using a questionnaire distributed to 440 professionals participating in the delivery of care to older patients at the Vlietland hospital. The professionals returned the completed questionnaires in a return envelope. A gift voucher of 10 euro was given as a reward for their participation. A total of 192 professionals completed and returned the questionnaire (44% response rate), of which 48 medical specialists (out of 101; 48% response), 113 nurses (out of 306; 37% response) and 26 paramedics (out of 33; 79% response). All personal identifiers were removed or disguised so the person(s) described are not identifiable and cannot be identified through the details of the study.

Instruments

In addition to demographic characteristics, participants were asked how often they participated in a multidisciplinary team meeting (response categories: never, once a month, once in two weeks, once a week or multiple times a week) and which occupational backgrounds were represented in these meetings.

Team climate

The Team Climate Inventory (TCI) was used to measure the professional's perceptions of team climate while working in multidisciplinary teams delivering care to older patients. The questionnaire comprises four broad factors reflecting a team's shared perceptions of organisational policies, practices and procedures: shared vision and objectives (four items), participative safety (four items), task orientation (three items) and support for innovation (three items). Participants were asked to rate their agreement on the TCI-items on a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). Higher scores indicated a better or more desirable team climate (Anderson & West, 1998; Kivimäki & Elovainio, 1999).

Relational coordination

Relational coordination was measured using six survey questions on a four-point scale (1 = never, 2 = rarely 3 = occasionally, and 4 = all the time) including three questions about communication (frequency/timeliness, accuracy, problem-solving) and three questions about relationships (shared goals, shared knowledge, mutual respect). The relational coordination score was derived by calculating the mean of in total 6-items scores. Higher scores indicated better or more desirable relational coordination (Cramm & Nieboer, 2011, 2012; Gittell et al., 2008). Pilot testing revealed that the items 'timely' and 'frequent' communication were not distinguishable for the professionals delivering care to hospitalized older patients, which led us to combine both aspects of relational coordination in a single question. Respondents were asked about communication and coordination with other professionals involved in delivering care to hospitalized older patients: medical specialists, nurses, physical therapists, dieticians, social workers, transfer nurses, case managers, and family physicians.

Ethical considerations

All the necessary approvals were obtained from the participating organization. The study protocol was approved by the Medical Ethics Committee of the university responsible for performing the current study.

Data analysis

We tested for influence of the team (level 2) on relation coordination. These results indicated that team level affects relational coordination (-2 loglikelihood 495.829 *vs.* 472.324; $p = 0.01$). Therefore, to account for the hierarchical structure of the study design we fitted a hierarchical random-effects model. The hierarchical structure comprises 192 professionals nested in 25 teams. Individuals were excluded if any outcome observation was missing, leading to a total of 138 professionals in the multilevel regression analysis. The indicators of multidisciplinary team meetings and team climate were estimated with a two-model random-intercepts and fixed-slopes model structure. To estimate the strength of associations explained variances were obtained. First, the estimates of the empty model are described (model 1), which reflect variation in the intercept. Second, the adjusted coefficients of the different independent variables are estimated (model 2). Data were analyzed using the SPSS software package (ver. 18.0 for Windows; SPSS Inc., Chicago, IL, USA). A significance level of 0.05 was used for all statistical tests.

Validity and reliability

Both the TCI and Relational Coordination survey are validated and reliable measurement tools. Cronbach's alpha of the TCI in this study was 0.94, indicating excellent

reliability. The questionnaire has been applied to examine the effect of teamwork on the quality of care delivery (Bower et al., 2003; Campbell et al., 2001). Cronbach's alpha of the Relational Coordination survey in this study was 0.96, also indicating excellent reliability. The questionnaire has been applied in the hospital setting (Gittell et al., 2000, Havens et al., 2010).

RESULTS

Table 1 displays the descriptive characteristics of the study sample. Of those who completed the questionnaire, the majority was female (76%) and worked as a nurse (64%) or medical specialist (27%). Within the occupational groups, nurses were mostly female (87%), medical specialists were evenly divided (50% female) and paramedics were mostly male (35% female). A large majority of the respondents (71%) has been working in the organization for a period longer than 5 year.

Table 1 Descriptive statistics

Demographic characteristics		Range	% or Mean (SD)	*n*
Sex	Female		76%	187
Profession				187
	Medical specialist		27%	
	Nurse		64%	
	Paramedic		9%	
Years working in the organization	> 5 year		71%	187
Frequency of MDTM*		1-5	2.3 (1.4)	184
Number of disciplines participating in MDTM		0-12	4.1 (3.3)	184
Team climate		1-5	3.6 (0.7)	140
Relational coordination		1-4	2.6 (1.0)	164

Note. SD = standard deviation; MDTM = multidisciplinary team meeting.

Multidisciplinary team meetings

The biweekly multidisciplinary team meetings were not attended by all professionals at all times. Most respondents participated in a multidisciplinary team meeting between once in two weeks and once a month. On average, professionals from 5 different occupational backgrounds attended these meetings.

Team climate and relational coordination

Mean overall team climate was 3.6 (± 0.7; range 1-5) and relational coordination 2.6 (± 1.0; range 1-4).

Non-response analysis

We performed a non-response analysis for the Relational Coordination survey. Non-response was common for this comprehensive instrument which was part of the last section of the questionnaire. Professionals who did not complete the Relational Coordination survey participated significantly less in multidisciplinary team meetings (1.58; ± 1.10; once a month) compared to professionals who did complete the instrument (2.28; ± 1.41; once in two weeks). This may explain their loss of interest in completing the Relational Coordination survey. No differences were found in gender, occupation, and team climate.

Associations with relational coordination

Correlation analysis revealed a positive relationship between being female and relational coordination (r = 0.22; $p \leq 0.01$). Nurses showed a positive relationship with relational coordination (r = 0.40; $p \leq 0.001$), while medical specialists showed a negative relationship (r = -0.35; $p \leq 0.001$). The frequency of multidisciplinary team meetings did not show an association with relational coordination. However, the number of disciplines represented during multidisciplinary team meetings had a positive relationship with relational coordination (r = 0.36; $p \leq 0.001$). In addition, team climate showed a positive relationship (r = 0.22; $p \leq 0.01$) with relational coordination (Table 2).

Table 3 shows the multilevel indicators for all examined factors. Relational coordination was positively influenced by being a nurse ($p \leq 0.001$), the number of disciplines participating in a multidisciplinary team meeting ($p \leq 0.001$) and team climate ($p \leq 0.05$). In addition to the other factors, being female or paramedic had no significant relationship with relational coordination in the multilevel analysis.

Table 2 Associations with relational coordination

	Relational coordination	*n*
Sex (female)	0.22*	164
Medical specialist	-0.35**	164
Nurse	0.40**	164
Paramedic	-0.05	164
Years working in the organization > 1 year	-0.04	164
Frequency of MDTM	0.07	161
Number of disciplines participating in MDTM	0.36**	164
Team climate	0.22*	138

Note. *$p \leq 0.01$; **$p \leq 0.001$ (two-tailed); MDTM = multidisciplinary team meeting.

Table 3 Hierarchical multiple regression analyses of relational coordination among professionals (n = 138)

Model	1		2	
	B	SE	B	SE
Constant	2.49**	0.10	2.74**	0.05
Sex (female)			0.05	0.05
Nurse			0.23**	0.06
Paramedic			0.04	0.05
Number of disciplines participating in MDTM			0.18**	0.05
Team climate			0.12*	0.05
-2 log likelihood	342.411		231.165	
Explained variance (individual level)			18.6%	
Explained variance (team level)			30.2%	

Note. *$p \leq 0.05$; **$p \leq 0.001$ (two-tailed); reference group medical specialists; listwise deletion of cases; SE = standard error; MDTM = multidisciplinary team meeting.

DISCUSSION

Our multilevel results indicated that the number of disciplines participating in multidisciplinary team meetings and team climate were contributors to the development of relational coordination. Multidisciplinary team meetings increase performance of interdependent work processes by facilitating interaction among professionals and are increasingly effective under conditions of high uncertainty (Galbraith, 1974). Ideally, each team member knows the diverse points of view held by all other team members and trusts others to deliver care that is appropriate to their respective background. Since multidisciplinary team meetings have high information processing capability, they also facilitate interaction among professionals in a work process (Gittell, 2006). In line with our results, Gittell (2002b) showed that team meetings improve performance by increasing the level of relational coordination among professionals. Our findings add to this current understanding of relational coordination that it is not so much the frequency of multidisciplinary team meetings that influences relational coordination, but particularly the number of disciplines represented. This is an important finding since the complex needs of older adults often ask for task reallocation and the use of new types of professionals (Wagner et al., 1996). In addition, we found that team climate enhances relational coordination. A positive team climate may have promoted coordination and communication among professionals delivering care to older patients by a more supportive and stimulating environment expressed by shared goals, shared knowledge, and mutual respect.

While workforce flexibility and multidisciplinary teamwork create an increasing interdependence between different types of professionals (Nancarrow & Borthwick,

2005); this does not automatically lead to enhanced communication and coordination among professionals from different disciplines. The tension between medical specialists and nurses and the barriers to multidisciplinary teamwork, for example, have received considerable attention (Casey & Smith, 1997; Stein, Watts, & Howell, 1990). This study revealed a positive relationship between being a nurse and relational coordination, whereas medical specialists showed a negative relationship. Although medical specialists are dependent on other professionals in delivering care to older patients, medical specialists often independently prescribe, alter or manage interventions or treatments in accordance with their own specialized judgment (Daly & Carnwell, 2003; Nancarrow & Borthwick, 2005). Compared to other professionals, medical specialists more often make their treatment decisions independently of others, which may explain the negative relationship found between medical specialists and relational coordination. Nurses are, however, more dependent on coordination and communication with other professionals in performing their tasks, which may explain the positive relationship found between being a nurse and relational coordination. While it may not be less important for medical specialists to communicate and coordinate with professionals of other disciplines in their own care delivery, it is important for relational coordination among the whole team to deliver holistic integrated care to older patients (World Health Organization, 1996). This study underscores the importance of enhancing relational coordination between medical specialists and other professionals delivering care to older patients.

Limitations

There are limitations. First, the cross-sectional design allowed us to identify associations but not to determine causality. Longitudinal data would provide the opportunity to disentangle the dynamic relationships between multidisciplinary team meetings, team climate and relational coordination. Secondly, the response rate of 44% is slightly below the average response rate of about 50%, which is often found among professionals working in hospitals (Cummings, Savitz, & Konrad, 2001). Thirdly, we were not able to control for all possible confounders such as personality traits. A confounding factor that may have influenced this research has to do with a more positive attitude of some professionals towards teamwork and coordination in general. Differences in coordination may in part reflect gender or personality differences, rather than differences in relational competence. Females are e.g. often described as more sensitive to social cues, resulting in more active cooperative behavior (Croson & Gneezy, 2009). One could reason that, since most participants were female, this may have had an impact on the development of relational coordination. To explore this possibility, further research has to be performed. In addition, we were also not able to capture organizational dynamics. A confounding factor that may have influenced this

research has to do with the organizational context (Nieboer & Strating, 2012). Future research has to explore the effects of organizational factors such as competition between hospitals or changes in hospital funding on teamwork within organizations and its effect on relational coordination. Finally, although we examined the relationship between multidisciplinary team meetings, team climate and relational coordination among professionals delivering care to hospitalized older adults, further longitudinal research is necessary to assess the effects of relational coordination on improved patient experiences and outcomes.

Conclusion

As our population ages, healthcare professionals face the challenge of working with a variety of professionals to reshape care delivery so that it is more responsive to the needs and desires of older patients (World Health Organization, 1996). Relational coordination among healthcare professionals in the hospital is expected to be a useful tool for the achievement of this goal. The results of this study provide insight into the predictors of relational coordination.

The study results have important implications. Our findings support the importance of multidisciplinary team meetings and team climate in the development of relational coordination, and suggest that it is not the frequency of multidisciplinary team meetings per se but also the number of professionals represented that has a positive influence. The coordinated response of activities and information that could result from relational coordination is believed to be an important feature of effective and efficient care delivery (Batalden & Mohr, 1997; Ouwens et al., 2005; Wagner et al., 2001; Wagner et al., 1996). Furthermore, this study underscores the importance of enhancing relational coordination between medical specialists and other professionals delivering care to older patients.

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Chapter 5

Situational awareness, relational coordination and integrated care delivery to hospitalized elderly in The Netherlands

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ABSTRACT

Background: It is known that interprofessional collaboration is crucial for integrated care delivery, yet we are still unclear about the underlying mechanisms explaining effectiveness of integrated care delivery to older patients. In addition, we lack research comparing integrated care delivery between hospitals. Therefore, this study aims to (i) provide insight into the underlying components 'relational coordination' and 'situational awareness' of integrated care delivery and the role of team and organizational context in delivering integrated care; and (ii) compare situational awareness, relational coordination, and integrated care delivery of different hospitals in The Netherlands.

Methods: This cross-sectional study took place in 2012 among professionals from three different hospitals involved in the delivery of care to older patients. A total of 215 professionals filled in the questionnaire (42% response rate). Descriptive statistics and paired-sample t-tests were used to investigate the level of situational awareness, relational coordination, and integrated care delivery in the three different hospitals. Correlation and multilevel analyses were used to investigate the relationship between background characteristics, team context, organizational context, situational awareness, relational coordination and integrated care delivery.

Results: No differences in background characteristics, team context, organizational context, situational awareness, relational coordination and integrated care delivery were found among the three hospitals. Correlational analysis revealed that situational awareness (r = 0.30; $p \leq 0.01$), relational coordination (r = 0.17; $p \leq 0.05$), team climate (r = 0.29; $p \leq 0.01$), formal internal communication (r = 0.46; $p \leq 0.01$), and informal internal communication (r = 0.36; $p \leq 0.01$) were positively associated with integrated care delivery. Stepwise multilevel analyses showed that formal internal communication ($p \leq 0.001$) and situational awareness ($p \leq 0.01$) were associated with integrated care delivery. Team climate was not significantly associated with integrated care delivery when situational awareness and relational coordination were included in the equation. Thus situational awareness acted as mediator between team climate and integrated care delivery among professionals delivering care to older hospitalized patients.

Conclusions: The results of this study show the importance of internal formal communication and situational awareness for quality of care delivery to hospitalized older patients.

INTRODUCTION

Currently, healthcare delivery in hospitals often leads to poor outcomes for older patients (Reuben, 2000). Many hospitalized older patients suffer from a mixture of problems and therefore are expected to benefit from integrated care delivery. This holistic and personalized care encompasses the total care process, rather than focusing on disease-related problems only (Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005; Moyle, Olorenshaw, Wallis, & Borbasi, 2008; Wagner et al., 2001; Wagner, Austin, & Von Korff, 1996). The patient should be placed in the centre of the care process and care should be tailored to their personal needs. In order to provide such care, more is needed than professionals who each work within their particular scope of practice (D'Amour, Ferreda-Videla, San Martin Rodriguez, Beaulieu, 2005; Mariono, 1999), instead interprofessional collaboration is needed with care that is organized through horizontal work processes, rather than through functional profiles. Besides medical expertise, interprofessional collaboration is crucial for integrated care delivery (Anderson, Allred, & Sloan, 2003; Cramm & Nieboer, 2011a, 2012; Liedtka & Whitten, 1998; Young et al., 1998). Yet we are still unclear about the underlying mechanisms explaining effectiveness of integrated care delivery to older patients.

Conceptual model: Underlying mechanisms of integrated care delivery

Figure 1 displays our conceptual model with the underlying components 'relational coordination' and 'situational awareness' of integrated care delivery. We expect that the organizational context as well as team context influence relational coordination, situational awareness and integrated care delivery.

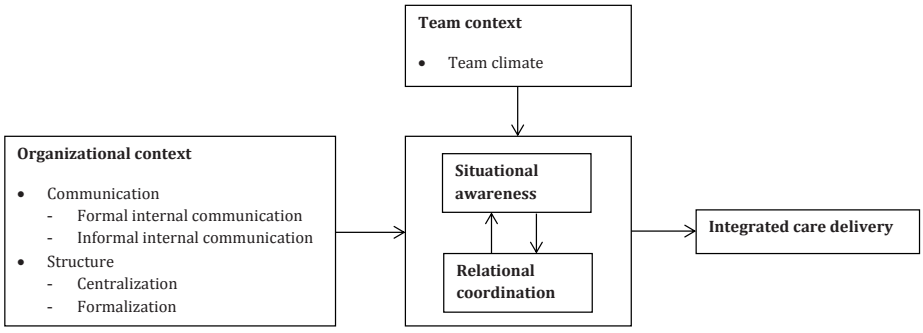

Figure 1. Underlying mechanisms of integrated care delivery in hospitals

Team context

Interprofessional collaboration and multidisciplinary teamwork are expected to benefit from a positive team climate. With a supportive climate for teamwork, team members are more willing to share resources, perceptions, policies, practices, and procedures (Schein, 1990). As such, a team climate may encourage social interaction and draws the interpretations by professionals of events and objects closer together (Ford & Seers, 2006; Schneider & Reichers, 1983). Consequently, professionals working in such teams may coordinate and communicate more freely with each other regarding their tasks and expertise (West & Anderson, 1996). An encouraging team climate is therefore expected to enhance integrated care delivery.

Organizational context

The structure of an organizations' internal communication channels may have consequences for the exchange and transfer of knowledge. Internal communication has two components: on one side, *formal internal communication* which consists of formal activities for teams and units (Kahn & Mentzer, 1996), and on the other side *informal internal communication* which consists of a more casual form of information sharing typically used in personal conversations (Stern, 1998). To enhance integrated care delivery, internal communication should be channelled in such a way that professionals have access to diverse sources of new information and knowledge through e.g. frequent multidisciplinary team meetings and electronic information systems (Suter, Oelke, Adair, & Armitage, 2009).

The amount of *centralization* and *formalization* within an organization may also affect quality of integrated care delivery. Research has shown that less formal, functionally differentiated organizations with decentralized decision making and a great variety of professionals are more likely to generate, and develop new knowledge (Anderson, de Dreu, & Nijstad, 2004). We therefore reason that these organizations create the possibility for professionals to combine the knowledge needed for integrated care delivery by shared problem solving and decision making.

Relational coordination

Since integrated care is organized through horizontal work processes, rather than through functional profiles, the complementary role of each healthcare professional and the interdependency among them are important features (Batalden & Mohr 1997; McCormack, Mitchell, Cook, Reed, & Childs, 2008). According to the theory of *relational coordination*, the effectiveness of coordination is determined by the quality of communication among professionals in a work process, which depends on the quality of their underlying relationships (Gittell, 2006). The quality of their relationships, in turn, reinforces the quality of their communication. Relational coordination is defined

as 'a mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration' (Gittell, 2002, p. 301). More simply, relational coordination is coordinating work through relationships of shared goals, shared knowledge, and mutual respect, supported by frequent, timely, accurate, and problem solving communication (Gittell, 2006). Together, these communication and relational dynamics provide the basis for coordinated collective action under conditions of task interdependence, uncertainty, and time constraints (Gittell et al., 2000). Since the provision of care to elderly is a complex undertaking that requires input from and high levels of interdependency among professionals from various disciplines (Grol, 2000), it can be reasoned that relational coordination improves integrated care delivery by enhancing the exchange of relevant information and by strengthening shared goals. Research indeed showed that relational coordination was associated with better quality of care in the primary care setting (Cramm & Nieboer, 2011b, 2012), community setting (Cramm & Nieboer, 2012) and hospital setting (Gittell, Weinberg, Pfefferle, & Bishop, 2008; Hartgerink et al., 2012).

Situational awareness

For coordination to operate effectively and improve quality of care delivery, it is important that professionals are aware of the individual patients' demand for care. *Situational awareness* is the level of awareness that an individual has of a situation; a dynamic understanding of "what's going on". As part of information processing, situational awareness follows perception of the situation and leads to decision making and action execution (Endsley, 1995a). This dynamic knowledge is especially important in the healthcare context where misinformation can result in negative consequences for the patient. Individual treatment plans are made by integrating information, from a variety of sources such as assessment of the patient, information from charts and monitors, and other professionals with individual knowledge. The professionals then comprehend the meaning and significance of the patient assessment and project this onto likely outcomes. These expectations result from awareness of the situation of the patient and play a critical role in the integrated decision making process of the individual patient, in terms of actions to be taken or in some cases not taken (Mosier & Fischer, 2010; Reader, Flin, Mearns, & Cuthbertson, 2013; Wright & Endsley, 2008). As such they are expected to enhance integrated care delivery.

Aims

The underlying mechanisms explaining high quality integrated care delivery to vulnerable elderly are still unknown. In addition, we lack research comparing integrated care delivery between hospitals. Therefore, this study aims to (i) provide insight into the underlying components 'relational coordination' and 'situational awareness' of

integrated care delivery and the role of team and organization context in delivering integrated care; and (ii) compare situational awareness, relational coordination, and integrated care delivery among three hospitals in The Netherlands.

METHODS

Setting and design

This cross-sectional study was performed as part of a larger evaluation study examining the delivery of integrated care to hospitalized older patients in The Netherlands. Data were collected in 2012 by means of questionnaires distributed in three different hospitals. Since no clear distinction could be made between professional teams within the hospital delivering care to older patients, data were collected on a unit level. Professionals involved in the delivery of care to older patients were invited to complete the questionnaire (215 out of 510 respondents, overall response rate 42%). The response and non-response of respondents were evenly distributed throughout the hospitals and hospital units.

Table 1 describes the three different settings. Hospital A implemented the Prevention and Reactivation Care Program (PReCaP) in three units (geriatrics, cardiology, and internal medicine). This program was designed to prevent loss of function in older patients due to hospitalization and targeted older hospital patients (≥ 65 years of age) who were vulnerable to loss of function after hospital admission (Asmus-Szepesi et al., 2011). The program utilized a multidisciplinary, integrated, and goal-orientated approach focused at the early screening of risk factors for functional decline and the provision of a patient-orientated reactivation program (de Vos et al., 2012). Hospital B, that participated with the units of internal medicine, respiratory medicine, neurology, orthopedics and general surgery, did not implement the integrated care program. Neither did hospital C, that participated with the units of internal medicine, respiratory medicine, neurology, orthopedics and cardiology. Work processes focused on the patients' medical condition and each involved medical discipline used a separate treatment plan, without active integration. However, Hospital B did use an electronic patient record including targeted consultation and central intake prior to admission. A clinical geriatrician was available in Hospital A and B, but not in Hospital C.

It was expected that hospital A would score higher on overall integrated care delivery in comparison to hospital B and C. Situational awareness was expected to be increased, due to the patient-orientated integrated treatment plan and by discussing the treatment with the older patient. Weekly multidisciplinary team meetings and the goal-orientated approach are expected to result in higher levels of relational coordination between professionals who deliver care to the older patient.

Table 1 Differences between the Prevention and Reactivation Care Program and two other hospitals in The Netherlands

	Hospital A - Prevention and Reactivation Care Program	Hospital B	Hospital C
Hospital care	Identification of vulnerable older patient within 48h Assessment of risk factors for functional decline Start reactivation treatment within 48h Clinical geriatrician Geriatric nurses	Start reactivation treatment after discharge Medication safety project Clinical geriatrician (consultation two days a week) Electronic patient record including targeted consultation (consult dietitian based on SNAQ scores) Central intake prior to admission including screening frail elderly and development individualized care plan	Start reactivation path after discharge Medication safety project
Multidisciplinary approach	Weekly multidisciplinary team meeting Treatment and care focused on medical condition and functioning in six domains (i.e. physical, mental, social, financial, home, and care) Goal-orientated approach	Key professional is responsible for treatment and interdisciplinary consults Discussion and coordination focused on medical condition	Key professional is responsible for treatment and interdisciplinary consults Discussion and coordination focused on medical condition
Patient	Patient-orientated integrated treatment plan Discussion treatment with patient during entire treatment path Problem solving	Separate treatment plans Treatment coherence determined by patient	Separate treatment plans Treatment coherence determined by patient

Questionnaires

Integrated care delivery

The Assessment of Chronic Illness Care (ACIC, see appendix 1) was originally developed to measure the degree to which a healthcare system adheres to elements of the Chronic Care Model (CCM), and the integration effect that occurs when all model elements are engaged (Bonomi, Wagner, Glasgow, & VonKorff, 2002). The instrument has been validated and used for the evaluation of hospital care (Bonomi et al., 2002; Cramm, Strating, Tsiachristas, & Nieboer, 2011; Lemmens, Strating, Huijsman, & Nieboer, 2009; Minkman, Ahaus, & Huijsman, 2007; Wagner et al., 2001). The ACIC is responsive to the system changes made by teams and correlates well with other measures of productivity in system change (Bonomi et al., 2002; Glasgow, Orleans, Wagner, Curry, & Solberg, 2001; Wagner et al., 2001). Four subscales of the Assess-

ment of Chronic Illness Care Short version (ACIC-S) were used in the current study, addressing self-management support (three items), delivery system design (three items), decision support (three items), and clinical information systems (three items) (Cramm et al., 2011). Since chronic illness care is a complex undertaking that contains several interacting components, partly performed within the hospital (Campbell et al., 2000), we generalized the ACIC-S to the current setting of integrated care delivery for hospitalized older patients. Responses were structured on a scale of 0-11, with higher scores indicating more comprehensive integrated care delivery. Cronbach's alpha was 0.90.

Situational awareness

The Situation Awareness Global Assessment Technique (SAGAT, see appendix 2) is based on a three-level model of situational awareness. It addresses perception of the elements (three items), comprehension of their meaning (three items), and projection of future status (three items) (Endsley, 1995b). Although developed specifically to assess pilot situational awareness (Endsley, 1990; Endsley & Kiris, 1995c), the SAGAT has been used in the hospital setting to measure e.g. nurses' ability to assess and manage patient deterioration, and the integration of patient information (Cooper et al., 2011; Koch et al., 2013). Responses were structured on a scale of 0-5, with higher scores indicating more situational awareness. Cronbach's alpha was 0.92.

Relational coordination

Relational coordination was measured using six survey questions on a four-point scale (1 = never, 2 = rarely 3 = occasionally, and 4 = all the time) including three questions about communication (frequency/timeliness, accuracy, problem-solving) and three questions about relationships (shared goals, shared knowledge, mutual respect). The relational coordination score was derived by calculating the mean of the item scores. Higher scores indicated better or more desirable relational coordination (Cramm & Nieboer, 2011b, 2012; Gittell et al., 2008). The questionnaire was originally developed to measure airline operation (Gittell, 2001), and has been applied in hospitals (Gittell et al., 2000). Pilot testing revealed that the items 'timely' and 'frequent' communication were not distinguishable for the professionals delivering care to hospitalized older patients, which led us to combine both aspects of relational coordination in a single question. In the current study, respondents were asked about communication and coordination with other professionals involved in delivering care to hospitalized older patients: medical specialists, nurses, physical therapists, dieticians, social workers, transfer nurses, case managers, and family physicians. Cronbach's alpha was 0.94.

Team context

The Team Climate Inventory (TCI) was used to measure the professionals' perceptions of team climate while working in multidisciplinary teams delivering care to older patients. The questionnaire comprises four broad factors reflecting a team's shared perceptions of organizational policies, practices and procedures: shared vision and objectives (four items), participative safety (four items), task orientation (three items) and support for innovation (three items). Participants were asked to rate their agreement on the TCI-items on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated a better or more desirable team climate (Kivimäki & Elovainio, 1999; Strating & Nieboer, 2009). Cronbach's alpha was 0.89.

Organizational context

In order to provide insight into the organizational context, questions were asked about communication and structure of task allocation. All questions were rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Communication was measured by asking participants about the communication channels within their organization (Jansen, Van den Bosch, & Volberda, 2006; Lloria, 2006). Subscales were formal internal exchange of information (six items), and informal internal exchange of information (three items). Examples were "Normally, meetings are held to share knowledge, to share ideas, and discuss issues related to work", and "In our organization, there is ample opportunity for informal hall talk". Cronbach's alpha was 0.77 for formal internal exchange of information. And Cronbach's alpha was 0.84 for informal internal exchange of information.

The organizational structure was measured by the amount of centralization using three items (Dewar, Whetten, & Boje, 1980). An example was "Little action can be taken until a supervisor approves a decision". Cronbach's alpha was 0.60. Formalization was measured with three items. "How things are done here is left up to the persons doing the work" was an example. Cronbach's alpha was 0.62.

Background characteristics

In addition, we asked participants for gender, occupational background, and the number of years they worked in their organization.

Data analysis

Descriptive statistics were used to analyze professionals' background characteristics, the team and organizational context, and the level of integrated care delivery, relational coordination and situational awareness. We tested the levels of situational awareness, relational coordination, and integrated care delivery in the three different hospitals. The degree to which differences existed was assessed through a series of

paired-sample t-tests. Correlation analysis was used to investigate the relationship between the background characteristics, team and organizational context, situational awareness, relational coordination, and integrated care delivery. We tested for influence of unit (level 2) on integrated care delivery. These results indicated that unit affects integrated care delivery (-2 loglikelihood 754.456 *vs.* 743.369; p = 0.01). Therefore, to account for the hierarchical structure of the study design we fitted a hierarchical random-effects model. The hierarchical structure comprises of 215 professionals nested in 13 teams. Individuals were excluded if any outcome observation was missing, leading to a total of 189 professionals in the multilevel regression analysis. To assess the extent to which variance should be ascribed to the unit rather than to the individual, unit was added in model 1. We introduced the team and organizational context in model 2 and situational awareness and relational coordination in model 3. In addition, team climate, relational coordination and situational awareness were aggregated on unit level and added to the analysis. This did not have a significant influence on the results. Deviance tests or likelihood ratio tests were used to compare the relative fit of the different models. A significance level of 0.05 was used for all statistical tests. Data were analyzed using the SPSS software package (ver. 18.0 for Windows; SPSS Inc., Chicago, IL, USA).

RESULTS

The eligible study population consisted of 510 professionals, 215 of whom completed the questionnaire (42% response rate). The respondents were distributed in three hospitals, with a response rate of 41% (52 out of 128) in hospital A, 44% (121 out of 274) in hospital B, and 39% (42 out of 108) in hospital C. Of those who completed the questionnaire, the majority of respondents in all hospitals was female (between 76.2% and 90.0%), and worked as a nurse (between 71.7% and 84.6%). Table 2 displays the descriptive characteristics (mean and standard deviation) of the total study population and per hospital. The overall mean score for integrated care delivery on a 0-11 scale was 5.44 (± 1.79), indicating that basic support for integrated care delivery was present. On a 0-5 scale, the overall mean score for situational awareness was 3.91 (± 0.61). On a 1-4 scale, the overall mean score for relational coordination was 2.97 (± 0.60).

Table 2 Descriptive statistics

Characteristics	Range	Overall (*n* = 215) % or mean (SD)	Hospital A (*n* = 52) % or mean (SD)	Hospital B (*n* = 121) % or mean (SD)	Hospital C (*n* = 42) % or mean (SD)
Gender (female)		86.3%	90.0%	88.3%	76.2%
Profession					
Medical specialist		7.5%	10.0%	6.6%	7.7%
Nurse		77.5%	79.2%	71.1%	84.6%
Paramedic		15.0%	10.8%	22.3%	7.7%
Years working in the organization (> 5 years)		59.2%	46.2%	74.8%	70.7%
Integrated care delivery	0-11	5.44 (1.79)	5.53 (1.94)	5.48 (1.72)	5.21 (1.81)
Situational awareness	1-5	3.91 (0.61)	3.98 (0.61)	3.89 (0.58)	3.88 (0.72)
Relational coordination	1-4	2.97 (0.60)	3.12 (0.64)	2.93 (0.57)	2.91 (0.63)
Team context					
Team climate	1-5	3.53 (0.58)	3.54 (0.53)	3.47 (0.57)	3.68 (0.63)
Organizational context					
Communication					
Formal internal communication	1-7	4.14 (1.00)	4.12 (1.11)	4.24 (0.95)	3.80 (0.96)
Informal internal communication	1-7	4.95 (1.22)	4.71 (1.43)	5.15 (1.14)	4.69 (1.08)
Structure					
Centralization	1-7	3.25 (1.18)	3.11 (1.21)	3.23 (1.18)	3.45 (1.13)
Formalization	1-7	4.02 (1.07)	4.21 (1.10)	3.85 (1.03)	4.23 (1.09)

Note. SD = standard deviation.

Comparison between hospitals

The three hospitals did not differ significantly with regard to the instruments used in this study (all $p > 0.05$) (Table 2). The different hospital units did however differ on integrated care delivery ($p \leq 0.001$), with geriatrics in hospital A (mean 6.80; ± 1.40), respiratory medicine in hospital B (mean 6.22; ± 1.49), neurology in hospital C (mean 6.43; ± 1.47) and orthopedics in hospital B and C (mean 6.33; ± 1.28 and mean 6.18; ± 0.58) scoring significantly higher than the other hospital units (overall mean 5.44; ± 1.70). The hospital units did also differ on informal internal communication ($p \leq 0.05$), with respiratory medicine in hospital B (mean 5.23; ± 1.14), neurology in hospital B (mean 5.52; ± 1.14) and orthopedics in hospital B and C (mean 5.57; ± 0.90 and mean 5.40; ± 0.44) scoring significantly higher than the other hospital units (overall mean 4.95; ± 1.22).

Table 3 Associations with integrated care delivery

	Integrated care delivery	*n*
Gender (female)	-0.02	186
Medical specialists	-0.06	177
Nurse	-0.06	177
Paramedic	0.12	177
Years working in the organization (> 1 year)	-0.11	189
Situational awareness	0.30**	194
Relational coordination	0.17*	188
Team context		
Team climate	0.29**	170
Organizational context		
Communication		
Formal internal communication	0.46**	181
Informal internal communication	0.36**	186
Structure		
Centralization	0.01	176
Formalization	-0.13	179

Note. *$p \leq 0.05$; **$p \leq 0.01$ (two-tailed).

Table 4 Hierarchical multilevel analyses of factors associated with integrated care (random intercepts model) ($n = 189$)

Model	**1**				**2**				**3**			
	B	SD	ß	SE	B	SD	ß	SE	B	SD	ß	SE
Constant	5.49	0.21	0.03	0.12	0.59	0.82	0.05	0.09	-0.93	1.04	0.07	0.09
Team context												
Team climate					0.48*	0.22	0.16*	0.07	0.21	0.24	0.07	0.08
Organizational context												
Formal internal communication					0.60**	0.15	0.34**	0.08	0.59**	0.14	0.33**	0.08
Informal internal communication					0.15	0.12	0.10	0.08	0.13	0.11	0.09	0.08
Situational awareness									0.71*	0.23	0.24*	0.08
Relational coordination									-0.03	0.24	-0.01	0.08
-2 log likelihood	743.369				598.619				589.42			

Note. *$p \leq 0.01$; **$p \leq 0.001$ (two-tailed); listwise deletion of cases; SD = standard deviation; SE = standard error.

Associations with integrated care delivery

Correlation analysis revealed that situational awareness ($r = 0.30$; $p \leq 0.01$), relational coordination ($r = 0.17$; $p \leq 0.05$), team climate ($r = 0.29$; $p \leq 0.01$), formal internal communication ($r = 0.46$; $p \leq 0.01$), and informal internal communication ($r = 0.36$; $p \leq 0.01$) were positively associated with integrated care delivery (Table 3).

The results of the stepwise multilevel analyses are displayed in Table 4. The first (empty) model served as a baseline with just intercepts. Model 2 showed that team climate ($p \leq 0.01$) and formal internal communication ($p \leq 0.001$) had a positive effect on integrated care delivery. When situational awareness and relational coordination were added to model 3, the results showed that in addition to formal internal communication ($p \leq 0.001$), situational awareness ($p \leq 0.01$) predicted integrated care delivery. Team climate was not significantly associated with integrated care delivery when situational awareness and relational coordination were included in the equation. Thus situational awareness acted as mediator between team climate and integrated care delivery among professionals delivering care to older hospitalized patient.

DISCUSSION AND CONCLUSION

In this study, we aimed to relate the underlying components 'relational coordination' and 'situational awareness' of integrated care delivery to the role of the team and organizational context. It is of high importance to understand how these components operate and interact; as they could actually make integrated care work.

We found that awareness of the individual situation of patients was associated with higher levels of integrated care delivery. A greater understanding of patients' personal needs and the roles of various disciplines to fulfill these needs may have resulted in a more coordinated and integrated response by the involved professionals. Situational awareness has the objective of understanding professional focus and intentions. Perception of the actual situation of the patient (e.g. awareness of the current health condition), in combination with a comprehension of what might be necessary for the patient (e.g. knowledge about different treatment options), and a projection of what might happen (e.g. how to react to sudden deterioration) make it possible for professionals to react to individual patient needs (Mosier & Fischer, 2010; Reader et al., 2011; Wright & Endsley, 2008), which is expected to lead to better integrated care delivery.

Organization of formal activities that emphasize internal communication between professionals with different occupational backgrounds are also associated with higher levels of integrated care delivery in this study. Knowledge sharing is known to be one of the key mechanisms by which internal communication takes place (Cabrera

& Cabrera, 2005). Professionals who are provided with the opportunity to connect with other professionals through formal activities may expand their professional knowledge and skills (McDermott & O'Dell, 2001). Formal arrangement of face-to-face discussion may be an important way for hospitals to stimulate professionals to share new ideas and insights and keep professionals up-to-date about developments (Robertson & Hammersley, 2001). As such these formal arrangements of communication between professionals from different occupational backgrounds are expected to improve integrated care delivery (Robertson & Hammersley, 2001; Snell, Lepak, & Youndt, 1999).

The three Dutch hospitals did not differ in the degree of integrated care delivery. To understand the outcome, the work processes in the different hospitals were compared. Hospital A, which implemented the integrated care program, introduced weekly multidisciplinary team meetings. These meetings made it possible for professionals to share information about the patients' situation and demand for care, after which a patient-orientated integrated treatment plan was made. While hospital B and C did not implement these multidisciplinary team meetings; professionals in charge of care delivery did seek information from other professionals through interdisciplinary consults. Maybe introducing multidisciplinary team meetings had the same effects on integrated care delivery as the use of interdisciplinary consults. In line with this, the professionals in all hospitals worked according to treatment plans. The treatment plans in hospital A were patient-orientated and diverse disciplines were integrated. Hospital B and C worked with separate treatment plans for each discipline. But since the professionals in hospital B and C actively sought information from others, one could question whether their treatment plans were indeed less integrated than the treatment plans of hospital A. In contrary to hospital A, hospital B and C did not implement a screening instrument for vulnerability of older patients. Yet, they did perform a basic screening for general health problems and took proactive measures when problems were suspected. One could reason that both screening instruments had the same effect on the choice of treatment for the intervention and control hospitals, and therefore no differences in the care processes were identified. In addition, hospital B and C are participating in quality improvement programs other than serving as a control group in the current study (e.g. improving patient safety by medication verification). The participation in these projects could alter the perception of professionals on the quality of care they deliver. This could be of influence on their responses to the questionnaires of the current study. It should also be noted that hospital B is a Dutch training hospital for medical residents. Nowadays, the necessity of coordination for healthcare delivery is emphasized during training (Reeves et al., 2008), which could have resulted in higher levels of care integration. In addition, hospital C is smaller compared to the other two hospitals. Research has shown that smaller hospitals show

higher levels of cooperation (Young, Meterko, & Desai, 2000). Working with fewer professionals creates less boundaries for information sharing and decision making, which may have resulted in higher levels of integrated care delivery. However, less formalized communication may also have negative effects for some units or for some patients (Cosby & Croskerry, 2004).

While no differences were found between the hospitals, the hospital units did differ in their level of integrated care delivery. Elsewhere we reported higher levels of integrated care delivery in a geriatric hospital unit suggesting that professionals are more used to integrated care delivery (e.g. by participating in multidisciplinary team meetings), than professionals in other units (Hartgerink et al., 2012). One should therefore take differences in integrated care delivery between units into account when analyzing what is needed for integrated care delivery in the hospital setting.

The limitations of this study should be considered when interpreting the findings. Firstly, the cross-sectional design allowed us to identify associations but not to determine causality. Longitudinal data would provide the opportunity to disentangle the dynamic relationships among situational awareness, relational coordination and integrated care delivery. Secondly, we were not able to control for all contextual factors that may be of importance for integrated care delivery. Earlier research has shown that e.g. unit size, availability of support services, work complexity and work engagement have an influence on care delivery (Salver & Wan, 2003; Thornton Bacon & Mark, 2009). In addition, we only used professionals' self-reported data on integrated care delivery, situational awareness and relational coordination. Some professionals may have a more positive attitude towards integrated care delivery than others, resulting in response bias. By asking questions that refer to experiences of professionals with the ways in which they delivered care, one can avoid direct questions on the perceived level of integrated care delivery. There should be less response bias for these questions. Thirdly, the management of hospital A allowed only three of the ten hospital units in that hospital to participate in the integrated care program and current study. It might have been possible to detect a stronger effect of the program when it would have been implemented throughout the whole hospital. And finally, although we examined the relationship between situational awareness, relational coordination and integrated care delivery, the link between situational awareness and relational coordination remains unclear. Earlier research has shown that relational coordination improves the exchange of information relevant for delivering high-quality care (Gittell et al., 2008). Furthermore, Endsley (1995a) argues that situational awareness serves as an index for coordination or interface effectiveness. Future research has to further explore this dynamic relationship between situational awareness and relational coordination. In addition, further research is necessary to assess the effects of integrated care delivery on improved patient experiences and outcomes.

The current study provides insight into the underlying mechanisms of integrated care delivery in hospitals. Awareness of the individual patients' situation and structured activities within the hospital that enhance information sharing are a necessity for placing the older patient in the center of the care process.

Several practical implications can be drawn. Effective improvements in understanding the patients' situation can be achieved by improving the skills and knowledge that are critical for achieving situational awareness. Training programs devoted especially to teaching individual skills related to situational awareness include programs for teaching attention sharing, task management, and information seeking or filtering (Endsley, 1989; Endsley & Robertson, 2000). On a team and unit level, situational awareness could be improved by training teams to verbalize the information that led to a given decision and to share the results of a given decision (Endsley & Robertson, 1996). In addition, to enhance integrated care delivery hospitals should create formal moments of communication among professionals of different occupational backgrounds.

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Appendix 1 PACIC scale

1.	Assessment and documentation of self-management needs and activities
2.	Self-management support
3.	Addressing concerns of patients and families
4.	Evidence-based guidelines
5.	Providing education for elderly care
6.	Informing patients about guidelines
7.	Appointment system
8.	Planned visits for elderly care
9.	Continuity of care
10.	Feedback
11.	Information about relevant subgroups of patients needing services
12.	Patient treatment plans

Appendix 2 SAGAT scale

1.	Are other professionals aware of the current health condition of the elderly patient?
2.	Do other professionals know which medicine the elderly patient takes?
3.	Do other professionals know which treatment the elderly patient undergoes?
4.	Do other professionals have sufficient information about the general health condition of the elderly patient?
5.	Do other professionals know which treatment options the elderly patient has?
6.	Do other professionals know which treatment goals the elderly patient has?
7.	Do other professionals have expectations about the course of illness of the elderly patient?
8.	Do other professionals know how to act when sudden deterioration occurs in the situation of the elderly patient?
9.	Do other professionals who to contact when sudden deterioration occurs in the situation of the elderly patient?

Chapter 6

The importance of integrated care delivery and satisfaction with hospital care for older patients' quality of life after hospitalization

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ABSTRACT

Purpose: This study aimed to identify the role of the quality of integrated care delivery and satisfaction with hospital care on quality of life among older patients after hospitalization.

Methods: Our longitudinal research was based on a pilot study of older people who had recently been admitted to a hospital. In the pilot study, all patients (≥ 65 years of age) who were admitted to the Vlietland hospital between June and October 2010 were asked to participate, which led to the inclusion of 500 older patients at baseline. A total of 291 patients (58% response rate) were interviewed 3 months after admission. Measures included quality of life, quality of integrated care delivery and satisfaction with hospital care. We used descriptive statistics, correlations, and multilevel analyses.

Results: Being married ($p \leq 0.05$), satisfaction with hospital care, perceived quality of integrated care delivery (both $p \leq 0.01$), and quality of life within 48 hours of hospital admission ($p \leq 0.001$) significantly correlated with quality of life three months after hospital admission. After controlling for background characteristics, multilevel analysis indicated that satisfaction with hospital care ($p \leq 0.05$) and perceived quality of integrated care delivery ($p \leq 0.01$) predicted patients' quality of life three months after hospitalization.

Conclusions: This study found a longitudinal relationship between quality of integrated care delivery, satisfaction with hospital care and quality of life of older patients after hospitalization. These results underscore the importance of enhancing older patients' experiences with integrated care delivery and satisfaction with hospital care.

INTRODUCTION

With the aging population healthcare professionals are increasingly dealing with older patients suffering from multiple chronic diseases. This poses challenges for the complex coordination of tasks performed during care delivery (Kodner & Kyriacou, 2000). Their intense use of health services puts older patients at greater risk of receiving fragmented or poor-quality care (Leichsenring, 2004; World Health Organization, 1996). Once admitted to the hospital, older patients are at an increased risk for poor outcomes such as readmission, increased length of stay, functional decline, iatrogenic complications, and nursing home placement (Forster, Murff, Peterson, Gandhi, & Bates, 2003; Palmer, 1998). Schwarz (2000) found a 33% rate of readmission within three months for older patients, which is consistent with other studies of readmission rates among these patients. Sager and colleagues (1996) found that the ability to perform one or more activities of daily living had declined in 32% of older patients at the time of discharge. Of functional independent individuals of 65 years and older admitted to the hospital from their home for acute illness, 75% experienced adverse events after hospitalization, including 15% who were discharged to nursing homes (Brown, Friedkin, & Inouye, 2004; Creditor, 1993). So for many older patients, hospitalization is followed by an often irreversible decline in functional status and quality of life (Hoenig & Rubenstein, 1991; Hoogerduijn, 2006).

The healthcare delivery system is a major factor contributing to health and quality of life outcomes for hospitalized older adults (Boyd et al., 2005; Reuben, 2000). The organization and delivery of hospital care is often fragmented, uncoordinated, and duplicated (Kodner, 2006; World Health Organization, 1996). Since a substantial number of older patients suffer from a mixture of problems in multiple life domains, protecting their quality of life not only concerns physical health, but also involves social and psychological well-being (Rowe & Kahn, 1997). Vulnerable older patients have complicated and on-going needs, experience difficulties in everyday living, require a mix of services delivered sequentially or simultaneously by multiple providers and receive both cure and care (Kodner & Spreeuwenberg, 2002). The provision of healthcare, social services and related services at the right time and place to such older patients is of high importance. Problems typically include difficulties with obtaining needs assessments, putting together comprehensive service packages, coordinating multiple providers and services, ensuring continuity, and monitoring health and functional status (Kodner, Sherlock, & Shankman, 2001). To solve many of these problems, the literature strongly suggests that holistic and personalized integrated care delivery encompassing the total care process is required (Grol, 2000; Moyle, Olorenshaw, Wallis, & Borbasi, 2008; World Health Organization, 1996). This approach enhances quality of care and provides better levels of service; that is, one that is more

sensitive to the personal circumstances and wishes of the individual patient (Kodner & Spreeuwenberg, 2002). Through the integration of interrelated care delivery components (e.g. case management, support systems, multidisciplinary teamwork, treatment plans), all the activities and information about the needs of the patient are coordinated, placing the older patient in the centre of the care process (Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005; Wagner et al., 2001; Wagner, Austin, & Von Korff, 1996). Integrated care delivery has shown to improve quality of care due to patient involvement in planning of care, better patient education, more staff time with patients and improved communication between professionals (Williams, Roberts, & Rigby, 1993). As a result, length of stay in the hospital decreased, and complications were reduced (Ogilvie-Harris, Botsford, & Hawker, 1993; Wentworth & Atkinson, 1997; Windham, Bennett, & Gottlieb, 2003). As such we expect that integrated care delivery is positively related to quality of life of older patients.

Satisfaction with hospital care may be an additional important quality of care indicator (Cleary et al., 1991), which is beneficial to older patients' quality of life. Several studies have demonstrated a positive association between patients' satisfaction with hospital care and patients' functional health (Hall, Feldstein, Fretwell, & Rowe, 1990; Hall, Roter, & Katz, 1988), self-perceived health and emotional health (Greenley, Young, & Schoenherr, 1982; Marshall, Hays, & Mazel, 1996). Evidence has shown that care which is less satisfactory to the patient is associated with non-compliance with treatment and return appointments, and a poor understanding and retention of medical information (Fitzpatrick, 1991). As such patient satisfaction with hospital care may be directly related to improvements in quality of life, and healthcare outcomes (Asadi-Lari, Tamburini, & Gray, 2004; Fitzpatrick, Hopkin, & Harvard-Watts, 1983; Petterson et al. 1998; Wong & Fielding, 2008).

Therefore, we reason that both older patients' perception of quality of integrated care delivery and satisfaction with hospital care are important for their quality of life over time.

METHODS

Setting and design

The current study was conducted in 2010 among older patients who were admitted to a hospital in the context of the Prevention and Reactivation Care Program (Asmus-Szepesi et al., 2011), which was designed to prevent loss of function in older patients due to hospitalization and targeted older hospital patients (≥ 65 years of age) who were vulnerable to loss of function after hospital discharge. This research is based on the pilot study of 500 patients (≥ 65 years old) prior to implementation of the

Prevention and Reactivation Care Program. The results of the pilot study have been used to identify possible practical implementation problems in preparation for the main evaluation study and serve as a base for power calculations for the main study.

A total of 1026 patients admitted to the Vlietland hospital in The Netherlands between June and October 2010 were approached to participate in the study. We excluded patients who refused participation, did not understand the Dutch language, were expected to stay in the hospital for less than 48 hours, were unable to answer questions or follow instructions due to cognitive problems (MMSE score lower than 12), or had a life expectancy of less than three months. Five hundred agreed to participate and signed an informed consent form (response 49%). Three months after admission, 173 participants had been lost to follow up, 36 participants had died, and 291 people (response rate 58%) were interviewed.

Questionnaire

Quality of life was assessed with an adjusted version of Cantril's Self Anchoring Ladder (Cantril, 1965). Within 48 hours after hospital admission (T0) and three months after hospital admission (T1), respondents were asked to rate their lives on a scale of 0-10, with 10 being the best possible score.

Patients' perceptions of quality of integrated care delivery were assessed with the 10-item Older Patients' Assessment of Integrated Care (O-PACIC scale, see appendix 1) (Cramm & Nieboer, 2013), which was based on the 20-item Patient Assessment of Chronic Illness Care questionnaire (PACIC) (Glasgow et al., 2005). The PACIC is intended to assess the receipt of integrated care, which emphasizes the key elements of self-management support (e.g., patient activation, delivery-system/practice design, goal setting/tailoring, problem solving/contextual, and follow-up coordination) and planned, proactive care delivery. The O-PACIC was developed and validated as a reliable instrument to assess older patients' experiences with integrated care delivery after hospitalization. The O-PACIC score represents the sum of the participants' responses divided by 10. Scores ranged from 1 to 5, with higher scores indicating a greater perception of receipt of integrated care delivery (Cramm & Nieboer, 2013; Glasgow et al., 2005). At T1 (three months after hospital admission) respondents were asked to give their perception on the quality of integrated care delivery. The Cronbach's alpha coefficient of the scale was 0.75, indicating reliability.

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS survey, see appendix 2) is a questionnaire which especially assesses patients' hospital experience. The questionnaire consists of 18 questions, including 14 questions used to construct 6 subscales: communication with nurses (three questions), communication with doctors (three questions), responsiveness of hospital staff (two questions), pain management (two questions), communication about medicines (two questions), and

discharge information (two questions); two individual items (cleanliness of hospital environment, and quietness of hospital environment); and two global ratings (overall rating of hospital, and willingness of hospital environment) (Giorgano, Elliot, Goldstein, Lehrman, & Spencer, 2010). The response categories consisted of most positive (always" for 5 HCAHPS subscales, "yes" for discharge information, "9" or "10" for hospital rating, and "definitely" for recommend the hospital), in-between ("usually" for 5 HCAHPS subscales, "7" or "8" for hospital rating, and "probably yes" for recommend the hospital), and least positive ("sometimes" or "never" for 5 HCAHPS subscales, "no" for discharge information, "0" through "6" for hospital rating, and "probably no" or "definitely no" for recommend the hospital (Center for Medicare and Medicaid Services, 2011). The standardized HCAHPS score was the mean of the participants' responses on the subscales, individual items and global ratings. Scores ranged from 0 to 2, with higher scores indicating more satisfaction with the received hospital care. At T1 (three months after hospital admission) respondents were asked to assess the hospital experience from 3 months earlier. The Cronbach's alpha coefficient for this instrument was 0.87, indicating good reliability.

We further asked participants for age, gender, marital status, education level, length of hospital stay, general health, and cognitive and physical functioning. Education was assessed on seven levels ranging from (1) no school or some primary education (6 years of education or less) to (7) university degree (18 years of education or more). In our analyses, we dichotomized this into (1) low educational level (followed school after primary education, but without a diploma or less), and (0) followed school after primary education with diploma or higher. The length of hospital stay was used as a proxy for severity of the patients' medical problems for which he/she was admitted (Newgard et al., 2010). The participants' general health was assessed on a 5-point scale (1= excellent, 2 = very good, 3 = good, 4 = reasonable, 5 = bad). We dichotomized this into (1) bad health (scores 4 and 5), and (0) good health (scores 1, 2 and 3). Cognitive functioning was assessed with the Mini Mental State Examination (MMSE), which measures cognitive functioning by asking questions about orientation in time and space, short- and middle-term memory, comprehension, and other cognitive dimensions. Scores ranged from 0 to 30, with higher scores indicating higher levels of cognitive functioning. Any score equal or above 25 points (of 30) represents effective cognitive functioning (intact). Below this, scores can indicate severe (≤ 9 points), moderate (10-20 points), or mild (21-24 points) cognitive functioning losses (Folstein, Folstein, & McHugh, 1975; Kempen, Brilman, & Ormel, 1995). Physical functioning was assessed using the Katz Index of independence in activities of daily living (Katz, Down, Cash, & Grotz, 1970; Katz, Ford, Moskowitz, Jackson, & Jaffa, 1963), which ranks an individuals' ability to perform six functions: bathe, dress, use the toilet, transfer, remain continent, and feed oneself. Scores of no (1) or yes (0) indicate (in)dependence

in each function, with 6 is full physical function, 4 is moderate, and equal or below 2 is severe physical function impairment.

Statistical analysis

Descriptive statistics were used to analyze patients' age, gender, marital status, education level, length of hospital stay and health. Correlation analysis was used to investigate the relationship between the background characteristics, patients' general health, cognitive functioning, physical functioning, satisfaction with hospital care, quality of integrated care delivery, and quality of life. We employed a random-effects multilevel model to investigate the relationship between older patients' perception of the quality of integrated care delivery, satisfaction with hospital care and quality of life over time. Background characteristics and significant univariate associations with quality of life at T1 (three months after hospital admission) were included in the multilevel analyses. A significance level of 0.05 was used for all statistical tests. Data were analyzed using the SPSS software package (ver. 18.0 for Windows; SPSS Inc., Chicago, IL, USA).

RESULTS

Descriptive statistics are displayed in Table 1. Respondents' mean age was 75.9 (± 7.2; range 65-95); slightly more were female (55.2%). Just over half were married/living together (56.9%); the others were single, widowed or divorced (43.1%). Of the respondents, 34.7% had a low educational level. On average, patients stayed 6.6 days (± 6.7) in the hospital and 40.5% rated their health as poor. At T0 (within 48 hours after hospital admission), the mean score for cognitive functioning was 26.2 (± 4.3), indicating intact cognitive functioning. The mean score for physical functioning was 3.9 (± 2.0), indicating moderate physical function impairment. The mean score for quality of life at T0 (within 48 hours after hospital admission) was 7.2 (± 1.4). At T1 (three months after hospital admission), the mean score for quality of life was 7.4 (± 1.3). The respondents who were lost to follow-up between T0 and T1 did not differ significantly in their score for quality of life at T0.

On 1-5 scale, the mean quality of integrated care delivery as measured with the O-PACIC was 1.8 (± 0.6). The respondents reported a mean overall satisfaction with hospital care of 1.2 (± 0.4) as measured on the 0 to 2 HCAHPS scale.

Table 1 Descriptive statistics

Demographic characteristics	Range	% or mean (SD)
Quality of life T0	1-10	7.2 (1.4)
Gender (female)		55.2%
Age	65-95	75.9 (7.2)
Marital status (married)		56.9%
Low educational level		34.7%
Length of hospital stay	0-65	6.6 (6.7)
Poor health		40.5%
Cognitive functioning	0-30	26.2 (4.3)
Physical functioning	0-6	3.9 (2.0)
Satisfaction with hospital care	0-2	1.2 (0.4)
Perception of integrated care delivery	1-5	1.8 (0.6)
Quality of life T1	1-10	7.4 (1.3)

Note. SD = standard deviation; T0 = within 48 hours after hospitalization; T1 = three months after hospitalization.

Hospital care satisfaction, integrated care delivery and quality of life

Correlation analysis revealed that being married ($r = 0.14$; $p \leq 0.05$), satisfaction with hospital care at T1 (three months after hospitalization; $r = 0.17$; $p \leq 0.01$), quality of integrated care delivery at T1 (three months after hospitalization; $r = 0.18$; $p \leq 0.01$) and quality of life at T0 (within 48 hours after hospital admission) ($r = 0.43$; $p \leq 0.001$) were positively associated with quality of life at T1 (three months after hospitalization). Poor health at T0 (within 48 hours after hospital admission; $r = -0.27$; $p \leq 0.001$) showed a negative correlation with quality of life at T1 (three months after hospitalization) (Table 2).

The results of multilevel analyses are displayed in Table 3. These analyses showed that satisfaction with hospital care ($p \leq 0.05$) and quality of integrated care delivery ($p \leq 0.01$) were positively related to patients' quality of life at T1 (three months after hospitalization).

Table 2 Correlations between background characteristics, integrated care delivery, satisfaction with hospital care and quality of life

	Quality of life T1	*n*
Quality of life T0	0.43***	286
Gender (female)	0.02	289
Age	-0.04	288
Marital status (married)	0.14*	289
Low educational level	-0.10	289
Length of hospital stay	-0.02	289
Poor health	-0.27***	289
Cognitive functioning	0.11	289
Physical functioning	0.09	289
Satisfaction with hospital care	0.17**	287
Perception of integrated care delivery	0.18**	279

Note. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$ (two-tailed); T0 = within 48 hours after hospitalization; T1 = three months after hospitalization.

Table 3 Quality of life predictors at T1 as assessed by multilevel regression analyses (random intercepts model) ($n = 264$)

	B	SD	β	SE
Constant	3.72	0.99	7.36	0.08
Quality of life T0	0.36***	0.06	0.51***	0.08
Gender (female)	0.32*	0.15	0.16*	0.08
Age	-0.00	0.01	-0.00	0.08
Marital status (married)	0.29	0.16	0.14	0.08
Low educational level	-0.24	0.16	-0.11	0.08
Length of hospital stay	0.00	0.02	0.00	0.11
Poor health	-0.50***	0.15	-0.45***	0.07
Satisfaction with hospital care	0.38*	0.18	0.15*	0.07
Perception of integrated care delivery	0.31**	0.12	0.19**	0.07

Note. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$ (two-tailed); T0 = within 48 hours after hospitalization; T1 = three months after hospitalization; SD = standard deviation; SE = standard error; multilevel analyses included respondents who filled in questionnaires at both T0 and T1 only ($n = 291$); listwise deletion of missing cases resulted in 264 cases for the multilevel regression analyses.

DISCUSSION

This study aimed to identify the role of the quality of integrated care delivery and patient satisfaction with hospital care on quality of life among older patients after hospitalization. Our results showed that quality of life three months after hospitalization was indeed related to patients' satisfaction with hospital care and quality of integrated care delivery over time. This implies that older patients who are more satisfied about the received hospital care and experience higher levels of integrated care delivery are those with a higher quality of life three months after hospitalization. Such results align with those of previous studies, which have found that integrated care delivery had a positive effect on quality of life (Kodner & Kyriacou, 2000; Weingarten et al., 2002).

Healthcare improvement programs at hospitals usually focus on isolated interventions, such as medication supply or multidisciplinary cooperation, rather than on the total care process of the patient (Grol, 2000). Integrated care programs have begun to receive support as approaches to reduce fragmentation of care and to achieve improved results for patient outcomes (Ouwens et al., 2005). Our findings are based on a pilot study conducted in 2010 among older people who had recently been admitted to a Dutch hospital in the context of the Prevention and Reactivation Care Program (Asmus-Szepesi et al., 2011). This integrated care program supports a multifaceted and multidisciplinary approach to the care of older patients organized around several core components, including screening for vulnerability, early detection and treatment of health problems, case management, and multidisciplinary teamwork. The main goal of the program is to reduce the loss of function among older patients after hospital discharge. The current study shows the importance of assessing the perspective of older patients on the amount of care integration and patient satisfaction with hospital care while evaluating care delivery, as they could be a predictor of the outcomes on quality improvement programs.

Patients want timely access, reassurance, and diagnostic expedience without regard to costs or use. Medical professionals also want satisfied patients, but tend to focus on achieving a specific health outcome and not necessarily on the process by which it is achieved. In addition, medical professionals have the added responsibility to use resources efficiently and effectively (Kupfer & Bond, 2012). The question for medical professionals is how to balance between these competing needs. Interventions that focus on patient education may be a useful addition to the usual integrated care components of case management, support systems, multidisciplinary teamwork, and treatment plans (Ouwens et al., 2005; Rowe & Kahn, 1997). Shen and colleagues (2006) showed that a nurse conducted education program for hospitalized older patients resulted in improved medication knowledge. Since integrated care delivery emphasizes the importance of informed patients that can interact with proactive pro-

fessional teams (Ouwens et al., 2005), education about medication usage and health conditions could be of added value. This could result in more satisfied patients with a better quality of life (Burge et al., 2005).

The limitations of this study should be considered when interpreting the findings. Firstly, patients were asked to provide a grade for their quality of life within 48 hours after hospital admission and three months after hospital discharge. No information is available of their quality of life prior to their hospital admission, which is expected to be an additional indicator for quality of life after hospitalization. In addition, we asked participants to rate the level of integrated care delivery and satisfaction with hospital care three months after they were discharged from the hospital. This retrospective design may have had an effect on how the hospital experience is recalled (Janson, 1981). Although our study showed that patient satisfaction with hospital care had a positive relationship with older patients' perception of the quality of integrated care delivery, the question then becomes how these concepts are linked. The literature often describes that integrated care delivery enhances patient satisfaction (Ouwens et al., 2005), it could however be reasoned that highly satisfied patients receive better care and experience improved health outcomes. However, a recent study showed that highly satisfied patients had higher healthcare use and worse outcomes, even if they rated their own health as excellent (Coulter, 2012). An explanation for this finding could be that medical professionals, who naturally want to satisfy their patients and achieve high satisfaction scores, are more inclined to order diagnostic tests and prescribed medications. It is also suggested that patients who make the most demands receive a disproportionate amount of care, perhaps to their own disadvantage (Kupfer & Bond, 2012). Future research has to further explore the link between patient satisfaction, integrated care delivery and quality of life. Finally, our study sample consisted of older people who had recently been admitted to the hospital, which limits generalizability of our study findings to e.g. integrated care programs in other healthcare settings or the community.

Conclusions

We conclude that older patients' perception of the quality of integrated care delivery and satisfaction with hospital care are important for their quality of life three months after hospitalization. These results underscore the importance of enhancing older patients' experiences with integrated care delivery and satisfaction with hospital care.

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Appendix 1 O-PACIC scale

1.	When I received care I was given choices on treatment to think about
2.	When I received care I was asked to talk about any problems with my medicines or their effects
3.	When I received care I was given a written list of things I should do to improve my health
4.	When I received care I was shown how what I did to take care of my illness influenced my condition
5.	When I received care I was asked to talk about my goals in caring for my illness
6.	When I received care I was helped to set specific goals to improve my eating or exercise
7.	When I received care I was encouraged to go to a specific group/class to help me cope with my illness
8.	When I received care I was helped to make a treatment plan that I could do in my daily life
9.	When I received care I was asked how my illness affects my life
10.	When I received care I was contacted after a visit to see how things were going

Appendix 2 HCAHPS survey

1.	Communication with nurses: During this hospital stay, how often did nurses treat you with courtesy and respect?
2.	Communication with nurses: During this hospital stay, how often did nurses listen carefully to you?
3.	Communication with nurses: During this hospital stay, how often did nurses explain things in a way you could understand?
4.	Communication with doctors: During this hospital stay, how often did doctors treat you with courtesy and respect?
5.	Communication with doctors: During this hospital stay, how often did doctors listen carefully to you?
6.	Communication with doctors: During this hospital stay, how often did doctors explain things in a way you could understand?
7.	Responsiveness of hospital staff: During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?
8.	Responsiveness of hospital staff: How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?
9.	Pain management: During this hospital stay, how often was your pain well controlled?
10.	Pain management: During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?
11.	Communication about medicines: Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?
12.	Communication about medicines: Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?
13.	Cleanliness of hospital environment: During this hospital stay, how often were your room and bathroom kept clean?
14.	Quietness of hospital environment: During this hospital stay, how often was the area around your room quiet at night?
15.	Discharge information: During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?
16.	Discharge information: During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?
17.	Overall hospital rating: Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?
18.	Recommend the hospital: Would you recommend this hospital to your friends and family?

Chapter 7

Understanding older patients' self-management abilities: Functional loss, self-management, and well-being

Cramm, J.M., Hartgerink, J.M., Steyerberg, E.W., Bakker, T.J., Mackenbach, J.P., & Nieboer, A.P. (2012).

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ABSTRACT

Purpose: This study aimed to increase our understanding of self-management abilities and identify better self-managers among older individuals.

Methods: Our cross-sectional research was based on a pilot study of older people who had recently been admitted to a hospital. In the pilot study, all patients (≥ 65 years of age) who were admitted to the Vlietland hospital between June and October 2010, were asked to participate, which led to the inclusion of 456 older patients at baseline. A total of 296 patients (65% response rate) were interviewed in their homes three months after admission. Measures included social, cognitive, and physical functioning, self-management abilities and well-being. We used descriptive, correlations and multiple regression analyses. In addition, we evaluated the mediation effect of self-management abilities on well-being.

Results: Social, cognitive, and physical functioning significantly correlated with self-management abilities and well-being (all $p \leq 0.001$). After controlling for background characteristics, multiple regression analysis indicated that social, cognitive, and physical functioning still related to self-management abilities ($\beta = 0.17\text{-}0.25$; all $p \leq 0.001$). Older people with low levels of social, cognitive, and physical functioning were worse self-managers than were those with higher levels of functioning.

Conclusions: Self-management abilities mediate the relationship between social, cognitive, and physical functioning and well-being. Interventions to improve self-management abilities may help older people better deal with function losses as they age further.

INTRODUCTION

Hospitalized older patients are at risk of functional loss (Covinsky et al., 2003; Creditor, 1993; Sager et al., 1996; Wu et al., 2000). Among 70-year-olds, 35% showed some loss of function upon discharge compared with their pre-admission status; this rose to 65% for persons aged 90 years or older (Covinsky et al., 2003). Although hospital-related functional loss among older people is often associated with complications of an illness or its treatment (Creditor, 1993), it is only partially so (Covinsky et al., 2003; Sager et al., 1996; Wu et al., 2000), implying that the hospital stay per se is a contributor. Wu and colleagues (2000) found that one or more limitations developed within two months in 42% of older patients with no baseline dependency at admission. Sager and colleagues (1996) found that the ability to perform one or more activities of daily living had declined in 32% of older patients at the time of discharge. Functional loss may lead to readmission, prolonged hospital stay, transfer to a nursing home, or early death (Boyd et al., 2008; de Rooij et al., 2006). Furthermore, it leads to poor well-being outcomes, greater dependence and thus higher burden on informal caregivers (Covinsky, Justice, Rosenthal, Palmer, & Landefeld, 1997; Covinsky et al., 1999; Inouye et al., 1998), higher utilization of healthcare and, in turn, higher healthcare costs (McCusker, Kakuma, & Abrahamowicz, 2002). Preventing or reducing functional loss at an early stage of risk to maintain well-being of older people is therefore important (Health Council of The Netherlands, 2009).

Self-management abilities are expected to mediate the negative effect of declines in these domains of functioning on well-being (Bandura, 1997; Marino, Sirey, Raue, & Alexopoulos, 2006; Wu et al., 2011). Self-management abilities become thus particularly important in the face of loss of function. Health or disease-related self-management abilities (taking medication, exercise, eating healthy, quit smoking), have been developed and translated effectively into interventions (Clark et al., 1992; Lorig et al., 1999). In addition to health-related self-management abilities, there may also be a need for interventions aimed at the self-management of overall health and well-being to contribute to the (pro)active creation and maintenance of one's own health and well-being. A substantial number of older patients suffers from a mixture of problems in multiple life domains; successful ageing not only concerns physical health, but also involves social and psychological well-being (Baltes & Baltes, 1990; Rowe & Kahn, 1987, 1997). Therefore, they may benefit more from self-management interventions that provide them with a general cognitive and behavioral repertoire for dealing with different kinds of problems rather than from interventions focusing on disease or health-related problems only. Relatively few interventions are designed to explicitly focus on the achievement and maintenance of well-being. The Self-Management of Well-being (SMW) theory (Steverink, Lindenberg, & Slaets,

2005), which is based on the theory of Social Production Functions (SPF) (Lindenberg, 1996; Steverink, Lindenberg, & Ormel, 1998), offers concrete guidelines for the achievement of better self-regulation with regard to well-being. The SMW theory distinguishes six self-management abilities: (1) having a positive frame of mind, (2) being self-efficacious, (3) taking initiative, (4) investing in resources for long-term benefits, (5) taking care of a variety of resources, and (6) taking care of resource multifunctionality. Self-management abilities to achieve and maintain well-being depend on whether older people have adequate levels of social, cognitive and physical functioning for fulfilling their well-being needs and goals (Steverink & Lindenberg, 2008). As such, lower levels of functioning are expected to result in poorer self-management abilities. Poorer levels of social, cognitive and physical functioning, for example, could negatively affect the self-management ability 'having a positive frame of mind,' which refers to the ability to adopt and maintain a positive frame of mind or positive expectations. The ability to have a positive frame of mind is expected to contribute to well-being because it extends the time-horizon and boosts confidence, which, in turn, encourages people to engage in activities and not to give up easily (Steverink et al., 2005). Lower levels of social, cognitive and physical functioning might lead to negative thoughts, feelings, and lower levels of confidence and motivation, which are expected to harm the self-management abilities 'having a positive frame of mind' and 'taking initiative.' In addition, they might negatively affect the ability to be self-efficacious and to gain and maintain a belief in personal competence, which is important to maintain well-being (Schuurmans et al., 2005; Steverink & Lindenberg, 2008). Investment behavior is important for the realization and maintenance of well-being, even among older people with a declining time-horizon (Steverink et al., 2005). Without investment behavior there will be a (stronger) decline in social, cognitive and physical functioning and well-being. Kahana and colleagues (2002) for example, found that proactive prevention activities in older people have positive consequences for longevity and well-being. The self-management ability taking care of a variety of resources refers to having more than one resource or activity to achieve a specific aspect of well-being. For example, having a spouse, siblings and friends as resources for affection. The primary importance of having a variety of resources lies in its buffer function to maintain well-being, since a variety in resources implies that there are possibilities to compensate loss (Nieboer & Lindenberg, 2002). Function declines in social, cognitive and physical functioning may reduce buffer function to maintain well-being. Taking care of resource multifunctionality refers to activities that serve multiple aspects of well-being (e.g. social and physical well-being) simultaneously and in a mutually reinforcing way. For example, going for a walk (physical well-being) with friends (social well-being). Poorer levels of social, cognitive and physical functioning may limit opportunities for multifunctionality, which is expected to negatively affect

well-being. Many older people experience losses in social, cognitive, and physical functioning that may affect their self-management abilities; thus, self-management interventions may best be aimed at older people at risk of functional loss. This is supported by the findings of Schuurmans and colleagues (2004) that frailty is strongly related to a decline in self-management abilities. Research investigating the relationship between levels of functioning and self-management among older people at risk of function loss is scarce. Understanding self-management abilities among those older people and identifying poor self-managers could be a path to mitigating age-related functional declines and subsequent deteriorations in well-being.

Therefore, this research aimed to identify better self-managers among older individuals at risk of function loss by examining the relationship between social, cognitive and physical functioning and self-management abilities, which in turn can mediate the relationship between social, cognitive, and physical functioning and well-being (Figure 1). We thus aimed to (i) identify the role of social, cognitive, and physical functioning on self-management abilities and well-being among older people vulnerable to functional loss due to hospitalization, and (ii) determine the mediating role of self-management abilities in the relationship between social, cognitive, and physical functioning and well-being.

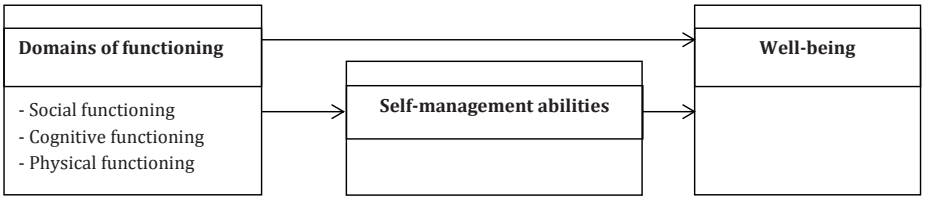

Figure 1. Theoretical model of functioning, self-management abilities, and well-being

METHODS

Study population

Our cross-sectional research was based on a pilot study of older people who had recently been admitted to a hospital. The results of the pilot study have been used to identify possible practical implementation problems in preparation for the main evaluation study and serve as a base for power calculations for the main study (Asmus-Szepesi et al., 2011). In the pilot study, all patients (≥ 65 years of age) who were admitted to the Vlietland hospital between June 2010 and October 2010, were asked to participate, which led to the inclusion of 456 older patients at baseline (within 48 hours after hospital admission). A total of 296 patients (65% response rate) were interviewed in their homes three months after admission. Exclusion reasons were:

lost interest to participate (n = 52), too ill (n = 35), terminally ill (n = 5), objection by partner/family (n = 14), mentally not able (n = 8), private reasons (e.g. death of spouse; n = 4), questions not applicable (n = 8), no contact/unable to reach respondent (n = 12), and reason unknown (n = 22). Deceased patients were excluded from the study sample (n = 49). The study protocol was approved by the medical ethics committee of the Erasmus Medical Centre, Rotterdam, The Netherlands, under protocol number MEC2011-041. Informed consent was obtained from all participants.

Measures

Well-being (the outcome variable) was measured with the 15-item version of the Social Production Function Instrument for the Level of Well-being (SPF-IL(s)) (Nieboer, Lindenberg, Boomsma, & van Bruggen, 2005). This instrument is based on the SPF theory and contains both physical and social well-being. For physical well-being two basic needs are specified: comfort and stimulation. Social well-being is achieved through the fulfillment of three basic social needs: affection, behavioral confirmation, and status. Answers could be given on a four-point scale, ranging from never (1) to always (4). A higher score indicates greater well-being. An overall sum score was used, with higher scores indicating higher levels of well-being.

Self-management was measured with the 30-item Self-Management Abilities Scale (SMAS), which consists of six five-item subscales (Schuurmans et al., 2005). The subscales taking initiative, investing, self-efficacy, variety, and multifunctionality are related to the physical and social dimensions of well-being, while the ability to have a positive frame of mind is considered to be a more general cognitive frame (Schuurmans et al., 2005). Examples of self-management abilities are investing in resources for long-term benefits, efficaciously managing resources, and taking initiatives (i.e., being instrumental or self-motivating in enhancing health and well-being). Average self-management ability scores ranged from 1 to 5, with higher scores indicating higher self-management abilities.

Social functioning was measured using the social component of the Short Form 20 Health Survey (SF-20). This social functioning scale focuses on whether the respondents' health has limited social activities. The scale was transformed to range from 0 to 100, with higher scores indicating higher levels of social functioning.

Cognitive functioning was assessed with the Mini Mental State Examination (MMSE), which measures cognitive functioning via interviews in which patients are asked questions about orientation in time and space, short- and middle-term memory, comprehension, and other cognitive dimensions. Scores ranged from 0 to 30, with higher

scores indicating higher levels of cognitive functioning. Any score equal or above 25 points (of 30) represents effective cognitive functioning (intact). Below this, scores can indicate severe (≤ 9 points), moderate (10-20 points) or mild (21-24 points) cognitive functioning losses (Folstein, Folstein, & McHugh, 1975; Kempen, Brilman, & Ormel, 1995).

Physical functioning was assessed using the Katz Index of independence in activities of daily living, which ranks an individuals' ability to perform six functions: bathe, dress, use the toilet, transfer, remain continent, and feed oneself (Katz, Down, Cash, & Grotz, 1970; Katz, Ford, Moskowitz, Jackson, & Jaffa, 1963). Scores of yes (1) or no (2) indicate (in)dependence in each function, with 6 is full physical function, 4 is moderate and below or equal to 2 is severe physical function impairment.

Education ranged from 1 (no school or some primary education; < 6 years) to 7 (university degree; > 18 years).

Age, *gender* and *marital status* were also assessed.

Analysis

Descriptive analysis included calculating means and standard deviations (SDs). The mediation effect of self-management abilities on well-being was evaluated based on conditions put forth by Baron and Kenny (1986, 2010) and Judd and Kenny (1981).

- Condition 1: The theoretically specified *independent variables* (social, cognitive, and physical functioning) must emerge as significant predictors of the *outcome variable* (well-being) in correlation analyses.
- Condition 2: The theoretically specified independent variables must emerge as significant predictors of the *mediator variable* (self-management abilities) in correlation analyses.
- Condition 3: The mediator variable must be significantly associated with the outcome variable after controlling for the independent variables.
- Condition 4: The relationship between the *significant* independent variables and the outcome variable (well-being) must be significantly reduced when the effects of the mediator variable (self-management abilities) are included in the model.

After calculating bivariate correlations to investigate conditions 1 and 2, multiple regression analyses were performed to assess conditions 3 and 4. In addition, Steiger's Z-tests were used to test whether coefficients were significantly reduced when the effects of the mediator variable (self-management abilities) were included in the model (Meng & Rosenthal, 1992). All statistical analyses were conducted with SPSS software (ver. 17.0; SPSS, Inc., Chicago, IL, USA).

RESULTS

Respondents had a median age of 75.8 years (± 6.8 years; range = 65-94 years; Table 1). About half (54.2%) were female, just over half (56.6%) were married/partnered, and 43.4% were single, widowed, or divorced. Most (55.9%) lived independently with others; about one-third (37.3%) lived independently alone, and 6.8% lived in senior residences or nursing homes. The mean educational level was 4.1 (± 1.6; range = 1-7). The mean well-being score of our sample (2.8; ± 0.4; range = 1.3-3.8) was comparable to that measured by Frieswijk and colleagues (2006) using the SPF-IL among slightly to moderately frail older people (mean = 2.8; ± 0.4).

Table 1 Characteristics of the study population

	% or mean ± SD (range)	*n*
Background characteristics		
Age	75.8 ± 6.8 (65-94)	291
Sex (female)	45.8%	295
Marital status (married/living together)	56.6%	295
Education	4.1 ± 1.6 (1-7)	295
Functioning domains		
Social functioning (SF-20)	68.6 ± 31.7 (0-100)	293
Cognitive functioning (MMSE)	28.1 ± 2.0 (19-30)	293
Physical functioning (Katz)	5.6 ± 0.8 (1-6)	293
Self-management abilities (SMAS)	2.7 ± 0.8 (0.2-4.8)	282
Well-being (SPF-IL)	2.8 ± 0.4 (1.3-3.8)	288

Note. SD = standard deviation; SF-20 = Short Form 20 Health Survey; MMSE = Mini Mental State Examination; Katz = Katz Index of independence in activities of daily living; SMAS = Self-Management Abilities Scale; SPF-IL = Social Production Function Instrument for the Level of Well-being.

Correlations of independent variables and well-being are displayed in Table 2. The results indicated that functioning (social, cognitive, and physical) was significantly related to well-being (all $p \leq 0.001$). Self-management abilities were strongly associated with social, cognitive, and physical functioning, as well as with well-being (all $p \leq 0.001$). Thus, our results met conditions 1 and 2.

Table 2 Correlations among background characteristics, domains of functioning, self-management abilities, and well-being in older people at risk of function loss (n = 296)

	1.	2.	3.	4.	5.	6.	7.	8.
1. Age								
2. Sex (female)	0.13*							
3. Marital status (married)	-0.20***	-0.34***						
4. Education (1-7)	0.03	0.09	0.03					
5. Social functioning (SF-20)	-0.12*	-0.07	0.06	-0.04				
6. Cognitive functioning (MMSE)	-0.20***	0.02	0.15**	0.12*	0.09			
7. Physical functioning (Katz)	-0.25	-0.22***	0.22***	-0.02	0.34***	0.14**		
8. Self-management abilities (SMAS)	-0.13*	0.15**	0.07	0.05	0.32***	0.23***	0.31***	
9. Well-being (SPF-IL)	-0.01	0.03	0.06	0.02	0.44***	0.22***	0.31***	0.65***

Note. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$ (two-tailed); SF-20 = Short Form 20 Health Survey; MMSE = Mini Mental State Examination; Katz = Katz Index of independence in activities of daily living; SMAS = Self-Management Abilities Scale; SPF-IL = Social Production Function Instrument for the Level of Well-being.

Table 3 displays the results of the multiple regression analyses using the mediating variable (self-management) as the dependent variable. After controlling for background characteristics, the results indicated that social (β = 0.22; $p \leq 0.001$), cognitive (β = 0.17; $p \leq 0.001$), and physical (β = 0.25; $p \leq 0.001$) functioning were all significantly related to self-management abilities.

Table 3 Relationships among background characteristics, domains of functioning, and self-management abilities of older people, as determined by multiple regression analyses (standardized β)

Self-management abilities scale (SMAS)	
Background characteristics	
Age	-0.02
Sex (female)	0.24***
Marital status (married/living together)	0.04
Education (1-7)	0.01
Domains of functioning	
Social functioning (SF-20)	0.22***
Cognitive functioning (MMSE)	0.17**
Physical functioning (Katz)	0.25***
Adjusted R^2 for equation	21.0%
F	11.512

Note. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$ (two-tailed); SF-20 = Short Form 20 Health Survey; MMSE = Mini Mental State Examination; Katz = Katz Index of independence in activities of daily living.

Multiple regression analyses were performed to test conditions 3 and 4. Table 4 shows the direct effects of background characteristics and social, cognitive, and physical functioning on the outcome variable (well-being). After controlling for all independent variables, self-management abilities significantly affected well-being ($\beta = 0.56$; $p \leq 0.001$), thus meeting condition 3.

Table 4 Multiple regression analysis of background characteristics, domains of functioning, and the mediating effect of self-management abilities on the well-being (SPF-IL) of older people at risk of function loss

	Adjusted R^2	F-value	β (step 1)	β (step 2)
Background characteristics (step 1)	23%	12.89***		
Age			0.11	0.12
Sex (female)			0.10	-0.04
Marital status (married)			0.02	0.00
Education (1-7)			-0.03	-0.03
Domains of functioning				
Social functioning (SF-20)			0.34***	0.22***
Cognitive functioning (MMSE)			0.17***	0.08
Physical functioning (Katz)			0.22***	0.09
Mediator (step 2)	48%	32.77***		
Self-management abilities (SMAS)				0.56***

Note. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$ (two-tailed); SF-20 = Short Form 20 Health Survey; MMSE = Mini Mental State Examination; Katz = Katz Index of independence in activities of daily living; SMAS = Self-Management Abilities Scale; SPF-IL = Social Production Function Instrument for the Level of Well-being.

In step 1 of the regression model, social ($\beta = 0.34$; $p \leq 0.001$), cognitive ($\beta = 0.17$; $p \leq 0.001$), and physical ($\beta = 0.22$; $p \leq 0.001$) functioning significantly affected the well-being of older people at risk of function loss. To meet condition 4, the relationship between social, cognitive, and physical functioning and the outcome variable (well-being) must be significantly reduced when the effects of the mediator (self-management abilities) are included in the model. Thus, self-management abilities were included in step 2 of the regression analysis. Social functioning remained significantly related to well-being ($\beta = 0.22$; $p \leq 0.001$), but the strength of the relationship diminished from $\beta = 0.34$ to $\beta = 0.22$ ($z = 2.15$; $p \leq 0.01$). The same pattern was observed for the other domains. The strengths of the relationships of well-being with cognitive ($\beta = 0.17$ *vs.* $\beta = 0.08$) declined significantly ($z = 1.68$; $p \leq 0.05$) and physical ($\beta = 0.22$ *vs.* $\beta = 0.09$) functioning also declined significantly ($z = 2.24$; $p \leq 0.01$). Cognitive and physical functioning were not significantly associated with well-being when self-management abilities were included in the equation. Thus, self-management abilities acted as

mediators between social, cognitive, and physical functioning and well-being among older people recently admitted to hospital and at risk of function loss. Furthermore, cognitive and physical functioning are completely mediated, whereas social functioning is only partially mediated by self-management abilities.

DISCUSSION

This study aimed to identify the role of social, cognitive, and physical functioning on self-management abilities and well-being among older people vulnerable to functional loss due to hospitalization. We also examined whether self-management abilities mediate the relationship between social, cognitive, and physical functioning and well-being. Our results showed that levels of social, cognitive, and physical functioning were indeed strongly related to self-management abilities. This implies that older people with low levels of social, cognitive, and physical functioning are worse self-managers than are those with higher levels of functioning. In addition, social, cognitive, and physical functioning were also strongly related to well-being. Such results align with those of previous studies, which have found that multiple domains of functioning affect well-being (Frieswijk et al., 2006; Nieboer et al., 1998). Furthermore, this study showed the mediating role of self-management abilities in the relationship between social, cognitive, and physical functioning and well-being. Enhancing self-management abilities of at-risk older people is thus critical. Special attention may be needed for older patients reporting low levels of social, cognitive, or physical functioning who are worse self-managers than more highly functioning older people. These patients may benefit from case-management attention to enhance self-management abilities to prevent further - and hospital-induced - loss of function. We also found that whereas cognitive and physical functioning were completely mediated, social functioning was only partially mediated by self-management abilities. In part this may be the result of the strong relationship between social functioning and well-being. A meta-analysis provided evidence to support the directional influence of social relationships on mortality (Holt-Lunstad, Smith, & Layton, 2010), which may also hold for well-being. Correlational analyses indeed showed a stronger relationship between social functioning and well-being compared to the relationship between well-being, physical and cognitive functioning. Furthermore, while physical and cognitive functioning primarily depend on the person, social functioning may also depend on the abilities of other people in one's social network. The abilities of others may play an important role in maintaining one's social relationships. This may explain why social functioning was only partially mediated by self-management abilities of the older persons.

Our findings are based on a pilot study conducted in 2010 among older people who had recently been admitted to a hospital in the context of the Prevention and Reactivation Care Program (Asmus-Szepesi et al., 2011). The program supports a multifaceted and multidisciplinary case-management approach to the care of older individuals organized around several core components, including screening for vulnerability and early detection and treatment of (functional) health problems. The main goal of the program is to reduce the loss of function among older patients and the burden on the caregiver during and after hospital discharge. Investigation of and attention to the self-management abilities of recently hospitalized older people is thus necessary.

Examples of self-management interventions for older people are education on lifestyle, regulatory skills, and proactive coping. In addition, interventions on mood disorders (depression, anxiety, aggression) in combination with caregiver support (Bakker et al., 2010), are other important promising developments. However, older patients' abilities to self-manage their social lives and activities, such as regularly socializing with family and friends and being physically active, must also be addressed. Interventions that aim to enhance self-management abilities may provide a useful addition to traditional interventions, which focus solely on the physical decline associated with aging and chronic conditions (Frieswijk et al., 2006; Kremers, Steverink, Albersnagel, & Slaets, 2006; Rowe & Kahn, 1987, 1997; Schuurmans, 2004). Kremers and colleagues (2006) showed that a self-management group intervention based on the SMW theory improved self-management ability and well-being in single older women. Two other empirical studies have shown improvement in overall self-management ability (*vs*. control groups) through the implementation of bibliotherapy and home-based training interventions (Frieswijk et al., 2006; Schuurmans, 2004). These improvements remained significant after six months for bibliotherapy and four months for individual home-based training (Frieswijk et al., 2006; Schuurmans, 2004). Both interventions also showed significant improvements in four of the six self-management abilities (self-efficacy, taking initiative, resource investment, and resource variety), but not in positive frame of mind or resource multifunctionality. These studies, however, were conducted among frail older people in the community. Older people at risk of function loss due to hospitalization may also benefit from interventions that enhance self-management abilities.

The limitations of this study should be considered when interpreting the findings. Most importantly, the data collected were cross-sectional and therefore causal relationships could not be inferred. While our study showed that self-management abilities are important to mediate the relationship between social, cognitive, and physical functioning and well-being of older people at risk of function loss, we did not investigate whether interventions aiming to enhance these abilities actually did improve self-management. Further research is necessary to explore ways in which the

self-management abilities of older people at risk of function loss due to hospitalization can be improved. Finally, our study sample consisted of older people who had recently been admitted to a hospital, which limits generalizability of our study findings.

Conclusions

We conclude that older people with low levels of social, cognitive, and physical functioning are worse self-managers than are those with higher levels of functioning. We also identified the mediating role of self-management abilities in the relationship between social, cognitive, and physical functioning and well-being. Interventions to improve self-management abilities may help older people better deal with function losses as they age further. We feel these results provide a useful basis for the design of effective interventions for successful aging among older people at risk of functional loss.

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Chapter 8

General Discussion

INTRODUCTION

Traditional systems of care delivery do not adequately address the complex needs of an ageing population suffering from multiple chronic diseases. The organisation and delivery of elderly care is often described as fragmented, duplicated, and directed at acute disease (World Health Organization, 1996). Integrated care programs in the hospital have emerged to respond to the increasingly complicated demand for care by preventing complications and re-hospitalisations, thus leading to a better quality of life for older patients (Grol, 2000; Moyle, Borbasi, Wallis, Olorenshaw, & Gracia, 2010; Ouwens, Wollersheim, Hermens, Hulscher, & Grol, 2005; Wagner, 2000). Nonetheless, adequate interpretation of the effects of integrated care programs that have already been implemented is still lacking. Correct interpretation is, however, essential to gain insight into the underlying mechanisms by which these programs work. To do so, here we have introduced and systematically tested a framework that provides insight into how the underlying mechanisms of integrated care delivery influence the process of care delivery. In this way, this thesis contributes to the evidence on these underlying mechanisms and the effectiveness of integrated care programs in hospitals.

This chapter first presents the main findings of the study following the research questions. Next, the theory and methodology of the current study are discussed. Finally, the implications of this research for policy and practice as well as recommendations for future research are described.

MAIN FINDINGS

Research question 1: What does an evaluative framework that provides insight into the underlying mechanisms of integrated care delivery look like?

Evaluative framework for integrated care delivery

Integrated care programs consist of interrelated components that are brought together by professional collaboration and coordination of tasks. Hence, evaluations should focus on how and when these processes occur. We developed an evaluative framework, based on behavioural and cognitive components, that relates integrated care delivery with the underlying mechanisms by which care delivery influences outcomes and proposes direct and indirect relationships among them. A deeper understanding of which actions professionals take that are of value for the integration of different processes and disciplines, and the way in which they incorporate information from

diverse sources, enables a focus on how professionals coordinate their tasks in ways that meet the individual patients' demand for care.

The evaluative framework presented in Chapter 2 provides a heuristic approach for understanding how integrated care delivery affects outcomes of care. Both behavioural and cognitive components alter the way care is delivered through mechanisms such as the active seeking of new information and the combining of individual knowledge about the demands of patients. These changes in the actions taken and the way of thinking are presumed to contribute to or to facilitate the realisation of expected outcomes. The framework also shows that the team and organisational context influence the effectiveness of integrated care delivery and patient outcomes. Moreover, a supportive organisational and team environment is a requirement for the development of the cognitive and behavioural components.

Application of the evaluative framework enables comparison of the process of care delivery for integrated care programs. In this way, we can learn about the effectiveness of particular programs for elderly hospitalised patients.

For the purpose of clarification, Figure 1 provides insight into how the framework was systematically tested in the following chapters. In addition, Table 1 provides an overview of the data sets used in each empirical chapter.

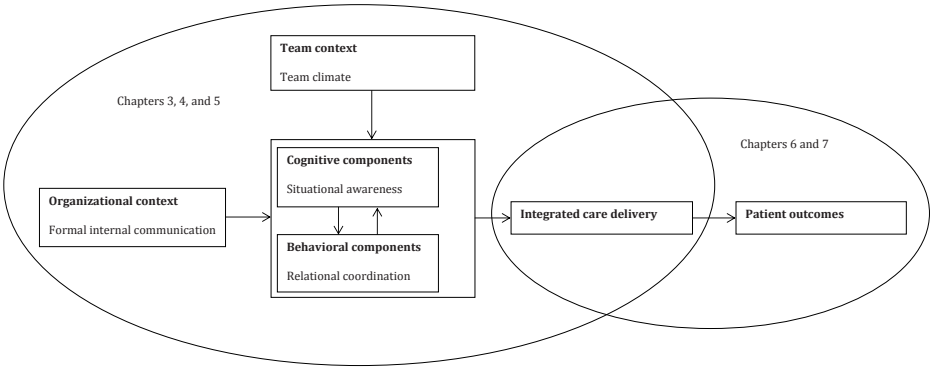

Figure 1. Framework for the underlying mechanisms of integrated care delivery in hospitals (Chapter 2)

Table 1 Overview data sets used for empirical chapters

	Perspective	Setting	Study	Time of measurement	Design
Chapter 3	Professional	Vlietland hospital	Pilot study	2010	Cross-sectional
Chapter 4	Professional	Vlietland hospital	Pilot study	2010	Cross-sectional
Chapter 5	Professional	Vlietland hospital Sint Franciscus hospital Ruwaard van Putten hospital	Main study	2012	Cross-sectional
Chapter 6	Patient	Vlietland hospital	Pilot study	2010-2011 T0: within 48 hours after admission T1: 3 months after discharge	Longitudinal
Chapter 7	Patient	Vlietland hospital	Pilot study	2010-2011 T0: within 48 hours after admission T1: 3 months after discharge	Longitudinal

Research question 2: Do the underlying mechanisms explain differences in the level of integrated care delivery?

Professional perspectives on integrated care delivery

Behavioural components of integrated care delivery

Our study showed that the behavioural components of professional care delivery to older patients are indeed of importance for integrated care delivery. The concept of relational coordination was used as an operationalisation of these components, because it describes which actions professionals take during care delivery. It is shown that this type of informal coordination that occurs through frequent, high-quality communication supported by relationships of shared goals, shared knowledge, and mutual respect enables the professionals to deliver integrated care (Chapter 3). In addition, our findings show that the levels of relational coordination and integrated care delivery are higher among professionals in the geriatric unit than among those in other units. It seems that these professionals are more familiar with the process of working together and thus provide holistic integrated care that meets the complex needs of older patients. The challenge for the future is to expand this geriatric awareness and competence to other units and to develop interventions that target professionals from diverse disciplines so that all can come to a better understanding of their interdependence in care delivery to older patients.

Chapter 4 provides details on the organisational constructs that could be of value for the development of the behavioural component of relational coordination. Our study shows that the team climate and the number of disciplines participating in multidisciplinary team meetings are associated with the development of relational coordination. Due to their high information processing capability, multidisciplinary team meetings may facilitate interaction among professionals. In combination with a supportive and stimulating team climate, this may promote coordination and communication among professionals delivering care to older patients, expressed by shared goals, shared knowledge, and mutual respect.

Cognitive components of integrated care delivery

Our study showed that, consistent with our evaluative framework, the cognitive components of professionals delivering care to older patients are associated with integrated care delivery. The concept of situational awareness was used as an operationalisation of these components, because it describes the level of awareness that an individual has of a situation - a dynamic understanding of "what's going on". It is shown in Chapter 5 that a greater understanding of the personal needs of patients and the roles of various disciplines to fulfil these needs may result in a more coordinated and integrated response by the professionals involved. Within the organisational context, formal activities that emphasise internal communication between professionals with different occupational backgrounds are associated with higher levels of integrated care delivery. Opportunities to connect with other professionals through face-to-face discussion create the possibility for professionals to share knowledge and information.

Team and organisational context

Since professionals do not work in isolation, we expected that the behavioural and cognitive components of the framework would be influenced by the team and organisational context. We did indeed show that a relationship exists between team climate and integrated care delivery through the behavioural component of relational coordination (Chapters 3 and 4). In addition, an organisation that emphasises internal communication by formal activities (e.g., multidisciplinary team meetings) creates the possibility of the development of the cognitive component of situational awareness (Chapter 5).

Research question 3: Are the patients' experiences with integrated care delivery associated with patient outcomes?

Patient perspectives on integrated care delivery

The aim of integrated care programs is to enhance quality of care and eventually patient outcomes. Our results in Chapter 6 imply that older patients who are more satisfied with the hospital care received and experience higher levels of integrated care delivery have a higher quality of life 3 months after hospitalisation. Besides the perspective of the professional, this study shows the importance of also assessing the perspective of the older patient while evaluating care delivery because it could be a predictor of the outcome of integrated care programs.

In addition, we showed in Chapter 7 that older people with low levels of social, cognitive, and physical functioning are worse self-managers than those with higher levels of functioning. Furthermore, we identified the mediating role of self-management abilities in the relationship between well-being and social, cognitive, and physical functioning. Interventions that aim to enhance self-management abilities as part of integrated care programs may therefore provide a useful addition to traditional interventions, which focus solely on functional decline associated with ageing and chronic conditions.

THEORETICAL AND METHODOLOGICAL CONSIDERATIONS

Theoretical reflections

The evaluative framework presented in this thesis has been geared to the underlying mechanisms of integrated care programs, for which no sound analytic evaluation method has thus far been available. Earlier theories on measures of quality of care, such as the structure-process-outcome (SPO) model (Donabedian, 1988, 2005) and the contingency theory (Leat & Schneck, 1981, 1982, 1984), failed to reveal these underlying mechanisms. Although the SPO model acknowledged the mediating role of the process, the scope is limited in addressing mechanisms that shape the relationship between structure and outcome. The contingency theory includes the organisations' choice for strategies of communication and coordination when evaluating care delivery. Still, the underlying mechanisms that support these concepts are not outlined. Grounded in theory as well as tested in various empirical studies, the framework that we developed appeared to be a sound basis for the evaluation of both integrated care programs and usual care for elderly hospitalised patients. Earlier research discussed the importance of providing insight into why interventions for older patients are effec-

tive (Singer et al., 2011; Zin & Mor, 1998). The framework suggested that the underlying cognitive and behavioural components and team and organisational context are important for the effectiveness of integrated care programs in hospitals. However, the framework did not expand on how the larger healthcare system influences outcomes of integrated care programs. Broader contextual factors, such as the availability of support services and financing systems, should be addressed more accurately since they could intervene with various parts of the framework (Coleman, Austin, Brach, & Wagner, 2009; Salver & Wan, 2003; Thornton Bacon & Mark, 2009).

Our empirical study found support for associations between the behaviour and cognitions of professionals, the process of integrated care delivery, and patient outcomes. Our results showed the value of understanding the actions professionals take when integrating different processes and disciplines and the way in which they incorporate information from diverse sources. These results are consistent with a review by Singer and colleagues (2011) that emphasises that measures of integrated care should include dimensions related to both coordination and patient centeredness. However, Uijen, Schers, Schellevis, and van den Bosch (2012) found that the concepts of coordination and information sharing are often formulated from the patient's perspective. Our results add to these systematic reviews by identifying the underlying mechanisms of integrated care delivery within a professional context. We found positive associations for behavioural and cognitive components that determine how professionals work in a multidisciplinary context and deliver integrated care. We showed that the behavioural component of relational coordination between professionals influences integrated care delivery to hospitalised older patients. This finding is in line with other studies that investigated the value of relational coordination for the integrative interventions of disease management and case management (Cramm & Nieboer, 2012; McEvoy, Escott, & Bee, 2011). In addition, the cognitive component of situational awareness influences integrated care delivery through a greater understanding of the personal needs of older patients and the roles of various disciplines to fulfil these needs, which may have resulted in a more coordinated and integrated response by the involved professionals. High-performing teams in hospitals have indeed been shown to use elements of situational awareness by acquiring knowledge from practice and incorporating it into the actions taken (O'Leary, Sehgal, Terrell, & Williams, 2012; Ranmuthugala et al., 2011).

Our empirical study emphasises the value of taking the patients' perspective on the received care into account when evaluating integrated care delivery because it is a predictor of quality of life over time. So far, most other studies in which care is adjusted to patient's needs have focused on the effects on patient outcomes and have not

taken into account the patient's perspective on quality of care (Miles & Mezzich, 2011; Straus, Tetroe, & Graham, 2011). The results of a systematic review that included integrative interventions that directly affect patient's experiences with care delivery were equivalent to those of our study (Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011). The comparison is somewhat compromised, however, because the included studies varied in setting and included different age groups.

Study design

Several limitations need to be considered when interpreting the results of our empirical studies. First, self-report measures are prominently used in this study. The problem of common method variance (CMV) arises when multiple measures come from the same source. Any defect in that source contaminates both measures, presumably in the same fashion and in the same direction (Kline, Sulsky, & Rever-Moriyama, 2000; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Although we used self-report measures, we did phrase the questions in terms of concrete actions performed in care delivery and objectively defined indicators (e.g., whether evidence-based protocols for delivering integrated care were available), instead of only asking about personal attitudes. We also added more objective measures that could be verified and are known to influence integrated care delivery or patient outcomes, such as the participation of professionals in multidisciplinary team meetings and duration of hospital stay for patients (Kodner & Spreeuwenberg, 2002; Newgard et al., 2010).

A cross-sectional design was used to identify associations between the underlying mechanisms of integrated care delivery and the care process from a professional perspective. This thesis shows that the concepts of relational coordination and situational awareness are associated with integrated care delivery. Since professionals know which actions to take and understand the situations of individual patients, higher levels of relational coordination and situational awareness are expected to increase the level of integrated care delivery. Nonetheless, a dynamic relationship could exist between these underlying mechanisms and integrated care delivery (Mann, 2003). One could reason that higher levels of integrated care delivery by professionals would also influence their level of relational coordination and situational awareness. Since professionals deliver integrated care that is aligned with patients' needs, they know which actions to take to create a better understanding of the individual patients' situation. Future research has to further explore this dynamic relationship between the underlying mechanisms of the care process and integrated care delivery.

The questionnaires used in this thesis showed satisfying Cronbach's alpha scores ranging from 0.87 to 0.96 for the instruments measuring the most important dependent

and independent variables. Besides the situated cognition instrument, all the other questionnaires for both professionals and patients were validated for the hospital setting in previous research. The Situation Awareness Global Assessment Technique (SAGAT) was used to measure professionals' situated cognitions (Endsley, 1995). Although developed specifically to assess pilot situational awareness (Endsley, 1990; Endsley & Kiris, 1995), the SAGAT has been used in the hospital setting with promising results (Cooper et al., 2011; Koch et al., 2013). Of the many situational awareness measures available, the SAGAT has the most encouraging evidence for validity (Jones & Kaber, 2005). The Relational Coordination survey was used as a measure of the situated behaviour of the professionals. Originally, the instrument was developed to analyze the communication and relationships through which work is coordinated across functional and organisational boundaries (Relational Coordination Research Collaborative, 2011). We used the survey to investigate the overt behaviour by professionals when crossing these boundaries.

The aim of our study was to identify the underlying mechanisms of integrated care delivery and to understand how they operate and interact, so that integrated care programs could enhance quality of care delivery and eventually improve patient outcomes. To do so, patients of 65 years and older admitted to the Vlietland hospital were interviewed within 48 hours after admission and 3 months after hospitalisation. This longitudinal design was used when investigating the effect of patient perspectives on integrated care and quality of life over time. Although we did not investigate the long-term effects (e.g., 12 months after hospitalisation) of patient perspectives on integrated care delivery and quality of life, earlier research showed that this long-term effect was not to be expected (Hoogerduijn, Schuurmans, Duijnstee, De Rooij, & Grypdonck, 2007).

In addition, our empirical studies of the patients' perspectives on integrated care delivery were based on the pilot data of the PReCaP. This pilot study was performed to identify possible practical implementation problems in preparation for the main evaluation study. Theoretically, a pilot study is not a hypothesis-testing study (Leon, Davis, & Kraemer, 2011). Due to the number of patients included (500 patients agreed to participate), the pilot study was large enough to provide useful information about the aspects of integrated care that were being assessed. The empirical studies on the professionals' perspectives on integrated care delivery were both based on data collected during the pilot study at the Vlietland hospital and the main PReCaP evaluation that included professionals from the Vlietland, Sint Franciscus, and Ruwaard van Putten hospitals. We found no reason to assume that the results would not be applicable to other settings.

It should be mentioned that the professional data was collected on a team level, yet analysed on a unit level (e.g. orthopaedics, neurology, geriatrics). Multidisciplinary teams are often assumed to be a fixed entity but in reality they vary greatly over time and in composition (Schofield & Amodeo, 1999). It was therefore not possible to make a clear distinction between professional teams within the hospital delivering care to older patients. To gain information about team work and cooperation between professionals while delivering integrated care, the questionnaire for professionals was phrased on a team level where possible (e.g., to what extent do you think your team's objectives are clearly understood by other members of the team?) or asked about the individual relationship with others (e.g., how frequently did you seek contact with other professionals while delivering care to older patients?). To account for this hierarchical structure of the data, we performed multilevel analyses when the unit level influenced the dependent variable significantly (Diez-Roux, 2000). In addition, we aggregated the independent variables on a unit level and added these variables to the analyses. Although this did not result in different outcomes, we interpreted our findings with due caution.

On the other hand, our study also had a considerable strength, because a theoretically driven approach is important for understanding complex interventions and their effects. In our study, we combined the best available evidence and appropriate theory with integrated care delivered in a real-life setting. Drawing on theories helped to conceptualise the underlying behavioural and cognitive components of integrated care delivery and their interactions with the team and organisational context. This understanding of the underlying mechanisms of integrated care delivery enabled a thorough evaluation of a concept whose working components have only been broadly described in literature.

Setting and participants

The hospital care of three Dutch hospitals, of which one implemented the PReCaP, was compared in Chapter 5 of this thesis. The program was developed to reduce hospital-related functional decline among elderly patients by offering interventions that are multidisciplinary, integrated, and goal-oriented at the physical, social, and psychological domains of functional decline. The program combines existing treatment methods and innovative care paths for patient reactivation into a comprehensive care package that fits the individual needs of older patients (de Vos et al., 2012). The PReCaP was performed in the Vlietland hospital. Two other Dutch hospitals, the Sint Franciscus hospital and Ruwaard van Putten hospital, served as control groups and performed care as usual. The participants in this study, professionals as well as patients, were

therefore influenced by contextual and structural differences between the Vlietland, Sint Franciscus, and Ruwaard van Putten hospitals.

With regard to the hospitals, contextual factors had an immediate effect on the intended implementation of the PReCaP in the Vlietland hospital. Despite earlier agreements, the management of the Vlietland hospital allowed only three of the ten hospital units to participate in the intervention. This decision undoubtedly affected the recruitment and case mix of the participants in the PReCaP, which shows the complex interrelationship between context and recruitment (Carroll et al., 2007). Furthermore, due to a reorganisation procedure, the internal medicine and oncology unit merged. It is highly likely that this merge impacted the case mix of the participants in the PReCaP due to the increased number of oncology patients.

A fidelity study was carried out in the 1st year of the program to determine the extent to which the intervention was delivered as intended (de Vos et al., 2013). The intervention adherence varied substantially per component due to a range of moderating factors, such as the lack of a comprehensive protocol. Furthermore, a number of intervention components were modified or added, which raises the question of to what extent the intervention objectives were achieved (de Vos et al., 2013).

Our study in Chapter 5 did not show a difference in the level of integrated care delivery between the three hospitals. Thus, it is possible that care as usual in the control hospitals contained integrative components that made a distinction with the intervention hospital less likely. As part of the PReCaP intervention, the Vlietland hospital combined different elements of care that are offered by a multidisciplinary team with geriatric expertise, including a geriatrician, geriatric nurse, nurse practitioner, social worker, transfer nurse, and case manager. This approach was anticipated to result in a patient-oriented treatment plan. While the Sint Franciscus hospital and Ruwaard van Putten hospital did not implement these multidisciplinary team meetings, professionals delivering care to hospitalised older patients did seek information from other professionals through interdisciplinary consults. The two control hospitals worked with separate treatment plans for each discipline. However, one could question whether these treatment plans were indeed less integrated because of the active information seeking behaviour by professionals.

All three hospitals were regional hospitals from the Rotterdam area. Therefore, a comparable case mix of patients was expected. However, several characteristics of the Sint Franciscus hospital and Ruwaard van Putten hospital made an objective comparison with the Vlietland hospital less likely. As in the Vlietland hospital, a clinical geriatri-

cian was available at the Sint Franciscus hospital for 2 days a week. In addition, both control hospitals also participated in quality improvement programs as well as serving as a control group in the current study. The Sint Franciscus hospital started the WHO High 5s project in 2010 and is still working on the implementation of problem-specific protocols to increase patient safety (World Health Organization, 2012). The Ruwaard van Putten hospital implemented a project to monitor the use of medicines in 2011 (Veiligheidsmanagementsysteem Zorg, 2013). Participation in these projects could have altered the perception of professionals on the quality of care they deliver, which could influence the results of the current study. It should also be mentioned that the Sint Franciscus hospital is a Dutch training hospital for medical residents. Nowadays, the necessity of coordination for healthcare delivery is emphasised during their training (Reeves et al., 2008), which could have resulted in higher levels of care integration. In addition, the Ruwaard van Putten hospital is smaller in comparison to the other two hospitals, and smaller hospitals show higher levels of cooperation while using less formalised communication (Young, Meterko, & Desai, 2000). However, these less formal work processes could have negative effects on some units or patient groups (Cosby & Croskerry, 2004). For example, the Dutch Health Care Inspectorate (IGZ) placed the cardiology unit of Ruwaard van Putten hospital under close supervision for 6 months in 2012 due to high mortality rates caused by not following clinical guidelines (Inspectie voor de Gezondheidszorg, 2012).

While finishing this dissertation, the data collection of patients participating in the main study at the three hospitals was finalised. A total of 2,754 patients were interviewed within 48 hours after hospital admission and 1,826 patients were interviewed 3 months after hospitalisation (a 66% response rate). Patients' perception of integrated care delivery was significantly higher in the Sint Franciscus hospital than in the Ruwaard van Putten hospital. No significant differences in patients' perception on integrated care delivery could be found between the Vlietland hospital and the two control hospitals. So from a patient point of view, the Sint Franciscus hospital performed care with more integrative components than the other two hospitals. This finding could be due to the proactive manner of care delivery in the Sint Franciscus hospital. Patients were screened for vulnerability before a planned hospital admission. In this way, patients were advised personally how to prepare for upcoming medical procedures. From a patient perspective, this may have resulted in a more positive view on how care is organised around each individual patient, preparing them as much as possible for the upcoming hospital admission while minimising the risks of additional health problems.

Both the patient and professional perspectives on integrated care delivery were outlined in this thesis. The questionnaires for the patients and professionals incorporated the same elements of integrated care delivery, such as self-management support and planned, proactive care delivery (Cramm & Nieboer, 2013; Cramm, Strating, Tsiachristas, & Nieboer, 2011; Glasgow et al., 2005; MacColl Institute for Healthcare Innovation, 2000). However, we did not find a relationship between the patient and professional perspectives on the quality of integrated care delivery. This could be explained by the fact that patients and professionals involved in hospital care define quality of care differently (McGlynn, 1997). Patients tend to define quality in terms of their preferences and values, which leads to quality definitions emphasising satisfaction with healthcare. Professionals tend to define quality in terms of the attributes and results of care, and this definition emphasises the technical excellence with which care is provided and the characteristics of interactions between provider and patient (Campbell, Roland & Buetow, 2000). However, the questionnaires used in this thesis that measure the quality of integrated care delivery from a professional perspective [by using the Assessment of Chronic Illness Care (ACIC)] and patient perspective [by using the Patients' Assessment of Integrated Care (PACIC)] are based on the same conceptual model (Cramm & Nieboer, 2013; Cramm, Strating, Tsiachristas, & Nieboer, 2011; Glasgow et al., 2005; MacColl Institute for Healthcare Innovation, 2000).

Professionals included in the study knew that the quality of their care delivery was being evaluated. As a consequence, the sample might not be representative since those professionals who decided to participate may have had a stronger interest in integrated care delivery. The response rate of the questionnaire for professionals varied between 41% and 44% for the three hospitals. Hospital units that were expected to provide the most care to older patients were well represented in the sample: 16% of the respondents worked in the cardiology unit, 14% in orthopaedics, and 13% in internal medicine. We are confident that this sample provides a clear representation of hospital units providing care to older patients.

With regard to the patient, several exclusion criteria were applied. Older patients who suffered severe cognitive problems, were not able to understand the Dutch language, and had a life expectancy of less than 3 months were excluded from the study (Asmus et al., 2011). Such criteria have been used in other studies including older patients (Ebly, Hogan, & Parhad, 1995; Winograd, 1991). Response and follow-up rates for the pilot study within the Vlietland hospital were moderate: an average of 49% of patients agreed to participate and 58% of these patients completed the 3-month follow-up (Beswick et al., 2008). We did compare drop-outs with patients who did participate at the follow-up measurement and found no selective loss.

RECOMMENDATIONS FOR PRACTICE AND RESEARCH

This thesis revealed several implications for practice and research. First of all, the professional, team, and organisational context of care delivery impacts how integrated care is delivered. In addition, the context of the patient influences how integrated care delivery affects patient outcomes. Consequently, the recommendations described below are organised according to this distinction. This section ends with recommendations for future research.

Professional context

Thus far, most guidelines have focused on decision making by individual professionals rather than on multidisciplinary decision-making processes. As such, professionals need to intensify their efforts to develop and implement multidisciplinary decision support tools as part of integrated care delivery. Demand-oriented care standards are a good example of combining patients' demand for care with evidence-based care (Rijckmans, Garretsen, Rijckmans, & Janssen, 2007).

Professional involvement is crucial in improving outcomes. Professionals should thus be supported in selecting improvement strategies in the context of integrated care delivery. Personal learning strategies and active participation have been shown to stimulate learning and improvement (Grol & Wensing, 2004). Hospitals should provide a framework for assessing the conditions in which integrative interventions become practically workable (May, 2006). Researchers could also play a role within this process by providing advice on intervention selection when bottlenecks are identified.

Team context

A positive team climate promotes coordination and communication among professionals delivering care via a more supportive and stimulating environment. Hospitals should therefore take actions to improve the team climate. Team goals need to be defined and the performance of teams should be evaluated periodically. In this way, team achievements are recognised and problems are identified for early corrective actions (Buljac-Samardzic, Dekker-van Doorn, van Wijngaarden, & van Wijk, 2010). In addition, creativity training at a team level helps to develop innovative behaviour and creates a motivating environment (Loewen & Low, 1994; Xue, Bradley, & Liang, 2011).

Organisational context

The geriatric unit plays an important role in caring for hospitalised older patients. Distinctive features of geriatric units are a comprehensive assessment that is focused on patient needs, multidisciplinary teamwork carried out by a core team of profession-

als, and early discharge planning (Baztán, Suárez-García, López-Arrieta, Rodríguez-Mañas, & Rodríguez-Artalejo, 2009). The current study showed that geriatric units did indeed deliver higher levels of integrated care than the other hospital units. This geriatric awareness should therefore be expanded to other hospital units that deliver care to older patients. When providing care in this more coordinated matter, who is eventually responsible for the care delivered should be clear for both professional and patient (Wharam & Sulmasy, 2009).

The current studies showed that hospital units differed in the level of integrated care delivered. Professionals within one hospital unit could already be used to perform the components that contribute to delivering integrated care, whereas professionals in other units may need extra training (Minkman, Vermeulen, Ahaus, & Huijsman, 2011). This distinction results in the need to take different actions at different units when changing the process of care delivery. One should therefore take differences in care processes between units into account when implementing integrated care programs in hospitals.

Patient context

The integrated care paradigm seeks to promote a full understanding of patients' demands. We showed that the levels of social, cognitive, and physical functioning of patients influences how well they manage their own health: older people with low levels of social, cognitive, and physical functioning are worse self-managers than those with higher levels of functioning. Professionals should therefore realise that the context of the patient in terms of functioning has implications for how care should be organised to meet patients' demands. Interventions such as case management and disease management should be developed because they provide a useful addition to traditional interventions (Gravelle et al., 2007; Johri, Beland, & Bergman, 2003; Weingarten et al., 2002).

In addition, the current study shows that the perception of care delivery by the patient is essential for improving outcomes. Moreover, greater attention to patient experiences with care is indicated. Hence, human factors in delivering care should be emphasised, with professionals being responsible for not only delivering clinical care, but also providing guidance through and information about the care delivered (Williams, Weinman, & Dale, 1998).

Recommendations for future research

We have seen that a comprehensive framework for integrated care delivery in hospitals to older patients gives insight into the underlying mechanisms that produce favour-

able outcomes. Based on the findings from this thesis, a number of recommendations can be given for future research on the effectiveness of integrated care programs.

Further research is needed to better measure the effects of integrated care delivery. The assessment of quality with process indicators is considered an essential step of quality improvement and variability reduction. These process indicators assess actual care and its services and help to detect care and service processes needing improvement (Mainz, 2003). Here, the question centres on how to capture the different levels and perceptions of quality in existing indicators and how integrated care-specific indicators can be defined (Minkman, Vermeulen, Ahaus, & Huijsman, 2011; Stein & Rieder, 2009).

Integrated care programs for older patients aim to reduce fragmentation of care delivery and achieve improved results for patients at acceptable costs (Villagra, 2004). However, little systematic analysis is performed on the cost effectiveness of integrated care programs (Ouwens et al., 2005). Given that ever-tightening budgets cannot meet the continuously increasing demand for healthcare, it is important to assess the costs and cost effectiveness of integrated care programs. This will facilitate decision making on the inclusion of integrative interventions into the benefit package of healthcare insurance, conditional reimbursement for specific indications, and capacity planning.

In this thesis, we applied the evaluative framework to an integrated care program directed at hospitalised older patients. However, not only older patients experience multimorbidity, and the fact remains that approximately 36% of patients with chronic conditions suffer from two or more conditions (Lemmens, Spreeuwenberg, & Rijken, 2008). Recognition of this large extent of comorbidity in the general population has implications for how care is organised in an integrated way. Therefore, the framework may also be applied to patients in other age groups, with specific chronic conditions, or for people suffering from multiple chronic diseases.

Conclusion

It can be concluded that a framework for the underlying mechanisms of integrated care delivery in hospitals gives insight into the effectiveness of integrated care programs. An understanding of professional and patient perceptions on care delivery is essential for the design and implementation of integrated care programs. These programs should include interventions that emphasise active information sharing between different professionals from diverse disciplines to increase awareness of patient situations. In addition, care should be organised around the demands of these individual patients. Organisational structures within hospitals should also be

modified by creating a truly multidisciplinary context for care provision. Moreover, the rapid increase in the prevalence of older people suffering from multiple chronic diseases demands proactive alterations in traditional care delivery. Insight into how integrated care delivery affects processes and outcomes of care is an essential factor when designing a responsive healthcare system.

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Summary

SUMMARY

Traditional elderly care is often described as fragmented and duplicated. Integrated care delivery reacts to these shortcomings by introducing a holistic and personalised approach that responds to the increasingly complex demand for care of an ageing population. By combining interacting components of care delivery, integrated care programs have begun to receive greater support to improve care quality and efficiency. The purpose of this thesis was to determine the underlying mechanisms of integrated care delivery for hospitalised older patients and to understand how they operate and interact, so that integrated care programs enhance the quality of care delivery and eventually improve patient outcomes.

In **Chapter 2**, a framework is presented for the determination of the underlying mechanisms of integrated care delivery. Although current models define concepts of integrated care delivery, they do not provide insight into the underlying mechanisms that explain how delivering integrated care affects processes and outcomes of care. Thus, in this chapter, it is investigated how an evaluative model of integrated care delivery provides insight into the effects of integrated care programs on the process and outcomes of care. This work resulted in a theoretically derived evaluative framework that includes behavioural and cognitive components. Insight was gained into how these components alter the way care is delivered by professionals through mechanisms such as the active seeking of new information and the combining of individual knowledge about patient demands. Changes in actions taken and the way of thinking by professionals are presumed to contribute to or to facilitate the realisation of integrated care delivery. The framework also explains that the team and organisational context may facilitate integrated care delivery. The evaluative framework is useful for the identification of the mechanisms behind integrated care delivery. Its consistent application should enable comparison between integrated care programs and care as usual.

The exploratory studies described in Chapters 3 and 4 aim to test whether the behavioural components of the framework explain differences in the level of integrated care delivery. A total of 192 professionals delivering care to older patients were recruited in a Dutch hospital. The study in **Chapter 3** shows that the behavioural component of relational coordination is associated with the level of integrated care delivery. Coordination that occurs through frequent, high-quality communication supported by relationships among shared goals, shared knowledge, and mutual respect enables professionals to provide holistic care to older patients that meets their complex needs. Moreover, relational coordination and integrated care delivery are better developed in

the geriatric unit than in other hospital units. This geriatric awareness should therefore be expanded throughout the hospital. The study in **Chapter 4** provides details on the organisational constructs that could be of value for the development of the behavioural component of relational coordination. The team climate and the number of disciplines participating in multidisciplinary team meetings are associated with the development of relational coordination. Due to their high information processing capability, multidisciplinary team meetings facilitate interaction among professionals. In combination with a supportive and stimulating team climate, this interaction promotes coordination and communication among professionals delivering care to older patients, expressed by shared goals, shared knowledge, and mutual respect.

In **Chapter 5**, the cognitive components of the framework were included. The evaluative framework was tested on 215 professionals delivering care to older patients in three Dutch hospitals. This explorative study was aimed at investigating whether the cognitive component of situational awareness is associated with integrated care delivery. This dynamic understanding of the situation of individual patients was expected to influence how care is coordinated between various disciplines. It was shown that a greater understanding of the personal needs of patients and the roles of various disciplines that fulfil these needs are indeed associated with a more coordinated and integrated response by the involved professionals. Within the organisational context, formal activities that emphasise internal communication between professionals with different occupational backgrounds facilitate integrated care delivery. The effect of an integrated care program for vulnerable elderly on the perception of care delivered by professionals within hospitals is also evaluated in Chapter 5. One Dutch hospital implemented an integrated care program, consisting of a multidisciplinary, integrated, and goal-oriented approach focused on the early screening of risk factors for the functional decline of older patients. Two control hospitals performed care as usual. No significant differences were found between the hospitals in the professional perception of the level of integrated care delivered. It was questioned whether the two control hospitals performed other integrative interventions besides serving as a control group for the current study. Although the professionals within the three hospitals did not differ in their perception of the level of integrated care delivered, the perception of the professionals did differ between hospital units. One should therefore take these differences into account when analyzing what is needed for the delivery of integrated care in the hospital setting.

The patient perspective on integrated care delivery is described in **Chapter 6**. The aim of this explorative study was to investigate whether older patients' perception of quality of integrated care delivery and satisfaction with hospital care are important

for their quality of life over time. This study was performed in a Dutch hospital in which 500 patients were interviewed within 48 hours after hospital admission. Of these patients, 291 were interviewed at the 3-month follow-up measurement. Our results indeed imply that older patients who are more satisfied with the hospital care received and experience higher levels of integrated care delivery are those with a higher quality of life 3 months after hospitalisation. This study shows the importance of also assessing the perspective of the older patient while evaluating care delivery, because this could be a predictor of the outcome of integrated care programs.

The relationship between social, cognitive, and physical functioning and self-management abilities is described in **Chapter 7** to identify better self-managers among older people at risk of function loss. Within 48 hours after admission to a Dutch hospital, 500 patients were interviewed. A total of 291 patients participated at the 3-month follow-up measurement. This study shows that older people with low levels of social, cognitive, and physical functioning are worse self-managers than those with higher levels of functioning. Furthermore, self-management abilities mediated the relationship between social, cognitive, and physical functioning and well-being. Enhancing self-management abilities of at-risk older people is thus crucial. Interventions that aim to enhance self-management abilities may therefore provide a useful addition to traditional interventions, which focus solely on functional decline associated with ageing and chronic conditions.

In the general discussion, the main findings of this thesis are presented and discussed. The conclusions are described following the evaluative framework. Subsequently, the methodological issues are reviewed, and it is suggested that this thesis contributes to the current understanding of integrated care delivery. The design limitations of this study are outlined, addressing the influence of contextual factors on the evaluation of complex interventions. The practice implications are addressed regarding the design of integrated care programs while considering the professional, team, organisational, and patient context. The discussion ends with some recommendations for future research, considering quality measurements and economic evaluations.

This thesis shows that a framework for the underlying mechanisms of integrated care delivery in hospitals gives insight into the effectiveness of integrated care programs. An understanding of professional and patient perceptions of care delivery is essential for the design and implementation of integrated care programs. These programs should include interventions that emphasise active information sharing between different professionals from diverse disciplines to improve awareness of patient situations. In addition, the patient should be placed in the centre of the care process to organise

care around individual patient demands. Organisational structures within hospitals should also be modified by creating a truly multidisciplinary context for care provision. Moreover, the rapid increase in the prevalence of older people suffering from multiple chronic diseases requires proactive alterations in traditional care delivery. Insight into *how* integrated care delivery affects processes and outcomes of care is an essential component when designing a responsive healthcare system.

Samenvatting

SAMENVATTING

De huidige ouderenzorg sluit niet goed aan bij de behoeften van een vergrijzende populatie. Integrale zorg is een holistische en vraag gestuurde aanpak van zorg om aan de complexe zorgvraag van oudere patiënten tegemoet te komen. Door de integratie van meerdere componenten binnen het zorgproces wordt de kwaliteit en doelmatigheid van zorg bevorderd. Het doel van dit proefschrift is om de onderliggende mechanismen van integrale zorgprogramma's voor ouderen in het ziekenhuis in kaart te brengen. Zo wordt inzicht verkregen in de wijze waarop deze programma's het zorgproces en de patiënt uitkomsten beïnvloeden.

In **hoofdstuk 2** wordt een model gepresenteerd dat inzicht geeft in de onderliggende mechanismen van integrale zorg. In de bestaande modellen ontbrak het aan inzicht in de onderliggende mechanismen die verklaren hoe integrale zorg het zorgproces en uitkomsten van zorg beïnvloedt. In dit hoofdstuk is onderzocht hoe een evaluatiemodel voor integrale zorg kan bijdragen aan het inzichtelijk maken van de effecten van integrale zorgprogramma's op het zorgproces en de uitkomsten. Dit heeft geresulteerd in een door theorie gestuurd evaluatiemodel, bestaande uit gedragsmatige en cognitieve componenten. Inzicht in deze componenten die de wijze van zorgverlening beïnvloeden is verkregen door het uitwerken van mechanismen, zoals het actief zoeken naar nieuwe informatie bij andere disciplines en het bundelen van individuele informatie over de zorgvraag van de patiënt. Het model laat zien dat verschillen in de gekozen handelingen en denkwijzen van professionals van belang zijn voor het verlenen van integrale zorg. Hiernaast laat het model zien dat het team en de organisatie waarin de professionals werken van invloed zijn op het verlenen van integrale zorg. Het evaluatiemodel kan worden gebruikt voor de identificatie van de onderliggende mechanismen van integrale zorgprogramma's. De toepassing van het model maakt het bovendien mogelijk om programma's en traditionele zorg met elkaar te vergelijken.

Het verkennende onderzoek in hoofdstuk 3 en 4 is erop gericht de gedragsmatige componenten van het model te toetsen. In totaal namen 192 professionals deel die zorg verlenen aan oudere patiënten in een Nederlands ziekenhuis. De studie uit **hoofdstuk 3** laat zien dat de gedragsmatige component van relationele coördinatie de mate van integrale zorg voorspelt. Coördinatie die plaats vindt door middel van frequente communicatie van hoge kwaliteit en die wordt ondersteund door gedeelde doelen, gedeelde kennis, en wederzijds respect maakt het mogelijk voor professionals om holistische zorg te verlenen aan oudere patiënten met een complexe zorgvraag. Hiernaast zijn de relationele coördinatie en het niveau van integrale zorg verder ontwikkeld op de afdeling geriatrie dan op andere afdelingen van het ziekenhuis.

De geriatrische visie op zorg zal dan ook verspreid moeten worden binnen het ziekenhuis. De studie in **hoofdstuk 4** beschrijft organisatorische constructen die van belang zijn voor de ontwikkeling van de gedragsmatige component van relationele coördinatie. Het aantal disciplines dat deelneemt aan een multidisciplinair overleg en het heersende team klimaat zijn gerelateerd aan de ontwikkeling van relationele coördinatie. Het multidisciplinair overleg faciliteert de interactie tussen professionals vanwege de mogelijkheid om informatie te delen en zo gedeelde doelen, gedeelde kennis en wederzijds respect te ontwikkelen. In combinatie met een ondersteunend en stimulerend team klimaat, leidt dit tot meer coördinatie en communicatie tussen de professionals die zorg verlenen aan oudere patiënten.

In **hoofdstuk 5** zijn de cognitieve componenten van het model toegevoegd. Het evaluatiemodel is toegepast op 215 professionals die zorg leveren aan oudere patiënten in drie Nederlandse ziekenhuizen. In dit verkennende onderzoek is gekeken of de cognitieve component van situationeel bewustzijn geassocieerd is met het verlenen van integrale zorg. Er werd verwacht dat dit dynamische begrip van de situatie van de individuele patiënt invloed zou hebben op hoe de zorg tussen verschillende disciplines gecoördineerd wordt. Gebleken is dat begrip van de behoeften van de patiënt en de rollen van verschillende professionals in het vervullen van deze behoeften resulteert in een meer gecoördineerde en integrale reactie van de betrokken professionals. Formele activiteiten, die de interne communicatie tussen professionals binnen de organisatie bevorderen, faciliteren eveneens integrale zorg. In hoofdstuk 5 is ook het effect van een integraal zorgprogramma voor kwetsbare ouderen op de perceptie van professionals op de geleverde zorg binnen ziekenhuizen geëvalueerd. Eén Nederlands ziekenhuis implementeerde een integraal zorgprogramma, bestaande uit multidisciplinaire, integrale en doelgerichte zorgverlening, gericht op een vroege detectie van risico factoren voor functieverlies van oudere patiënten. Twee controle ziekenhuizen leverden de gebruikelijke zorg. Er zijn geen significante verschillen gevonden tussen de ziekenhuizen in de perceptie van de professionals op de mate van integrale zorgverlening. Het is echter de vraag of de gebruikelijke zorg in de controle ziekenhuizen niet te veel integratieve componenten bezit om verschillen op te kunnen merken. Hoewel de professionals van de drie ziekenhuizen niet verschillen in hun perceptie van de mate van integrale zorgverlening, verschillen de percepties van de professionals tussen de ziekenhuisafdelingen wel degelijk in de mate van integrale zorgverlening. Deze verschillen moet men in overweging nemen bij de evaluatie en implementatie van integrale zorgprogramma's in ziekenhuizen.

Het patiënt perspectief op integrale zorg wordt beschreven in **hoofdstuk 6**. Het doel van dit verkennende onderzoek is om vast te stellen of de perceptie van de oudere

patiënt op de kwaliteit van integrale zorg en tevredenheid met de ziekenhuiszorg belangrijk zijn voor de toekomstige kwaliteit van leven. De studie is uitgevoerd in een Nederlands ziekenhuis. Binnen 48 uur na opname zijn 500 patiënten geïnterviewd. De drie maanden follow-up meting betrof 291 patiënten. De resultaten bevestigen dat oudere patiënten die meer tevreden zijn met de ontvangen ziekenhuiszorg en meer integrale zorg ervaren drie maanden na de ziekenhuisopname een hogere kwaliteit van leven hebben. Deze studie laat het belang zien van het perspectief van de oudere patiënt op de geleverde zorg omdat dit ook een voorspeller kan zijn van de uitkomst van integrale zorgprogramma's.

In **hoofdstuk 7** is de relatie tussen sociaal, cognitief, en fysiek functioneren en zelfmanagement capaciteiten onderzocht, om zo de betere zelfmanagers onder ouderen met een risico op functieverlies te herkennen. Binnen 48 uur na opname in een Nederlands ziekenhuis werden 500 patiënten geïnterviewd. In totaal namen 291 patiënten deel aan de follow-up meting na drie maanden. De uitkomsten van dit onderzoek lieten zien dat ouderen met een laag niveau van sociaal, cognitief, en fysiek functioneren slechtere zelfmanagers zijn dan diegenen met een hoog niveau van functioneren. Hiernaast hebben zelfmanagement capaciteiten een mediërend effect op de relatie tussen sociaal, cognitief, en fysiek functioneren en welzijn. Het verhogen van de zelfmanagement capaciteiten van ouderen met een groot risico op functieverlies is daarom essentieel. Interventies die zich richten op het vergroten van zelfmanagement capaciteiten lijken daarom een waardevolle toevoeging ten opzichte van traditionele interventies, die zich vaak alleen richten op het verminderen van functieverlies gerelateerd aan ouderdom en chronische ziektes.

De belangrijkste bevindingen en methodologische beperkingen van het onderzoek zijn besproken in de discussie. Het is benadrukt dat dit proefschrift een belangrijke bijdrage levert aan de ontwikkeling en het begrip van integrale zorg. De beperkingen van de studie opzet zijn besproken, waaronder de invloed van contextuele factoren op de evaluatie van complexe interventies. Er worden aanbevelingen voor de praktijk gegeven over de opzet van integrale zorgprogramma's, waarbij rekening gehouden moet worden met de context van de professional, het team, de organisatie, en de patient. Het hoofdstuk wordt afgesloten met een aantal suggesties voor verder onderzoek, zoals het ontwikkelen van kwaliteitsindicatoren en het uitvoeren van een kosten effectiviteitsstudie.

Dit proefschrift laat zien dat een model van de onderliggende mechanismen van integrale zorg in ziekenhuizen een waardevolle bijdrage levert aan het begrip van de effectiviteit van integrale zorgprogramma's. Inzicht in de perceptie van professionals en

patiënten over de geleverde zorg is essentieel voor het ontwerp en de implementatie van integrale zorgprogramma's. Deze programma's moeten interventies bevatten die nadruk leggen op het actief integreren van informatie van verschillende professionals met diverse achtergronden, zodat men zich meer bewust is van de situatie van de patiënt. Hiernaast moet de patiënt centraal staan in het proces van zorgverlening, zodat deze kan worden afgestemd op de individuele behoeften. De organisatorische structuur binnen ziekenhuizen moet worden aangepast, zodat het verlenen van multidisciplinaire zorg zich verder kan ontwikkelen. Alomvattend, de snelle toename van het aantal ouderen met meerdere chronische ziekten vraagt om proactieve veranderingen in het traditionele zorgsysteem. Inzicht in *hoe* integrale zorg de processen en uitkomsten van zorg beïnvloedt is een essentiële stap in het ontwerp van een responsief zorgsysteem.

Dankwoord

DANKWOORD

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About the author

ABOUT THE AUTHOR

Jacqueline Hartgerink was born in The Hague, The Netherlands, on October 9, 1982. In 2002 she graduated from secondary school (Athenaeum) at the Maerlant Lyceum in The Hague. From 2003 to 2008 she studied Psychology at the University of Leiden, where she graduated "cum laude" in the Social- and Organizational Psychology with a Master's dissertation on "The effect of deception in single and multiple series of prisoner's dilemma games". During these years she also studied at the Universidad de Salamanca, Spain, for six months. Here she followed classes in Spanish and Psychology.

In 2008 she started with a management traineeship at the Rabobank. She was introduced in the financial work field, with internships at both the financial and management departments of the Rabobank. Yet, her interest in performing research could not be denied. Therefore, in December 2009 she started to work on her PhD thesis at the institute of Health Policy and Management on the process evaluation of an integrated care program for elderly admitted to the hospital. Furthermore, she was involved as a teacher in the Bachelor and Master program of the institute of Health Policy and Management.

PhD Portfolio

PHD PORTFOLIO

PhD student	Jacqueline Hartgerink
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PhD period	2010-2013
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PhD training

Courses

-	Ready in four years	2011
-	Masterclass research methods for vulnerable elderly	2011
-	Methods of public health research - Johan Mackenbach and Lex Burdorf	2010

Presentations

-	Presentation "The importance of relational coordination for integrated care delivery to older patients in the hospital". International Conference on Integrated Care; Berlin Germany	2013
-	Poster "The importance of multidisciplinary teamwork and team climate for relational coordination among teams delivering care to older patients". International Conference on Integrated Care; Berlin Germany	2013
-	Presentation "The Prevention and Reactivation Care Program: A personalized, integrated intervention for prevention of functional decline after hospital stay". Seminar Health Policy and Management; Rotterdam The Netherlands	2013
-	Presentation "Care for elderly: A professional perspective". Panel of Elderly Representation; Rotterdam The Netherlands	2012
-	Presentation "A framework for understanding improved elderly care outcomes of integrated care programs in hospitals". Colloquium on Health Service and Management of Organizations; Rotterdam The Netherlands	2011

Teaching experiences

-	Master in Healthcare Management: Patient-centered care	2013
-	Pre-master in Healthcare Management: Quality of care	2012
-	Bachelor in Health Policy and Management: Quality and efficiency	2010 - 2012
-	Bachelor in Health Policy and Management: Thesis supervision	2010 - 2011
-	Bachelor in Health Policy and Management: Organisational sciences	2010
-	Bachelor in Health Policy and Management : Integrated care	2010