

Do interprofessional teams matter?

A survey-based study of patients and team members in hospitals and rehabilitation centres in secondary health care in Western Norway.

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Thesis for the degree of Philosophiae Doctor (PhD)
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Scientific environment

The thesis and research presented here is developed in collaboration between the Centre for Habilitation and Rehabilitation in Western Norway and the health services research group at the Department of Global Public Health and Primary Care, Faculty of Medicine at the University of Bergen, Norway.

This project's main supervisor was Øystein Hetlevik, Associate Professor at the Department of Global Public Health and Primary Care. Sturla Gjesdal, Professor at the Department of Global Public Health and Primary Care, and Eva Biringer, Senior Researcher at Helse Fonna Health Authority, were co-supervisors.

Jörg Aßmus, bio statistician of Haukeland University Hospital, was a co-author of all papers included. Vegard Pihl Moen, PhD and researcher at the Centre for Habilitation and Rehabilitation in Western Norway, was a co-author of Paper 3.

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Abstract

Background

Health care today is becoming more complex, and patients must interact with an array of health care professionals working within and between various health care settings. Coordinated health services meeting the patients' needs are certainly a major challenge for the modern society. Health care professionals working in interprofessional teams is a prioritised structure and are employed to ensure coordinated, collaborative care trajectories meeting the patients' needs in hospitals and rehabilitation centres within secondary health care. Therefore, the overall aim of this thesis is to investigate specific team functions in interprofessional teams in hospitals and rehabilitation centres, as well as to examine how these team functions are associated with continuity of care, rehabilitation benefit, and changes in health and functioning, as reported by the patients.

Materials and methods

The first part of the thesis (Paper I) is based on data from a cross-sectional multi-centre study investigating the quality of communication and supportive relationships in teams working in various hospitals in secondary health care. In Paper I, these qualities in teams are explored by means of a Norwegian version of the Relational Coordination Survey (RCS) with data from 263 health care professionals working in 23 care processes. RCS data were collected in 2012 and 2013.

The second part of this thesis (Papers II and III) utilises data from a longitudinal cohort study investigating associations between team functions in interprofessional rehabilitation teams and patient-reported outcomes in somatic rehabilitation centres. This section of the thesis also investigates associations between patient experienced interprofessional team functions, measured by Nijmegen Continuity Questionnaire-Norwegian version (NCQ-N), and changes in patient-reported health and functioning.

RCS data were collected from 94 health care professionals working in 15 interprofessional teams in somatic rehabilitation centres in Western Norway in the first

half of 2016 (Papers II and III). Patients were invited to participate when they were accepted for a rehabilitation stay at a somatic rehabilitation centre. Baseline data for the 701 included patients were collected during the first half of 2015, while follow-up data were collected one year after data collection at baseline.

In the first section of this thesis, linear mixed-effect models and one-way analyses of variance were employed in the statistical analyses. In the second part of this thesis, linear models were utilised to assess associations between independent (RCS, Papers II and III and NCQ-N, Paper III) and dependent variables (the patient-reported outcomes).

Results

A main finding of this present study was that written clinical procedures describing the care process were associated with increased quality of communication in teams (Paper I). Another main finding was the positive association between interprofessional teams scoring high RCS supportive relationship scores and patient-reported team continuity (Paper II). Furthermore, high patients reported team, personal and cross-boundary continuity was associated with improved health for the patients (Paper III). The RCS subscale scores were significantly higher among health professionals holding similar occupational roles within the team, compared to communication and relationships between other members of the team (Paper I). However, the RCS quality of communication and supportive relationships in teams did not show significant associations with changes in patient-reported health and functioning (Paper III).

Conclusions and implications

Working in interprofessional teams with common strategies towards reaching the patients' goals is the preferred way of delivering health care in hospitals and rehabilitation centres in secondary health care. This present study found that the quality of communication in interprofessional rehabilitation teams was associated with improved patient-reported team continuity, reflecting the current practice of interprofessional teamwork.

In addition, this present study found that patients experiencing team continuity, personal and cross-boundary continuity in the rehabilitation process reported more improvement in their health state one year after rehabilitation. On the other hand, the quality of communication and relationships in teams as reported by professionals were not associated with improvements in patient-reported health and functioning. This finding could indicate that patient-reported measures of team continuity is a better predictor for the content of teamwork most important for positive rehabilitation outcomes compared to RCS subscales.

Health care professionals having similar occupational roles had better communication and relationships with other professionals holding similar occupational roles. This finding could indicate that poor understanding of other team members' roles that consequently hinders the quality of communication and relationships.

Written clinical procedures were positively associated with increased quality of communication in teams. This finding indicates that written clinical procedures might increase the quality of health care delivery, improve continuity of care and be facilitated through the implementation of evidence-based clinical pathways.

List of publications

Paper I

Hustoft M, Hetlevik Ø, Aβmus J, Størkson S, Gjesdal S, & Biringer E. (2018). Communication and relational ties in inter-professional teams in Norwegian specialised health care: A multicentre study of relational coordination. *International Journal of Integrated Care*, 18(2), 9, doi: <http://doi.org/10.5334/ijic.3432>.

Paper II

Hustoft M, Biringer E, Gjesdal S, Aβmus J, & Hetlevik Ø. (2018). Relational coordination in interprofessional teams and its effect on patient-reported benefit and continuity of care: a prospective cohort study from rehabilitation centres in Western Norway. *Journal of Biomedical Science Health Services Research*, 18(1), 719, doi: <https://doi.org/10.1186/s12913-018-3536-5>

Paper III

Hustoft M, Biringer E, Gjesdal S, Moen VP, Aβmus J, & Hetlevik Ø. (2019). The effect of team collaboration and continuity of care on health and functioning among rehabilitation patients: a longitudinal survey-based study from western Norway. *Quality of Life Research*, 28, 2773 – 2785, doi: <https://doi.org/10.1007/s11136-019-02216-7>

‘The published papers (Paper I, Paper II and Paper III) are open access articles distributed under the terms of the Creative Commons Attribution 4.0 International License’

Abbreviations

| | |
|---------------------|---|
| ADL | Activity of daily living |
| ANOVA | One-way analysis of variance |
| B | Unstandardized estimated regression coefficient |
| CFA | Confirmatory factor analysis |
| CFI | Comparative fit index |
| CI | Confidence interval |
| COSMIN | COnsensus-based Standards for the selection of health Measurement INstruments |
| Cronbach's α | Cronbach's alpha |
| df | Degrees of freedom |
| EQ-5D-5L | EuroQol five-dimension five-level descriptive system |
| EQ-VAS | EuroQol EQ-VAS |
| GP | General practitioner |
| ICD-10 | Statistical Classification of Diseases and Related Health Problems Tenth Revision |
| ICF | International Classification of Functioning, Disability and Health |
| IOM | Institute of Medicine |
| LME | Linear mixed-effect model |
| MI | Multiple imputation |
| NCQ | Nijmegen Continuity Questionnaire |

| | |
|------------|---|
| NCQ-N | Nijmegen Continuity Questionnaire, Norwegian version |
| PasOpp | A survey instrument, exploring patients' experiences of a stay in a private rehabilitation centre in Norway |
| PRO | Patient-reported outcomes |
| RC | Relation coordination |
| RCS | Relational Coordination Survey |
| RMSEA | Root mean square error of approximation |
| SD | Standard deviation |
| SRMS | Standardised root mean square residual |
| TLI | Tucker-Lewis index |
| WHO | World Health Organisation |
| WHODAS 2.0 | World Health Organisation Disability Assessment Schedule version 2.0 |
| χ^2 | Chi square |

Table numbering in the thesis (examples)

| | |
|------------|-----------------------|
| Table 1 | Table 1 in the thesis |
| Table A9.1 | Table 1 in Appendix 9 |

1. Introduction

Patients encounter an array of health care professionals within and across different levels of health care. Empirical evidence has suggested that smooth trajectories are difficult in situations in which patients receive care from multiple care providers [1,2]. Ultimately, fragmented service delivery might occur due to gaps in care continuity [1,3]. The complexity of health care also increases the risk of errors, which could result in undesired events and suboptimal patient outcomes [4]. As health care is becoming more complex, the need for concerted efforts by health care professionals, organisations, leaders, regulators and policy makers is becoming imperative for the delivery of quality care [5].

In the 1990s, the Institute of Medicine (IOM) published the following reports: *To err is human: Building a safer health system* [5] and *Crossing the quality chasm: A new health system for the 21st century* [6]. These reports describe major issues concerning the quality of care delivery in America. The IOM defined quality of care as ‘the degree to which health care services for individuals and populations increase the likelihood of desired health outcomes, and are consistent with current professional knowledge’ [5,6], and recommended six specific aims for improvement, stating that health care should be ‘safe, effective, patient-centred, timely, efficient and equitable’ [5,6]. Furthermore, an influential contribution from the Canadian Minister of National Health and Welfare, Marc Lalonde, identified in 1974 eight components contributing to increasing the quality of care: acceptability, accessibility, appropriateness, competence, continuity, effectiveness, efficiency and safety [7].

Improving health care quality constitutes an ongoing and relevant issue. Countries worldwide have been facing an increasing demand to organise and coordinate health care to secure quality health care delivery [8-11]. Indeed, increasing cooperation and coordination through teamwork was considered necessary to ensure that patients’ needs are fulfilled and that they receive care in a manner that is respectful of their values and preferences [6,12]. In 2009, the Norwegian Ministry of Health and Care Services published the white paper, *The Coordination Reform. Proper treatment – At*

the right place and the right time'. In it, they highlighted three major challenges and provided recommendations for a better coordinated, more effective and better quality health care services [13]. Consequently, the Coordination Reform was implemented in January 2012. Improved accessibility and coordination of services were also requested through the white paper, *High Quality – Safe Services* [14], focusing on information exchange and high quality communication [14]. Furthermore, the white paper stated that high-quality care requires engaging patients in service delivery planning and choice of treatment [14].

1.1 Interprofessional teamwork

A literature review conducted by the American non-profit global research and development division (RAND) reviewed 16 health care studies in 2008, and found moderate evidence for teamwork positively influencing patient outcomes [15]. The implementation of interprofessional teams in secondary health care has been gaining priority in the political agenda over the past 20 years internationally [10,13,14,16]. Furthermore, evidence indicate that fewer errors were made as a result of collaboration and coordination in interprofessional teams [5].

The Donabedian's model for quality health care describes three primary dimensions — *structure, process* and *outcome*— central for measuring health care quality [17].

Attributes of structure include material resources (buildings, number of hospitals and number of hospital beds), human resources (population served) and organisational structures (management, staff and economy) [17,18]. The quality of health service delivery depends on the structures and processes taking place in the interprofessional team. Structures of the team are influenced by the composition which depends on the organisational structures implemented in the hospital or rehabilitation centre.

Consequently, the composition of teams might influence the quality of communication and the level of shared goals, shared knowledge and mutual respect in the team.

Furthermore, the processes occurring in teams influence levels of continuity of care.

Thus, the processes extends from patients seeking care to the care being carried out.

Therefore, this is relevant to all the health care professionals' activities, from initial

assessment to evaluation of care before discharging or referring the patient to other units [17]. The third dimension (outcome) of Donabedian's model is essential for evaluating the quality of health care delivery [17]. Patient-reported outcomes (PROs) provide unique information concerning health and disability from the patient's perspective [19]. Additionally, PROs offer opportunities for evaluating care delivery and generate insight into how well the treatment meets patients' requirements, thereby informing clinical and policy decisions [19,20].

The concept of teamwork was first implemented in health care settings in the 1970s and resurged in the late 1980s [5,21]. The World Health Organisation (WHO) has been a driving force in enhancing the quality of health care through the use of collaborative teams in European countries [10,22]. In Norway, teamwork in health care is described in Norwegian laws including the Secondary Health Care Services Law [23] and Health Personnel Law [24]. There has been a particular emphasis on utilising teams in rehabilitation settings [11,25,26], and are structured using interprofessional teams [27-30].

The team concept comprises a multi-dimensional construct [31,32]. Teams, teamwork and team performance are concepts important to define in order to understand the possible influence teamwork has on patient outcomes [32]. Teams can be defined as: 'an identifiable social work unit consisting of two or more people with complementary skills who are committed to a common purpose, performance goals and approach for which they hold themselves accountable' [32,33]. Accordingly, sharing of information and coordinating their activities in order to fulfil a task is the essence of a team [32]. In other words, health professionals working in a team need to engage in teamwork [32]. Xyrichis and Ream [34] defined teamwork in health care specifically as 'a dynamic process involving two or more health care professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental efforts in assessing, planning, or evaluating patient care'. Team performance has been defined as 'a multilevel process that results from team members' engagement to accomplish individual and team-level task work and teamwork' [35], and is often described in terms of inputs, processes and outputs [32].

Interprofessional teams are understood by the systems theory with an *input–process–output*-based approach with respect to the care process [29,31,36-40] (Fig. 1). A multifaceted set of interactions between inputs, processes and outputs defines the effectiveness of teamwork [37,30].

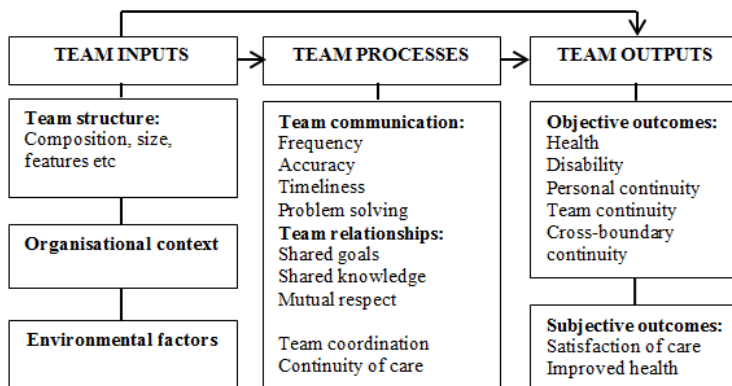


Figure 1. System theory approach of teamwork (adapted from Lamieux-Charles et al. [31] and Cohen and Bailey [36])

The association between inputs, measured processes, and outputs of teams empirically provides evidence of the effectiveness of team-delivered health care [31,36,41]. Team inputs comprise the context in which the team is working. Previously, the frequencies of meetings, team size, the composition of teams, using written clinical procedures and leadership have been identified as team inputs influencing team functions, i.e. the quality of communication in teams [28,42,43]. Team processes describe the acts among team members when converting inputs to outputs through frequent, accurate, timely and problem-solving communication. These interdependent acts remain dependent on the underlying relationships formed through shared goals, shared

knowledge and mutual respect to ensure continuity of care and meeting the patients' needs [44] (Fig.1). Team outputs describe the result of the team performance divided into objective and subjective outcomes (Fig.1). Several core skills of interprofessional teams have previously been identified as communication, shared goals, understanding of each other's roles, team management, coordination, flexibility, problem-solving, working across boundaries, continuity of care, mutual respect and collaboration [42,45-52]. These core skills enable the team to act as an integrated entity that can positively influence the quality of care [48,49,51].

Various terms describe the level of teamwork occurring in health care settings such as interprofessional or interdisciplinary, multi-professional or multidisciplinary and transdisciplinary teams [46]. Interprofessional or interdisciplinary teamwork involves the highest level of collaboration [46]. To be defined as an interprofessional team, at least two or more health care providers must work collaboratively with patients and caregivers towards achieving the same long-term goals [45,53]. This present study will focus on interprofessional teams involved in care processes in hospital settings and rehabilitation centres in Western Norway. The interprofessional teams in hospital settings consist of health care professionals who share a common clinical purpose and have direct responsibility for a well-defined group of patients that emerge every time a patient with a specific condition is admitted to the hospital [30]. In the rehabilitation services the interprofessional teams consist of health care professionals sharing a common purpose for patients admitted to the rehabilitation centres. Because of the multitude of treatment interventions and complexity of rehabilitation services there is a particular emphasize on organizing these services using interprofessional teams [11,27-30]. Teams investigated in this present study included all health care professionals working collaboratively towards shared goals and were therefore defined as interprofessional teams [44,53,54].

The investigation of associations between team characteristics in secondary health care and team functions could elicit information regarding processes important for well-functioning teams. Furthermore, the investigation of associations between communication and supportive relationships in teams and patient-reported continuity

of care, health and disability could provide information regarding team outputs. Hence, increased knowledge of structures and processes associated with patient outcomes could provide leaders and policy-makers with information on areas within health care that need improvement [55].

1.1.1 Relational coordination

Common core values of interprofessional teamwork and relational coordination in teams include optimal communication, shared goals, shared knowledge and mutual respect between health care professionals and service users involved in the care process [56]. Coordination means ‘integrating or linking together different parts of an organisation to accomplish a collective set of tasks’ [57] and is further defined as ‘managing dependencies between activities’ [58]. Coordination constitutes a fundamental relational process in hospitals and rehabilitation centres influencing continuity of care and patient outcomes [59]. The Relational Coordination (RC) theory specifies the nature of the relational dynamics of coordinated teamwork [60] and is defined as a ‘mutually reinforced process of interaction between quality communication and supportive relationships among team members for the purpose of task integration’ [59].

The RC theory states that the quality of coordination is determined by the frequency, accuracy, timeliness and problem-solving nature of communication among interprofessional team members [59,61]. Communication in particular has been perceived as a crucial factor for enhancing team functions which are influenced by the professional roles included in the teams [62-64]. The quality of communication further depends on the underlying relationships among team members, and particularly the extent to which team members have shared goals, shared knowledge and mutual respect [65,66]. Figure 2 illustrates the relational process between communication and relationships among interprofessional team members.

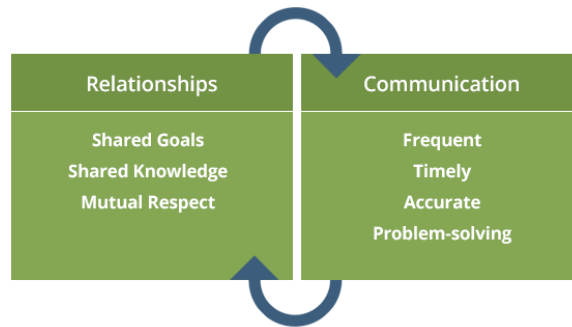


Figure 2. Relational process of coordinated care (adapted from Gittel [59])

Team members are typically assigned tasks depending on their role as i.e. a physician, nurse, occupational therapist or other relevant members of an interprofessional team [67]. The RC theory focuses on team functions among and between team members' occupational roles rather than between the individuals [56,59,68-72]. Each professional role included in the team is essential to the coordinating efforts towards delivery of quality care [73,74]. Focusing on roles thus enables health care professionals to come and go interchangeably in the team without 'missing a beat' in the teamwork process [60].

Coordination in teams is particularly important for quality in health care since care delivery within hospitals and rehabilitation centres have high levels of 'task interdependence, uncertainty and time constraints' [44,59]. Task uncertainty refers to the severity and diversity of the work undertaken by the individual team members [57,59]. Task interdependence indicates the extent to which health professionals remain dependent upon other team members to perform their individual jobs [57,59]. According to RC theory, the effect of teamwork on patient-reported outcomes are enabled through relational coordination (Fig. 3) [59].

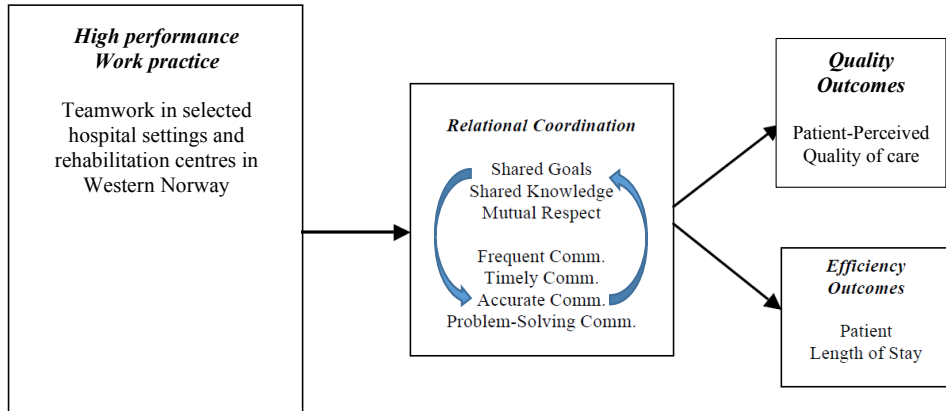


Figure 3. A relational model of work systems (adapted from Gittell [59])

Previous research has indicated that care provided by interprofessional teams maintaining the quality of communication and supportive relationships are more efficient than care provided by a single health care professional [45,75]. For a team to be collaborative and provide coordinated health care its members must have shared knowledge, shared goals and understanding among team members as well as relationships built on mutual respect [61,65]. Improving the quality of these aspects has also been found to improve team performance and care continuity [76].

This study utilises the RC theory as a theoretical basis for investigating the quality of communication and supportive relationships among team members in interprofessional teams within hospitals and rehabilitation centres in secondary health care. Furthermore, the RC theory is also used as a basis for the investigation of the associations between interprofessional rehabilitation team-functions patient-reported outcomes.

1.1.2 Rehabilitation

Changes in health care, such as shorter hospital stays, a shift from communicative to non-communicative diseases and the ageing population living longer with chronic illness and disability, has increased the need for rehabilitation services worldwide [46,77,78]. Rehabilitation is defined in a number of different ways internationally [79]. According to Stucki et al., rehabilitation is the key health strategy of the 21st century [77], and comprises health strategies that are essential for addressing the population's needs and are highly prioritised [55,77,80-82]. Rehabilitation constitutes multifaceted interventions performed in complex contexts [79,83] and a problem-solving process employing a multitude of treatment interventions to address multifaceted health problems of patients in various settings [79]. Furthermore, it is also a 'process of enhancing well-being and of attaining a meaningful life in the context of disease, illness or impairment' [84].

The WHO World Report on Disability defines rehabilitation as 'a process aimed at enabling disabled people to reach and maintain their optimal physical, sensory, intellectual, psychological and social functional levels. Rehabilitation provide tools patients need to attain independence and self-determination' [11]. The WHO further describes the rehabilitation process to include 'a set of measures that assist individuals who experience, or are likely to experience, disability to achieve and maintain optimal functioning in interaction with their environment' [11]. In Norway, the Ministry of Health and Social Care Services provided a definition of rehabilitation in the White Paper No. 21 (1998-99) *'Responsibility and coping. Towards a Holistic Rehabilitation Policy'* [26]. Here, rehabilitation was defined as: 'a set of planned, time-limited processes with clearly defined goals and means in which different health care professionals cooperate in order to provide necessary assistance to the service user's own efforts to achieve the best possible function and coping, independence and participation socially and in society [26]. The Norwegian definition of rehabilitation was evaluated in 2018 and refined for the purpose of strengthening the patient perspectives [85]. The new definition of rehabilitation defines that 'rehabilitation shall be based on the individual patient's life situation and goals'. Furthermore, it describes

rehabilitation as ‘goal directed collaborative processes in different areas between patients, service users, relatives and service providers. The processes are characterised by being coordinated, coherent and evidence based’ [85]. To better reflect the need for ongoing rehabilitation for people with chronic illnesses the aspects of time limitation has been removed.

In Norway, rehabilitation is moving towards shorter in-patient stay or day-programmes in specialised health care settings towards increased responsibility for rehabilitation in the municipalities where people live their lives [55,86], and increased participation of the patient in the decision-making process [55,84]. The National strategy for quality improvement (‘...og bedre skal det bli’) framed six dimensions necessary for high quality in all areas of health care services, including rehabilitation [87]. Accordingly, quality health care should be a: impactful, b: safe, c: involving and empowering the service user, d: coordinated and continuous, e: use resources available in an efficient manner and f: accessible [87]. The Norwegian ‘*National guideline for rehabilitation, habilitation, individual plan and coordinator*’ further describes good quality rehabilitation services to be coordinated, interprofessional and planned [25]. Furthermore, good quality rehabilitation services also depends on the level of information exchange and use of evidence-based interventions [25].

Historically, rehabilitation interventions were strongly rooted in the medical model of disability where the purpose of the intervention was ‘fixing’ or correcting deviation of the norm [88,89]. In the late 1960s through early 1980s, the medical model was challenged. The medical model did not encounter social constructs affecting participation in society in a satisfactory manner [90]. Therefore, the social model was developed as an opposition to the medical model [89,91]. Thus, removing mechanisms and barriers preventing people with disabilities from participation became politically important [90]. In 1977, George L. Engel introduced the bio-psycho-social model, where health and disease was seen as an interplay between biological, psychological and social factors [92]. In Norway, professor Ivar Lie at the University in Oslo was presumably the first to systematically form a relational understanding of disability in

the 1970s [89]. In 1989, Lie defined disability as an inconsistency between the individual's functional ability and functional requirements of the environment, known as the Nordic model [89].

WHO adopted the bio-psycho-social model proposed by Engel in the development and the operationalising of the International Classification of Functioning, Disability and Health (ICF). The ICF provides a universal language describing functioning and disability [77,93-95]. The model attempts to reflect the health of all people, and offers a combination of medical and social approaches using a biopsychosocial framework [84]. Furthermore, ICF contributes to explaining relationships between functioning and disability through the concepts of 'body functions' and 'activity and participation', also how health conditions and contextual factors influence function [96] (Fig.4). Consequently, approaches used in practice are moving away from a predominantly biomedical approach towards including biological, psychological and sociocultural aspects [97-99].

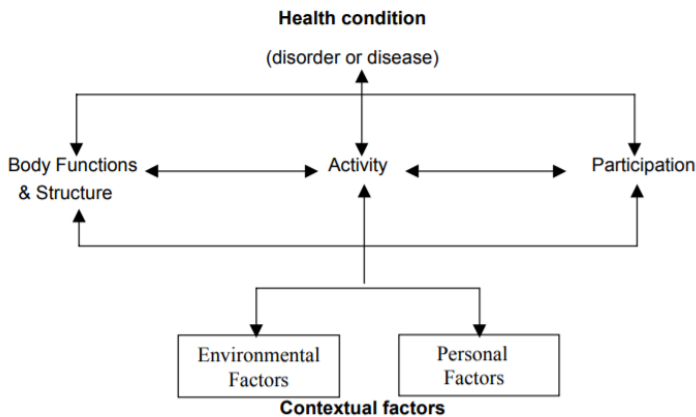


Figure 4. The ICF model [95]

The ICF provides descriptions of a complex interaction between persons' health conditions and the context in which the person functions [100,101]. However, due to the complex, dynamic and multi-dimensional concept of disability, the ICF does not provide specific operationalisation of the term 'disability'. Disability thus remains a highly contextual dependent factor in the ICF framework [100,102]. This study utilises PROs based on the ICF activity and participation domains to determine the effectiveness of rehabilitation team functions on patient health and disability outcomes [101].

This project is based on data from the Western Regional Health Authority in Norway that delivers health care to a population of approximately 1.1 million people. According to the 2017 statistics from the Norwegian Directorate of Health, the Norwegian patient register (NPR), 239 754 people had experienced at least one stay in a somatic hospital in Norway [103] and were treated by health care professionals working in various types of teams. The Western Regional Health Authority includes specialised rehabilitation services. It comprises approximately 50 private rehabilitation centres divided between four Regional Health Authorities in Norway. These private rehabilitation centres were included in the Regional Health Authority in 2006 [55]. The Western Health Authority has an agreement with seven of these private rehabilitation centres [104]. Each year, approximately 4000 people are referred, either directly to the rehabilitation centre after a hospital stay or from the municipality, usually referred by the local general practitioner (GP). Referrals from patients living at home are assessed at a regional assessment unit: Regional vurderingseining for rehabilitering. In the Norwegian *'Opptappingsplan for habilitering og rehabilitering' (2017–2019)* an interprofessional rehabilitation team was included as a prerequisite for ensuring a coordinated rehabilitation process [55]. The Western Health Authority has in the agreement with the private rehabilitation centres defined that a physician, nurse, physical therapist and an occupation therapist are mandatory team members in these interprofessional rehabilitation teams. Additionally, a selected member of the team should fulfil the role of a coordinator to ensure coordinated and a seamless rehabilitation process for the patient [104].

1.2 Continuity of care

Continuity is described as ‘the state or quality of being uninterrupted in sequence or succession’ in the Oxford English Dictionary (www.oed.com). Concepts related to continuity of care include, among others, coordination of care, integration of care, patient-centred care and case management [105]. The concept of continuity of care first appeared in the literature in the 1950s used by Ruth Miriam Farrissey [106], where it primarily explored personal relations between a nurse and a patient. The concept changed in the 1970s to include communication and cooperation as well as personal relations [105]. In the 1980s, however, the continuity of care concept returned to solely being a matter of personal relations between a care provider and a patient [105]. From the 1990s onwards, continuity of care became a more complex and multifaceted concept contributing to increased quality of care and patient satisfaction, entailing personal relationships, communication and cooperation [105,107-113]. Communication and cooperation have also become increasingly important aspects of continuity of care due to an increased involvement of multiple care providers in patient care [107].

Almost 40 years ago, the late Professor Barbara Starfield discussed the confusion of terms used for continuity of care and the lack of a common definition of the concept [114]. The Canadian Health Services Research Foundation published a report in 2002 entitled *Defusing the Confusion: Concepts and Measures of Continuity of Health care* [112]. In this report, they defined types of care continuity and possible measurement approaches [112]. Three types of care continuity were found to be essential for quality health care services: *informational continuity*, *relational continuity* and *management continuity* [112]. Informational, relational and management continuity describe intertwined processes and can be considered from a disease-focused or a person-focused perspective [112] (Fig. 5).

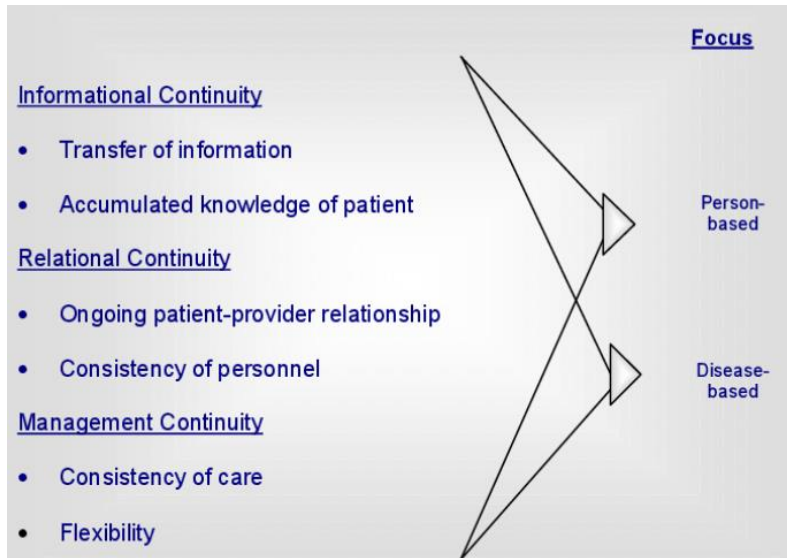


Figure 5. Types of continuity (adapted from Reid et al. [112])

The transfer of information between and across health care settings is a critical aspect of informational continuity [112,115-117]. Informational continuity ensures connectedness and coherent care with accumulated knowledge of the patient. Furthermore, informational continuity is fundamental for the services to be receptive to patients' needs and for coordinating care [112,115]. Informational continuity includes written documentation (patient medical record) and the health care professionals' knowledge of the treatment or therapy provided [115]. Accordingly, lack of informational continuity has been found to negatively affect continuity of care causing fragmented service delivery for the patient [2,116,118].

Relational continuity describes the ongoing relationship between a patient and a health care professional or between a patient and a consistent team of professionals [112,115]. Having a consistent personal care provider is particularly valued by the patient and influences their satisfaction with the care [110,116,119].

Management continuity refers to the flexibility in adapting care according to patients' needs. It also refers to the consistent and coherent management of coordinated care

trajectories for the patient [112,115]. Management continuity is particularly significant when providing health care to patients with chronic diseases and multi-morbidity [115]. Furthermore, the availability of health care with seamless care processes is an important aspect of the patients' perception of management continuity [51,120].

Freeman et al. [121] proposed a different model of continuity of care due to the important distinction in terms of health care delivery concerning the patient's experiences of continuity of care. [121]. In this model, informational and management continuity comprised the most relevant types of continuity for health care delivery from the perspective of the health professional [121]. However, patient-experienced continuity encompassed distinctively other dimensions, such as concerns, values, and experiences of service users, including patients and family members [121]. Patient-reported continuity of care as a measure of quality care has increasingly been used in research in recent years [122-124]. Accordingly, there are numerous instruments measuring continuity of care. However, the most commonly measured aspects are visit patterns, duration of relationships or the number of times a patient has visited their GP [125-127]. Furthermore, most survey instruments on care continuity measure one or two of the aspects involved [107,112,114,126,128,129] and most frequently measuring care continuity according to a defined setting and/or diagnosis group, such as patients with diabetes [130,131], cancer [132,133] or mental illness [134-137].

To capture patient perspectives on informational, relational and management continuity, Uijen et al. developed a generic questionnaire measuring care continuity for use across care settings [105]. Three predominant themes ensuring connectedness of health care delivery were identified and utilised in this instrument [138]:

- 'A personal care provider in every separate care setting who knows and follows the patient'
- 'Communication of relevant patient information between care providers'
- 'Cooperation between care providers, both in the specific care setting and between care settings'

Research has demonstrated that care continuity improves health care quality generally [125,139], and in more specific settings such as somatic rehabilitation [2,3], primary care [109,140], chronic care [141] and hospital settings [142,143]. Continuity of care is not solely an attribute of health care service delivery; it involves health care professionals and patients who experience first-hand how well health care services are integrated and coordinated [115]. A lack of communication among health care professionals in interprofessional teams can therefore inhibit care continuity and lead to more fragmented services [144-146]. However, continuity of care should lead to patients' experiencing seamless trajectories of care and having their care needs appropriately met and is thus preferably measured from the patient's perspective [112,122].

Most studies of care continuity and patient outcomes measure aspects of relational continuity between the patient and GP or health care professionals providing longitudinal care, particularly in primary health care settings [111,119] and disease-specific settings [118,130]. Very few studies have focused on all aspects of care continuity in a generic patient group [3]. This present study investigated the quality of communication and supportive relationships in interprofessional teams, utilising the RC theory and framework [59,60]. The investigations of the quality of communication and relationships in interprofessional teams increase the knowledge of processes important for the coordinating mechanisms and continuity of care occurring in the rehabilitation process for patients included in this present study. Furthermore, this present study investigated continuity of care by measuring the three primary dimensions of continuity of care, described by Uijen et al. [108], reported by the rehabilitation patients.

1.3 Literature

Preparing for the included papers warranted an extensive search in the literature, see example of a search strategy in appendix 4. During the writing-process of this thesis, the references were supplemented with literature of the latest studies and knowledge in the field. The last search was performed on the 5th of February 2019.

2. Research aims

The overall aim of this thesis was to investigate team functions in interprofessional teams in hospitals and rehabilitation centres in secondary health care, as well as examining how these team functions were associated with patient-reported continuity of care, rehabilitation benefits, health and disability.

Specific aims in Paper I:

- To investigate team functions in specific care processes within selected hospitals in the Western Norway Health Region
- To assess the associations between team characteristics and the quality of communication and supportive relationships in interprofessional teams
- To evaluate psychometric properties of the RCS

Specific aims in Paper II:

- To investigate the quality of communication and supportive relationships in interprofessional teams in rehabilitation centres in Western Norway Health Region
- To assess patient-reported benefits and continuity of rehabilitation care
- To investigate associations between RCS team functions and patient-reported rehabilitation benefits and continuity of the rehabilitation process at one-year follow-up

Specific aim in Paper III:

- To investigate associations between RCS team functions in interprofessional rehabilitation teams and changes in patient-reported health and disability from baseline to one-year follow-up
- To investigate associations between patient-reported continuity of care and changes in health and disability

3. METHODS

3.1 Design

The first part of this thesis is based on data from a cross-sectional multi-centre study investigating teams working in selected care processes in secondary health care (Paper I). The second part of this thesis is based on data from a longitudinal cohort study investigating the associations of team functions in interprofessional rehabilitation teams and PROs before and after a stay in somatic rehabilitation centres in Western Norway (Papers II and III).

Data for the first part (Paper I) were collected from health care professionals working in teams in secondary health care settings during two periods in 2012 and 2013. Data for the second part (Papers II and III) were collected during the first half of 2016 from health care professionals working in interprofessional rehabilitation teams in secondary health care settings.

Patient-reported baseline data were gathered during the first half of 2015 (Papers II and III). One-year follow-up data were collected during the first half of 2016 (Papers II and III).

3.2 Study participants and recruitment procedures

Three main samples of participants are included in this study. Teams of health care professionals working in 23 care processes in six somatic hospitals and six mental health units in Western Norway were investigated in Paper I. Papers II and III focused on data collected from 94 team members in 15 interprofessional rehabilitation teams, and from a patient cohort (n=701) accepted for a stay in a somatic rehabilitation centre (n=7) in Western Norway. Health care professionals and patients included in Papers II and III are all part of the REKOVE research project in Western Norway. Patients provided self-reports regarding their experiences of rehabilitation benefits, continuity of care, health and disability outcomes at baseline and one-year follow-up which were utilised in Papers II and III.

3.2.1 Interprofessional teams

Interprofessional team members were selected in collaboration with liaisons from the included hospitals in Paper I [147]. Health care professionals in daily contact with patients in a specific care process were defined as potential team member respondents. An invitation to participate in the survey was emailed, including information about the project. A link to the Relational Coordination Survey (RCS) questionnaire measuring the quality of communication and supportive relationships in teams in Corporater Surveyor (version 3.3) (Corporater Inc.) was also provided in the email. Non-respondents received a reminder one month after initial invitation (Paper I). Figure 6 presents an overview of the inclusion process of health care professionals for Paper I.

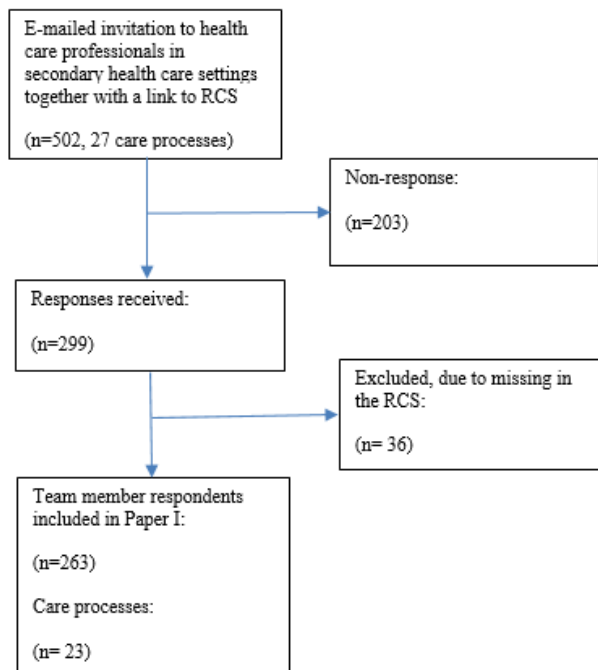


Figure 6. Flow chart showing the recruitment of team members working in care processes in hospital settings in secondary health care (Paper I)

For the second part of this study, health care professionals working in interprofessional rehabilitation teams in Western Norway were invited to participate (Papers II and III). Team members working in teams from the rehabilitation centre were identified. A liaison at the rehabilitation centre provided an overview of potential respondents. The liaison also provided information concerning team characteristics such as which team each member belonged to, whether the respondent worked in more than one team, the number of teams each member worked in and the contact information for each team member. Figure 7 presents a flow chart of the inclusion process for health care professionals in rehabilitation centres being a team member in one or multiple interprofessional teams included in Papers II and III.

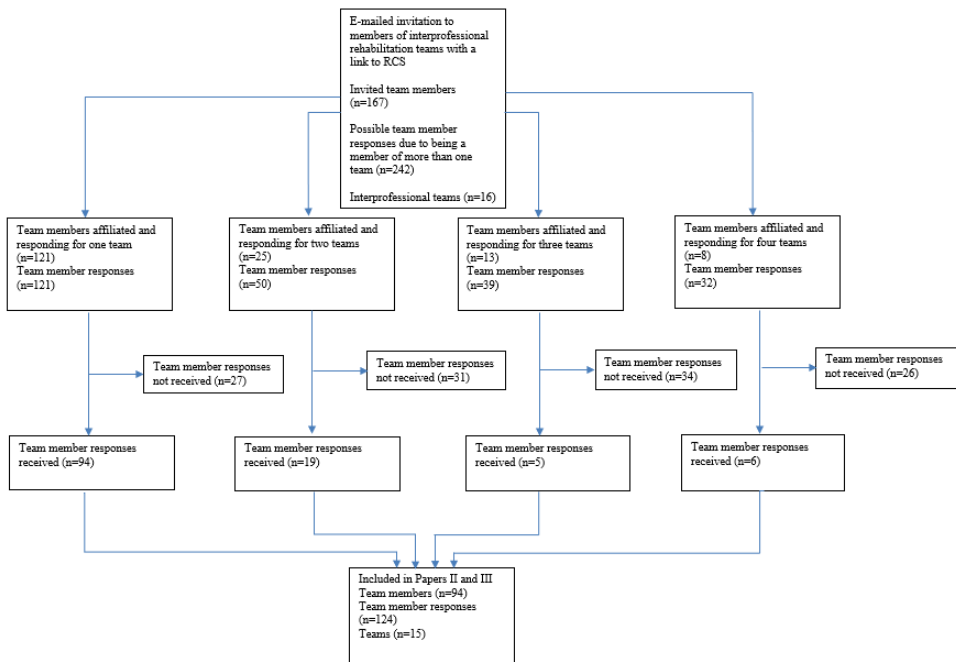


Figure 7. Flow chart of the recruitment of health care professionals being a team member of one or multiple interprofessional rehabilitation teams (Papers II and III)

Potential respondents were sent an email containing an invitation to participate and information about the project along with a link to the RCS questionnaire in Corporater Surveyor (version 3.3) (Corporater Inc.). Non-responding team members received two reminders, sent out one and two months after invitation. Furthermore, information regarding this project's aim was presented for team members in all rehabilitation centres prior to the data collection.

Team members included in Papers I, II and III involved physicians, nurses, physical therapists, occupational therapists and other health care professionals relevant to the specific care process in which the team member worked.

3.2.2 Patient cohort

For the second part of this study, patients aged 18 and above were invited to participate (Papers II and III). Patients were excluded if they were referred due to morbid obesity or referred for a follow-up stay in the rehabilitation centre as these patients had a different referral path. Two means for inviting patients to participate at baseline were employed: an oral invitation at the rehabilitation centre or a postal invitation from a waiting list held by the assessment unit (Regional vurderingseining for rehabilitering).

Patients recruited directly at the rehabilitation centre were asked to complete the questionnaire within two days after admittance. A liaison in each of the rehabilitation centres provided the study's information to patients and obtained written consent. Patients invited by post were sent information about the project along with an informed consent form and a prepaid return envelope. Non-responders received a reminder one month after the initial invitation to participate in the baseline study.

Patients participating in the baseline study were invited to complete a one-year follow-up questionnaire. They received information concerning the follow-up study along with the questionnaire and a prepaid return envelope. Figure 8 presents an overview of the inclusion process of patient respondents from rehabilitation centres in secondary health care utilised in Papers II and III.

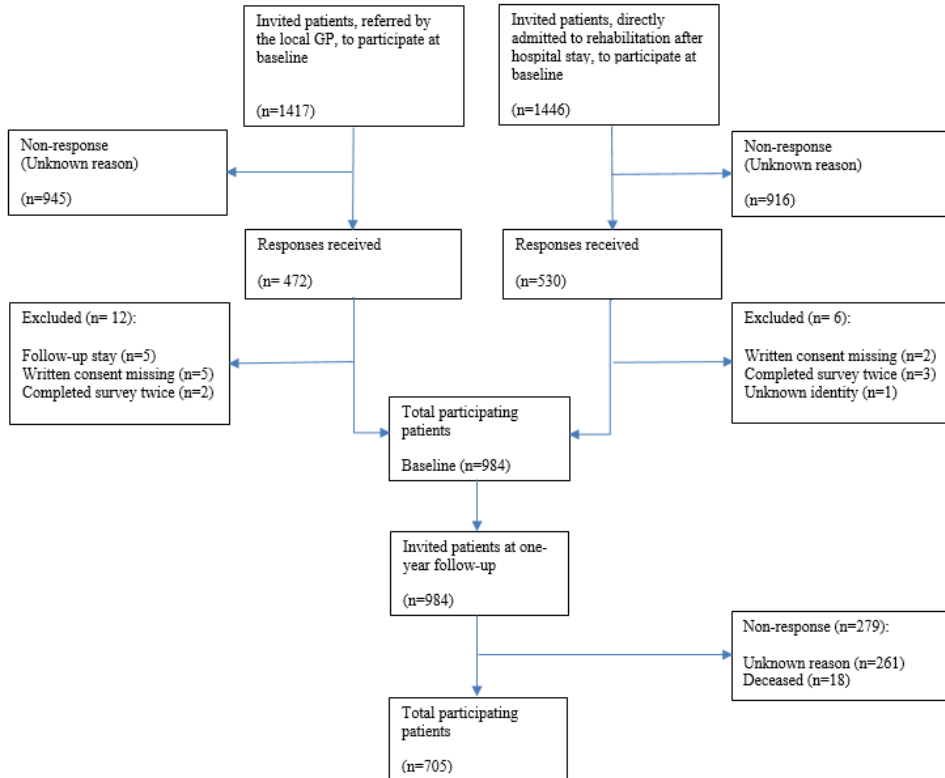


Figure 8. Flow chart of recruitment of patient respondents from somatic rehabilitation centres in secondary health care (Papers II and III)

Patients were linked to the interprofessional team responsible for their treatment during the rehabilitation stay. This linkage was facilitated in collaboration with liaisons working in the rehabilitation centres. The liaisons received a list of patients registered as having stayed in the rehabilitation centre in question. Furthermore, the liaisons were asked to provide information regarding which team treated the particular patient within the rehabilitation centre. Non-responders were issued two reminders, occurring one and two months after initial invitation, for the one-year follow-up. Information concerning sex and age was obtained from the baseline survey for non-responders in the follow-up study.

3.3 Measurements

3.3.1 Health care professional questionnaire

Relational Coordination survey

The RCS was developed by Professor Jody Hoffer Gittel and was first tested and utilised in a study of flight departures in 1994 [59]. Following the flight departure studies, the RCS has increasingly been used within health care [67,71,148], outpatient clinics [149,150] and various hospital settings [61,70,151,152]. RCS is considered a valid and reliable tool for measuring team functions in health care settings [153]. Furthermore, the RCS has also been found to be related to improvement of patient outcomes [61,69,72,152]. Guidelines for RC theory, measurement and analysis were published in 2011 and revised in 2012 [59].

The original American version of the RCS was translated using an authorised translation bureau. The research team discussed lingual, cultural and cognitive issues of the translated RCS questionnaire [147]. Prior to the back translation of the survey, the Norwegian version of the RCS was pilot tested among 10 health care professionals [147], resulting in only minor amendments regarding the interpretation of items and contextual issues. The translation and back-translation was performed in accordance with the guidelines recommended by Beaton et al. [154]. The Norwegian version of the RCS was used in Papers I, II and III [147].

The RCS measures team functions in two subscales: quality communication and supportive relationships. Four aspects; frequency, timeliness, accuracy and problem-solving, evaluate the quality of communication between interprofessional team members [59]:

- *Frequent* communication involves team members communicating for the purpose of information exchange and building relationships
- *Timely* communication entail that the ongoing communication is provided in time

-
- *Accurate* communication involves the trustworthiness among team members and the effectiveness of team performance
 - *Problem-solving* communication involves team members engaging in solving problems through communication rather than blaming

Three aspects evaluate supportive relationships between interprofessional team members; shared goals, shared knowledge and mutual respect [59]:

- *Shared goals* involves team members sharing a set of goals ensuring that patients' needs are met
- *Shared knowledge* involves team members having knowledge of each other's roles and how their own role fits that of the other team members involved in the care process
- *Mutual respect* involves respecting the competence of each team member involved in the same care process

Each RCS item represents a question focusing on the health care professionals' role (e.g. 'How *frequently* do members of the interprofessional team communicate with you about _____ patients?'). Each response was ascertained on a five-point Likert scale ranging from one (never) to five (always). The mean score was calculated for each of the two RCS subscales. A higher mean subscale scores indicate better quality communication and/or supportive relationships among and between interprofessional team members [67,74]. Jody Hoffer Gittel, Head of the Relational Coordination Research Collaborative (RCRC), permitted the use of the RCS in the present study (<https://heller.brandeis.edu/relational-coordination/>). The Norwegian version of the Relational Coordination Survey is presented in appendix 5.

3.3.2 Patient-reported questionnaire

By December 2014, a research team prepared and developed the questionnaire for patient-reported outcomes [155] intended for use at baseline in the REKOVE study. Issues concerning comparability, efficiency, non-redundancy, validity, reliability and feasibility were discussed. In the questionnaire used at baseline we asked for

information regarding: date of filling in the questionnaire, sex, main diagnosis, additional diagnosis, physical fitness, physical activity, smoking and health care utilization. Furthermore, the baseline questionnaire included the following survey instruments:

1. Nijmegen Continuity Questionnaire-Norwegian version (NCQ-N)
2. WHO disability assessment schedule-version 2.0 (WHODAS 2.0)
3. Medical Outcome Study Questionnaire Short Form 36 version I (SF-36)
4. Hospital Anxiety and Depression Scale (HADS)
5. Sense of Coherence 13-item questionnaire (SOC-13)
6. European Quality of Life Five Dimension Five descriptive system (EQ-5D-5L)

A pilot test was conducted to uncover possible points of misunderstanding, weaknesses, uncertainties and completion time [155], among three colleagues at the Centre for rehabilitation and habilitation in Western Norway and 33 rehabilitation patients selected from four rehabilitation centres in Western Norway. These test groups had no prior knowledge of the content in the questionnaire. Age ranged from 40 to 86. Twenty-one were women and 15 men. Completion time ranged from 21 to 90 minutes with a mean time of 37 minutes. The pilot test did not result in alterations of the baseline questionnaire.

A research team prepared the one-year follow-up questionnaire in December 2015. The one-year follow-up questionnaire included a section related to the rehabilitation stay and selected items from the PasOpp survey instrument [156], NCQ- N, WHODAS 2.0, SF-36, HADS and EQ-5D-5L. As the follow-up questionnaire was similar to the baseline questionnaire, only shorter, no pilot testing was performed. The baseline questionnaire package was 14 pages long and consisted of 150 questions/statements. The one-year follow-up questionnaire package was 13 pages long and consisted of 141 questions/statements. The baseline questionnaire can be viewed in V.P. Moen [155]. The complete questionnaire of the one-year follow-up survey is presented in appendix 6.

Additionally, information about respondents' education level and marital status was obtained from Statistics Norway and linked to the data for Papers II and III.

Information regarding the main diagnoses (Statistical Classification of Diseases and Related Health Problems- tenth revision (ICD-10) chapter) was collected from the patients' letter of referral.

3.3.3 Patient-reported outcome measures

In this present study, a selection of patient-reported outcome measures from the baseline and 1-year follow-up questionnaire package was used in papers I, II and III.

Nijmegen Continuity Questionnaire-Norwegian version

In 2007, Uijen et al. developed and tested the Nijmegen Continuity Questionnaire (NCQ) [108]. The NCQ is a patient-rated instrument measuring personal, team and cross-boundary continuity of care [108,138,157]. Hence, these aspects of continuity cover informational, relational and management continuity described by Reid et al. [112]. According to a psychometric evaluation, the NCQ has been identified as a valid and reliable generic instrument measuring patient-experienced care continuity as a multi-dimensional concept to be utilised regardless of diagnosis, multi-morbidity or settings [138]. The NCQ has previously been used for chronic illness [123], heart failure [158] and chronic obstructive pulmonary diseases [124].

The NCQ comprises 28 positively formulated items divided into seven subscales [108,138]:

- Personal continuity: 'the GP knows me' (five items)
- Personal continuity: 'the GP shows commitment' (three items)
- Personal continuity: 'the care provider knows me' (five items)
- Personal continuity: 'the care provider shows commitment' (three items)
- Team continuity: 'collaboration between care providers within the team' (four items)
- Team continuity: 'collaboration within the hospital or outpatient department' (four items)

-
- Cross-boundary continuity: ‘collaboration between GP and specialist’ (four items)

The original Dutch version of the NCQ was translated into Norwegian in 2014 [159]. According to the recommended guidelines by Beaton et al [154], the original Dutch version of the NCQ was translated using a forward and backward translation process [154], and the research group included linguistic and health care professionals from the Netherlands and Norway.

The Norwegian version of the NCQ (NCQ-N) was included in the 1-year follow-up questionnaire (Appendix 6) and used in Papers II and III. For the purpose of this study, the NCQ-N included in the one-year follow-up questionnaire package was adapted to be utilised in a rehabilitation setting. Consequently, Papers II and III employed two subscales for personal continuity, now reading: ‘the most important health care provider in the rehabilitation centre knows me’ and ‘the most important health care provider in the rehabilitation centre shows commitment’. Furthermore, it included one subscale regarding team continuity: ‘collaboration between health care professionals working in the rehabilitation centre’, and one subscale regarding cross-boundary continuity: ‘collaboration between the rehabilitation centres and GPs in the municipality’. The NCQ-N uses a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree), with an additional option to answer, ‘don’t know’. The NCQ can be accessed online: (<https://ars.els-cdn.com/content/image/1-s2.0-S0895435611000928-mmc1.pdf>).

World Health Organisation Disability Assessment Schedule- version 2.0

In 1988, the WHO published the original Disability Assessment Schedule (WHO/DAS), which primarily assessed functioning of psychiatric inpatients. A beta version of the generic assessment instrument WHODAS II was issued in 1999 [100]. WHODAS II provided a cross-cultural and standardised method for measuring activity limitations and restrictions concerning participation in community activities, and was based on the WHO Psychiatric Disability Assessment Schedule [100].

The WHO developed the WHODAS version 2.0 (WHODAS 2.0) using the activity and participation domains from the ICF to measure disability and to identify the effectiveness of health interventions [101]. The instrument was cross-culturally tested in 19 countries worldwide and was found to perform well in terms of psychometric properties across widely different cultures, populations and diseases [101]. The manual for measuring health and disability through the use of WHODAS 2.0 was published in 2010 [160]. Currently, WHODAS 2.0 constitutes a leading standardised measure of disability across cultures worldwide [100]. Furthermore, WHODAS 2.0 has previously been used to evaluate disability in rehabilitation settings [160-163] and chronic care [164].

Three different versions of WHODAS 2.0 exist: a 36-item version, a 12-item version and a 12+24-item version. In addition, three modes of administration are available: self-administration, interview, and proxy—a third-party view of functioning taken from, for instance, family member or caretakers [160]. In this study, WHODAS 2.0 was included in a larger questionnaire package. WHODAS 2.0 was completed by the patient, and measured the level of disability in the past 28 days of filling in the questionnaire. The 36-item version was employed, including six activity and participation domains [100]:

- Cognition – ‘understanding and communicating’ (six items)
- Mobility – ‘moving and getting around’ (five items)
- Self-care – ‘hygiene, dressing, eating and being alone’ (four items)
- Getting along – ‘interacting with other people’ (five items)
- Life activities – ‘domestic responsibilities, leisure, work and school’ (eight items = four items related to household and four items related to work)
- Participation – ‘joining in community activities’ (eight items)

Responses to each item were ascertained on a five-point Likert scale ranging from one (none) to five (extreme or cannot do). Domain scores are transformed within a range between zero (no disability) and 100 (full disability). In accordance with the WHODAS 2.0 manual, four items of the ‘Life activity’ domain were omitted if no work relations were reported by the respondents [165]. The WHODAS 2.0 global score was calculated using either 36 or 32 items, depending on work-related participation. The global score ranges from zero (best/no disability) to 100 (worst/full disability). The WHODAS 2.0 domain and global scores were calculated using complex scoring in accordance with the WHODAS 2.0 manual [165]. Permission to use the WHODAS 2.0 in the present study was granted by the WHO.

EuroQol EQ-VAS

The EuroQol five-dimension descriptive system (EQ-5D) was developed by an interdisciplinary five-country EuroQol group from 1987 to 1991 [166-169]. The three-level EQ-5D was introduced in 1990 and consisted of five dimensions: mobility, self-care, usual activities, pain or discomfort and anxiety or depression. An elaborated version—the five-level EQ-5D—was developed after extensive research and was introduced in 2005 [167]. The EQ-5D describes a generic self-report instrument measuring health status across disease areas, comprising a five-domain questionnaire and a visual analogue scale (EQ-VAS) [166,167,170-172]. The EQ-VAS offers information concerning the patient-rated health state at the time they fill in the questionnaire [167]. Furthermore, the EQ-VAS measures the patients’ overall health ranging from zero (‘worst imaginable health state’) to 100 (‘best imaginable health state’) [167].

The EQ-5D constitutes a validated instrument [173,174] and has been employed in various settings, such as rehabilitation [162,175,176], primary care [177] and chronic care [178,179]. The five-level EQ-5D has also been included in a core set of outcome measures for rehabilitation in Norway [180]. The EuroQol group granted permission to use this instrument in the present study.

PasOpp

In 2003 the Patient Experiences Questionnaire (PEQ) was developed as part of RESKVA (RESultat & KVALitet=results and quality) to be used among inpatients in somatic hospitals in secondary health [181]. The PEQ has been used to measure patient experiences of a hospital stay in Norway [181]. The PasOpp (Pasient-Oppløvelser=patient experiences) replaced RESKVA in a later development of the questionnaire in 2009 [182].

The Norwegian Institute of Public Health (*Folkehelseinstituttet*) developed the patient-reported PasOpp survey for capturing patient experiences of a stay in private rehabilitation centres in secondary health care. The PasOpp survey aimed to develop a validated method for measuring patient experiences of a rehabilitation stay regardless of diagnosis groups [183]. PasOpp was tested in 2008 and has since been used nationally by collaborating private rehabilitation centres in secondary health care as a quality assurance measure [183].

In the current study only five questions concerning the patient-experienced benefit of the rehabilitation stay, including overall rehabilitation benefits, physical health benefits, mental health benefits, activity of daily living (ADL) benefits, and social participation were retrieved and utilised from the PasOpp survey [156]. Responses were measured on a five-point Likert scale ranging from one (not at all) to five (to a great extent) with an additional option of ‘not applicable’. The PasOpp questionnaire can be accessed online:

(https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2009-og-eldre/pasopp_sporreskjema_rehab_nasjonal.pdf)

3.3.4 Overview of variables used

The RCS was utilised to measure quality communication and supportive relationships in interprofessional teams within hospitals and rehabilitation centres in secondary health care in Papers I, II and III. The NCQ-N, PasOpp, WHODAS 2.0 and EQ-VAS were utilised to measure patient-reported continuity of care, rehabilitation benefits, health and disability in Papers II and III. These instruments were included in a larger

questionnaire package also containing sociodemographic questions used in this study. Table 1 provide an overview of variables obtained through the RCS survey among health care professionals in the first part of this study (Paper I).

Table 1. Overview of sociodemographic variables and team-reported variables used in Paper I

| | Categorisation/ item scoring | Paper |
|--------------------------------------|--|--------------|
| Sociodemographic variables | | |
| Sex | Male or female | I |
| Age | Decades | I |
| Predictor variables | | |
| <i>Individual predictors</i> | | |
| Age | ≤ 30 and ≥ 40 | I |
| Sex | female vs male | I |
| Use of clinical procedures | yes and under development vs no | I |
| Physician | physician vs not physician | I |
| <i>Team specific predictors</i> | | |
| Proportion of women | Number of women in the team/number of team members in the team | I |
| Proportion of team members | >40 years | I |
| Clinical procedure | if $\geq 80\%$ yes and under development= in use | I |
| Proportion of physicians in the team | Number of physicians in team/total number of team members | I |
| Team size | Total number of valid responses in the care process | I |
| Outcome variables | | |
| <i>Relational Coordination</i> | Likert scale: 1–5 1=never 5=always | I |

For the second part of this thesis, associations between quality communication and supportive relationships and PROs were captured using the mean RCS subscale scores estimated for each team. Furthermore, each patient was assigned the respective mean RCS subscale score from the team they were treated by in Papers II and III. Table 2

provides an overview of the sociodemographic and team- and patient-reported variables utilised in Papers II and III (Table 2).

Table 2. Overview of sociodemographic variables, team- and patient-reported variables utilised in Papers II and III

| | Categorisation/ item scoring | Paper |
|-----------------------------------|---|--------------|
| Sociodemographic variables | | |
| Sex | Male or female | II, III |
| Age | Decades | II, III |
| Origin of referral | Hospital physician or GP | II |
| Referral diagnosis | Neoplasms, circulatory, neurological, musculoskeletal or others | II, III |
| Education level | Elementary school, high school or university/college | II, III |
| Marital status | Married, unmarried, divorced | II, III |
| Predictor variables | | |
| Relational Coordination | RCS subscale scores Team mean (SD) | II, III |
| NCQ-N | Likert scale: 1–5 1=strongly disagree 5=strongly agree | III |
| Outcome variables | | |
| NCQ-N | Likert scale: 1–5 1=strongly disagree 5=strongly agree | II |
| WHODAS 2.0 | 0 –100 0=no disability 100=complete disability | II, III |
| EQ-VAS | 0 –100 0=no health 100=complete health | III |
| PasOpp | Likert scale: 1–5 1=not at all 5=to great extent | II |

Abbreviations: NCQ-N: Nijmegen continuity questionnaire- Norwegian version; WHODAS 2.0: World Health Organization Disability Assessment Schedule version 2.0; EQ-VAS: EuroQol EQ-VAS.

3.4 Analyses

The IBM SPSS for Windows version 23 (IBM, Corp., Armonk, NY) and R 3.3 [184] with the packages lavaan 0.5 [185] and nlme (Linear mixed-effect (LME) model) [186] were employed for statistical analyses in Paper I. The IBM SPSS for Windows version 23 (IBM Corp., Armonk, NY) and STATA 14 (Stata-Corp., College Station, TX) [187] were used in Paper II. The IBM SPSS for Windows version 24 (IBM Corp., Armonk, NY) [188] and STATA 15 (Stata Corp., College Station, TX) [189] were utilised in Paper III. The tests were two-tailed, and the level of significance was set to 0.05 for all papers, as Bonferroni correction applied for the α -level in models involving multiple tests was considered too conservative.

3.4.1 Paper I

In order to assess the psychometric properties of the Norwegian version of the RCS a confirmatory factor analysis (CFA) was employed evaluating four estimates of model fit; comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMS). To define a satisfactory model fit, the following criteria were utilised: $CFI \geq 0.95$, $TLI \geq 0.95$, $RMSEA < 0.06$ to 0.08 and $SRMR \leq 0.08$ [190-192]. A χ^2 difference test was employed to assess the best model fit [193].

Cronbach's alpha (α) was computed to assess intra-scale consistency with regards to internal reliability; Cronbach's $\alpha \geq 0.90$ was regarded as excellent [194].

At the time of conducting this study, no instruments measuring communication and relationships in teams were available in Norwegian language. Therefore, the criterion validity of the RCS could not be tested according to what degree the subscale scores were reflecting a golden standard [195].

The arrangement of RCS items in Corporator Surveyor allowed responders to leave items unanswered, and consequently the questionnaire was returned with missing items in Paper I. Therefore, cases were excluded due to missing data. Missing RCS responses were handled by excluding respondents with less than 40% of the

questionnaire filled in. Furthermore, health care professionals who responded to less than three of the seven RCS items were excluded. Finally, teams were excluded if the care process had less than four respondents.

In order to explore the research question concerning team functions (communication and relationships) within and between interprofessional team members in specific care processes in secondary health care, a one-way analysis of variance (ANOVA) was utilised.

To assess individual- and team-level characteristics influencing communication and relationships in the interprofessional team, linear models were employed. To analyse individual-level characteristics, LME models were employed using age, sex, use of clinical procedures and profession as independent variables and RCS subscale scores as dependent variables. Team affiliation was set as a random effect in the LME model to account for possible intra-cluster correlations within each team. Simple linear models were employed to analyse team-level characteristics. In these models, aspects concerning the composition of the team (proportion of women, proportion of physicians, team members above 40 years and team size) and the use of written clinical procedure were included as independent variables while RCS subscale scores were entered as dependent variables.

3.4.2 Paper II

For the RCS data collection in Paper II, team members needed to answer for all occupational groups included in the interprofessional rehabilitation team in one RCS question before proceeding to the next RCS question. Consequently, there were no missing values for RCS data in Papers II and III.

Patient-responses were excluded if more than two items of the NCQ-N were missing in a subscale. Furthermore, patient-responses were excluded if WHODAS 2.0 was left without a response in the one-year follow-up study. Additionally, patient respondents were excluded if not connected to the interprofessional team treating the patient, and due to missing education level.

This study used LME to investigate the research question of associations between RCS team functions and patient-reported rehabilitation benefits and continuity of care. The RCS communication and relationship scores were utilised as independent variables in these models. Dependent variables consisted of five rehabilitation benefit items from the PasOpp survey instrument and four NCQ-N subscales: personal continuity ('knows me'), personal continuity ('shows commitment'), team continuity and cross-boundary continuity from the one-year follow-up survey. Furthermore, the adjusting variables consisted of sex, age group at one-year follow-up, ICD-10 referral diagnosis group, origin of referral, level of education and WHODAS 2.0 global baseline score.

Four models were estimated for each of the nine dependent variables. The independent and dependent variables were included in model zero, i.e. RCS communication as the independent variable and NCQ-N Personal continuity 'knows me' as the dependent variable. The second model (model one) included the ICD-10 referral diagnosis as an adjustment variable. The third model (model two) included the ICD-10 referral diagnosis and WHODAS 2.0 global baseline score. The final model (model three) included the ICD-10 referral diagnosis, WHODAS 2.0 global baseline scores, sex, age-group, origin of referral and education level. All models included an Akaike information criterion (AIC) estimating the relative amount of information lost after including adjustment variables [196] (Supplementary table accompanying Paper II, appendix 2).

3.4.3 Paper III

Linear models were used to assess the research question regarding possible associations between RCS subscales (independent variables) in interprofessional rehabilitation teams and changes in patient-reported health state and level of disability (EQ-VAS and WHODAS 2.0 domain and global scores as dependent variables). Additionally, linear models were employed to assess the research question concerning associations between patient-rated personal, team and cross-boundary continuity (NCQ-N subscales were used as independent variable) and changes in the health state and level of disability (EQ-VAS and WHODAS 2.0 domain and global scores at

follow-up were used as dependent variables). Changes in dependent variables were expressed by adjusting for WHODAS 2.0 domain and global scores and EQ-VAS baseline scores in all linear models. The LME models were employed when assessing associations between RCS subscale scores and changes in dependent variables (WHODAS 2.0 domain and global scores and EQ-VAS) due to RCS subscales being clustered at the team level. These models included a random intercept to account for possible team-level clustering.

Analyses included an interaction between ICD-10 referral diagnosis groups and WHODAS 2.0 domain and global scores/EQ-VAS. This interaction was incorporated to assess the possible different gradients present for the diagnosis groups included. All models were adjusted for sex, age group, marital status, education level and ICD-10 referral diagnosis groups.

Missing data were handled using a flexible multiple imputation (MI) method, according to the WHODAS 2.0 manual [160]. This involved using chained predictive mean matching, creating 50 datasets [197]. The results of the 50 datasets were pooled into a final point estimate along with the standard error according to Rubin's rules [197].

3.5 Ethical considerations

The research in this study was carried out in accordance with the Declaration of Helsinki [198].

In the first part of this study, the data collection method was approved by the Norwegian Social Science Data Service (NSD) in 2012 (reference no. 29128) (Appendix 7). The Regional Committee for Medical Research Ethics in Western Norway (REK-No. 2014-1636) approved the research project and data collection for Papers II and III (Appendix 8).

Health care professionals working in interprofessional teams in secondary health care received information regarding the study and informed consent by an email. The

invitation included information concerning the project, information regarding voluntary participation and the possibility of withdrawal of consent, data anonymity and the method used to collect data. Informed consent to participate was assumed when a completed survey was electronically returned (Papers I, II and III).

Furthermore, invited patients received information concerning the project along with a written consent form (Papers II and III). They were informed regarding the possibility to withdraw their consent to participate and data anonymity. The written consent collected from all participating patients also included consent to link the data with public register data.

4. RESULTS

4.1 Interprofessional team characteristics

The first part of this study included a sample of 263 participants (52% response rate), representing teams in 23 care processes from somatic hospitals and mental health units (Paper I). The second part included 124 team member responses (52% response rate), representing 15 interprofessional rehabilitation teams from rehabilitation centres in secondary health (Papers II and III). Table 3 provides an overview of health care professionals included in all three papers.

Table 3. Overview of professional groups included in Papers I, II and III

| Functional group | Paper I | Papers II and III |
|---|------------------|-------------------|
| | N (%) | N (%) |
| Physician | 88 (33) | 10 (8) |
| Physical therapist | 23 (9) | 42 (34) |
| Occupational therapist/ Educator/Social worker | 28 (11) | 16 (13) |
| Nurse | 98 (37) | 39 (31) |
| Other* | 22 (7) | 17 (14) |
| Missing | 7 (3) | 0 (0) |
| Total | 263 (100) | 124 (100) |

*Other: Paper I: coordinator (n=8), bioengineer (n=5), learning disability nurse (n=4), radiographer (n=1), radiologist (n=1) and special education (n=2). Papers II and III: job counsellor (n=1), coach (n=2), child welfare (n=1), coordinator (n=3), nutritionist (n=4) and undefined (n=6).

4.2 Patient cohort characteristics

Among the 701 included patient 62% were women. The mean age (standard deviation [SD]) was 60 (13.5) years for women and 63 (13.4) years for men. Of the included patients, 7% were included in the neoplasm patient group, 11.6% in the nervous

system disease group, 50.8% in the musculoskeletal system disease group, 8.6% in the circulatory system disease group and 21.7% in others (Table 1, Paper III).

4.3 Paper I

The evaluation of three estimates of fit—CFI=0.93, TLI=0.89 and SRMR=0.06 (the latter being dependent on χ^2 and sample size [190]) demonstrated a satisfactory two-factor solution for the Norwegian version of the RCS. A χ^2 difference test confirmed the two-factor solution as the optimal fit for the RCS instrument ($\chi^2_{\text{diff}}=83.6$, $p<0.001$).

The estimated intra-scale consistency for RCS communication and relationship subscale scores had a Cronbach's α of 0.93 and 0.80, respectively. These estimates indicate satisfactory internal reliability of the instrument.

The mean (SD) RCS quality communication and supportive relationship scores in interprofessional teams in secondary health ranged from 4.3 (0.52) to 2.7 (0.34) and from 4.5 (0.33) to 3.2 (0.71), respectively (Table 4, Paper I). The 95% confidence interval (CI) shows a marked difference of the RCS subscale scores between teams working in care processes included in this present study (Table A9.1, Appendix 9).

There were significantly higher RCS communication and relationships scores among health professionals having similar occupational roles. Table 5 presents the descriptive results of the associations between RCS subscale scores and the occupational roles included in the team. These results are also presented as Figure 1 in Paper I.

Table 5. RCS communication and relationship subscale scores among and between occupation roles included in interprofessional teams in secondary health care

| | Nurse Mean (95% CI) | Physician Mean (95% CI) | Therapy/other Mean (95% CI) |
|--------------------------|------------------------|----------------------------|--------------------------------|
| RCS communication | | | |
| Nurse | 4.36 (4.22, 4.49)* | 4.09 (3.91, 4.28) | 4.02 (3.82, 4.23) |
| Physician | 3.71 (3.56, 3.85) | 3.92 (3.76, 4.07) | 3.68 (3.49, 3.87) |
| Therapy/other | 2.75 (2.55, 2.95) | 2.83 (2.62, 3.03) | 3.48 (3.29, 3.67)** |
| RCS relationship | | | |
| Nurse | 4.44 (4.33, 4.55)** | 4.32 (4.21, 4.43) | 3.92 (3.74, 4.10) |
| Physician | 3.94 (3.80, 4.08) | 4.29 (4.15, 4.42)** | 3.68 (3.49, 3.86) |
| Therapy/other | 3.41 (3.25, 3.58) | 3.48 (3.31, 3.64) | 3.83 (3.65, 4.00)* |

* p <0.05

** p <0.001

Investigations of individual-level characteristics associated with teamwork revealed that written clinical procedures improved the quality of communication among team members ($b=0.20$; 95% CI=0.00, 0.41; $p=0.049$). Furthermore, a physician present in interprofessional teams demonstrated a trend towards improving supportive relationship scores in teams ($b=0.17$; 95% CI=0.00, 0.34; $p=0.051$) (not significant) (Table 3, Paper I). For the individual-level characteristics (predictor), this study found that the variance of fixed effects (predictor) explained 2% and 3% of the variation in the RCS subscales, respectively. In turn, the variance explained by the random effect between teams (variance between teams) explained 41% and 28% in the multivariate LME. These estimates have previously no been included in Paper I, and are presented in Table A9.2 (Appendix 9).

While investigating team-level characteristics associated with RCS team functions, it was found that the fraction of women was associated with higher RCS communication and supportive relationship scores in the team ($b=1.68$; 95% CI=0.51, 2.85; $p=0.007$ and $b=0.99$; 95% CI=0.12, 1.85; $p=0.028$, respectively). However, these results were only significant in the univariate model. Other team-level characteristics were not associated with RCS team functions in the multivariate model (Table 5, Paper I). For the association between team-level characteristics and RCS subscale scores, 21% and 30% of the variance in the RCS communication and relationship subscales the

univariate model were explained by the fraction of women in the team, respectively (not previously included in Paper I) (Table A9.3, Appendix 9)

4.4 Paper II

RCS mean (SD) communication and supportive relationship scores in interprofessional rehabilitation teams were 3.9 (0.63) and 4.1 (0.56), and ranged between 3.4–4.4 and 3.6–4.5, respectively (Table 2, Paper II). Table A9.4 (Appendix 9) includes the 95% CI of the mean RCS subscale scores for all the interprofessional rehabilitation teams showing a difference in RCS subscale scores between teams working in rehabilitation centres included in this present study (not previously presented in Table 2, Paper II).

In the one-year follow-up, the mean (SD) rehabilitation benefit scores (PasOpp) ranged from 3.8 (0.97) – 3.1 (1.11), with an overall mean (SD) patient-reported rehabilitation benefit being the highest rated rehabilitation benefit score. The mean (SD) patient-reported NCQ-N personal, team and cross-boundary continuity of care scores ranged from 3.7 (0.82) to 2.9 (0.97). Team continuity constituted the highest rated continuity of care subscale (Table 3, Paper II, and Table A9.5 in appendix 9).

The results with regard to associations between RCS subscale scores and patient-reported rehabilitation benefits and NCQ-N subscales were derived from the univariate LME models as the AIC estimate indicated that adjustments did not improve the model.

Being treated by teams having high quality communication was associated with improvement of ADL, as reported by the patient ($b=0.29$, 95% CI=0.01, 0.58, $p=0.044$). No associations were found between RCS subscale and the overall, physical, mental health and participation benefit scores investigated in this study (Table 4, Paper II). This study found that the effects of the predictor variables (fixed effect) explained < 1 % of the variation, whilst the random effect between teams explained <3% of the variation in the univariate LME for the associations between RCS subscale scores and patient-reported rehabilitation benefit scores. Details about explained variances are given in Table A9.7 in appendix 9 that is an extension of Table 4, Paper II.

RCS supportive relationships scores in interprofessional rehabilitation teams were associated with patient-reported NCQ-N team continuity ($b=0.36$, 95% CI=0.05, 0.68, $p=0.024$). There were significant inverse associations between RCS quality communication and supportive relationships scores in teams and the two NCQ-N subscales of personal continuity: ‘knows me’ and ‘shows commitment’ ($b=-0.33$, 95% CI=-0.58, -0.09, $p=0.008$ and $b=-0.40$, 95% CI=-0.67, -0.13, $p=0.004$) ($b=-0.40$, 95% CI=-0.83, -0.09, $p=0.011$ and $b=-0.50$, 95% CI=-0.83, -1.16, $p=0.004$), respectively. An inverse association was also found between the RCS supportive relationship subscale score and cross-boundary ($b=-0.42$, 95% CI=-0.80, -0.04, $p=0.030$) (Table 4, Paper II). For the associations between RCS subscale scores and patient-reported NCQ-N subscale scores, this study found the variance explained by the fixed (predictors) effect was $< 2\%$, whilst the random effects between teams explained $< 1\%$ of the variance in the univariate LME in this study (Table A9.8, Appendix 9) (not included in Table 4, Paper II). The intra-class correlation (ICC) between the independent variables and dependent variables in Paper II were < 0.001 and almost equal to explained variance obtained from the fixed and random effects (not tabulated), reflecting the use of team allocation as random intercept may have been unnecessary in the LME.

4.5 Paper III

In the sample of patients ($N = 701$), the mean (SD) WHODAS 2.0 global disability score decreased from 28.6 (15.4) at baseline to 24.1 (15.9) at the one-year follow-up. Furthermore, the patient-reported mean (SD) EQ-VAS improved from 51.4 (18.8) at baseline to 58.2 (20.1) at the one-year follow-up (Table 2, Paper III).

All four NCQ-N continuity of care subscales were positively associated with improved patient health state as measured with EQ-VAS at one-year follow-up (Table 5, Paper III). Associations between NCQ-N subscale scores and patient-reported EQ-VAS scores revealed that the variance explained by the predictor (R^2) was between 26% – 34% in the univariate linear models. Table A9.9 in appendix 9 is an extension of Table 5, Paper III and presents the explained variance between NCQ-N subscales and EQ-

VAS. The NCQ-N team continuity was associated with positive changes in WHODAS 2.0 cognition domain score ($b=-1.54$, $95\%CI=-2.90, -0.18$, $p=0.027$) and participation domain score ($b=-2.09$, $95\%CI=-4.39, -0.00$, $p=0.050$). Additionally, cross-boundary continuity was associated with positive changes in WHODAS 2.0 life activities domain scores ($b=-2.20$, $95\%CI=-4.39$, $p=0.050$). However, no other associations were found between NCQ-N subscales scores with the remaining WHODAS 2.0 (domain/global) scores (Table 4, Paper III). For the associations between NCQ-N subscale scores and patient-reported WHODAS 2.0 domain and total scores, this study found that the variance explained by the predictor (R^2) was between 5% – 34% in the univariate linear models (Table A9.10 in appendix 9 is an extension of Table 4 in Paper III).

The study did not reveal associations between RCS quality communication and supportive relationships and change in health state, as measured with EQ-VAS (Table 5, Paper III). Furthermore, no associations were found between RCS team functions and changes in patient-reported level of functioning, as measured with WHODAS 2.0 domain and global scores (Table 4, Paper III).

The results from the analyses including an interaction between the ICD-10 diagnosis groups and the independent variables showed an association between RCS quality communication and positive changes in the disability level for the neoplasm patient groups. The neoplasm patient group exhibited a marked reduction in the disability level for most WHODAS 2.0 domain and global subscale scores compared to other patient groups included (Table 2 and Supplementary Table 1, Paper III, Appendix 3). The same group also experienced greater improvement in their EQ-VAS health status score from baseline to one-year follow-up compared to other patient groups included, however, not significant (Table 2 and Supplementary Table 1, Paper III, Appendix 3). Teams reporting high levels of supportive relationships were associated with a reduction in EQ-VAS health state score for the neurological disease patient group (Figure 3, Paper III).

Non-responders at the one-year follow-up were descriptively younger and consisted of a larger proportion of men (Table 1, Paper III). Table 5 shows an overview of all findings in Papers I, II and III.

4.6 Overview of findings in Papers I, II and III

Table 5. Overview of findings in Papers I, II and III

| Paper | Association studied | | Finding | Comment |
|--------------|--|--|--|---|
| I | Team members holding similar occupational roles | Increased RCS quality communication and supportive relationships | Positive significant association | |
| I | Written clinical procedures | Increased RCS quality communication | Positive significant association | |
| I | Proportion women in the team | Increased RCS quality communication and supportive relationships | Positive significant association | Significant in the unadjusted model |
| I | Physician present in the team | Increased RCS supportive relationships | Trend towards positive significant association | Significant in the unadjusted model |
| II | RCS quality communication | Improved ADL benefit at one-year follow up | Positive significant association | Significant in the unadjusted model |
| II | RCS quality communication and supportive relationships | Improved overall benefit, physical health benefit, mental health benefit and participation | No significant association | Positive but non-significant association for all outcomes |
| II | RCS supportive relationships | Improved NCQ-N team continuity at one-year follow up | Positive significant association | |
| II | RCS quality communication | Improved NCQ-N team continuity at one-year follow up | No significant association | |
| II | RCS quality communication and supportive relationships | Improved NCQ-N personal continuity at one-year follow up | Inverse significant association | |
| II | RCS supportive relationships | Improved NCQ-N cross-boundary continuity at one-year follow up | Inverse significant association | |

| | | | |
|-----|--|--|----------------------------------|
| III | NCQ-N personal continuity | Improvement in EQ-VAS health state from baseline to follow up | Positive significant association |
| III | NCQ-N team continuity | Improvement in EQ-VAS health state from baseline to follow up | Positive significant association |
| III | NCQ-N cross-boundary continuity | Improvement in EQ-VAS health state from baseline to follow up | Positive significant association |
| III | NCQ-N team continuity | Decrease in WHODAS 2.0 cognition domain from baseline to follow-up | Positive significant association |
| III | NCQ-N team continuity | Decrease in WHODAS 2.0 participation domain from baseline to follow-up | Positive significant association |
| III | NCQ-N cross-boundary continuity | Decrease in WHODAS 2.0 life activities domain from baseline to follow-up | Positive significant association |
| III | NCQ-N team, personal and cross-boundary continuity | Decrease in other WHODAS 2.0 domain and global score from baseline to follow-up | No significant associations |
| III | RCS quality communication and supportive relationships | Improvement in EQ-VAS from baseline to follow-up | No significant associations |
| III | RCS quality communication and supportive relationships | Decrease in WHODAS 2.0 from baseline to follow-up | No significant associations |
| III | RCS quality communication | Decrease in WHODAS 2.0 from baseline to follow-up for the neoplasm patient group | Positive significant association |
| III | RCS supportive relationships | Improvement in EQ-VAS from baseline to follow-up for the nervous disease patient group | Inverse significant association |

5. DISCUSSION

RCS quality communication and supportive relationships varied across the interprofessional teams working within selected hospital settings and rehabilitation centres in secondary health care in Western Norway. The RCS quality of communication and supportive relationships were highest in teams working in care processes related to rehabilitation. The use and development of written clinical procedures was associated with RCS quality communication in teams in the present study.

Further findings were that high level of RCS supportive relationships among health care professionals in a team was positively associated with patient-reported team continuity. However, high RCS supportive relationship scores in teams were inversely associated with patient-reported personal and cross-boundary continuity of care (NCQ-N).

Finally, patient-reported team and personal continuity was associated with positive changes of the patients' health state (EQ-VAS). Although there was a positive association between RCS quality of communication in teams and patient-reported changes in ADL (PasOpp), this study could not confirm other associations between RCS subscale scores and patient-reported changes in health state (EQ-VAS) and disability (WHODAS 2.0). Cross-boundary continuity between teams in rehabilitation centres and the local GP was associated with positive changes over time in the patients' health state.

5.1 Relational coordination in interprofessional teams in secondary health care

Nine out of 15 interprofessional rehabilitation teams scored above 4.0 on RCS subscales (Paper II and III) whereas six out of 23 teams working in hospital settings scored above 4.0 (Paper I), indicating high quality of communication and relationships in these teams [59,74,199]. Three of these teams were rehabilitation teams treating stroke patients (Paper I). This finding could be explained by the implementation of a

national guideline for treatment and rehabilitation of stroke patients, which emphasise the importance of collaborative teamwork for this patient group [200]. Furthermore, the rather high RCS subscale scores in rehabilitation teams indicate that these services are following recommendations to improve integrated care coordination stated in the Norwegian white papers: *Coordination Reform and High Quality – Safe Services* [13,14].

Written clinical procedures were associated with the quality of communication in teams (Paper I), in line with previous studies [42,199,201]. Furthermore, the Norwegian definition of rehabilitation from 2018 states that the rehabilitation process should be ‘processes that are characterised by being coordinated, coherent and evidence based’. A systematic review revealed that written clinical procedures improves the quality of communication and supportive relationships among team members [30]. It has previously been established that written clinical procedures support interprofessional teams implementing evidence-based key interventions [202]. The quality of care could improve due to team members being more involved in processes important for forming effective teamwork by utilising written clinical procedures [64,76,203].

Health care professionals holding similar occupational roles influenced the quality of communication positively, in line with previous studies (Paper I) [70,204]. One explanation for this finding could be that team members communicate and share information better when holding similar occupational roles due to a common underlying philosophy [205]. Previous research has found that poor understanding of other team members’ occupational roles hinders the quality of communication and supportive relationships [28,75,63,206]. Subsequently, an understanding of each other’s professional roles in the team must be recognised for real communication and collaboration to occur [207]. Cultural differences between health care professional, i.e. different values, beliefs, attitudes, customs and behaviours, could be another explanation for the better communication and relationships among team members holding similar professional roles found in this study [208]. As teams in health care have high levels of task interdependence, these cultural aspects are challenged and

may reduce the ability to form good quality communication and relationships among team members [42]. Therefore, better communication and relationships among health care professionals holding similar roles may indicate evidence of existing cultural barriers and could have limited efficient interprofessional teamwork in some of the teams included in this study.

This present study indicates that having a physician in interprofessional teams may improve supportive relationships among team members (Paper I). However, previous research has found that physicians in the team may inhibit relationship formation, as physicians are trained to make independent decisions [68]. On the other hand, sharing knowledge and establishing relationships among team members can become difficult if a hierarchy is present in the team [27]. One explanation for the higher supportive relationships in teams including a physician found in this study could be that the hierarchy faded due to a collaborative focus on patient outcomes [48]. Furthermore, this study found that a higher proportion of women was associated with teams scoring higher on RCS subscales, in line with previous research [68]. In sum, the composition of interprofessional teams is relevant for quality communication and supportive relationships forming in health care settings.

The mean RCS subscale scores in interprofessional teams varied markedly in the care processes investigated in hospitals in secondary health care (Paper I). Although there were differences in RCS subscale scores for teams in rehabilitation centres (Paper II and III), these differences varied less markedly compared to the variation found for teams working in hospital settings. Previous research has found comparable ranges of RCS subscale scores for teams working in similar hospital settings as revealed in this study. However, most of these previous studies investigated RCS between two occupational roles in teams, i.e. the physician and the nurse [71,150,152], with the exception of one study that included teams with members holding similar professional roles as in the present study (Paper I) [72]. This previous study reported RCS communication and relationship scores at 3.7 and 3.4, respectively, which is within the same range found in Paper I, but a lower range compared to findings in Papers II and III [72]. A possible explanation for varying RCS subscale scores in this present study

may be differences in the structure or organisation of teams in the different care processes in hospital settings. Whilst a clear definition of an interprofessional team was evident in the rehabilitation centres, teams in hospital settings may have had more flexible and ad hoc structured teams [25]. Another explanation of the difference in RCS subscale scores could be the level of task interdependence in the team. Not all care processes have high levels of interdependence and therefore do not prioritize an interprofessional team structure in the same manner as rehabilitation teams. Interventions in rehabilitation settings are highly complex with high levels of task interdependence and therefore more in need of well-functioning teams compared to less interdependent teams [32].

5.2 The impact of relational coordination on continuity of care

5.2.1 Team continuity

An important finding of this study was the positive association between high RCS supportive relationship scores in teams and the patient-reported team continuity (Paper II). This finding indicates that patients found interprofessional teams to work collaboratively and that team members were passing on information important for the patients' rehabilitation process. Previous studies have found that relational coordination among team members was associated with patient satisfaction, i.e. information exchange, with the team [32]. According to the RC theory, interprofessional teams with high RCS relationship scores use a shared approach of problem solving to reach the patients' goals [44,59]. Furthermore, using problem-solving approaches in teams is of particular importance in health care due to the complexity of service delivery [44]. However, there was no association between RCS communication and patient-reported team continuity (NCQ-N) (Paper II). According to the RC theory, to achieve increased efficiency of teamwork the communication should be directed in a timely manner across occupational roles as this allows decisions to be made with full and accurate information [44]. Furthermore, the quality of communication and supportive relationships in teams conversely depend on each

other for the purpose of task integration [59] and is essential for achieving coordinated health care [61,65,72,209,152]. Therefore, an explanation for lack of a positive association between RCS quality communication in teams and patient-reported team continuity could be that patients were unaware of the communication occurring among team members. Furthermore, this finding could also indicate that the instrument used to measure the phenomenon of patient-reported team continuity did not capture similar constructs of communication among team members and therefore no significant associations were present [59,108].

5.2.2 Personal continuity

All patients in the rehabilitation centres should have a defined personal care coordinator according to the agreement between rehabilitation centres and the Western Norwegian Health Authority [104]. The coordinator should ensure coordinated and a seamless rehabilitation process for the patient, and ensure personal continuity in the team-based care. This study revealed an inverse association between RCS subscale scores and patient-reported personal continuity subscale scores (Paper II). This finding could indicate that teams emphasise coordination within the team at the expense of the role of a coordinator in the team. Furthermore, in line with results from the present study, a previous study found that health care professionals working in interprofessional rehabilitation teams might grant higher priority to team continuity and lower priority to personal continuity [210]. Related to knowledge regarding the benefits of personal continuity [51,111,116,119], the results in the present study may indicate the need for increased focus on the role of the coordinator in team-based care.

5.2.3 Cross-boundary continuity

The inverse association between RCS supportive relationships and patient-reported cross-boundary continuity (Paper II) was unexpected. Interpersonal processes, such as relational ties among team members assessed by RCS, are according to Donabedian's model for quality of care and the RC theory important for the quality of health care delivery [17,59]. Therefore, one assumption could be that high RCS subscale scores in teams should reflect teams prioritizing information exchange also across health care

settings. Subsequently, positively influencing patient-reported cross-boundary continuity. However, the inverse association found between RCS communication and cross-boundary continuity may indicate that high quality team functions exchange less information with the patients' GP [120]. Hence, within these care settings, working in interprofessional rehabilitation teams is highly prioritised and is facilitated to ensure a consistent and coordinated rehabilitation process within the rehabilitation centre for the patient [211]. The high priority of relational ties in rehabilitation teams could be at the expense of continuity across care settings and therefore affect the quality of an ongoing rehabilitation process negatively. One could speculate whether this inverse association between RCS relationship score and patient-reported cross-boundary continuity could arise because teams within these rehabilitation centres were connected within 'silos' rather than across boundaries and settings in health care. Working within 'silos' hampers care continuity and might impact patient outcomes negatively [56], and may be at the expense of communicating across health care settings.

5.3 The impact of relational coordination and continuity of care on patient-reported outcomes

5.3.1 Rehabilitation benefits

Overall, this study found no significant association between RCS subscale scores in interprofessional rehabilitation teams and patient-reported benefit outcomes, with the exception of ADL (Paper II). The improved ADL agrees with previous research that found well coordinated teamwork to be associated with improved ADL among stroke patients [212]. The improvement of ADL seen in this study is minor and may have been caused by other external factors occurring after the stay; therefore, the results should be interpreted cautiously. For the remaining benefit outcomes; overall benefit, mental health, physical health, and participation, there were generally positive but insignificant associations with high RCS quality communication and supportive relationships scores in teams (Paper II). The positive direction of the non-significant associations between RCS subscale scores and all rehabilitation benefit scores

(PasOpp) could indicate an importance of relational coordination in teams on patient-reported rehabilitation benefits and should be investigated further in future studies.

5.3.2 Health state

Patients reported positive changes in their health state (EQ-VAS) after rehabilitation (Table 2, Paper III). Positive associations were found between patient-reported NCQ-N team continuity and changes of health state (Paper III), implying that coherent and collaborative teams had a positive impact on improvement in the patients' health. This finding agrees with previous studies reporting that collaborative interprofessional teamwork influenced patient outcomes positively [46,49,61,213,214].

This present study found that patients reported more improvement in health state when treated by interprofessional teams passing on information and working well together with the GP in the municipality (Paper III). This finding agrees with previous research that found coordinated care between health care settings to reduce fragmented service delivery, thereby increasing the quality of health care and patient satisfaction [2,4,21,210,215]. Patient-reported personal continuity, which could indicate a clearly defined coordinator in the team, was positively associated with changes in their health (Paper III). This is in line with previous studies that have shown personal continuity to be important for the patient health outcome and the quality of the care process [51,120,125,216,217]. Consequently, having a care provider in interprofessional teams who know the patient well and show commitment contribute to improved patient health, which agrees with previous studies [51,111,128,218,219]. Moreover, the associations between continuity of care and changes in health found in this study could indicate that patient-reported measures of continuity of care is a better predictor for the content of teamwork that impact health outcomes compared to the RCS subscales [220].

According to the RC theory and the high performance work systems model [73], interprofessional rehabilitation teams with high quality of communication and relationships should influence patient outcomes [59,65,152]. However, this present study found that high RCS subscale scores were not associated with improvements in

patient-reported health (Paper III). One interpretation could be that changes in patient-reported health were not substantial enough to facilitate detectable associations with RCS subscale scores as these scores did not differ much between teams.

5.3.3 Functioning

Patients reported an overall significant change in their level of functioning (WHODAS 2.0 domain and global score) at 1-year follow-up (Table 2, Paper III). The changes in disability scores could be considered as moderate, but the clinical importance of these patient-reported changes in functioning could not be assessed since there currently is no established cut-off value for minimal significant change score in WHODAS 2.0. According to the Norwegian definition of rehabilitation, an important aspect contributing to reaching patients' goals is having 'different health care professional cooperating in order to provide necessary assistance to the service user's own efforts to achieve the best possible function' [55]. A possible explanation of the positive changes in the level of functioning could be processes occurring during the rehabilitation stay. On the other hand, as rehabilitation is an ongoing process, further improvements in functioning could also have occurred after a rehabilitation stay as a result of follow-up.

This present study found no associations between teams reporting high RCS subscale scores nor patients reporting high NCQ-N subscale scores and patient-reported WHODAS 2.0 domain and global scores (with few exceptions on WHODAS 2.0 domain subscales) (Table 4, Paper III). Interprofessional teams should empower the patient to take an active role in their own rehabilitation process [84,90,221]. Therefore, a possible explanation for these non-significant findings could be that contextual factors (personal and environmental) contributed more to the changes in the patients' functional level compared to the treatment provided by interprofessional teams during the rehabilitation stay [84]. Thus, the long-term impact of the treatment from interprofessional teams also depends on a wealth of other abilities and limitations that related to the patient, and the patients' physical and social environment [222]. Also, interprofessional teams may not have sufficiently succeeded to provide patients with

appropriate tools for how to live with impairments [223]. A further explanation for this lack of associations could be difficulties to achieve long-term changes in patient-reported disability levels due to the chronicity of the conditions included [41].

By examining different groups of patients in this study, a variation between patient groups related to the chronicity and natural disease progression was found. For instance, this study found that high RCS communication scores were associated with positive changes in patient-reported functioning for the neoplasm patient group. In addition, patients with neurological diseases treated by teams with high RCS supportive relationship scores reported decreased health state. Hence, these two patient groups represent different levels of chronicity and function, i.e. the neoplasm patient group is in a phase of recovery whilst patients with neurological diseases are in need of longer rehabilitation processes for a progressive disease. Therefore, rehabilitation patients have different expectations and needs from the interprofessional team.

5.4 Do interprofessional teams matter?

This study did not compare patients treated by interprofessional teams versus not treated by teams, but investigated interprofessional teams from the perspective of health care professionals, using the RCS, and from the perspective of rehabilitation patients, using the NCQ-N. The present study has shown some processes that are relevant for the quality of interprofessional teams and PROs in health care delivery [17,31,36]. For instance, this study found:

- using and developing written clinical procedures in teams influenced the quality of team communication positively
- teams including a physician was associated with better relationship skills
- health care professionals with high quality relationship skills were associated with patient-reported team continuity
- patients improved their ADL when treated by teams with high quality communication skills

-
- patients reporting positive experiences of team continuity and cross-boundary continuity reported more improvement in their health one year after rehabilitation

On the other hand, the study showed a negative association between RCS and personal continuity and cross-boundary continuity, which in turn had a positive association with PROs. This potential downside of good teamwork could be reduced if interprofessional teams establish better personal relations with patients as well as establishing better communication and relationships with health care professionals outside the institutions.

This study did not disclose associations between RCS team functions and changes in patient-reported health state and disability (Paper III). Even though patients reported an overall improvement of their health state (EQ-VAS) and a reduced disability level (WHODAS 2.0 domain and global), these changes were rather small and could therefore be too insignificant; consequently, detecting associations could be difficult. The lack of associations between RCS team functions and changes in health state and functioning could also reflect the need for different measures to capture associations between team functions and PROs in the future.

5.5 Methodological considerations

5.5.1 Design

A major strength of this study is the comprehensive RCS data set collected from interprofessional team members across a range of care processes typical for both somatic hospitals and mental health units in secondary health care (Paper I). As the number of included teams and care processes were high and a wide range of conditions and settings were represented, generalisability of findings from the present study should be high. However, Paper I used a cross-sectional design, and with this design conclusions about directions of effect cannot be taken.

Another strength of this study is the inclusion of data from team members representing all rehabilitation centres in Western Norway (Papers II and III) in addition to the use of data collected from a large heterogenic rehabilitation patient group (Papers II and III) representing diagnosis groups typical for treatment in rehabilitation centres was a strength. Including such a broad range of interprofessional teams and a comprehensive cohort of rehabilitation patients most probably reduced the risk of selection bias and increased the reliability and generalisability of findings.

A longitudinal prospective cohort study design was employed for Papers II and III. The longitudinal design helped determine how team functions were associated with outcomes such as individual changes in health state and disability. Longitudinal designs allowed making inferences about directions of effects and causality, although one should be careful with drawing certain conclusion about causality. However, a disadvantage of not including more than two measurement points in this study is that the possibility of determining trends in relation to changes in the PROs might be reduced [224,225].

5.5.2 Internal validity

Internal validity concerns what degree the results are due to the independent variable and not explained by other factors [226]. Possible problems threatening the internal validity of this present study are discussed below.

Selection bias

There is a possibility for selection bias in the current study because of factors that may have influenced the participation of health care professionals and rehabilitation patients [226]. If health care professionals most positive towards working in teams responds to the RCS subscales the results will overestimate team function measured by RCS scores and not be representative for the team members' in total. Furthermore, if patients responding to the questionnaire are healthier and more well-functioning compared to non-respondents, the result may be skewed. Since we have no information concerning these issues among non-responders selection bias cannot be ruled out. To increase participation rate health care professionals were offered

information about the study's purpose. Health care professionals and rehabilitation patients received reminders to increase the possibility of participation and to decrease the risk of selection bias.

Information bias

An information bias due to measurement bias occurring during data collection may be present in this current study and needs to be discussed [226,227]. Information bias also includes classification bias that refers to the improper recording of individual factors [228], however this was not considered to be of concern in this study.

Measurement bias

This study used the RCS instrument to investigate the quality of communication and supportive relationships in interprofessional teams in secondary health care. At the time of conducting this study, a systematic review had identified two other validated tools for measuring team functions [153]. However, only the RCS was positively related to the patient outcomes and therefore we selected the RCS to be used in this study (Papers I, II and III). The RCS has previously been suggested to have either a one- or two-factor model structure [28,60,150]. The CFA on the RCS conducted in Paper I demonstrated a satisfactory two-factor structure in line with the underlying RC theory [59]. Cronbach's α estimating the intra-scale consistency for RCS communication (0.93) and RCS relationship (0.80) supported the internal reliability of the two-factor solution. Furthermore, the factor structure and intra-scale consistency (Cronbach's α) of the RCS was investigated among health care professionals working in teams within a large patient population in 23 care processes representing a broad range of diagnoses included from a number of hospitals in Western Norway.

Issues related to criterion validity cannot be ruled out as it could not be assessed due to a lack of instrument comparable to the RCS at the time of conducting this study, i.e. there was no existing 'gold-standard' of the constructs of team communication and relationships to validate up against. Our validation process of the Norwegian version of the RCS was not validated according to the COnsensus-based Standards for the Selection of health Measurement INstruments (COSMIN) guidelines on health care professionals working in rehabilitation centres in Western Norway [229]. Future

studies should therefore consider evaluating the psychometric properties of the RCS in accordance to the COSMIN guidelines to verify the psychometric properties of the instrument.

One strength of this study was the use of validated and reliable generic patient-reported survey instruments, which should reduce possible measurement bias regarding patient-reported outcomes. WHODAS 2.0 is a validated generic survey instrument used internationally [160,161,164,230], showing satisfactory psychometric properties and test-retest reliability for rehabilitation settings in Norway [230]. Furthermore, the EQ-5D-5L is a valid and reliable generic patient-reported survey instrument used internationally [174,231], including Norwegian rehabilitation settings [162]. The NCQ-N is a validated generic instrument showing satisfactory psychometric properties in terms of factor structure and reliability [108,159]. However, a potential problem might occur with self-rated questionnaires when measuring ‘soft’ constructs operationalised through selected indicators. In this case, the interpretation of subjective experiences translated into objective numbers might result in decreased validity. Furthermore, a possible disadvantage of using generic instruments could be that the results might have poorer reliability due to greater bandwidth in questions included in the survey instrument [232].

There is some uncertainty present in treating Likert scales (ordinal data) as continuous variables since the interpretation of the distance between steps might vary among participating health care professionals and rehabilitation patients [84,233]. For instance, patient respondents may rate the degree of “agree” and “strongly agree” differently when responding to statements in the NCQ-N and using Likert scale as continuous variables introduce some uncertainty in interpretation of the data [232].

Explanatory variables

For this study, a research team identified possible explanatory variables during the preparation and development of the baseline questionnaire. The study retrieved information on gender, age, marital status, education level, origin of referral and referral diagnosis that were used as adjusting variables. However, teamwork in

secondary health care, and particularly in rehabilitation settings, constitutes a multifactorial construct including a vast number of interventions. Consequently, the statistical models may not have been adjusted for factors that may have influenced the associations found in this study, i.e. the type of interventions provided by interprofessional teams in the rehabilitation centres, and could be considered a limitation of the study.

Response bias

A response bias may occur when there is a discrepancy between responses given on the questionnaire and the true value [234]. Self-administrated responses are at risk of response bias due to patients or health care professionals selecting response options that do not truly reflect their true score [232,234]. Response bias may have affected several of the studies in the present thesis. Below is an outline of some examples of where these may have arisen, and how they potentially may have affected associations studied.

Patients were asked to recall the past four weeks in WHODAS 2.0, and consequently, recall bias may have affected findings. Responses could depend on the inclusion method according to whether the patient received the questionnaire upon admittance to the rehabilitation centres or at home awaiting rehabilitation stay. If present, these issues related to the reliability of responses due to subjective reports, might weaken the associations between team functions and patient-rated outcomes in this study.

Some items of the NCQ-Q yielded higher numbers of ‘do not know’ responses from patients participants, which could have weakened the associations between team functions and continuity of care, and further have weakened associations between continuity of care and PROs in this study. For instance, there was a higher frequency of ‘do not know’ responses from rehabilitation patients for NCQ-N cross-boundary continuity (items number 25-28). The responses to all parts of the NCQ-N are shown in Table A9.6 in appendix 9.

Common method bias is a potential problem in self-administrated questionnaires and threatens the validity of the conclusions about associations between independent and

dependent variables [235]. Common method bias may represent an alternative explanation for the significant and consistent associations found between patient-reported NCQ-N subscale scores and changes in patient-reported health as measured by EQ-VAS in the present study (Table 5, Paper III). Common method bias can cause Type I errors (i.e. detecting positive associations when there in fact are none) when the same type of reporting (for instance pen-and-pencil tasks with almost similar questions or response categories) are used to measure both the independent and dependent variable of a studied association [235].

However, the surveys in the present study measured different areas and used different response scales concerning the patients' experiences of team functions and their health outcomes. Therefore, the presence of a common method bias may be a less likely reason for the associations described in Table 5, paper III. NCQ-N collects data on patients' experiences of continuity of care in rehabilitation centres, whereas EQ-VAS and WHODAS 2.0 collects data on patient-reported health and disability outcomes. Both the NCQ-N and WHODAS 2.0 use a 5 point Likert scale, whereas the EQ-VAS consists of a visual analogue scale from 0 (no health) to 100 (complete health). Furthermore, the NCQ-N and WHODAS 2.0 are different in the number of items included, wording of questions/statements, response categories and scales. The risk for a common method bias was therefore considered to be low in this study.

A limitation due to loss of participants at 1-year follow-up should be discussed. The non-responders at follow-up were younger and more predominately men compared to responders of the follow-up questionnaire. An attrition bias could therefore have affected the findings of this study. Consequently, the findings regarding changes in health and disability could potentially be smaller at 1-year follow-up due to the patient population having higher mean age and increased number of women.

A further potential limitation of the present study is social desirability bias. Social disability bias arise when respondents, i.e. patients or health care professionals, present themselves in a favourable light when responding to surveys, regardless of their true feeling about an issue or topic [232,235]. The presence of such a bias in the present

study may have increased the chance of Type I error. Such a bias would threaten the internal validity of the study [235]. Therefore, in order to avoid social desirability bias, health care professionals responding to the RCS were asked to respond according to how other professional roles included in the team communicated or related with the respondent, i.e. they were not asked to evaluate their own role in the team.

Team member respondents affiliated with more than two teams were asked to respond to the RCS according to the number of teams to which they belonged (Papers II and III). However, the number of participants belonging to more than two teams was limited, thus reducing the effects of potential multi-collinearity. Furthermore, a Type II error (concluding no association when in fact there is one [236]) cannot be ruled out as some interprofessional teams included were relatively small.

The NCQ-N has an option of ‘don’t know’. This option was set as ‘missing’, in the analyses. Patient responses were excluded if they had more than two items missing in a NCQ-N subscale in Paper II. The increased number of missing responses due to the option of ‘don’t know’ in NCQ-N could have made the results less reliable. However, in Paper III, the missing values due to ‘don’t know’ responses in the NCQ-N were handled using flexible MI methods. Flexible MI methods have been found to mitigate the effect of bias caused by missing values [197]. This method deals with incomplete data by creating multiple plausible datasets reflecting the uncertainty of missing data [197]. Using MI thus strengthened this study’s validity and generalisability.

5.5.3 External validity

The patient groups represent typical ICD-10 diagnosis groups found in somatic rehabilitation nationally with the largest group being the musculoskeletal patient group [237], strengthen the possibility of generalisability of the results to a larger population in Norway, especially regarding the musculoskeletal patient group. Some of the patient groups included in this study (Papers II and III) were relatively small, suggesting limited generalisability. Another possible threat to the external validity could be because of the relatively low response rate from the invited patients (34%) at baseline. Furthermore, only 25% of the total invited patient population responded to the one-

year follow-up questionnaire. Unfortunately, these low response rates are increasingly normal in studies in clinical settings as response rates have been declining slightly since 1975 [234,238,239]. As the participation rates were low, selection bias might have occurred both during inclusion and during follow-up. Non-respondents for Papers II and III were younger and were more predominately men (Table 1, Paper III). Consequently, an selection bias related to the gender of the respondents cannot be ruled out. If present, this bias might have reduced the external validity and generalisability of findings.

6. CONCLUSION

To my knowledge, this study was the first to explore RCS team functions and continuity of care in interprofessional teams within hospitals and rehabilitation centres in secondary health care, and the first to investigate the associations between these team functions and continuity of care on patient-reported rehabilitation benefit, health and functioning in Norway.

This study provides novel insights into aspects enhancing interprofessional team functions that might increase the understanding of processes important for the quality of care. Based on the results of this study, the question whether interprofessional teams matter does not yield a straightforward answer. Clear findings on how teams matter was however yielded for some research questions in this present study. For instance, the quality of communication in interprofessional rehabilitation teams was associated with improved patient-reported team continuity. Written clinical procedures was positively associated with increased quality of communication in teams. In addition, patients experiencing team continuity and cross-boundary continuity reported more improvements in their health one year after rehabilitation.

The RCS could be a promising instrument to be used in the evaluation of the quality of care delivery. Future studies should compare the RCS with other measures regarding criterion validity, and should consider using the COSMIN guidelines. The RCS does not capture the medical content of the rehabilitation programme and future studies investigating the associations between team functions and PROs should include additional measures evaluating the medical content of the care process.

This study found that patient-reported personal, team and cross-boundary continuity captured patients experiences of a collaborative interprofessional rehabilitation team influencing their health state positively. Consequently, NCQ-N could be considered a promising measure of team functions important for the evaluation of the quality health care delivery and PROs.

7. FUTURE PERSPECTIVES

Working in interprofessional teams is currently the preferred way of delivering health care in hospitals and rehabilitation centres in secondary health care. However, findings in this study vary regarding the associations between team functions and PROs.

Therefore, there is still the need for more knowledge on how interprofessional team functions matter for patient outcomes.

The National guideline and the Opptappingsplan for rehabilitation in Norway place a strong emphasis on interprofessional teams, information exchange, empowered service users and service delivery being evidence-based. As this study has shown, better communication and relationships in teams measured by RCS were inversely associated with patient-reported personal and cross-boundary continuity. The rehabilitation services should clearly define the role of a coordinator in the team ensuring information exchange and continuity of care for the patient. Further research on rehabilitation processes across health care settings is required as lack of follow-up in primary health care could increase readmission rates, length of stay in hospitals, and ultimately decrease patient satisfaction of care. Efforts to improve computerised communication lines across health care setting could improve continuity of care.

The present study found that health care professionals had better communication and relationships with other professionals holding a similar role. A strategy for understanding each other's professional roles and their culture and common philosophy should be prioritised and be incorporated in the educational curriculum for health care professions. Furthermore, collaboration across occupational roles and hospital settings should therefore be further investigated in future studies, as this is potentially an important factor improving the quality of team-based health care delivery.

Written clinical procedures were found to improve communication in teams, a strategy improving evidence-based practice is the implementation of clinical pathways in rehabilitation services, and should be further developed. The effect of written clinical

procedures on the quality of teamwork, continuity of care and the implementation of evidence-based practice should also be investigated further.

Three-year follow-up data were collected from the patient cohort in 2018, not included in this thesis. Future studies in the REKOVE project will look at patient trajectories to assess continuity of care, and use health services as predictors for patient-reported outcomes. By doing this, we seek to increase the knowledge base on the determinants for care processes particularly suited for specialised rehabilitation care.

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9. APPENDICES

1. Paper I
2. Paper II
3. Paper III
4. Search history
5. Relational Coordination Survey- Norwegian version
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1. Paper I

RESEARCH AND THEORY

Communication and Relational Ties in Inter-Professional Teams in Norwegian Specialized Health Care: A Multicentre Study of Relational Coordination

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Introduction: The delivery of integrated care depends on the quality of communication and relationships among health-care professionals in inter-professional teams. The main aim of this study was to investigate individual and team communication and relational ties of teams in specific care processes within specialized health care.

Methods: This cross-sectional multi-centre study used data from six somatic hospitals and six psychiatric units (N = 263 [response rate, 52%], 23 care processes) using a Norwegian version of the Relational Coordination Survey. We employed linear mixed-effect regression models and one-way analyses of variance.

Results: The mean (standard deviation) relational coordination total score ranged from 4.5 (0.33) to 2.7 (0.50). The communication and relationship sub-scale scores were significantly higher within similar functional groups than between contrasting functional groups ($P < .05$). Written clinical procedures were significantly associated with higher communication scores ($P < .05$). The proportion of women in a team was associated with higher communication and relationship scores ($P < .05$).

Conclusion: The Relational Coordination Survey shows a marked variation in team functions within inter-professional teams in specialized health-care settings. Further research is needed to determine the reasons for these variations.

Keywords: Teamwork; integrated care; Relational Coordination; coordination; multilevel analysis

Background

Many patients today are in contact with multiple health-care services and professionals. This is a result of the complexity of modern health care and the high prevalence of patients with chronic diseases and multiple co-morbidities [1–6].

The implementation of inter-professional teams in health care began in the 1970s. It underwent resurgence in the late 1980s because evidence suggested that improved integrated care and coordination could save

lives [7]. Studies have found that the quality of patient care depends on skilled professionals collaborating in teams [8–11]. Teamwork is considered paramount for the coordination of integrated care in specialized health-care settings [5, 11–13]. With inter-professional teamwork, treatment plans become more complementary to patient needs and care becomes more efficient [3, 14–16]. Deneckere et al. [6] identified numerous individual and team characteristics that influence teamwork, such as conflict management, communication skills, frequency of meetings, common goals, team size, composition, and leadership [6].

Research has found that the quality of communication among health-care professionals and quality of their underlying relationships are central aspects of team functioning [5, 6, 17–20]. However, few studies have investigated the association of individual and team-level characteristics with team function [6, 8, 21]. Studies by Mickan [8] and Vinokur-Kaplan [21] have identified team composition, shared objectives, and team size as important predictors of team functioning. Smaller teams with greater occupational diversity are associated with higher overall effectiveness [6, 19].

Deneckere et al. [6] found that teams that develop clinical procedures showed better inter-professional teamwork

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and a higher level of organized care. Further, the authors also identified a significant increase in the level of individual competence and perceived “teamness” as a result of implementing clinical procedures. However, Deneckere et al. did not observe any association between communication skills or relational ties in inter-professional teams and the implementation of clinical procedures [6].

Research has produced inconsistent results with regard to the effect of team composition and size on teamwork. No investigations have assessed the relationship among age, use and development of clinical procedures, level of experience, and team functioning.

Owing to the lack of reports assessing the association between team function and relevant individual and team factors, we conducted a study on a range of inter-professional teams to determine the associations among age, use and development of clinical procedures, composition, years of experience in team, team size, and team functioning at both the individual and team level. In the present study, we thus undertook the following. First, within specialized health-care settings, we investigated levels of communication and relational ties in inter-professional teams in specific care processes. Second, we assessed the association between individual- and team-level characteristics of inter-professional teams and communication and relational ties in those teams.

Theory and Methods

Relational Coordination

A recent review identified 10 measurement tools measuring teamwork that meet the criteria for psychometric validity [20]. Those tools survey teamwork functions, such as communication, coordination, shared decision making, collaboration, active conflict management, shared objectives and respect. The Relational Coordination Survey was among the 10 recommended measurement tools [8]. This survey is used within health-care services as well as in primary care, community, and hospital settings; it is a useful tool when measuring the quality of communication and relational ties in inter-professional teams in different parts of health care [22–26].

Relational coordination is defined as a “mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration” [27]. Rather than examining relationships among particular individuals, the focus of relational coordination is on relationships among professional groups with similar roles (hereafter, “functional groups”) [8]. Relational coordination theory has been found to be a sound framework for investigating care coordination in inter-professional teams [28].

The original Relational Coordination Survey has two sub-scales: a communication sub-scale comprising four survey questions (evaluating the frequency, accuracy, timeliness, and problem-solving nature of communication); and a relationship sub-scale with three survey questions (concerning shared goals, shared knowledge, and mutual respect) [25]. The seven items in the Relational Coordination Survey employ a five-point Likert scale. Respondents are asked to complete each item according

to their perception of communication or relationships with specific functional groups of health professionals in their team, e.g., physicians, nurses, physiotherapists, and administrative personnel. This creates a matrix with seven Relational Coordination Survey items for each functional group.

The functional groups included in each team vary according to which types of functional groups are considered relevant for the particular care process under assessment. The scores for the two sub-scales are derived by calculating the mean of the four communication and three relationship scores [29]. Higher scores indicate better communication and relational ties within the inter-professional team.

For use in the present study, the Relational Coordination Survey was translated to Norwegian and piloted on 10 health-care professionals within a hospital by Storkson et al. [30]. An authorized translation agency translated the US-English version of the Relational Coordination Survey into Norwegian language. A research team discussed linguistic and cultural aspects. Minor amendments on the Norwegian Relational Coordination Survey were made due to minor difficulties regarding the interpretation of items and contextual issues before a second authorized translator translated the survey back into English language. This version was found comparable to the original version. This was accepted by the author of the original version of Relational Coordination Survey. A psychometric assessment of the Norwegian version of the Relational Coordination Survey constitutes part of the present study.

Design and participants

This cross-sectional multi-centre study used data from six somatic hospitals and six specialist psychiatric units within the Western Norway Regional Health Authority, constituting 27 care processes in total. The team members (N = 503) received information about the project by e-mail, including a link to the Relational Coordination Survey in Corporater Surveyor, version 3.3 (Corporater Inc., Norway) [30]. In all, 301 health-care professionals (60%) responded. All these participants were used in analyses of the psychometric properties of the Norwegian version of the Relational Coordination Survey.

We inspected the data for inconsistencies and missing items. Respondents with missing items were excluded as follows. First, we excluded individuals who had completed less than 40% of the survey response alternatives (there was one response alternative for each functional group of health professionals) among each of the seven items. Second, we excluded participants if they responded to three or fewer of the seven items. Finally, we excluded respondents in teams with fewer than four valid respondents. That left 263 (52%) participants in the final analysis, representing 23 care processes (Table 1).

Individual-specific variables

Respondents were asked to report the following information: professional group (registered nurse [somatic], physician, medical laboratory technician, physiotherapist, social worker/occupational therapist/social educator, or

Table 1: Overview of team characteristics in 23 care processes included in the valid sample, team size, fraction of women in team, age and professional group distribution and clinical procedure use in teams (N = 263).

| Care process | Team size | Valid responses | | Age group | | Functional group | | Clinical procedure | |
|--|-----------|-----------------|-----------|-----------|----------|----------------------|-----------|--------------------|----------------|
| | | N | N (%) | ≤39 | ≥40 | Reg. Nurse (somatic) | Physician | | Therapy/ other |
| 1. ADHD 1 ¹ | 10 | 4 (40%) | 3 (75%) | 2 (50%) | 2 (50%) | 1 (25%) | 0 (0%) | 3 (75%) | Yes |
| 2. ADHD 2 ² | 33 | 18 (54%) | 13 (72%) | 10 (56%) | 8 (44%) | 3 (17%) | 6 (33%) | 8 (44%) | Yes |
| 3. Hip arthroplasty | 9 | 5 (56%) | 4 (80%) | 4 (80%) | 1 (20%) | 2 (40%) | 1 (20%) | 2 (40%) | Yes |
| 4. Acute stroke | 19 | 16 (79%) | 13 (81%) | 8 (50%) | 8 (50%) | 8 (50%) | 4 (25%) | 4 (25%) | Yes |
| 5. Cerebral palsy, children | 14 | 11 (79%) | 11 (100%) | 1 (9%) | 10 (91%) | 0 (0%) | 0 (0%) | 11 (100%) | Yes |
| 6. Sinus surgery | 19 | 13 (68%) | 7 (54%) | 5 (38%) | 5 (38%) | 4 (31%) | 7 (54%) | 2 (15%) | No |
| 7. Diabetes treatment, children | 18 | 12 (67%) | 11 (92%) | 3 (23%) | 9 (75%) | 9 (75%) | 2 (17%) | 1 (8%) | Yes |
| 8. VT, diagnostic process and treatment ³ | 16 | 16 (100%) | 10 (63%) | 11 (69%) | 4 (25%) | 10 (63%) | 4 (25%) | 0 (0%) | Yes |
| 9. Elective hip surgery | 20 | 16 (80%) | 12 (75%) | 4 (25%) | 12 (75%) | 9 (56%) | 5 (31%) | 2 (13%) | Yes |
| 10. Stroke | 10 | 5 (50%) | 4 (80%) | 2 (40%) | 3 (60%) | 1 (20%) | 0 (0%) | 4 (80%) | Yes |
| 11. In vitro fertilisation | 17 | 13 (77%) | 11 (85%) | 2 (15%) | 11 (85%) | 4 (31%) | 2 (15%) | 7 (54%) | Yes |
| 12. Knee arthroplasty | 15 | 9 (60%) | 7 (78%) | 2 (22%) | 6 (67%) | 5 (56%) | 0 (0%) | 4 (44%) | Yes |
| 13. Chronic Obstructive Pulmonary Disease | 26 | 15 (58%) | 10 (67%) | 11 (73%) | 4 (27%) | 8 (53%) | 5 (34%) | 2 (13%) | No |
| 14. Lung cancer- diagnostic process | 21 | 10 (48%) | 6 (60%) | 7 (70%) | 3 (30%) | 4 (40%) | 5 (50%) | 1 (10%) | No |

(contid.)

| Care process | Team size | Valid responses | | Age group | | Functional group | | | Clinical procedure | |
|--|-----------|------------------|------------------|------------------|------------------|------------------|----------------------|-----------------|--------------------|-----|
| | | N (%) | | ≤39 | ≥40 | Physician | Reg. Nurse (somatic) | Therapy/other | In team | |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | Yes | No |
| 15. Breast cancer surgery | 14 | 7 (50%) | 7 (100%) | 3 (43%) | 4 (57%) | 0 (0%) | 5 (71%) | 2 (29%) | 2 (29%) | Yes |
| 16. Tonsillectomy/adenotomy, children | 15 | 10 (67%) | 6 (60%) | 3 (30%) | 7 (70%) | 3 (30%) | 4 (40%) | 2 (20%) | 2 (20%) | Yes |
| 17. Arthroscopy knee, meniscus surgery | 25 | 15 (60%) | 5 (33%) | 8 (53%) | 7 (47%) | 8 (53%) | 5 (34%) | 2 (13%) | 2 (13%) | Yes |
| 18. Psychosis (planned admission) | 18 | 9 (50%) | 8 (89%) | 5 (56%) | 4 (44%) | 8 (89%) | 0 (0%) | 1 (11%) | 1 (11%) | Yes |
| 19. Psychosis (outpatient) | 14 | 9 (64%) | 5 (56%) | 4 (44%) | 5 (56%) | 6 (67%) | 0 (0%) | 3 (33%) | 3 (33%) | Yes |
| 20. Psychosis | 24 | 13 (54%) | 9 (69%) | 4 (31%) | 9 (69%) | 10 (77%) | 1 (8%) | 2 (15%) | 2 (15%) | Yes |
| 21. Stroke rehabilitation | 26 | 12 (46%) | 10 (83%) | 7 (58%) | 5 (42%) | 4 (33%) | 4 (33%) | 5 (42%) | 5 (42%) | Yes |
| 22. Tonsillectomy, adult | 15 | 8 (53%) | 5 (63%) | 4 (50%) | 4 (50%) | 5 (63%) | 2 (25%) | 0 (0%) | 0 (0%) | Yes |
| 23. Respiratory diseases, emergency department | 22 | 17 (77%) | 8 (47%) | 9 (53%) | 8 (47%) | 4 (24%) | 9 (53%) | 2 (12%) | 2 (12%) | Yes |
| 24. Total | | 263 (52%) | 185 (70%) | 119 (45%) | 142 (54%) | 88 (33%) | 98 (37%) | 70 (27%) | 70 (27%) | |

¹ Attention-Deficit/Hyperactivity Disorder, diagnostic process 1.

² Attention-Deficit/Hyperactivity Disorder, diagnostic process 2.

³ Venous thrombosis, diagnostic process and treatment.

administrator/coordinator/advisor), sex, age group (20–29, 30–39, 40–49, 50–59, or 60–69 years), and whether they used a written clinical procedure in their daily care of the patient group (no, under development, or in use). We dichotomized age (≤ 39 versus ≥ 40 years), use of clinical procedures (no versus yes/under development), and profession (not physician versus physician).

Team-specific variables

Based on the individual variables, we defined team variables to characterize the composition of the team: the proportions of (1) women; (2) team members older than 40 years; and (3) physicians in the team and team size. The team was said to have a clinical procedure if $\geq 80\%$ of team members answered yes or under development to the related question.

Predictor variables

Individual-specific predictor variables for the survey communication and relationship sub-scales, as reported by each professional respondent, were age, sex, use of clinical procedures, and physician in the team. Team-specific predictor variables for the survey sub-scales (summarized for each team) were proportion of women in team, team members >40 years, use of clinical procedures, proportion of physicians, and team size.

Statistical analysis

We employed confirmatory factor analysis (maximum likelihood estimation with robust standard errors, Satorra-Bentler correction) to test the factor structure. To define a satisfactory model fit, we used the following: a cut-off at 0.95 or higher for the comparative fit index; cut-off at < 0.06 to 0.08 for the root mean square error of approximation; cut-off at 0.8 or lower for the standardized root mean square residual; and cut-off at 0.95 or higher for the Tucker-Lewis index [31]. To assess intra-scale consistency, we computed Cronbach's alpha. A construct validity test could not be performed as there were no comparative instruments available for Norwegian health care settings.

We tested differences among functional groups (nurses, physicians, therapists/other) with regard to the communication and relationship sub-scale scores by one-way analysis of variance and illustrated by graphical tools. To assess the association between the predictor variables and the sub-scale scores, we used linear regression models with the communication and relationship sub-scale scores as outcome variables.

For the individual variables (age, sex, profession, and use of clinical procedures), we took into account correlations within each team. Thus, we used a linear mixed-effects model, including the individual variables as fixed factors and team affiliation as random effect.

For the team-specific variables, we used a simple linear regression model with the team mean of the sub-scales as outcome and team-specific variables as predictor. We estimated the univariate model for each predictor as well as the multivariate model for the individual variables and team-specific variables. Tests were two-tailed and the significance level was set to 0.05.

The computation was done in SPSS 23 (IBM Corp., Armonk, NY) and R 3.3 [32] with the packages lavaan 0.5 (confirmatory factor analyses) [33] and nlme 3.1 (linear mixed-effect model) [34]. The graphics were produced using Matlab 9.0 (The Mathworks Inc., Natick, MA).

Informed consent to participate was assumed when respondents returned a completed survey. Returned questionnaires were de-identified and data were stored according to appropriate regulations. This study was approved by the Norwegian Social Science Data Services in 2012 (reference no. 29128), which, with this type of material, is the relevant body for approval.

Results

Psychometric properties

Previous research has suggested both a one-factor and two-factor approach for the Relational Coordination Survey [8, 35]. However, the factor structure of our sample revealed a better model fit with the two-factor structure than the one-factor model [8, 35]. Three estimates of fit—comparative fit index, Tucker-Lewis index, and standardized root mean square residual (the latter is independent of the χ^2 and sample size [32])—showed: 0.86, 0.79 and 0.09 for the 1-factor solution, respectively. Further, the chi-square from the 1-factor solution was 164.8 ($p < 0.001$) with 14 degrees of freedom giving a normed χ^2 of 11.8. For the 2-factor solution the three estimates of fit showed an acceptable fit: 0.93, 0.89, and 0.06, respectively. Further, the chi-square from the 2-factor solution was 84.2 ($p < 0.001$) with 13 degrees of freedom giving a normed χ^2 of 6.48. A chi-square difference test ($\chi^2_{diff} = 83.6$, $p < 0.001$) suggested that fit was most favourable the 2-factor solution.

Cronbach's alpha for the communication and relationship sub-scales was 0.93 and 0.80, respectively. This estimated intra-scale consistency supported the internal reliability of the measured items in a two-factor structure [36].

Individual-level associations

Table 2 lists the reported survey scores in each professional's team by different individual characteristics. Among the mean scores in **Table 2**, there is a trend for higher scores in the relationship than with the communication sub-scale. There are, however, no clear age or sex-related differences.

Communication sub-scale scores were significantly higher within unique functional groups than between contrasting functional groups (**Figure 1**): nurses and nurses, 4.4 (95% confidence interval, 4.22–4.27, $P = 0.016$); physicians and physicians, 3.9 (95% confidence interval, 3.76–4.07, not significant); and therapy/others and therapy/others, 3.5 (95% confidence interval, 3.29–3.67, $P = 0.001$). The relationship sub-scale scores were as follows: nurses and nurses, 4.4 (95% confidence interval, 4.33–4.55, $P = 0.001$); physicians and physicians, 4.3 (95% confidence interval, 4.15–4.42, $P = 0.001$); and therapy/others and therapy/others, 3.8 (95% confidence interval, 3.65–4.00, $P = 0.003$).

Individual team members who reported that they used a written clinical procedure on a daily basis or were in the process of developing procedures reported higher communication sub-scale scores than team members who did not use

or were not developing such a procedure (**Table 2**). **Table 3** indicates that using or developing a clinical procedure was significantly associated with higher communication sub-scale scores in the multivariate model ($B = 0.20$; 95% confidence interval for B , $0.00-0.41$; $P = 0.049$). There was a marginal non-significant result that being a physician was associated with higher relationship sub-scale scores ($B = 0.17$; 95% confidence interval, $0.00-0.34$; $P = 0.051$).

Team-level associations

With the survey scores for different teams (**Table 4**), we found the mean (standard deviation) for communication and relationship sub-scale scores ranged from 4.3 (0.52)

Table 2: Relational Coordination Survey mean (standard deviation) communication and relationship subscale scores according to respondent’s functional group, sex, age group, and use of clinical procedures in 23 care processes (N = 263).

| Predictor variables | Communication | Relationship |
|----------------------------|---------------|--------------|
| Functional Group | | |
| Registered nurse (somatic) | 3.3 (0.67) | 3.7 (0.60) |
| Physician | 3.4 (0.78) | 3.8 (0.61) |
| Therapy/others | 3.6 (0.63) | 3.8 (0.61) |
| Sex | | |
| Male | 3.3 (0.72) | 3.9 (0.56) |
| Female | 3.5 (0.66) | 3.8 (0.62) |
| Age group | | |
| ≤39 | 3.3 (0.72) | 3.7 (0.64) |
| 40–49 | 3.4 (0.69) | 3.8 (0.54) |
| ≥50 | 3.5 (0.71) | 3.8 (0.61) |
| Clinical procedure | | |
| No | 3.1 (0.65) | 3.6 (0.53) |
| Under development | 3.6 (0.59) | 3.8 (0.44) |
| In use | 3.4 (0.72) | 3.9 (0.64) |

to 2.7 (0.34) and 4.5 (0.33) to 3.2 (0.71), respectively. Notably, the communication and relationship sub-scale means were among the highest in teams responsible for stroke patients. We found no clear differences concerning in- or outpatient or somatic or psychiatric care processes.

The proportion of women in a team was associated with higher communication and relationship sub-scale scores in the univariate model (respectively, $B = 1.68$; 95% confidence interval, $0.51-2.85$; $P = 0.007$) and ($B = 0.99$; 95% confidence interval, $0.12-1.85$; $P = 0.028$; **Table 5**).

Discussion

Based on the normed χ^2 , comparative fit index, Tucker-Lewis index, and standard root mean square residual estimates of fit from the confirmatory factor analysis; we conclude that the Norwegian version of the Relational Coordination Survey is acceptable for use in specialized health-care settings employing the two suggested sub-scales of communication and relationship. The chi-square test is perceived inappropriate as it is sensitive to large study populations (above 200) and therefore tends to reject models too often [37]. This conclusion is supported by earlier investigations of the factor structure of the survey employing exploratory factor analyses [8, 35].

The use of the Relational Coordination Survey in the included care processes revealed relatively large differences in the quality of teamwork through the survey sub-scales (**Table 4**). The better communication and relational ties in these inter-professional teams may reflect an increased effort to improve integrated care for these patient groups. Previous research has shown that implementation of specific inter-professional teams and specific guidelines within stroke rehabilitation have improved patient outcomes [38, 39].

At the level of the individual respondent, we observed that being a physician was associated with higher relationship sub-scale scores within teams. This may reflect physicians typically having a central, coordinating role in inter-professional teams in specialized health-care settings in Norway. However, this result is contrary to that of Hartgerink et al. [23]; they found that being a physician

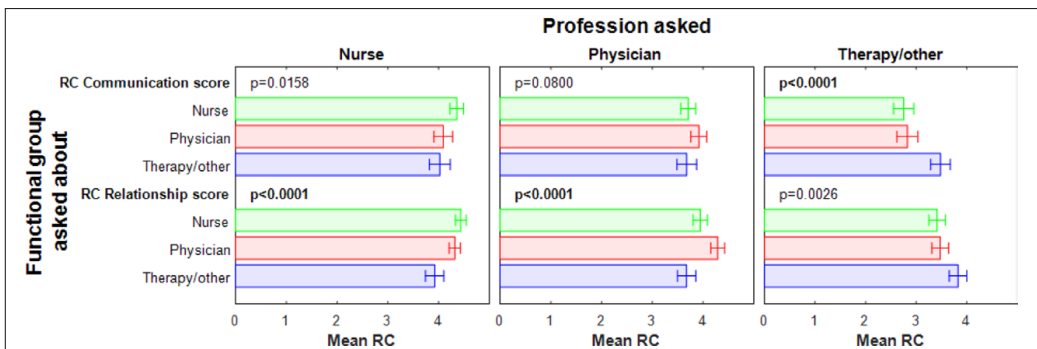


Figure 1: Relational Coordination Survey communication and relationship sub-scale scores within and between unique functional groups (N = 263).

Table 3: Individual-level characteristics' associations with Relational Coordination Survey communication and relationship subscale scores (N = 263).

| Communication sub-scale scores | Univariate | | | Multivariate | | |
|---|------------|----------------|---------|--------------|---------------|---------|
| | Estimates | | | Estimates | | |
| Individual predictors ¹ | B | 95%CI | p-value | B | 95%CI | p-value |
| Age (>= 40) ² | 0.05 | (-0.09, 0.19) | 0.479 | 0.05 | (-0.09, 0.19) | 0.505 |
| Sex ³ | 0.09 | (-0.06, 0.24) | 0.228 | 0.12 | (-0.06, 0.29) | 0.188 |
| Use of clinical procedures ⁴ | 0.18 | (-0.02, 0.37) | 0.081 | 0.20 | (0.00, 0.41) | 0.049 |
| Physician ⁵ | 0.01 | (-0.14, 0.17) | 0.858 | 0.14 | (-0.04, 0.32) | 0.130 |
| Relationship sub-scale scores | Univariate | | | Multivariate | | |
| | Estimates | | | Estimates | | |
| Individual predictors ¹ | B | 95%CI | p-value | B | 95%CI | p-value |
| Age (>= 40) ² | 0.04 | (-0.09, 0.18) | 0.533 | 0.06 | (-0.08, 0.20) | 0.407 |
| Sex ³ | -0.17 | (-0.32, -0.03) | 0.019 | -0.10 | (-0.26, 0.07) | 0.259 |
| Use of clinical procedures ⁴ | 0.09 | (-0.09, 0.28) | 0.328 | 0.11 | (-0.08, 0.30) | 0.269 |
| Physician ⁵ | 0.18 | (0.03, 0.33) | 0.016 | 0.17 | (0.00, 0.34) | 0.051 |

¹ Linear Mixed Effects Model, individual, random effect: team.

² Reference category; age group ≤39.

³ Reference category; men.

⁴ Reference category; no clinical procedure in place.

⁵ Reference category; all other functional groups.

was associated with lower perceived team communication and relational ties. The authors explained this negative association as the result of medical specialists often making their treatment decisions independently of others—and consequently not interacting frequently with other team members.

In the present study, team members in the same profession communicated better with others in the functional group to which they belonged than with members of other functional groups. Inter-professional teamwork has received much attention lately; however, this result may reflect a lack of understanding of different roles and poor communication skills across contrasting functional groups. Furthermore, inter-professional education that includes hands-on inter-professional teamwork practice is not yet fully implemented in all education programmes within health care [40].

Individual team members' development or daily use of a written clinical procedure was associated with significantly higher communication sub-scale scores (Table 4). This finding may reflect the fact that clinical procedures serve as a coordinating mechanism, assuring necessary levels of communication in inter-professional teamwork [41]. Moreover, Deneckere et al. [6] found that coordination of care and communication improved in inter-professional teams developing clinical procedures. In our study, each team member stated whether or not a written clinical procedure was in daily use. However, the team members reported this information inconsistently. This

discrepancy may be explained by respondents' interpretation of the term "clinical procedure": it may be understood differently from one respondent to another [30]; it may also reflect individual respondents being unaware of the existence of a particular procedure. Further, respondents who were aware of the existence of the clinical procedure may not actually have used it in the care process.

A team with a greater proportion of female members was associated with higher communication sub-scale scores. One explanation for this finding may be that women tend to be more oriented towards interpersonal relations and social interactions—and therefore provide higher communication sub-scale scores—than men [42]. Research has shown that nurses were more positive towards collaborating in a team environment than physicians, who traditionally learn to make more independent decisions [23, 43]. Another study found a positive relationship between women and the degree of relational coordination [23].

Strengths and limitations

One strength of this study is the collection of data on a wide array of care processes typical for specialized health-care settings. The inclusion of inter-professional teams from a broad range of clinical areas probably reduced the risk of selection bias. Furthermore, this inclusion increased the reliability and generalizability of the findings. The hierarchical statistical approach (which is appropriate when investigating associations of individual

Table 4: Means (standard deviations) for Relational Coordination Survey communication and relationship sub-scale scores among 23 care processes included in the valid sample (N = 263).

| Care process | Communication | Relationship |
|--|---------------|--------------|
| Acute stroke | 4.3 (0.52) | 4.2 (0.52) |
| In vitro fertilization | 4.3 (0.34) | 4.5 (0.33) |
| Stroke treatment | 4.2 (0.47) | 4.0 (0.46) |
| Stroke rehabilitation | 4.2 (0.45) | 4.3 (0.49) |
| Hip fracture | 4.0 (0.53) | 4.5 (0.21) |
| Psychosis (outpatient) | 3.8 (0.62) | 3.8 (0.56) |
| Psychosis (planned admission) | 3.8 (0.51) | 3.9 (0.39) |
| Cerebral palsy, children | 3.8 (0.48) | 3.8 (0.49) |
| Attention-Deficit/Hyperactivity Disorder, diagnostic process 2 | 3.5 (0.36) | 4.1 (0.50) |
| Knee arthroplasty | 3.3 (0.69) | 3.4 (0.66) |
| Hip arthroplasty | 3.3 (0.55) | 3.9 (0.63) |
| Tonsillectomy/adenotomy, children | 3.3 (0.35) | 3.7 (0.35) |
| Psychosis | 3.2 (0.72) | 3.3 (0.60) |
| Breast cancer surgery | 3.2 (0.67) | 3.5 (0.71) |
| Chronic Obstructive Pulmonary Disease | 3.2 (0.45) | 3.7 (0.37) |
| Diabetes treatment, children | 3.2 (0.43) | 3.7 (0.24) |
| Attention-Deficit/Hyperactivity Disorder, diagnostic process 1 | 3.1 (0.36) | 3.9 (0.21) |
| Tonsillectomy, adult | 3.0 (0.75) | 3.6 (0.39) |
| Sinus surgery | 3.0 (0.55) | 3.6 (0.36) |
| Arthroscopy knee, meniscus surgery | 2.9 (0.76) | 3.7 (0.57) |
| Lung cancer- diagnostic process | 2.9 (0.55) | 3.6 (0.53) |
| Respiratory diseases, emergency department | 2.7 (0.50) | 3.2 (0.71) |
| Venous thrombosis, diagnostic process and treatment | 2.7 (0.34) | 3.3 (0.65) |

characteristics clustered at the team level) made false-positive findings (type I findings) less likely.

However, this study has several limitations. The cross-sectional design allowed us to identify associations and characteristics of inter-professional teams in specialized health-care settings but not determine causality.

The median response rate for surveys has declined slightly since 1975 [44]. In the present study, the response rate was acceptable (52%); however, we had limited information on individuals who did not return the survey, for example whether the majority were men or women. Consequently, an inclusion bias cannot be excluded. Further, the number of respondents in each care process is relatively low; results may therefore reflect a coincidental expression of the individual teams' performance rather than cultural differences. However, more studies are needed to clarify these findings further.

Communication and relationships are believed to be different within and between professional groups [45].

By merging specific categories of professional groups in some analyses, we lost the possibility of identifying patterns or levels of responses specific to each of those groups. Further, although the Relational Coordination Survey showed satisfactory psychometric properties in earlier investigations [8, 46], we cannot rule out measurement error or issues related to construct validity in the present study.

Conclusion

This study represents the first exploration of inter-professional teamwork using the Relational Coordination Survey in a Norwegian context. The communication and relationship sub-scale scores were significantly higher within unique functional groups than between contrasting groups; this implies there is a need for inter-professional education programmes to enhance the understanding of health professionals' roles and communication skills among team members. Our findings indicate that

Table 5: Team-level characteristics' associations between the valid sample of 23 inter-professional teams and Relational Coordination Survey communication and relationship sub-scale scores.

| Communication sub-scale scores | Univariate | | | Multivariate | | |
|---|------------|---------------|---------|--------------|---------------|---------|
| | | Estimates | | | Estimates | |
| Team specific predictors ¹ | B | 95%CI | p-value | B | 95%CI | p-value |
| Proportion of women ² | 1.68 | (0.51, 2.85) | 0.007 | 2.37 | (-0.10, 4.83) | 0.059 |
| Proportion of team members older than 40 ³ | 0.46 | (-0.76, 1.67) | 0.445 | 0.01 | (-1.42, 1.45) | 0.984 |
| Use of clinical procedures ⁴ | 0.21 | (-0.89, 1.31) | 0.694 | 0.34 | (-0.95, 1.63) | 0.579 |
| Proportion of physicians in the team ⁵ | -0.32 | (-1.21, 0.56) | 0.460 | 0.81 | (-0.90, 2.53) | 0.323 |
| Team size ⁶ | -0.02 | (-0.05, 0.02) | 0.416 | - | - | - |
| Relationship sub-scale scores | Univariate | | | Multivariate | | |
| | | Estimates | | | Estimates | |
| Team specific predictors ¹ | B | 95%CI | p-value | B | 95%CI | p-value |
| Proportion of women ² | 0.99 | (0.12, 1.85) | 0.028 | 1.45 | (-0.41, 3.31) | 0.115 |
| Proportion of team members older than 40 ³ | -0.05 | (-0.91, 0.81) | 0.912 | -0.31 | (-1.39, 0.77) | 0.550 |
| Use of clinical procedures ⁴ | 0.53 | (-0.24, 1.29) | 0.167 | 0.58 | (-0.39, 1.55) | 0.219 |
| Proportion of physicians in the team ⁵ | -0.25 | (-0.86, 0.37) | 0.418 | 0.57 | (-0.72, 1.86) | 0.359 |
| Team size ⁶ | -0.01 | (-0.03, 0.02) | 0.678 | - | - | - |

¹ Linear Regression Model, for team means.

² Number of women in team/total number of team members.

³ Number of team members ≥40 years of age/total number of team member.

⁴ Reference category; no clinical procedure.

⁵ Number of physicians in team/total number of team members.

⁶ Total number of valid responses in the care process.

communication around specific groups of patients is better when team members use or develop a written clinical procedure in their clinical practice.

Future studies should be designed as longitudinal investigations. They should include outcomes at the patient and system level. They should also examine causal aspects of the communication and relationship skills of the Relational Coordination Survey to determine the quality of health-care delivery.

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Reviewers

Two anonymous reviewers.

Competing Interests

The authors have no competing interests to declare.

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2. Paper II



RESEARCH ARTICLE

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Relational coordination in interprofessional teams and its effect on patient-reported benefit and continuity of care: a prospective cohort study from rehabilitation centres in Western Norway

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Abstract

Background: Rehabilitation services depend on competent professionals who collaborate effectively. Well-functioning interprofessional teams are expected to positively impact continuity of care. Key factors in continuity of care are communication and collaboration among health care professionals in a team and their patients. This study assessed the associations between team functioning and patient-reported benefits and continuity of care in somatic rehabilitation centres.

Methods: This prospective cohort study uses survey data from 984 patients and from health care professionals in 15 teams in seven somatic rehabilitation centres in Western Norway. Linear mixed effect models were used to investigate associations between the interprofessional team communication and relationship scores (measured by the Relational Coordination [RC] Survey and patient-reported benefit and personal-, team- and cross-boundary continuity of care. Patient-reported continuity of care was measured using the Norwegian version of the Nijmegen Continuity Questionnaire.

Results: The mean communication score for healthcare teams was 3.9 (standard deviation [SD] = 0.63, 95% confidence interval [CI] = 3.78, 4.00), and the mean relationship score was 4.1 (SD = 0.56, 95% CI = 3.97, 4.18). Communication scores in rehabilitation teams varied from 3.4–4.3 and relationship scores from 3.6–4.5. Patients treated by teams with higher relationship scores experienced better continuity between health care professionals in the team at the rehabilitation centre ($b = 0.36$, 95% CI = 0.05, 0.68; $p = 0.024$). There was a positive association between RC communication in the team the patient was treated by and patient-reported activities of daily living benefit score; all other associations between RC scores and rehabilitation benefit scores were not significant.

Conclusion: Team function is associated with better patient-reported continuity of care and higher ADL-benefit scores among patients after rehabilitation. These findings indicate that interprofessional teams' RC scores may predict rehabilitation outcomes, but further studies are needed before RC scores can be used as a quality indicator in somatic rehabilitation.

Keywords: Rehabilitation, Continuity of care, Interprofessional relations, Patient-reported outcome measures, Health care survey, Health services research, Relational coordination

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Background

Interprofessional teamwork is recognised as a cornerstone for both the philosophy and practice of somatic rehabilitation [1]. It emphasises how teams comprising different health care professionals use a shared strategy to work together towards common aims [2]. The need for interprofessional teamwork stems from the complex nature of patients' health problems and care needs, with teamwork success dependent on collaboration of health care professionals in teams [3–6]. Well-functioning interprofessional teams are expected to have an impact on continuity of care [4]. However, more research is needed to clarify the association between team functioning and outcomes at patient- and system-levels.

Assessing interprofessional team function is a new and challenging task. Relational Coordination (RC) theory is a framework for assessing teamwork that focuses on communication and relationships among health care professionals in a team [7]. Communication in teams depend on the teams' underlying relationships [8, 9]. RC is defined as a 'mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration [10]. The RC theory argues that for a team to be effectively coordinated, there is a need for shared knowledge and understanding in teams, as well as relationships built on shared goals and mutual respect [9].

Improved continuity of care has been shown to improve health outcomes, efficiency of care and patient satisfaction [11–14]. Most existing research has focused on aspects of personal continuity of care from the care providers' perspective; for example, the importance of having a care provider that sees the patient over a time period [15–17]. Information exchange between care providers and care management is also important to ensure continuity [11]. However, continuity of care is a complicated concept, as multiple health care providers in teams care for patients with their own expectations and needs [18, 19]. Therefore, it is important to consider the perspective of the patient when investigating aspects of continuity of care in rehabilitation service delivery. Ideally, improved RC in teams should lead to better continuity of care and increased rehabilitation benefits for the patients involved. Currently, there is a gap in knowledge regarding how collaboration among care providers in a team affects continuity of care [19–22]. To gather patient perspectives on continuity of care from a population representing a broad range of diagnostic groups, it is recommended that the generic Nijmegen Continuity Questionnaire (NCQ) is used [23, 24]. The NCQ captures personal continuity as well as continuity within teams and across services [22], and has recently been translated to Norwegian health care settings (NCQ-N) [25].

To our knowledge, no previous studies have investigated the associations between RC in interprofessional teams and patient-reported benefit and experienced

continuity of care. Therefore, we assessed associations between communication and relationships in a range of interprofessional teams and patient-reported benefit and continuity of care in somatic rehabilitation centres in Western Norway.

Aims

The aims of this study were threefold: to measure RC scores in interprofessional teams in seven rehabilitation centres in Western Norway; assess patient-reported benefit and continuity of rehabilitation care, and investigate associations between RC scores and patient-reported benefit and continuity of care.

Methods

Study design

This prospective cohort study used data from two surveys of patients in all seven somatic rehabilitation centres in Western Norway. Baseline data were collected from January 2015 to June 2015, with follow-up data collection 1 year later. All patients had a 3–4 week stay at one of the rehabilitation centres in the period between these patient surveys. Patient treatment at the rehabilitation centres is organised in teams and all patients were linked to their treating team. Health care professionals in the rehabilitation centres were surveyed from January 2016 to March 2016.

Interprofessional rehabilitation team survey

In cooperation with the leaders of the rehabilitation centres, all health professionals ($N = 167$) engaged in working with patients in the centres were invited to participate in the survey. These centres deliver services via interprofessional teams; we identified 16 teams, which were the unit of interest in the present study, according to RC theory [9]. Some healthcare professionals were members of more than one team in the centre in which they worked; these professionals were asked to respond to the survey for each team they worked with. Most healthcare professionals were affiliated with only one team ($n = 121$), 25 had roles in two teams, 13 in three teams and eight worked in four teams. This gave a possible 121 team member responses from healthcare professionals affiliated with more than one team. Therefore, a total of 242 team member responses were invited. Team members were recruited via an e-mail that included information about the project and a link to the RC Survey in Corporater Surveyor version 3.3 (Corporater Inc.). Responses were received from 124 team members (52%), representing 94 different healthcare professionals in 15 interprofessional rehabilitation teams (56% of all employees). Of the responses; 30 were from 19 team members affiliated with two teams, five from members of three teams and six with roles in four teams. One team was missing as no team members responded to the survey and only three patients

responded to the questionnaire. The submission of a completed survey was considered provision of consent to participate.

RC survey

The RC Survey is based on RC theory and is used in both hospital and primary health care settings [14, 26–29]. The survey has been translated into Norwegian language and validated for Norwegian health care settings in a previous study [30]. The survey comprises seven items evaluating interprofessional team function divided into two sub-scales: four communication items (frequency, accuracy, timeliness and problem solving) and three relationship items (shared goals, shared knowledge and mutual respect) [9]. Each item represents a question (e.g. 'Do health care professionals in this group communicate *frequently* with you about rehabilitation patients?'), with responses on a five point Likert scale (1 = never, 2 = rarely, 3 = occasionally, 4 = often, and 5 = always). A higher score indicates better communication or relationships in the interprofessional team. RC survey communication and relationship subscale scores are derived by calculating the mean scores for each subscale [31]. RC focuses on communication and relationships between roles in the team, rather than between unique individuals [9].

Patient surveys

Participants

Patients aged over 18 years who were accepted for admission to a rehabilitation centre in Western Norway between January and July 2015 were invited to participate in this study ($N = 2863$). In total, 984 patients (34% response rate) accepted the invitation and returned a completed and written consent to participate [32, 33]. The recruitment of patients for the baseline study is fully described in Moen et al. [33]. A 1-year follow-up survey was sent to the 984 participating patients and 705 (25% of those invited at baseline) responded. We excluded 46 patients because of missing *The World Health Organisation Disability Assessment Schedule* (WHODAS 2.0) data, and four cases that education level was not registered. Finally, 655 patients were included in the analyses (Table 1). Eighteen of the 279 patients who did not respond had died.

Data sources

The WHODAS 2.0 global score as reported in the baseline survey was used as an adjustment variable. This is a 36-item generic patient-reported instrument that measures health and disability [34]. The scale gives subscores for patient self-perceived disability in six functional domains: cognition, mobility, self-care, getting along, life activities, and participation [33, 34]. The WHODAS 2.0 global score ranges from 0 to 100 where 5–24 reflects mild functional loss, 25–49 moderate functional loss, 50–95 severe functional loss and 96–100 total functional loss.

Table 1 Patient characteristics ($N = 655$)

| | |
|--|--------------|
| Proportion women, % | 62 |
| Age, mean (SD) | |
| Women | 59 (14.0) |
| Men | 63 (11.9) |
| Education, % | |
| Elementary school | 21 |
| High school | 48 |
| University/college | 31 |
| Origin of referral, % | |
| Hospital | 35 |
| General practitioner | 65 |
| Referral diagnosis, % | |
| Neoplasms | 7 |
| Diseases of the nervous system | 12 |
| Diseases of the musculoskeletal system | 52 |
| Diseases of the circulatory system | 8 |
| Other | 21 |
| WHODAS 2.0 global score, mean (SD) | |
| Women | 31.0 (15.12) |
| Men | 27.0 (16.16) |

Abbreviations: SD Standard deviation, WHODAS 2.0: World Health Organization Disability Assessment Schedule 2.0

WHODAS 2.0: This scale assesses disability with the global score (0–100) assessed as: 0–4: no functional problems; 5–24: mild functional problems; 25–49: moderate functional problems; 50–95: severe functional problems; and 96–100: total functional loss

Information about whether the patient was referred by a general practitioner (GP) or a hospital physician was collected from the referral letter at baseline, along with referral diagnoses based on the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10). Additionally, Statistics Norway provided data concerning patient education level. We also included questions from the follow-up survey regarding rehabilitation benefits extracted from the PasOpp Survey [35], developed for the Norwegian Institute of Public Health. Patients were asked to assess how their stay in a rehabilitation centre benefitted their overall health, physical health, mental health, management of activities of daily living (ADL) and participation in social activities.

In addition, we used the *NCQ-N* which covers three aspects of continuity: personal, team and cross-boundary continuity [19, 25, 36]. These domains are closely related to informational, management and relational continuity of care [11, 37]. The original NCQ has been used for patients receiving care from multiple providers in both hospital and primary health care settings [12, 15, 38, 39], but this study is the first to use the *NCQ-N* [25]. The *NCQ-N* comprises of 28 items that are positively formulated statements concerning different aspects of continuity of care (e.g. personal

continuity: care provider knows me well, *'This care provider knows my medical history very well'*), scored using a five-point Likert (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). A 'don't know' option was also provided, and set as 'missing'. Subscales for personal continuity ('the most important health care professional in the rehabilitation centre knows me') comprising five items and 'the most important health care professional in the rehabilitation centre shows commitment' (three items) were derived using the mean scores of the included items. Furthermore, subscales covering team continuity (four items) within the rehabilitation team and cross-boundary continuity (four items) between the rehabilitation centre and the patients' regular GP were also used. NCQ-N subscales with fewer than two missing items were included in the analyses.

Outcome variables

Five items from the PasOpp Survey were used as outcome variables: overall rehabilitation benefits, physical health benefits, mental health benefits, ADL benefits and social participation benefits. Responses were on a five point Likert scale (1 = not at all, 2 = to a lesser extent, 3 = to some extent, 4 = to large extent, 5 = to great extent), with an additional "not applicable" option (set as 'missing').

Four NCQ-N subscales were used as outcome variables with a continuous scale, ranging from 1 to 5 (5 = best):

- Personal continuity: the most important health care professional in the rehabilitation centre knows me
- Personal continuity: the most important health care professional in the rehabilitation centre shows commitment
- Team continuity: collaboration among health care professionals in teams within somatic rehabilitation centres
- Cross-boundary continuity: collaboration among health care professionals in teams within somatic rehabilitation centres and GPs in the municipality.

Explanatory variables

The main explanatory variables in this study were the RC communication and relationships scores, which were calculated for each team and used as continuous variables, from 1 (lowest) to 5 (highest).

Statistical analysis

Descriptive methods were used to analyse sample characteristics. Given the possible intra-cluster correlation between responses from patients treated by the same team, linear mixed effect models were used to investigate associations between patient-reported rehabilitation benefit items (overall rehabilitation benefit, physical benefit, mental health benefit, ADL benefit and social participation benefit) and NCQ-N personal, team and cross-boundary

continuity of care items (as outcome variables). The teams' RC communication and relationship scores were used as explanatory variables. Team allocation was set as the random effect in all models.

For each of the nine outcome variables listed above, four models were estimated using the RC communication subscale as main explanatory variable. First, an unadjusted model (Model 0) containing only the explanatory variable, RC communication subscale and the outcome variables, rehabilitation benefit item scores and NCQ-N subscale scores. Model 1 was adjusted for referral diagnosis (ICD-10) code grouped as: neoplasms, diseases in the nervous system, diseases in the musculoskeletal system, diseases in the circulatory system and others. Model 2 was adjusted for WHODAS 2.0 global score and referral diagnosis. Model 3 was adjusted for WHODAS 2.0 global score, referral diagnosis, sex, age group at the 1 year follow-up (categorised as: < 20, 21–30, 31–40, 41–50, 51–60, 61–70, and > 71), origin of referral (referred by hospital physician or GP) and level of education (categorised as: elementary school, high school, university/college). Similar analyses were repeated with RC relationship scores as the main explanatory variable.

Because of the use of an electronic version of the RC Survey for healthcare professionals, the data retrieved contained no missing values. The level of statistical significance was set as 0.05. All statistical analyses were performed with IBM SPSS for Windows version 23 (IBM Corp., Armonk, NY) [40] and STATA 14 (Stata-Corp., College Station, TX) [41].

Results

RC scores for rehabilitation teams

The mean communication score among healthcare team respondents was 3.9 (standard deviation [SD] = 0.63, 95% confidence interval [CI] = 3.78, 4.00) and the mean relationship score was 4.1 (SD = 0.56, 95% CI = 3.97, 4.18). The communication scores for the rehabilitation teams ranged from 3.4–4.3, and the relationship scores ranged from 3.6–4.5. Table 2 shows an overview of the 15 teams. The rehabilitation centres varied in size, with 5–17 members in each team.

Patient-reported benefit and continuity of care

The mean overall benefit, physical health and ADL scores were 3.8 (SD = 0.97, 95% CI = 3.73, 3.88), 3.5 (SD = 1.00, 95% CI = 3.45, 3.60) and 3.2 (SD = 1.05, 95% CI = 3.15, 3.32), respectively (Table 3). Team continuity, representing collaboration among rehabilitation team members, had a mean score of 3.7 (SD = 0.82, 95% CI = 3.61, 3.76). Personal continuity mean scores, for the 'knows me' and 'shows commitment' subscales were 3.0 (SD = 0.86, 95% CI = 2.96, 3.11) and 2.9 (SD = 0.96, 95% CI = 2.76, 2.94), respectively. The cross-boundary continuity mean score for collaboration

Table 2 Characteristics of interprofessional rehabilitation teams and mean (standard deviation) of team communication and relationship scores

| Team | Number of team members ^a | Number of patients treated by team | RC Communication Mean (SD) | RC Relationship Mean (SD) |
|-------|-------------------------------------|------------------------------------|----------------------------|---------------------------|
| 1 | 8 | 20 | 4.3 (0.46) | 4.4 (0.45) |
| 2 | 5 | 85 | 4.2 (0.45) | 4.5 (0.37) |
| 3 | 7 | 19 | 4.2 (0.39) | 4.3 (0.40) |
| 4 | 7 | 49 | 4.2 (0.37) | 4.2 (0.52) |
| 5 | 5 | 30 | 4.2 (0.48) | 4.3 (0.41) |
| 6 | 12 | 59 | 4.1 (0.62) | 4.3 (0.39) |
| 7 | 17 | 35 | 4.1 (0.50) | 4.0 (0.46) |
| 8 | 8 | 40 | 3.9 (0.41) | 4.3 (0.35) |
| 9 | 12 | 60 | 3.7 (0.79) | 3.8 (0.74) |
| 10 | 5 | 38 | 3.7 (0.61) | 4.0 (0.63) |
| 11 | 7 | 47 | 3.7 (0.60) | 3.8 (0.43) |
| 12 | 7 | 8 | 3.6 (1.07) | 3.9 (0.93) |
| 13 | 8 | 30 | 3.6 (0.54) | 3.6 (0.47) |
| 14 | 8 | 42 | 3.4 (0.59) | 3.9 (0.53) |
| 15 | 8 | 43 | 3.4 (0.49) | 3.8 (0.55) |
| Total | 124 | 605 | 3.9 (0.63) | 4.1 (0.56) |

Abbreviations: SD standard deviation, RC relational coordination
^aNumber of team member responses who completed the RC survey

between the rehabilitation centre and patients' GPs, was 2.9 (SD = 0.97, 95% CI = 2.81, 3.02).

Associations between team RC scores and patient-reported benefit and continuity of care

The results presented in Table 4 are derived from the univariate model because adjustments in the models did not lead to improvement of Model 0. Results from the fully adjusted models are shown in the table in the Additional file 1.

There was a significant association between RC communication in the team the patient was treated by and

ADL benefit (b = 0.29, 95% CI = 0.01, 0.58; p = 0.044). All other associations between RC scores and patient-reported rehabilitation benefit scores were non-significant, but these showed positive coefficients and most had CIs crossing zero with small margins. Associations of team communication and relationships with patient benefit variables were also tested across sex, age groups, referral diagnosis, and education level (not tabulated); however, no significant group differences were found. There was a positive association between team relationship scores and patient-reported team continuity (b = 0.36, 95% CI 0.05, 0.68; p = 0.024), but no significant associations were found regarding communication. Inverse associations were found between communication and relationship scores in teams and both patient-reported personal continuity scales ('knows me' and 'shows commitment') (Table 4). In addition, there was an inverse association between relationship in teams and cross-boundary continuity (b = - 0.42, 95% CI - 0.80, - 0.04; p = 0.030), whereas no associations were found between communication in teams and cross-boundary continuity of care.

Discussion

This is the first study to investigate prospective associations between communication and relationships in interprofessional teams (measured with the RC Survey), and patient-reported benefit of the rehabilitation stay and experience of continuity of rehabilitation care. Patients treated by teams with higher relationship scores experienced better continuity in the healthcare services they received. However, this study also found that patients reported lower personal continuity of care when treated by teams with higher communication and relationship scores. High relationship scores were associated with lower cross-boundary continuity of care between the rehabilitation centre and the patients' GPs, as perceived by the patient.

Table 3 Reported benefit and continuity of care among patients at the 1-year follow-up (N = 655)

| Outcome variables | n | Mean (SD) | 95% CI |
|---|-----|------------|------------|
| Overall rehabilitation benefit | 624 | 3.8 (0.97) | 3.73, 3.88 |
| Physical health benefit | 622 | 3.5 (1.00) | 3.45, 3.60 |
| Mental health benefit | 532 | 3.3 (1.11) | 3.19, 3.38 |
| Activities of daily living benefit | 565 | 3.2 (1.05) | 3.15, 3.32 |
| Social participation benefit | 563 | 3.1 (1.11) | 3.01, 3.19 |
| NCQ-N personal continuity ("knows me") | 524 | 3.0 (0.86) | 2.96, 3.11 |
| NCQ-N personal continuity ("shows commitment") | 425 | 2.9 (0.96) | 2.76, 2.94 |
| NCQ-N team continuity (within somatic rehabilitation) | 461 | 3.7 (0.82) | 3.61, 3.76 |
| NCQ-N cross boundary continuity (between rehabilitation centres and GP in municipality) | 322 | 2.9 (0.97) | 2.81, 3.02 |

Abbreviations: SD standard deviation, CI confidence interval, NCQ-N Nijmegen Continuity Questionnaire, Norwegian version

Table 4 Unadjusted analysis^a of patient-reported benefit and continuity of care score associations with communication and relationship sub-scale scores (N = 655)

| Rehabilitation benefit | | | | | |
|------------------------|------------------------|------------------------|---------------------|------------------------------|---------------------|
| RC Communication | Overall ^b | Physical ^c | Mental ^d | ADL ^e | Social ^f |
| b | 0.26 | 0.31 | 0.30 | 0.29 | 0.25 |
| 95% CI | -0.09, 0.62 | -0.06, 0.67 | -0.00, 0.61 | 0.01, 0.58 | -0.06, 0.55 |
| p-value | 0.145 | 0.097 | 0.053 | 0.044 | 0.112 |
| RC Relationship | | | | | |
| b | 0.35 | 0.35 | 0.28 | 0.04 | 0.06 |
| 95% CI | -0.04, 0.73 | -0.05, 0.75 | -0.06, 0.61 | -0.28, 0.37 | -0.30, 0.42 |
| p-value | 0.079 | 0.083 | 0.109 | 0.786 | 0.751 |
| Continuity of care | | | | | |
| RC Communication | Personal1 ^g | Personal2 ^h | Team ⁱ | Cross- boundary ^j | |
| b | -0.33 | -0.40 | 0.25 | -0.35 | |
| 95% CI | -0.58, -0.09 | -0.71, -0.09 | -0.06, 0.56 | -0.72, 0.01 | |
| p-value | 0.008 | 0.011 | 0.114 | 0.056 | |
| RC Relationship | | | | | |
| b | -0.40 | -0.50 | 0.36 | -0.42 | |
| 95% CI | -0.67, -0.13 | -0.83, -0.16 | 0.05, 0.68 | -0.80, -0.04 | |
| p-value | 0.004 | 0.004 | 0.024 | 0.030 | |

Abbreviations: RC relational coordination, NCQ-N Nijmegen Continuity Questionnaire- Norwegian version, b unstandardised estimated regression coefficient, CI confidence interval, ADL activities of daily living

^aBased on 18 unadjusted linear mixed effects models with either RC communication score or RC relationship scores as the explanatory variable with team allocation set as the random effect in all models

^bOverall rehabilitation benefit

^cPhysical health benefit

^dMental health benefit

^eActivities of daily living benefit

^fSocial participation benefit

^gNCQ-N personal continuity ('knows me')

^hNCQ-N personal continuity ('shows commitment')

ⁱNCQ-N team continuity (within somatic rehabilitation)

^jNCQ-N cross boundary continuity (between rehabilitation centres and general practitioner in the municipality)

Communication and relationship skills among health-care professionals are essential for the quality of health-care delivery [4–6]. Further, strong relationships in teams are expected to contribute to effective service delivery and improved patient health outcomes [42]. Gittell indicated that team functions are strong when the reported RC scores are ≥ 4 on a five-point scale, which was found for nine of the 15 teams included in this study [10]. An earlier study investigating RC in 23 teams from six somatic hospitals and six psychiatric units in Western Norway found that 14 of 23 teams had a RC score below 3.4, which was the lowest score for rehabilitation teams in the present study [30]. Further, in this previous study, half of the teams showed relationship scores below 3.8, compared with only one rehabilitation team in the present study [30]. The RC scores in this study were also high compared with previous international studies, indicating strong team functions for interprofessional teams in rehabilitation centre in Western Norway [8, 26, 29, 43, 44]. A reason why communication and relationship skills were higher in the present study than in

previous studies may be that working in teams is crucial for well-functioning rehabilitation services, and the present study suggests this was implemented as the working environment in these rehabilitation centres.

The patient-reported rehabilitation benefit was moderate in our study, with the highest scores for overall benefit and physical health. Only a significant association between benefit and team functions (as measured by RC score) was found. This contrasted with previous studies that showed positive associations between RC scores and outcomes [8, 14, 26, 27]. However, we observed consistent (but non-significant) associations between patient-reported rehabilitation benefit scores and RC scores. The relatively small variance of RC scores between teams in this study may explain why these associations did not reach statistical significance. Another reason for the lack of significant association between RC scores and benefit outcomes may be that the RC scores did not capture the medical content of the rehabilitation programmes, which may vary independent of team function. Future studies should supplement the RC score with measures of programme content.

An important finding of this study was the association between team relationship skills and patient-reported team continuity. Good relationships among health care professionals develop shared knowledge and skills in teams, and impact continuity of care [3]. Research has also found that strong relationships among team members impacted building rapport with patients treated by the team, and increased patient satisfaction [8, 38, 44]. Our study confirmed that patient experienced increased satisfaction with care when there was shared knowledge, shared goals and mutual respect among team members.

The associations between RC scores and team continuity in this study suggest that patients experienced better relational treatment from the whole team rather than from a single healthcare professional. Several studies have found that personal continuity impacted on patients' experienced benefit of care [18, 45–49]. However, previous studies also found positive associations between team continuity and improved patient outcomes [16], which is consistent with the finding of this study. Therefore, an inverse association between RC and personal continuity could be considered as a natural consequence of a well-functioning team. However, evaluation of the potential negative effect of reduced personal continuity is a topic for further research.

Seamless transitions between service levels increase patient satisfaction [46–50]. Our finding that better team functioning was associated with lower patient scores for continuity between the rehabilitation centres and primary care was unexpected. The expectation was that strong team functions in rehabilitation services would increase the emphasis on seamless transitions between the centres and the primary care. An explanation for our finding could be that patient respondents tended to over-report negative experiences with cross-boundary continuity, as these were easier to remember (recall bias). Therefore, cross-boundary continuity resulting in seamless transitions might have been overlooked. Another explanation could be that patients who experienced well-functioning teams had higher expectations for cross-boundary continuity, therefore, the inverse association between team RC and patient rating of cross-boundary continuity might be attributable to patients' disappointment. However, this finding should be interpreted with caution, as the response rate for this subscale was lower than for the other continuity of care subscales (Table 3). Further, more studies are needed to investigate this research question.

Study strengths and limitations

Strengths of this study included the prospective longitudinal design and the large and comprehensive study population including patients in rehabilitation centres in Western Norway. A main limitation was the low response rate among patients (34%), which might have resulted in selection bias. Although a high response rate was accomplished from baseline to follow-up (73%), only

25% of the total number of patients invited at baseline responded at follow-up, increasing the problem of representability. Unfortunately, there was no information available regarding non-respondents.

The investigation of associations across multiple health care problems and the use of generic survey instruments were further strengths of this study. However, large numbers of 'don't know' for some NCQ-N items meant that these cases were not included in the analysis and might have caused less certain results. Team members responding for more than one team might also have increased the risk for recall bias. In addition, the response rate for the healthcare professionals was relatively low, which might have introduced selection bias. Healthcare professionals with more than one team might also have experienced difficulties in accurately differentiating communication and relationship patterns for their different rehabilitation teams; if so, this would reduce the differences between teams found in RC scores. However, the response rate for team members affiliated with more than one team was relatively low (24%). In general, the RC survey scores did not vary greatly between the teams, reducing the possibility of detecting weaker associations with the outcomes. Further studies are needed to verify these findings.

Conclusion

Communication and relationships in rehabilitation teams as measured by RC were higher than in comparable studies. This suggests team functioning is a high priority for somatic rehabilitation centres in Western Norway. This study found a positive association between RC relationship in the team the patients were treated by and team continuity reported by patients. However, we did not show that stronger RC team functions in rehabilitation centres predicted better patient outcomes, with the exception of a significant positive association with improved ADL. The negative associations found between team function within rehabilitation centres and cooperation with primary care should be further studied, as further rehabilitation benefits depend on follow-up in primary care.

Additional file

Additional file 1: Linear mixed effect models, fully adjusted. (DOCX 24 kb)

Abbreviations

ADL: Activity of daily living; CI: Confidence interval; GP: General practitioner; NCQ: Nijmegen Continuity Questionnaire; NCQ-N: Norwegian version of the Nijmegen Continuity Questionnaire; RC: Relational coordination; SD: Standard deviation; WHODAS 2.0: World Health Organization Disability Assessment Schedule 2.0

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Availability of data and materials

The raw data are property of the research unit in the Bergen Health Authority (Helse Bergen) and are available on reasonable request.

Authors' contributions

MH, ØH, SG and EB developed the project idea and contributed to writing the paper. MH, ØH and JA performed the statistical analysis and interpreted the results. All authors have approved the final version.

Ethics approval and consent to participate

All procedures were in accordance with the ethical standards of the regional research committees and the Declaration of Helsinki 1964 and its later amendments. This study was approved by the Regional Committees for Medical and Health Research Ethics in 2015 (2014/1636/REK vest). Written consent was obtained from all participating patients. Return of the electronic RC Survey questionnaire by healthcare professionals was considered provision of consent.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Additional file 1. Associations between Relational coordination communication and relationship scores among inter-professional teams and the patient-reported benefit and experienced continuity of rehabilitation in Western Norway. Team allocation is set as random effect in all models (N=655).

| | Model: 1 ¹ | | | | | | Model: 2 ² | | | | | | Model: 3 ³ | | | | | | |
|--|-----------------------|--------------|-------|-------------------------------------|--------|-------|-----------------------|--------|--------------|-------------------------------------|--------|-------|-----------------------|--------------|-------|-------------------------------------|--------|---|--|
| | Parameter estimation | | | Model fit (Comparison with Model 0) | | | Parameter estimation | | | Model fit (Comparison with Model 1) | | | Parameter estimation | | | Model fit (Comparison with Model 2) | | | |
| | B | 95% CI | P | B | 95% CI | P | B | 95% CI | P | B | 95% CI | P | B | 95% CI | P | B | 95% CI | P | |
| RC Communication | | | | | | | | | | | | | | | | | | | |
| Overall rehabilitation benefit | 0.26 | -0.09, 0.62 | 0.145 | 1606.9 | 1606.9 | 0.164 | 0.415 | 0.23 | -0.13, 0.60 | 0.210 | 1609.0 | 0.048 | 0.27 | -0.10, 0.65 | 0.152 | 1614.1 | 0.167 | | |
| Physical health benefit | 0.31 | -0.06, 0.67 | 0.097 | 1622.1 | 1622.1 | 0.096 | 0.596 | 0.24 | -0.09, 0.58 | 0.149 | 1620.4 | 0.002 | 0.27 | -0.06, 0.62 | 0.132 | 1620.7 | 0.039 | | |
| Mental health benefit | 0.29 | -0.00, 0.61 | 0.053 | 1506.9 | 1506.9 | 0.118 | 0.724 | 0.22 | -0.11, 0.54 | 0.187 | 1512.1 | 0.096 | 0.32 | -0.02, 0.65 | 0.064 | 1516.6 | 0.139 | | |
| Activities of daily living benefit | 0.29 | 0.01, 0.58 | 0.044 | 1538.7 | 1538.7 | 0.073 | 0.808 | 0.25 | -0.06, 0.55 | 0.117 | 1545.8 | 0.267 | 0.27 | -0.04, 0.58 | 0.089 | 1542.7 | 0.042 | | |
| Social participation benefit | 0.25 | -0.06, 0.55 | 0.112 | 1584.6 | 1584.6 | 0.226 | 0.735 | 0.16 | -0.16, 0.48 | 0.329 | 1589.4 | 0.210 | 0.20 | -0.13, 0.54 | 0.238 | 1589.7 | 0.040 | | |
| NCQ personal continuity ("knows me") | | | | | | | | | | | | | | | | | | | |
| NCQ personal continuity ("shows commitment") | -0.33 | -0.58, -0.09 | 0.008 | 1235.3 | 1235.3 | 0.014 | 0.834 | -0.31 | -0.57, -0.05 | 0.021 | 1242.5 | 0.246 | -0.30 | -0.57, -0.03 | 0.027 | 1247.0 | 0.142 | | |
| NCQ team continuity (between providers within somatic rehabilitation) | -0.40 | -0.71, -0.09 | 0.011 | 1092.2 | 1092.2 | 0.008 | 0.953 | -0.42 | -0.74, -0.10 | 0.010 | 1096.7 | 0.301 | -0.37 | -0.70, -0.04 | 0.026 | 1100.2 | 0.106 | | |
| NCQ cross boundary continuity (between providers within somatic rehabilitation and GP in municipality) | 0.25 | -0.06, 0.56 | 0.114 | 1035.8 | 1035.8 | 0.382 | 0.136 | 0.16 | -0.13, 0.45 | 0.290 | 1038.8 | 0.887 | 0.22 | -0.09, 0.52 | 0.163 | 1040.2 | 0.054 | | |
| | -0.35 | -0.72, 0.01 | 0.056 | 833.5 | 833.5 | 0.090 | 0.848 | -0.35 | -0.74, 0.04 | 0.082 | 841.9 | 0.645 | -0.39 | -0.80, 0.01 | 0.056 | 851.3 | 0.470 | | |
| RC Relationship | | | | | | | | | | | | | | | | | | | |
| Overall rehabilitation benefit | 0.35 | -0.04, 0.73 | 0.079 | 1606.2 | 1606.2 | 0.083 | 0.602 | 0.30 | -0.09, 0.69 | 0.127 | 1608.5 | 0.054 | 0.36 | -0.04, 0.75 | 0.079 | 1613.4 | 0.157 | | |
| Physical health benefit | 0.35 | -0.05, 0.75 | 0.083 | 1622.0 | 1622.0 | 0.079 | 0.661 | 0.27 | -0.08, 0.62 | 0.131 | 1620.4 | 0.002 | 0.36 | -0.00, 0.72 | 0.051 | 1619.7 | 0.028 | | |
| Mental health benefit | 0.28 | -0.06, 0.61 | 0.109 | 1508.1 | 1508.1 | 0.109 | 0.614 | 0.18 | -0.17, 0.53 | 0.308 | 1512.8 | 0.106 | 0.33 | -0.04, 0.70 | 0.078 | 1516.9 | 0.125 | | |
| Activities of daily living benefit | 0.04 | -0.28, 0.37 | 0.786 | 1542.6 | 1542.6 | 0.831 | 0.670 | -0.03 | -0.35, 0.30 | 0.869 | 1548.2 | 0.159 | 0.09 | -0.25, 0.42 | 0.618 | 1545.3 | 0.013 | | |
| Social participation benefit | 0.06 | -0.30, 0.42 | 0.751 | 1585.0 | 1585.0 | 0.938 | 0.636 | -0.06 | -0.40, 0.29 | 0.739 | 1590.2 | 0.139 | 0.09 | -0.29, 0.46 | 0.647 | 1590.9 | 0.044 | | |
| NCQ personal continuity ("knows me") | | | | | | | | | | | | | | | | | | | |
| NCQ personal continuity ("shows commitment") | -0.40 | -0.67, -0.13 | 0.004 | 1234.0 | 1234.0 | 0.007 | 0.870 | -0.35 | -0.63, -0.07 | 0.016 | 1241.9 | 0.362 | -0.33 | -0.62, -0.03 | 0.028 | 1247.0 | 0.169 | | |
| NCQ team continuity (between providers within somatic rehabilitation) | -0.50 | -0.83, -0.16 | 0.004 | 1090.5 | 1090.5 | 0.005 | 0.949 | -0.47 | -0.82, -0.12 | 0.009 | 1096.3 | 0.429 | -0.44 | -0.80, -0.08 | 0.017 | 1099.4 | 0.095 | | |
| NCQ cross boundary continuity (between providers within somatic rehabilitation and GP in municipality) | 0.36 | 0.05, 0.68 | 0.024 | 1034.3 | 1034.3 | 0.025 | 0.990 | 0.31 | 0.03, 0.58 | 0.028 | 1036.8 | 0.960 | 0.36 | 0.07, 0.65 | 0.016 | 1037.7 | 0.057 | | |
| | -0.42 | -0.80, -0.04 | 0.030 | 832.5 | 832.5 | 0.042 | 0.806 | -0.44 | -0.84, -0.04 | 0.032 | 840.4 | 0.480 | -0.49 | -0.91, -0.07 | 0.023 | 849.8 | 0.477 | | |

¹Crude estimates

²Adjusted for referral diagnosis, neoplasms, diseases of the nervous system, diseases of the musculoskeletal system, diseases of the circulatory system, other

³Adjusted for referral diagnosis, neoplasms, diseases of the nervous system, diseases of the musculoskeletal system, diseases of the circulatory system, other and World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0)

Physician or from the general practitioner in the municipality.

3. Paper III





The effect of team collaboration and continuity of care on health and disability among rehabilitation patients: a longitudinal survey-based study from western Norway

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Abstract

Purpose The purpose of this study was to investigate how changes in patient-rated health and disability from baseline to after rehabilitation were associated with communication and relationships in rehabilitation teams and patient-rated continuity of care.

Methods Linear models were used to assess the associations between relational coordination [RC] and Nijmegen Continuity Questionnaire-Norwegian version [NCQ-N] with changes in the World Health Association Disability Assessment Schedule 2.0 [WHODAS 2.0] and EuroQol EQ-VAS [EQ-VAS]. To express change in WHODAS 2.0 and EQ-VAS, the model was adjusted for WHODAS 2.0 and EQ-VAS baseline scores. Analyses for possible slopes for the various diagnosis groups were performed.

Results A sample of 701 patients were included in the patient cohort, followed from before rehabilitation to 1 year after a rehabilitation stay involving treatment by 15 different interprofessional teams. The analyses revealed associations between continuity of care and changes in patient-rated health, measured with EQ-VAS (all p values < 0.01). RC communication was associated with more improvement in functioning in neoplasms patient group, compared to improvement of health among included patient groups. The results revealed no associations between NCQ-N and WHODAS 2.0 global score, or between RC in the rehabilitation teams treating the patients and changes in WHODAS 2.0 global score.

Conclusion The current results revealed that better personal, team and cross-boundary continuity of rehabilitation care was associated with better patient health after rehabilitation at 1-year follow-up. Measures of patient experiences with different types of continuity of care may provide a promising indicator of the quality of rehabilitation care.

Keywords Continuity of patient care · Rehabilitation · Disability evaluation · Interprofessional relations · Patient-rated outcome measures · Relational coordination

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s11136-019-02216-7>) contains supplementary material, which is available to authorized users.

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Abbreviations

| | |
|------------|--|
| RC | Relational coordination |
| NCQ | Nijmegen Continuity Questionnaire |
| NCQ-N | Norwegian version of the Nijmegen Continuity Questionnaire |
| GP | General practitioner |
| WHODAS 2.0 | World Health Organization Disability Assessment Schedule 2.0 |
| EQ-5D-5L | EuroQol-5 dimension descriptive system |
| EQ-VAS | EuroQol EQ-VAS |
| b | Unstandardized estimated regression coefficient |
| SD | Standard deviation |
| CI | Confidence interval |

Background

Rehabilitation is considered one of the most important processes enabling attainment and maintenance of physical, mental, social and vocational activities for people with various health conditions and disabilities [1]. Somatic rehabilitation emphasises health and functioning through a continuous and coordinated process that extends over a period of time with a collaborating interprofessional rehabilitation team [2]. Self-rated health and disability have received increased attention in recent decades as important outcomes in rehabilitation [3].

While undergoing rehabilitation, patients are treated by an array of health care professionals in a team, not only during their stay in a rehabilitation centre, but also across multiple specialities and in different health care settings [4]. According to Donabedian's health care quality model, high-quality structures of care should lead to improvements in clinical processes and subsequently improve patient outcomes [5]. Collaboration and coordination in interprofessional rehabilitation teams are important for ensuring good quality continuity of care and outcomes for patients [6–8]. Relational coordination (RC) among interprofessional team members has been found to improve patient outcomes [9] and impact care coordination [10].

Continuity of rehabilitation care occurs when patient experiences are linked to care over time or when the care is connected [11]. Continuity of care is considered to be essential for high-quality patient care [12–14] and is commonly framed as being composed of relational continuity (relationship between a patient and a provider over time), information continuity (availability and use of data from prior events during current patient encounters) and management continuity (coherent delivery of care from different health care professionals) [11, 13]. It is generally preferable for continuity of care to be measured from the patients' perspective [15].

A large number of studies of continuity of care have examined the personal continuity between patients and general practitioner (GP) or health care professional delivering care over time and have typically been performed in primary health care settings [16, 17]. Few studies have investigated continuity of care in somatic specialised health care and even fewer have examined somatic rehabilitation settings [18–20]. Investigations of patients' perceived personal, team and cross-boundary continuity in rehabilitation services are scarce [21]. In a recent study, we found associations between RC functions in interprofessional rehabilitation teams and the patient-rated continuity of care at 1-year follow-up [18]. Further, this previous study also indicated weak associations between RC subscale scores and patient-rated benefit in more general terms, most pronounced related to activities in daily living [18].

To the best of our knowledge, no previous studies have investigated the associations between interprofessional team functioning and continuity of care with changes in patient-rated health and disability longitudinally. Therefore, we assessed associations between RC in interprofessional rehabilitation teams and patient-rated continuity of care with changes in patient-rated health and disability.

Aims

The current study sought to investigate how changes in patient-rated health and disability from baseline to after rehabilitation were associated with communication and relationships in rehabilitation teams and patient-rated continuity of care.

Methods

Study design

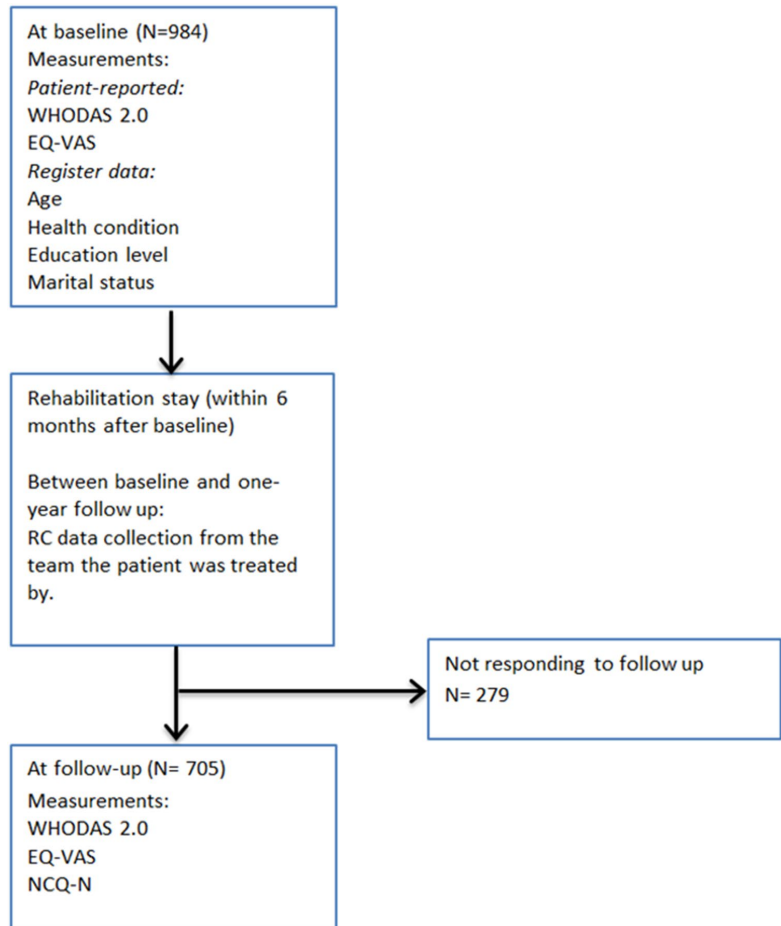
This study used a longitudinal survey-based design following a cohort of patients accepted for a rehabilitation stay in secondary health care services (Fig. 1). Survey data was collected when patients were recruited (baseline) and in a follow-up survey 1 year after baseline data collection. In between the two surveys, the patients had a rehabilitation stay in one of the centres. All patients included have taken part in a 3-week rehabilitation process treated by an interprofessional team comprising of a physician, occupational therapist, physical therapist, nurse and other relevant team members. Each of the seven rehabilitation centres in Western Norway provides interventions appropriate for the diagnostic group referred to the centre. As we aimed to include a large cohort of rehabilitation patients in Western Norway all patients who were referred with various diagnosis were included, and therefore a single specific intervention is not studied. RC in interprofessional teams were estimated by a survey among the professionals working in the rehabilitation centres.

Participants

Patient cohort

All patients aged 18 and above who were accepted for rehabilitation in a rehabilitation centre in Western Norway between January 2015 and June 2015 were invited to participate ($n = 2863$). For baseline data collection, a total of 984 (34%) patients accepted the invitation to participate and provided written consent and a completed questionnaire. A 1-year follow-up questionnaire was sent to all participating patients ($n = 984$), and 705 patients (25% of the

Fig. 1 Flow chart for data collection



patient group invited at baseline) returned the questionnaire. We extracted 279 of the baseline participants from the analyses, as they did not respond to the 1-year follow-up survey. Four respondents were omitted from the analyses due to missing data on outcome variables. Finally, 701 (24% of the patient group invited at baseline) patients were included in the analyses (Table 1). Each patient respondent was linked to their corresponding interprofessional team from whom they received rehabilitation services during their stay in the rehabilitation centre. Further descriptions of the recruitment and inclusion process of patients and health care professionals have been reported in previous studies [18, 22, 23].

Dependent variables and measurements

The World Health Organization Disability Assessment Schedule version 2.0 (WHODAS 2.0) was developed to correspond directly to the “activity and participation” dimension of the International Classification of Disability, Function and Health (ICF) [24] and has previously been used to evaluate disability in a generic rehabilitation group [25, 26]. WHODAS 2.0 is an extensively validated and used patient-rated generic self-evaluation survey instrument [22, 27, 28]. WHODAS 2.0 is translated into several languages, including Norwegian [22], and has been used

Table 1 Characteristics of included rehabilitation patients ($N=701$) answering both baseline and the 1-year follow-up survey, and non-responders of the 1-year follow-up survey ($N=279$)

| Patient characteristics | Included patients ($N=701$) | Non-responders at 1-year follow-up ($N=279$) |
|--|-------------------------------|--|
| Age mean (SD) | | |
| Male | 63 (13.4) | 56 (12.83) |
| Female | 60 (13.5) | 52 (15.12) |
| Age group n (%) | | |
| 18–29 | 10 (1.4) | 12 (4.6) |
| 30–39 | 35 (5.0) | 40 (14.5) |
| 40–49 | 113 (16.1) | 68 (24.5) |
| 50–59 | 165 (23.5) | 65 (23.5) |
| 60–69 | 198 (28.3) | 52 (18.8) |
| > 70 | 180 (25.7) | 39 (14.1) |
| Missing | 0 (0) | 0 (0) |
| Sex n (%) | | |
| Male | 269 (38.0) | 88 (31.5) |
| Female | 432 (62.0) | 191 (68.5) |
| Missing | 0 (0) | 0 (0) |
| Health conditions n (%) | | |
| Neoplasms | 49 (7.0) | 16 (5.7) |
| Diseases in the nervous system | 81 (11.6) | 21 (7.5) |
| Diseases in the musculoskeletal system | 356 (50.8) | 130 (46.6) |
| Diseases in the circulatory system | 60 (8.6) | 48 (17.2) |
| Others ^a | 152 (21.7) | 64 (23.0) |
| Missing | 3 (0.4) | 0 (0) |
| Education level n (%) | | |
| Elementary school | 152 (21.7) | 76 (27.2) |
| High school | 328 (46.8) | 128 (45.9) |
| College/University | 213 (30.4) | 67 (24.0) |
| Missing | 8 (1.1) | 8 (2.9) |
| Marital status n (%) | | |
| Married | 356 (50.8) | 130 (46.6) |
| Unmarried, not divorced | 189 (27.0) | 83 (29.7) |
| Divorced | 150 (21.4) | 64 (22.9) |
| Missing | 6 (0.9) | 2 (0.7) |

^aOther health conditions included the following: endocrine, nutritional and metabolic diseases ($n=36$); respiratory diseases ($n=35$); diseases of the skin and subcutaneous tissue (23); injuries and external causes ($n=18$); factors influencing self-rated health and contact with services ($n=7$); mental and behavioural disorders ($n=12$); symptoms, sign and abnormal clinical and laboratory findings, not elsewhere classified ($n=4$); codes for special purposes ($n=6$); diseases of the digestive system ($n=5$); diseases of the blood and blood-forming organs, and certain disorders involving the immune mechanism ($n=1$); diseases of the ear and the mastoid process ($n=1$); diseases of the genitourinary system ($n=1$); congenital malfunctions, and chromosomal abnormalities ($n=1$); and certain infectious and parasitic diseases ($n=2$)

in various health care settings, such as chronic care [24], stroke [29] and secondary rehabilitation services [23].

WHODAS 2.0 measures health and disability using 36 items across six domains [26] (number of items and Cronbach's alpha from Norwegian validation study [22] in parentheses): cognition (six items, $\alpha=0.87$), mobility (five items, $\alpha=0.85$), self-care (four items, $\alpha=0.77$), getting along (five items, $\alpha=0.75$), life activities (eight items, $\alpha=0.91$) and participation (eight items, $\alpha=0.83$). Four items in the

domain of *life activities* relate to the household and four items relate to work/study. Responses were given on a five-point Likert scale (one = none, two = mild, three = moderate, four = severe and five = extreme or cannot do). Scores were computed for each domain by adding the item responses representing each domain. Each domain score was transformed into a range from zero (best = no disability) to 100 (worst = full disability). A global score was calculated using either all 36 items or 32 items in cases where the four items

regarding work/school were omitted because they did not apply to the participating patients [30]. The global score ranged from zero (best = no disability) to 100 (worst = full disability). The range scores for the domain and global scores were assessed as 0–4: no functional problem; 5–24: mild functional problem; 25–40: moderate functional problem; 50–95: severe functional problem and 95–100: total functional loss. The calculation of the WHODAS 2.0 domain and global scores was conducted according to the WHODAS 2.0 manual with complex scoring [26].

The EuroQol-5 dimension descriptive system (EQ-5D) includes a visual analogue scale (EQ-VAS) for measuring respondents' overall health status [31–34]. The EQ-5D is an extensively validated and reliable generic health-related measurement tool [35–37], including validation in rehabilitation settings [31, 32]. EQ-5D has, among others, been used in primary care [38], geriatric health [39] and in somatic and community-based rehabilitation settings [23, 40]. EQ-5D is ideally used by self-evaluation [34]. Respondents indicated their self-rated health on a vertical, calibrated, line ranging from zero (“worst imaginable health state”) to 100 (“best imaginable health state”) [34].

Independent variables and measurements

The main independent variables in this study were the team-reported RC subscale scores and the patient-rated Nijmegen Continuity Questionnaire, Norwegian version, (NCQ-N) subscale scores.

RC is a self-reporting validated survey measuring team functions among members of interprofessional teams [20, 41]. The RC survey has recently been translated into Norwegian and validated within teams in specialised health care settings [42]. This study found a satisfactory two-factor solution (Cronbach's alpha in parentheses); RC communication = four items: frequency, accuracy, timeliness and problem-solving ($\alpha=0.93$), RC relationship = three items: shared knowledge, shared goals, mutual respect ($\alpha=0.80$) [42, 43]. Each item represents a question (e.g. “How frequently do members of the interprofessional team communicate with you about the rehabilitation patient?”). Responses were reported on a 5-point Likert scale (one = never, two = rarely, three = occasionally, four = often and five = always). RC has been used in various health care settings, such as primary health [44], hospital settings [42, 45] and secondary rehabilitation services [18]. RC subscale scores were obtained for all teams ($N=15$) in all rehabilitation centres by conducting a survey among health care professionals ($N=124$, 52% response rate). The RC subscale scores are reported as clustered mean scores for each team in this study, and scores were assigned to the patients treated by the respective teams.

The Nijmegen Continuity Questionnaire (NCQ) is a validated generic survey measuring continuity of care from

the perspectives of the patients and consists of 28 items divided into six subscales [46, 47]. The NCQ has been used in primary care [19], chronic illness [48] and somatic rehabilitation [18, 49]. The NCQ has recently been translated into Norwegian (NCQ-N) [49]. In this study, we used two subscales of the NCQ-N for personal continuity (number of items and Cronbach's alpha in parentheses): most important health care professional in the interprofessional rehabilitation team knows me (five items, $\alpha=0.92$), most important health care professional in the interprofessional rehabilitation team shows commitment (three items, $\alpha=0.88$) together with subscales regarding team continuity: collaboration between providers within the team in the rehabilitation centre (four items, $\alpha=0.96$) and cross-boundary continuity: between the rehabilitation centres and general practitioners in the municipality (four items, $\alpha=0.95$). The NCQ-N uses a 5-point Likert scale (one = strongly disagree, two = disagree, three = neutral, four = agree, five = strongly agree) with an option of “don't know” (set as missing).

As adjustment variables we used variables; *age* and *sex* from the baseline survey. Variables; *marital status* and *education level* were register data provided by Statistics Norway and linked to the survey.

Statistical analyses

Descriptive methods were used to describe sample characteristics. Missing data was handled with flexible multiple imputation method using chained predictive mean matching, creating 50 datasets [50]. Rubin's rules were used for pooling the results [50].

Linear models were used to assess the association between RC and NCQ-N as independent variables and the WHODAS 2.0 domain and global scores and EQ-VAS score at 1-year as dependent variables. To express change in WHODAS 2.0 and EQ-VAS from baseline to follow-up, the model was also adjusted for WHODAS 2.0 and EQ-VAS baseline scores [51]. All models were adjusted for: sex, age (categorised as: 18–29, 30–39, 40–49, 50–59, 60–69 and > 70), marital status (categorised as: married, unmarried [not divorced], divorced), education level (categorised as: elementary school, high school and university/college) and health conditions, based on the Statistical Classification of Diseases and Related Health Problems Tenth Revision (ICD-10) referral diagnosis grouped as: neoplasms, nervous system diseases, musculoskeletal system diseases, circulatory system diseases, and others. Additionally, we made corresponding analyses including an interaction between diagnoses and the independent variables to assess possibly different slopes for the various ICD-10 referral diagnosis groups. All RC scales at patient level were clustered because of the team allocation. This has been taken into account by adding a

random intercept for team allocation in the models including RC, turning them to Linear Mixed Effects models (LME).

The level of significance was set as 0.05. All statistical analyses were performed with IBM SPSS for Windows version 24 (IBM Corp. Armonk, NY) [52], and STATA 15 (STATA Corp., College Station, TX) [53]. The graphics were produced using Matlab 9.0 (The Mathworks Inc., Natick, MA).

Results

Patients reported a mean WHODAS 2.0 global score at 28.6 (standard deviation [SD]=15.4) at baseline, which decreased to 24.1 (SD=15.9) at 1-year follow-up, indicating reduced disability. Patients with neoplasms reported a larger reduction of disability, as measured by WHODAS 2.0 global score, compared to patients in other referral diagnosis groups included in this study (Table 2). The mean EQ-VAS score changed from 51.4 (SD=18.8) at baseline to 58.2 (SD=20.1) at 1-year follow-up, indicating improved self-rated health. Generally, patients reported largest reduction of disability for the WHODAS 2.0 domains: life activities, mobility and participation domains (Table 2). The neoplasms patient group shows a market reduction of disability in most WHODAS 2.0 domain scores and EQ-VAS score

compared to other referral diagnosis groups included in this study (Supplementary Table 1).

The mean interprofessional team RC communication score for the patient group was 3.9 (SD=0.31), and the mean team RC relationship score for the patient group was 4.1 (SD=0.28) (Table 3). NCQ-N among patients ranged from 2.9 (SD=0.91) for personal continuity, where respondents

Table 3 Relational coordination and Nijmegen Continuity Questionnaire-N subscale scores in the study population ($N=701$)

| | Mean (SD) |
|---|------------|
| Relational coordination ^a | |
| RC communication | 3.9 (0.31) |
| RC relationship | 4.1 (0.28) |
| Nijmegen Continuity Questionnaire-Norwegian version | |
| NCQ-N personal continuity ("knows me") | 3.0 (0.83) |
| NCQ-N personal continuity ("shows commitment") | 2.9 (0.91) |
| NCQ-N team continuity (within somatic rehabilitation) | 3.7 (0.84) |
| NCQ-N cross-boundary continuity (between rehabilitation centres and GP in municipality) | 3.0 (0.92) |

RC relational coordination, NCQ-N Nijmegen continuity questionnaire-Norwegian version, GP general practitioner, SD standard deviation

^aAll patients were connected to their respective treating team in the rehabilitation centre during their stay

Table 2 Distribution of the World Health Organisation Disability Assessment Schedule 2.0 and the EuroQol EQ-VAS among 701 patients at baseline and 1-year follow-up from specialised rehabilitation centres in Western Norway during the first half of 2015 and 2016

| | Baseline Mean (SD) | 1-year follow-up Mean (SD) | Change score Mean (95% CI) |
|--|-----------------------|-------------------------------|-------------------------------|
| WHODAS 2.0 domain score (all patients) | | | |
| Cognition | 16.4 (18.0) | 14.3 (16.4) | -2.1 (-3.24, -0.96) |
| Mobility | 32.5 (25.4) | 26.3 (25.2) | -6.2 (-7.77, -4.63) |
| Self-care | 11.0 (17.2) | 8.4 (15.9) | -2.6 (-3.84, -1.36) |
| Getting along | 23.9 (20.7) | 22.3 (21.4) | -1.6 (-2.93, -0.27) |
| Life activities | 43.5 (28.1) | 34.8 (27.5) | -8.7 (-10.62, -6.78) |
| Participation | 39.4 (20.4) | 34.6 (21.7) | -4.8 (-6.10, -3.50) |
| WHODAS 2.0 global score (all patients) | 28.6 (15.4) | 24.1 (15.9) | -4.5 (-5.42, -3.58) |
| Neoplasms | 30.3 (15.4) | 20.1 (14.8) | -10.2 (-14.83, -5.57) |
| Diseases in nervous systems | 30.0 (14.2) | 26.4 (14.0) | -3.6 (-6.08, -1.18) |
| Diseases in musculoskeletal systems | 26.6 (15.3) | 22.2 (15.9) | -4.4 (-5.57, -3.13) |
| Diseases in circulatory systems | 32.6 (15.7) | 28.4 (16.6) | -4.2 (-7.39, -1.03) |
| Others | 30.6 (15.0) | 27.1 (16.3) | -3.5 (-5.48, -1.52) |
| EQ-VAS (all patients) | 51.4 (18.8) | 58.2 (20.1) | 7.2 (5.85, 8.55) |
| Neoplasms | 51.7 (19.7) | 63.4 (21.9) | 10.2 (3.17, 17.17) |
| Diseases in nervous systems | 46.1 (18.9) | 56.3 (18.3) | 9.7 (5.92, 13.52) |
| Diseases in musculoskeletal systems | 53.0 (18.7) | 59.9 (19.8) | 7.0 (5.29, 8.77) |
| Diseases in circulatory systems | 47.4 (17.0) | 55.2 (16.9) | 8.0 (3.15, 12.83) |
| Others | 50.6 (19.1) | 54.6 (21.0) | 4.6 (1.61, 7.53) |

WHODAS 2.0, World Health Organization Disability Assessment Schedule version 2.0; EQ-VAS, EuroQol EQ-VAS; SD: standard deviation; 95% CI, 95% confidence interval; 1: WHODAS 2.0 domain and Global score range from: 0=no disability to 100=full disability); 2: EQ-VAS range from, 0=worst imaginable health state to 100=best imaginable health state

Table 4 Associations of relational coordination in interprofessional teams and patient-rated continuity of care subscale scores with the changes in World Health Organisation Disability Assessment Schedule 2.0 global score ($N=701$)

| | WHODAS 2.0 domain and global score | | |
|-----------------------------|------------------------------------|--------------|----------------|
| | Adjusted ^a | | |
| | <i>b</i> | 95% CI | <i>p</i> value |
| RC communication | | | |
| Cognition | -2.36 | -6.12, 1.40 | 0.218 |
| Mobility | -0.75 | -8.91, 7.41 | 0.857 |
| Self-care | -0.91 | -5.51, 3.70 | 0.699 |
| Getting along | -1.93 | -6.80, 2.95 | 0.438 |
| Life activities | -2.25 | -10.64, 6.14 | 0.600 |
| Participation | -1.32 | -7.17, 4.53 | 0.658 |
| Global score | -1.04 | -5.84, 3.75 | 0.670 |
| RC relationship | | | |
| Cognition | -2.17 | -6.04, 1.71 | 0.274 |
| Mobility | 3.19 | -5.72, 12.10 | 0.482 |
| Self-care | 0.02 | -5.20, 5.23 | 0.995 |
| Getting along | -0.78 | -5.65, 4.10 | 0.755 |
| Life activities | -1.39 | -10.61, 7.81 | 0.766 |
| Participation | 0.59 | -6.08, 7.26 | 0.861 |
| Global score | 0.86 | -4.55, 6.27 | 0.755 |
| NCQ-N personal1 | | | |
| Cognition | 0.19 | -1.12, 1.50 | 0.777 |
| Mobility | 0.15 | -1.77, 2.08 | 0.877 |
| Self-care | 0.27 | -1.07, 1.62 | 0.688 |
| Getting along | 0.10 | -1.44, 1.64 | 0.897 |
| Life activities | -0.62 | -2.75, 1.50 | 0.566 |
| Participation | -0.74 | -2.28, 0.80 | 0.347 |
| Global score | -0.26 | -1.37, 0.86 | 0.653 |
| NCQ-N personal2 | | | |
| Cognition | -0.01 | -1.19, 1.18 | 0.990 |
| Mobility | -0.76 | -2.50, 0.98 | 0.390 |
| Self-care | 0.15 | -1.04, 1.34 | 0.802 |
| Getting along | -0.45 | -1.87, 0.98 | 0.537 |
| Life activities | -0.81 | -2.79, 1.16 | 0.419 |
| Participation | -1.08 | -2.48, 0.32 | 0.132 |
| Global score | -0.58 | -1.60, 0.43 | 0.260 |
| NCQ-N team | | | |
| Cognition | -1.54 | -2.90, -0.18 | 0.027 |
| Mobility | -0.79 | -2.64, 1.06 | 0.403 |
| Self-care | -0.30 | -1.73, 1.13 | 0.679 |
| Getting along | -1.59 | -3.26, 0.08 | 0.062 |
| Life activities | -0.40 | -2.66, 1.86 | 0.727 |
| Participation | -2.09 | -3.66, -0.53 | 0.009 |
| Global score | -1.03 | -2.19, 0.13 | 0.082 |
| NCQ-N cross-boundary | | | |
| Cognition | -0.19 | -1.51, 1.13 | 0.775 |
| Mobility | -1.06 | -2.94, 0.82 | 0.270 |
| Self-care | -0.01 | -1.34, 1.31 | 0.986 |
| Getting along | -0.49 | -2.00, 1.01 | 0.521 |

Table 4 (continued)

| | WHODAS 2.0 domain and global score | | |
|-----------------|------------------------------------|--------------|----------------|
| | Adjusted ^a | | |
| | <i>b</i> | 95% CI | <i>p</i> value |
| Life activities | -2.20 | -4.39, -0.00 | 0.050 |
| Participation | -1.26 | -2.84, 0.31 | 0.115 |
| Global score | -0.79 | -1.97, 0.38 | 0.186 |

WHODAS 2.0 World Health Organization Disability Assessment Schedule version 2.0, **RC** relational coordination subscale score, **NCQ-N** Nijmegen continuity questionnaire- Norwegian version, *b* unstandardized estimated regression coefficient, *CI* confidence interval, **NCQ-N Personal1** NCQ-N personal continuity (“knows me”), **NCQ-N Personal 2** NCQ-N personal continuity (“shows commitment”), **NCQ-N Team** NCQ-N team continuity (within somatic rehabilitation), **NCQ-N Cross-boundary** NCQ-N cross-boundary continuity (between rehabilitation centres and general practitioner in municipality)

^aAdjusted for: patients’ age group, sex, health conditions, education level, marital status and baseline dependent variable subscale score (WHODAS 2.0)

reported that the most important health care professional in the team “shows commitment”, to the highest mean score for team continuity within somatic rehabilitation centres of 3.7 (SD=0.84) (Table 3).

No associations were found between RC and NCQ-N subscale with changes in WHODAS 2.0 global score (Table 4). There were associations between NCQ-N team continuity and change in WHODAS 2.0 cognition; -1.54 (SD = 18.3, $p=0.027$), NCQ-N team continuity and WHODAS 2.0 participation; -2.09 (SD = 21.2, $p=0.009$) and NCQ-N cross-boundary continuity and WHODAS 2.0 life activities; -2.20 (SD = 29.7, $p=0.050$); however, no associations were found between RC and changes in WHODAS 2.0 domain scores (Table 4).

Figure 2 presents analyses of associations between RC and NCQ-N subscale scores and changes in WHODAS 2.0 global scores for patient grouped by referral diagnosis. A higher RC communication score was associated with improved health for the neoplasms patient group ($b = -20.66$, 95% CI = $-37.05, -4.28$, $p = 0.013$) (Supplementary Table 3). A similar (not significant) pattern can be seen between RC relationship and WHODAS 2.0 global scores for the neoplasms patient group. This study did not disclose associations between NCQ-N and changes in WHODAS 2.0 global score when analysing referral diagnosis groups separately. Supplementary Table 3 provides *b* coefficient, 95% CI and *p* values related to Fig. 2.

We found significant associations between all NCQ-N subscales and changes in the EQ-VAS (Table 5), while no associations were found between RC and changes in EQ-VAS.

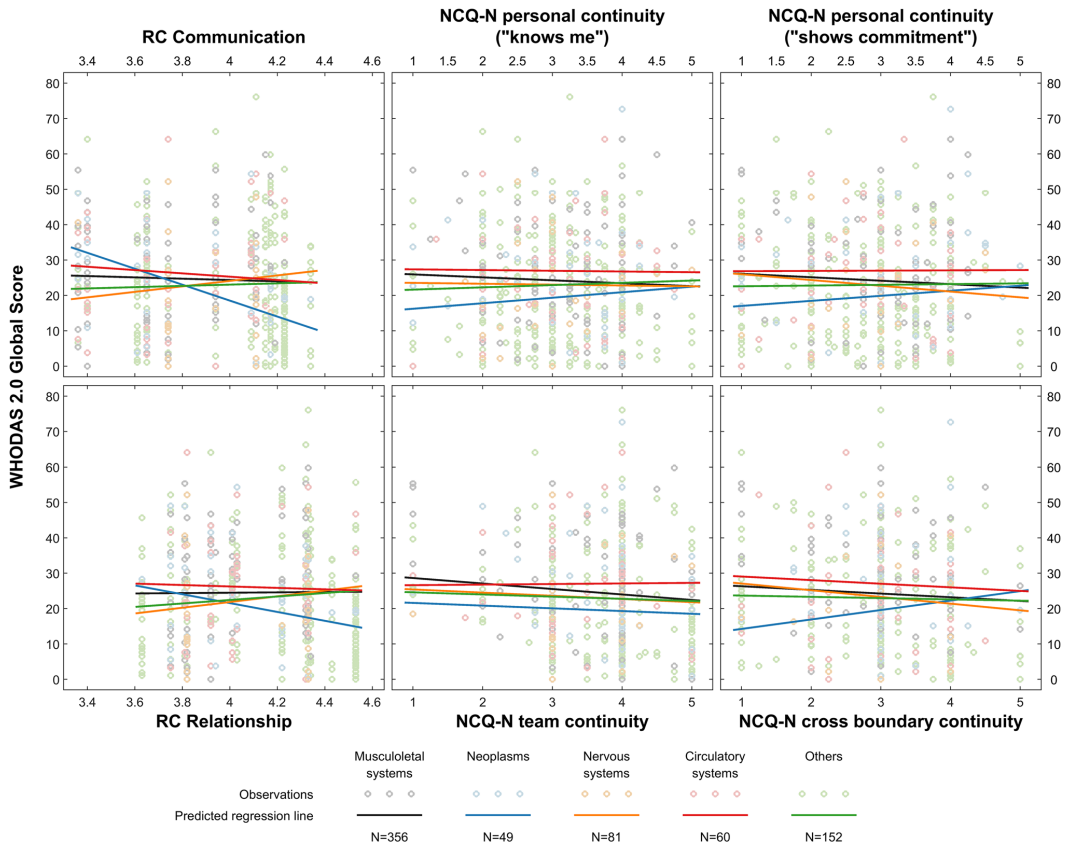


Fig. 2 Associations of relational coordination subscale scores in interprofessional teams and patient-rated continuity of care subscale scores with the World Health Organisation Disability Assessment Schedule 2.0 global score with patients grouped by ICD-10 referral

diagnoses ($N=701$). *WHODAS 2.0* World Health Organization Disability Assessment Schedule version 2.0, *RC* relational coordination, *NCQ-N* Nijmegen continuity questionnaire-Norwegian version

Figure 3 presents analyses of associations between RC and NCQ-N subscale scores with changes in EQ-VAS scores for patients grouped by referral diagnosis. Patients referred with nervous system diseases reported a decrease in the EQ-VAS score when treated by teams with higher levels of RC relationship score ($b = -20.66$, 95% CI = -38.96 , -2.36 , $p = 0.027$) (Supplementary Table 4), a similar (not significant) association was seen between RC communication score and EQ-VAS score in the same patient group. This study found that patients in all referral diagnosis groups reported improvement in health when experiencing continuity of care. Supplementary Table 4 provides b coefficient, 95% CI and p values related to Fig. 3.

Discussion

To the best of our knowledge, this is the first study to investigate the associations between team functions in somatic rehabilitation centres and changes in health and disability among rehabilitation patients. An improvement of health was associated with better patient-reported continuity of care regarding rehabilitation care. However, continuity of care was not associated with reduced disability. Communication and relationship in teams, as reported by the professionals, were not associated with improvement in health or decreased disability, looking at the total sample. However, neoplasms patient group improved their health more compared to other diagnosis groups included in this study.

Previous studies have reported that continuity of care is associated with reduced length of stay in hospital, reduced

Table 5 Associations of relational coordination subscale scores in interprofessional teams and patient-rated continuity of care subscale scores with the EuroQol EQ-VAS health state score ($N=701$)

| | EQ-VAS score | | |
|----------------------|-----------------------|-------------|----------------|
| | Adjusted ^a | | |
| | <i>b</i> | 95% CI | <i>p</i> value |
| RC communication | 0.99 | -5.49, 7.46 | 0.764 |
| RC relationship | 0.27 | -6.90, 7.44 | 0.941 |
| NCQ-N Personal1 | 2.50 | 0.94, 4.06 | 0.002 |
| NCQ-N Personal2 | 2.28 | 0.81, 3.76 | 0.002 |
| NCQ-N team | 1.73 | 0.11, 3.35 | 0.037 |
| NCQ-N cross-boundary | 2.40 | 0.84, 3.96 | 0.003 |

EQ-VAS EuroQol EQ-VAS, RC relational coordination subscale score, NCQ-N Nijmegen continuity questionnaire-Norwegian version, *b* unstandardized estimated regression coefficient, CI confidence interval, Personal1 NCQ-N personal continuity ("knows me"), Personal 2 NCQ-N personal continuity ("shows commitment"), Team NCQ-N team continuity (within somatic rehabilitation), Cross-boundary NCQ-N cross-boundary continuity (between rehabilitation centres and general practitioner in municipality)

^aFully adjusted model is adjusted for: patients' age group, sex, health conditions, education level, marital status and baseline dependent variable subscale score (EQ-VAS)

readmission rates, reduced cost, and increased patient satisfaction as outcomes [12, 16, 54, 55]. However, relatively few studies have investigated the associations between continuity of care and patient-rated health outcomes. The present study expands knowledge in this field, revealing a significant association between both personal continuity and team continuity in the rehabilitation team on one hand, and improved health after rehabilitation stay on the other. However, we found no association between continuity of care and changes in the level of disability. These findings indicate a need for more research to verify the impact of continuity of care on patients' outcomes, preferably with more direct measures of health and functioning.

The importance of teams working towards shared goals using a shared approach in health care settings has a well-established theoretical and empirical basis, and found to positively influence the quality and continuity of patient care [56–59]. One would therefore assume that a higher score on RC in rehabilitation teams would positively affect patients' health and disability. This present study found that the neoplasms patient group reported a greater improvement in function compared to the other patient groups included. This is in line with previous research that found communication in interprofessional teams to positively impact patient outcomes of cancer care [60]. In our study, this patient group showed the most marked improvement in functioning during the study period. One explanation for this finding could be that this patient group represents a selection of patients who had recently undergone treatment prior to commencing a

rehabilitation stay and therefore could be more inclined to be in a phase of recovery where the intervention by rehabilitation teams is especially useful. Patients with nervous system diseases treated by teams with better team functions as measured by RC reported a decrease in health, as measured by EQ-VAS. These patients often have progressive diseases, and one explanation for this finding could be that patients with most serious condition are of greater need for team functions due to a more severe decline in health over time, compared to other diagnosis groups included in this study.

In a previous study, we found that RC communication and relationships in teams were inversely associated with personal continuity as reported by the patient after rehabilitation [18]. Thus, patients treated by a well-functioning team, as defined by RC, were unlikely to specifically have a close relationship with the most important professional during their rehabilitation stay. This is contradictory to previous research reporting that team-based models was associated with increased social participation among stroke patients [61]. However, in these models the patient had a defined coordinator, responsible for systematic follow-up after a rehabilitation process. The present study found an association between personal continuity and improvement in health, as measured by EQ-VAS. This effect of personal continuity is well documented in other care settings [16, 17, 21, 62]. Further, in accordance with previous research [12, 55], this current study found continuity of care to positively influence patient-rated changes in health after a rehabilitation stay. One explanation for these findings could be that continuity of care as defined and experienced by patients may differ from continuity of care as defined by health care professionals. The lack of personal continuity might be a limitation of team-based care and should be taken into account when organising rehabilitation care.

Since the present study focused on the health outcomes after rehabilitation, we also looked at cross-boundary continuity between rehabilitation centres and primary health care. Patients may have received health care services in the municipality to follow up interventions received at the rehabilitation centre. Interprofessional rehabilitation teams communicate with other health care professionals across settings, and the current results revealed that better cross-boundary continuity in the NCQ-N was associated with improved health outcomes. This finding is in line with previous studies reporting that a lack of continuity across settings was associated with an increased risk of inactivity, falls and readmission among stroke patients [63]. Further, previous studies have shown that continuity of care after hospital discharge was associated with a reduced risk of death and readmission to hospital [54, 55].

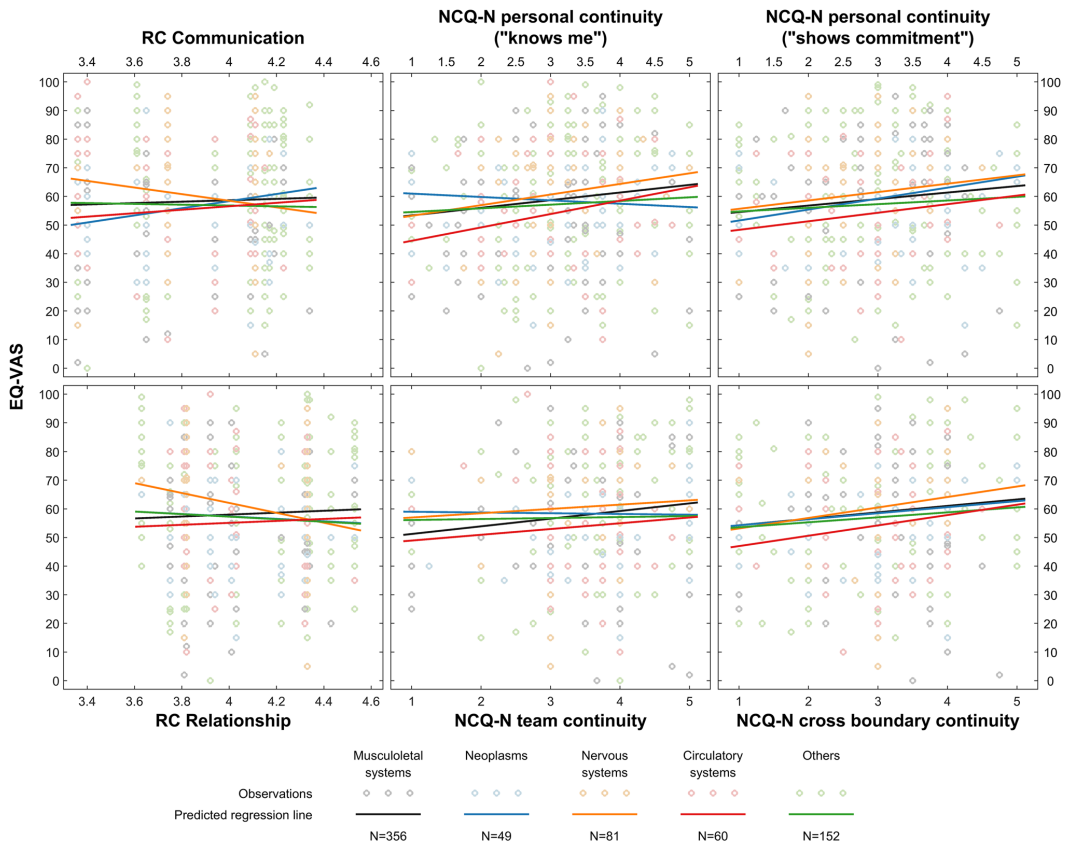


Fig. 3 Associations of relational coordination subscale scores in interprofessional teams and patient-rated continuity of care subscale scores with the EuroQol EQ-VAS health state score with patients

grouped by ICD-10 referral diagnoses ($N=701$). EQ-VAS EuroQol EQ-VAS, RC relational coordination, NCQ-N Nijmegen continuity questionnaire-Norwegian version

Study strengths and limitations

An important strength of the current study was the longitudinal design and the comprehensive study population with a broad range of health conditions. In addition, this study included patients who were accepted for somatic rehabilitation in all rehabilitation centres in a defined geographical area (Western Norway), combined with data collection from employees working in interprofessional rehabilitation teams. However, a major limitation was the low response rate at baseline (34%) and at 1-year follow-up (25% of the patients recruited at baseline), which may have resulted in selection bias and problems regarding representability. A further limitation was loss of participants at 1-year follow-up. As non-responders at follow-up seemed to be younger and more often male compared to the responders, an attrition

bias could have affected findings. Changes in health at 1-year follow-up could be smaller due to including a sample with a higher mean age and increased number of women.

Strength of the current study was the use of validated generic survey instruments, which enabled us to study a heterogeneous rehabilitation patient cohort. The instruments have shown satisfactory psychometric properties in terms of factor structure and reliability, and the WHODAS 2.0 had satisfactory test-retest reliability [22]. The instruments used were valid and reliable for capturing patient-rated health and disability. However, several limitations regarding the included instruments should be considered. The NCQ-N included the response option “don’t know”, which, in this study, was set as “missing”. This resulted in a relatively large number of missing data points. However, using a flexible multiple imputation method for handling missing data

reduced the potential effects of bias due to a large number of missing data points in the NCQ-N responses. The low variance in RC between teams may make it difficult to disclose eventual associations between RC in teams and patient-rated outcomes, and our findings should be interpreted with this precaution. The results of the analyses regarding referral diagnosis groups should be interpreted cautiously as some patient groups were relatively small and our findings may therefore not be generalizable to these groups at large. A further potential limitation is that patients in the present study reported mild to moderate disability level according to the WHODAS 2.0 global scale, which may limit the generalisability of the current results to populations with more severe disability.

Conclusion

The current study revealed that better personal, team and cross-boundary continuity of rehabilitation care was associated with improved health after rehabilitation. Measures of patient-rated personal, team and cross-boundary continuity may be a promising indicator of the quality of rehabilitation care. However, our findings did not reveal any associations between RC in interprofessional teams and self-rated health or disability among rehabilitation patients. More research is needed to understand the effects of team functioning in inter-professional rehabilitation teams on patient health outcomes.

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Authors' contribution MH, ØH and SG developed the project idea and contributed to writing the paper. MH, VPM and JA performed the statistical analyses and interpreted the results. VPM and EB contributed to writing the paper. All authors have approved the final version.

Funding The main author is employed at Haukeland University Hospital, and the study is performed through her position as a Ph.D. candidate.

Availability of data and materials The raw data are property of the research unit in the Bergen Health Authority (Helse Bergen) and are available on a reasonable request.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Consent for publication Not applicable.

Ethical approval The study was approved by the Regional Ethics Committee West in Norway (REK-No. 2014-1636).

All procedures were in accordance with the ethical standards of the Regional research committee and with the Declaration of Helsinki 1964 and its later amendments.

Informed consent Informed consent was obtained from all individual participant included in the study, also accepting the linkage to register data.

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Supplementary table 1. Distribution of the World Health Organisation Disability Assessment Schedule 2.0 domain and global scores and the EuroQol EQ-VAS among 701 patients at baseline and 1-year follow-up from secondary rehabilitation centres in Western Norway grouped by ICD-10 referral diagnoses.

| | Baseline Mean (SD) | 1-year follow-up Mean (SD) | Change score Mean (95% CI) |
|-------------------------------------|-----------------------|-------------------------------|-------------------------------|
| WHODAS 2.0 domain score | | | |
| Cognition | 16.4 (18.0) | 14.3 (16.4) | -2.1 (-3.24, -0.96) |
| Neoplasms | 15.4 (19.5) | 10.4 (13.6) | -5.0 (-9.81, -0.21) |
| Diseases in nervous system | 18.3 (18.2) | 16.3 (16.3) | -2.0 (-5.40, 1.42) |
| Diseases in musculoskeletal systems | 15.8 (17.4) | 13.1 (16.6) | -2.8 (-4.24, -1.26) |
| Diseases in circulatory systems | 18.3 (21.1) | 15.3 (16.6) | -3.0 (-7.33, 1.25) |
| Others† | 16.3 (17.5) | 16.9 (17.1) | 0.6 (-1.99, 3.15) |
| Mobility | 32.5 (25.4) | 26.3 (25.2) | -6.2 (-7.77, -4.63) |
| Neoplasms | 45.8 (28.3) | 28.0 (24.0) | -17.8 (-26.28, -9.34) |
| Diseases in nervous system | 35.4 (23.0) | 32.3 (25.7) | -3.1 (-11.27, 5.07) |
| Diseases in musculoskeletal systems | 28.5 (24.7) | 23.0 (23.8) | -5.5 (-7.54, -3.50) |
| Diseases in circulatory systems | 33.9 (26.3) | 30.0 (27.4) | -3.9 (-9.02, 1.24) |
| Others† | 35.4 (25.3) | 29.0 (26.5) | -6.4 (-9.92, -2.82) |
| Self-care | 11.0 (17.2) | 8.4 (16.9) | -2.6 (-3.84, -1.36) |
| Neoplasms | 18.7 (21.4) | 7.5 (13.0) | -11.3 (-17.10, -5.41) |
| Diseases in nervous system | 13.0 (17.8) | 10.2 (16.7) | -2.7 (-5.82, 0.34) |
| Diseases in musculoskeletal systems | 8.6 (15.1) | 7.0 (15.3) | -1.6 (-3.36, 0.12) |
| Diseases in circulatory systems | 11.3 (18.4) | 10.0 (17.7) | -1.3 (-5.43, 2.77) |
| Others† | 12.8 (18.1) | 10.5 (16.2) | -2.3 (-4.91, 0.31) |
| Getting along | 23.9 (20.7) | 22.3 (21.4) | -1.6 (-2.93, -0.27) |
| Neoplasms | 19.3 (15.7) | 18.2 (17.6) | -1.1 (-5.41, 3.25) |
| Diseases in nervous system | 21.7 (17.8) | 21.3 (19.9) | -0.4 (-3.78, 3.04) |
| Diseases in musculoskeletal systems | 23.2 (20.6) | 21.7 (20.8) | -1.5 (-3.31, 0.33) |
| Diseases in circulatory systems | 28.1 (25.6) | 27.7 (27.0) | -0.4 (-6.04, 5.16) |
| Others† | 26.4 (21.3) | 23.2 (21.3) | -3.2 (-6.34, -0.16) |
| Life activities | 43.5 (28.1) | 34.8 (27.5) | -8.7 (-10.62, -6.78) |
| Neoplasms | 47.8 (30.5) | 28.7 (23.7) | -19.0 (-29.30, -9.14) |
| Diseases in nervous system | 47.0 (26.1) | 37.8 (25.6) | -9.1 (-15.29, -2.99) |
| Diseases in musculoskeletal systems | 39.9 (27.4) | 31.7 (27.2) | -8.3 (-10.84, -5.74) |
| Diseases in circulatory systems | 49.9 (29.1) | 41.9 (29.0) | -8.0 (-13.55, -2.37) |
| Others† | 46.3 (29.0) | 40.1 (28.2) | -6.2 (-10.20, -2.24) |
| Participation | 39.4 (20.4) | 34.6 (21.7) | -4.8 (-6.10, -3.50) |
| Neoplasms | 39.5 (22.1) | 28.4 (19.7) | -11.1 (-17.10, -5.02) |
| Diseases in nervous system | 39.4 (18.0) | 36.6 (19.4) | -2.9 (-6.06, 0.30) |
| Diseases in musculoskeletal systems | 37.4 (20.6) | 32.5 (20.9) | -4.9 (-6.57, -3.27) |
| Diseases in circulatory systems | 44.7 (18.9) | 41.1 (20.6) | -3.7 (-7.89, 0.53) |
| Others† | 41.9 (20.8) | 38.2 (23.8) | -3.8 (-6.93, -0.61) |
| WHODAS 2.0 global score | 28.6 (15.4) | 24.1 (15.9) | -4.5 (-5.42, -3.58) |
| Neoplasms | 30.3 (15.4) | 20.1 (14.8) | -10.2 (-14.83, -5.57) |
| Diseases in nervous system | 30.0 (14.2) | 26.4 (14.0) | -3.6 (-6.08, -1.18) |
| Diseases in musculoskeletal systems | 26.6 (15.3) | 22.2 (15.9) | -4.4 (-5.57, -3.13) |
| Diseases in circulatory systems | 32.6 (15.7) | 28.4 (16.6) | -4.2 (-7.39, -1.03) |
| Others† | 30.6 (15.0) | 27.1 (16.3) | -3.5 (-5.48, -1.52) |
| EQ-VAS | 51.4 (18.8) | 58.2 (20.1) | 7.2 (5.85, 8.55) |
| Neoplasms | 51.7 (19.7) | 63.4 (21.9) | 10.2 (3.17, 17.17) |
| Diseases in nervous system | 46.1 (18.9) | 56.3 (18.3) | 9.7 (5.92, 13.52) |
| Diseases in musculoskeletal systems | 53.0 (18.7) | 59.9 (19.8) | 7.0 (5.29, 8.77) |
| Diseases in circulatory systems | 47.4 (17.0) | 55.2 (16.9) | 8.0 (3.15, 12.83) |
| Others† | 50.6 (19.1) | 54.6 (21.0) | 4.6 (1.61, 7.53) |

Abbreviations: WHODAS 2.0: World Health Organization Disability Assessment Schedule version 2.0; EQ-VAS: EuroQol EQ-VAS; SD: standard deviation; 95% CI: 95% confidence interval; 1: WHODAS 2.0 domain and global score range from: 0=no disability to 100=full disability); 2: EQ-VAS range from: 0=worst imaginable health state to 100=best imaginable health state

† Other health conditions included the following: endocrine, nutritional and metabolic diseases (n=36); respiratory diseases (n=35); diseases of the skin and subcutaneous tissue (23); injuries and external causes (n=18); factors influencing self-rated health and contact with services (n=7); mental and behavioural disorders (n=12); symptoms, sign and abnormal clinical and laboratory findings, not elsewhere classified (n=4); codes for special purposes (n=6); diseases of the digestive system (n= 5); diseases of the blood and blood-forming organs, and certain disorders involving the immune mechanism (n=1); diseases of the ear and the mastoid process (n=1); diseases of the genitourinary system (n=1); congenital malfunctions, and chromosomal abnormalities (n=1); and certain infectious and parasitic diseases (n=2).

Supplementary table 2. Associations of Relational Coordination subscale scores in interprofessional teams and continuity of care subscale scores with changes in the World Health Organisation Disability Assessment Schedule 2.0 global score with patients grouped by ICD-10 referral diagnoses (N=701).

| | WHODAS 2.0 Global score | | |
|---|-------------------------|---------------|---------|
| | b | 95% CI | p-value |
| RC Communication, main effect[‡] | -1.04 | - 5.84, 3.75 | 0.670 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | -1.87 | -7.60, 3.87 | 0.524 |
| Neoplasms | -20.66 | -37.05, -4.28 | 0.013 |
| Diseases in the nervous system | 9.61 | -0.24, 19.46 | 0.056 |
| Diseases in the circulatory systems | -2.82 | -14.60, 8.96 | 0.639 |
| Others [†] | 3.67 | -4.41, 11.76 | 0.373 |
| RC Relationship, main effect[‡] | 0.86 | -4.55, 6.27 | 0.755 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | 0.52 | -5.65, 6.69 | 0.869 |
| Neoplasms | -13.04 | -27.47, 1.39 | 0.076 |
| Diseases in the nervous system | 7.57 | -4.98, 1.39 | 0.237 |
| Diseases in the circulatory systems | -2.53 | -17.04, 11.97 | 0.732 |
| Others [†] | 4.40 | -5.19, 13.98 | 0.369 |
| NCQ-N Personal1, main effect[‡] | -0.26 | -1.37, 0.86 | 0.653 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | -0.83 | -2.35, 0.69 | 0.283 |
| Neoplasms | 2.39 | -2.38, 7.16 | 0.326 |
| Diseases in the nervous system | 0.59 | -2.95, 4.12 | 0.745 |
| Diseases in the circulatory systems | 0.63 | -3.15, 4.41 | 0.744 |
| Others [†] | 1.48 | -1.37, 4.32 | 0.309 |
| NCQ-N Personal2, main effect[‡] | -0.58 | -1.60, 0.43 | 0.260 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | -0.97 | -2.36, 0.41 | 0.167 |
| Neoplasms | 2.41 | -3.08, 7.89 | 0.389 |
| Diseases in the nervous system | -0.66 | -3.77, 2.45 | 0.679 |
| Diseases in the circulatory systems | 1.05 | -2.35, 4.45 | 0.543 |
| Others [†] | 1.18 | -1.38, 3.74 | 0.366 |
| NCQ-N Team, main effect[‡] | -1.03 | -2.19, 0.13 | 0.082 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | -1.55 | -3.16, 0.06 | 0.060 |
| Neoplasms | 0.78 | -4.32, 5.88 | 0.763 |
| Diseases in the nervous system | 0.65 | -3.13, 4.43 | 0.736 |
| Diseases in the circulatory systems | 1.71 | -2.33, 5.76 | 0.406 |
| Others [†] | 0.94 | -1.80, 3.67 | 0.503 |
| NCQ-N Cross- boundary, main effect[‡] | -0.79 | -1.97, 0.38 | 0.186 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | -1.04 | -2.44, 0.36 | 0.145 |
| Neoplasms | 3.71 | -1.62, 9.05 | 0.172 |
| Diseases in the nervous system | -0.86 | -4.35, 2.64 | 0.631 |
| Diseases in the circulatory systems | 0.02 | -3.84, 3.89 | 0.991 |
| Others [†] | 0.68 | -1.93, 3.29 | 0.610 |

Abbreviations: WHODAS 2.0: World Health Organization Disability Assessment Schedule version 2.0; RC: Relational coordination subscale score; NCQ-N: Nijmegen continuity questionnaire- Norwegian version; ICD-10: International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; NCQ-N Personal1: NCQ-N personal continuity ("knows me"); NCQ-N Personal 2: NCQ-N personal continuity ("shows commitment"); NCQ-N Team: NCQ-N team continuity (within somatic rehabilitation); NCQ-N Cross-boundary: NCQ-N cross-boundary continuity (between rehabilitation centres and general practitioner in municipality)

[†] Other health conditions included the following: endocrine, nutritional and metabolic diseases (n=36); respiratory diseases (n=35); diseases of the skin and subcutaneous tissue (23); injuries and external causes (n=18); factors influencing self-rated health and contact with services (n=7); mental and behavioural disorders (n=12); symptoms, sign and abnormal clinical and laboratory findings, not elsewhere classified (n=4); codes for special purposes (n=6); diseases of the digestive system (n= 5); diseases of the blood and blood-forming organs, and certain disorders involving the immune mechanism (n=1); diseases of the ear and the mastoid process (n=1); diseases of the genitourinary system (n=1); congenital malfunctions, and chromosomal abnormalities (n=1); and certain infectious and parasitic diseases (n=2).

* Adjusted for: patients' age group, sex, health conditions, education level, marital status and baseline dependent variable subscale score (WHODAS 2.0).

[‡]Main effect are results from the linear regression models presented in table 5 in the paper.

£ Interaction between RC/NCQ-N and ICD-10 referral diagnosis groups

Supplementary table 3. Associations of Relational Coordination subscale scores in interprofessional teams and continuity of care subscale scores with changes in the European Quality of Life visual analogue scale health state score with patients grouped by ICD-10 referral diagnoses (N=701).

| | EQ-VAS Adjusted* | | |
|--|---------------------|---------------|---------|
| | b | 95% CI | p-value |
| RC Communication, main effect[‡] | 0.99 | -5.49, 7.46 | 0.764 |
| Main effect (Mean for diagnoses) | | | |
| Model with interaction[‡]: | 2.44 | -5.50, 10.38 | 0.547 |
| Neoplasms | 10.00 | -12.65, 32.65 | 0.387 |
| Diseases in the nervous system | -13.99 | -28.40, 0.42 | 0.057 |
| Diseases in the circulatory systems | 3.60 | -11.64, 18.84 | 0.643 |
| Others [†] | -3.86 | -15.56, 7.85 | 0.518 |
| RC Relationship, main effect[‡] | 0.27 | -6.90, 7.44 | 0.941 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | 3.35 | -4.90, 11.60 | 0.426 |
| Neoplasms | -7.59 | -28.61, 13.42 | 0.479 |
| Diseases in the nervous system | -20.66 | -38.96, -2.36 | 0.027 |
| Diseases in the circulatory systems | 0.05 | -18.95, 19.04 | 0.996 |
| Others [†] | -7.80 | -22.00, 6.40 | 0.281 |
| NCQ-N Personal1, main effect[‡] | 2.50 | 0.94, 4.06 | 0.002 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | 2.67 | 0.49, 4.84 | 0.016 |
| Neoplasms | -3.84 | -10.81, 3.12 | 0.280 |
| Diseases in the nervous system | 1.04 | -3.86, 5.94 | 0.677 |
| Diseases in the circulatory systems | 2.00 | -3.18, 7.19 | 0.449 |
| Others [†] | -1.38 | -5.41, 2.65 | 0.501 |
| NCQ-N Personal2, main effect[‡] | 2.28 | 0.81, 3.76 | 0.002 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | 2.27 | 0.26, 4.28 | 0.027 |
| Neoplasms | 1.56 | -5.80, 8.92 | 0.678 |
| Diseases in the nervous system | 0.65 | -3.94, 5.25 | 0.780 |
| Diseases in the circulatory systems | 0.72 | -4.00, 5.43 | 0.766 |
| Others [†] | -1.00 | -4.69, 2.70 | 0.596 |
| NCQ-N Team, main effect[‡] | 1.73 | 0.11, 3.35 | 0.037 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | 2.67 | 0.36, 4.98 | 0.023 |
| Neoplasms | -2.93 | -9.65, 3.80 | 0.393 |
| Diseases in the nervous system | -1.17 | -6.64, 4.30 | 0.675 |
| Diseases in the circulatory systems | -0.66 | -6.12, 4.80 | 0.813 |
| Others [†] | -2.33 | -6.34, 1.68 | 0.255 |
| NCQ-N Cross-boundary, main effect[‡] | 2.40 | 0.84, 3.96 | 0.003 |
| Model with interaction[‡]: | | | |
| Reference diagnosis (musculoskeletal) | 2.26 | 0.31, 4.20 | 0.023 |
| Neoplasms | -0.14 | -7.72, 7.43 | 0.970 |
| Diseases in the nervous system | 1.41 | -3.75, 6.57 | 0.593 |
| Diseases in the circulatory systems | 1.36 | -4.29, 7.00 | 0.637 |
| Others [†] | -0.52 | -4.42, 3.38 | 0.794 |

Abbreviations: EQ-VAS: EuroQol EQ-VAS; RC: Relational coordination sub-scale score; NCQ-N: Nijmegen continuity questionnaire-Norwegian version; b: unstandardized estimated regression coefficient; CI: confidence interval; NCQ-N Personal1: NCQ-N personal continuity ("knows me"); NCQ-N Personal 2: NCQ-N personal continuity ("shows commitment"); NCQ-N Team: NCQ-N team continuity (within somatic rehabilitation); NCQ-N Cross-boundary: NCQ-N cross-boundary continuity (between rehabilitation centres and general practitioner in municipality)

[†] Other health conditions included the following: endocrine, nutritional and metabolic diseases (n=36); respiratory diseases (n=35); diseases of the skin and subcutaneous tissue (23); injuries and external causes (n=18); factors influencing self-rated health and contact with services (n=7); mental and behavioural disorders (n=12); symptoms, sign and abnormal clinical and laboratory findings, not elsewhere classified (n=4); codes for special purposes (n=6); diseases of the digestive system (n=5); diseases of the blood and blood-forming organs, and certain disorders involving the immune mechanism (n=1); diseases of the ear and the mastoid process (n=1); diseases of the genitourinary system (n=1); congenital malfunctions, and chromosomal abnormalities (n=1); and certain infectious and parasitic diseases (n=2).

* Adjusted for: patients' age group, sex, health conditions, education level, marital status and baseline dependent variable subscale score (EQ-VAS).

‡ Main effect are results from the linear regression models presented in table 5 in the paper.

£ Interaction between RC/NCQ-N and ICD-10 referral diagnosis groups

4. Search history



Search done in Pubmed, Embase and Cinahl. Final search completed 5. February 2019

- 1 Interprofessional Relations [Mesh]
- 2 Interprofessional [Title/Abstract]) OR multiprofessional [Title/Abstract]) OR interdisciplinary [Title/Abstract]) OR multidisciplinary [Title/Abstract]
- 3 (Interprofessional Relations [Mesh]) OR (Interprofessional [Title/Abstract]) OR multiprofessional [Title/Abstract]) OR interdisciplinary [Title/Abstract]) OR multidisciplinary [Title/Abstract])
- 4 Continuity of Patient Care [Mesh]
- 5 continuity of care [Title/Abstract] OR care continuity [Title/Abstract] OR personal continuity [Title/Abstract] OR informational continuity [Title/Abstract] OR relational continuity [Title/Abstract] OR management continuity [Title/Abstract] OR team continuity [Title/Abstract] OR cross-boundary continuity [Title/Abstract]
- 6 (Continuity of Patient Care [Mesh]) OR (continuity of care [Title/Abstract] OR care continuity [Title/Abstract] OR personal continuity [Title/Abstract] OR informational continuity [Title/Abstract] OR relational continuity [Title/Abstract] OR management continuity [Title/Abstract] OR team continuity [Title/Abstract] OR cross-boundary continuity [Title/Abstract])
- 7 Patient Satisfaction [Mesh]
- 8 patient-reported [Title/Abstract] OR patient rated [Title/Abstract] OR patient perceived [Title/Abstract]) OR patient experienc* [Title/Abstract]
- 9 Quality of Health Care [Mesh]
- 10 (Patient Satisfaction [Mesh]) OR (patient-reported [Title/Abstract] OR patient rated [Title/Abstract] OR patient perceived [Title/Abstract]) OR patient experienc* [Title/Abstract]) OR (Quality of Health Care [Mesh])
- 11 Rehabilitation Centers [Mesh]
- 12 Rehabilitation [Mesh]
- 13 Rehabilitation [Title/Abstract] OR somatic rehabilitation [Title/Abstract] OR rehabilitation institution*[Title/Abstract]
- 14 (Rehabilitation Centers [Mesh]) OR (Rehabilitation [Mesh]) OR (Rehabilitation [Title/Abstract] OR somatic rehabilitation [Title/Abstract] OR rehabilitation institution*[Title/Abstract])

- 15 Coordination [Title/Abstract] OR relational coordination [Title/Abstract] OR communication [Title/Abstract] OR relation* [Title/Abstract]
- 16 (Interprofessional Relations [Mesh] OR Interprofessional [Title/Abstract] OR multiprofessional [Title/Abstract] OR interdisciplinary [Title/Abstract] OR multidisciplinary [Title/Abstract]) **AND** (Continuity of Patient Care [Mesh] OR continuity of care [Title/Abstract] OR care continuity [Title/Abstract] OR personal continuity [Title/Abstract] OR informational continuity [Title/Abstract] OR relational continuity [Title/Abstract] OR management continuity [Title/Abstract] OR team continuity [Title/Abstract] OR cross-boundary continuity [Title/Abstract]) **AND** (Patient Satisfaction [Mesh] OR patient-reported [Title/Abstract] OR patient rated [Title/Abstract] OR patient perceived [Title/Abstract] OR patient experienc* [Title/Abstract] OR Quality of Health Care [Mesh]) **AND** (Rehabilitation Centers [Mesh] OR Rehabilitation [Mesh] OR (Rehabilitation [Title/Abstract] OR somatic rehabilitation [Title/Abstract] OR rehabilitation institution*[Title/Abstract])) **AND** (Coordination [Title/Abstract] OR relational coordination [Title/Abstract] OR communication [Title/Abstract] OR relation* [Title/Abstract])

| Search engine | Date search | Results | Full text |
|---------------|-------------|---------|-----------|
| PubMed | 5.2.2019 | 526 | 30 |
| Embase | 5.2.2019 | 292 | 25 |
| Cinahl | 5.2.2019 | 55 | 11 |

5. Relational Coordination Survey- Norwegian version

‘Relational Coordination Survey for Patient Care’ –norsk versjon

1. Hvor ofte kommuniserer helsepersonell i disse gruppene med deg om pasienter i _____ behandlingsforløpet?

| | | | | | |
|------------------------|-----------------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|
| Leger | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Sykepleiere | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Fysioterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Ergoterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Koordinatorer | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |

2. Kommuniserer helsepersonell i disse gruppene med deg i tide om pasienter i _____ behandlingsforløpet?

| | | | | | |
|------------------------|-----------------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|
| Leger | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Sykepleiere | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Fysioterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Ergoterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Koordinatorer | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |

3. Kommuniserer helsepersonell i disse gruppene *noyaktig (på en presis måte)* om pasienter i _____ behandlingsforløpet?

| | | | | | |
|------------------------|-----------------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|
| Leger | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Sykepleiere | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Fysioterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Ergoterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Koordinatorer | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |

4. Når det oppstår problemer angående behandling av pasienter i _____ behandlingsforløpet, samarbeider helsepersonell i disse gruppene med deg for å løse problemene?

| | | | | | |
|------------------------|-----------------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|
| Leger | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Sykepleiere | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Fysioterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Ergoterapeuter | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |
| Koordinatorer | Aldri <input type="checkbox"/> | Sjelden <input type="checkbox"/> | Av og til <input type="checkbox"/> | Ofte <input type="checkbox"/> | Hele tiden <input type="checkbox"/> |

5. Hvor mye *vet* helsepersonell i disse gruppene om din rolle i behandlingen av pasienter i _____ behandlingsforløpet?

| | | | | | |
|------------------------|---------------------------------------|----------------------------------|------------------------------------|---------------------------------|---------------------------------|
| Leger | Ingenting <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Alt <input type="checkbox"/> |
| Sykepleiere | Ingenting <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Alt <input type="checkbox"/> |
| Fysioterapeuter | Ingenting <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Alt <input type="checkbox"/> |
| Ergoterapeuter | Ingenting <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Alt <input type="checkbox"/> |
| Koordinatorer | Ingenting <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Alt <input type="checkbox"/> |

6. I hvor stor grad *respekterer* helsepersonell i disse gruppene din rolle i behandlingen av pasienter i _____ behandlingsforløpet?

| | | | | | |
|------------------------|--|----------------------------------|------------------------------------|---------------------------------|---|
| Leger | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Sykepleiere | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Fysioterapeuter | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Ergoterapeuter | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Koordinatorer | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |

7. I hvor stor grad har helsepersonell i disse gruppene *samme mål* som deg i behandlingen av pasienter i _____ behandlingsforløpet?

| Leger | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
|------------------------|--|----------------------------------|------------------------------------|---------------------------------|---|
| Sykepleiere | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Fysioterapeuter | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Ergoterapeuter | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |
| Koordinatorer | Ikke i det hele tatt <input type="checkbox"/> | Lite <input type="checkbox"/> | En del <input type="checkbox"/> | Mye <input type="checkbox"/> | Fullt og helt <input type="checkbox"/> |

Original v. Jody Hoffer Gittel, Associate Professor, Heller School for Social Policy and Management Brandeis University, US.

Øversettelse v. *Nettverk for forskning på behandlingslinjer og samhandling*, Helse Fonna HF, v. S. Størkson & E. Biringer (2012/2013).

6. One-year follow-up questionnaire: Rehabilitation Western Norway

Spørreskjema etter rehabilitering ved rehabiliteringsinstitusjon

Hensikten med dette forskningsprosjektet er å få bedre kunnskap om personene som får tilbud om rehabilitering, og hvordan det går etter rehabiliteringsoppholdet. *Det er mange spørsmål i skjemaet. **Det er ingen riktige eller gale svar.** Les spørsmålene nøye og forsøk å beskrive det som passer best for deg. Noen spørsmål ligner på hverandre. Årsaken til dette er at spørreskjemaet er sammensatt av flere standardiserte spørreskjema brukt i forskning internasjonalt, og som ikke kan endres på. Det er derfor viktig at du **besvarer alle spørsmålene** om ikke annet er spesifisert.*

Oppgi dag og måned for utfylling av skjemaet:/..... - 2016

Hvem fyller ut skjema: Pasient selv Pårørende

Ikke skriv her

ID-NR:

Når avsluttet du du rehabiliteringsoppholdet (oppgi måned):

Hva slags opphold hadde du ved rehabiliteringsinstitusjonen?

Døgnopphold, det vil si opphold med overnatting

Dagopphold, det vil si behandling der du ikke overnattet

Hvilke behandlere hadde du kontakt med under rehabiliteringsoppholdet? Du kan sette flere kryss

- | | | |
|--|--|---------------------------------------|
| <input type="checkbox"/> Fysioterapeut | <input type="checkbox"/> Sosionom | <input type="checkbox"/> Lege |
| <input type="checkbox"/> Sykepleier | <input type="checkbox"/> Hjelpepleier | <input type="checkbox"/> Ergoterapeut |
| <input type="checkbox"/> Idrettspedagog | <input type="checkbox"/> Ernæringsfysiolog | <input type="checkbox"/> Logoped |
| <input type="checkbox"/> Attføringskonsulent | <input type="checkbox"/> Samtalerapeut (psykolog, psykiater, psykiatrisk sykepleier el.l) | <input type="checkbox"/> Andre |

Hvilke behandlingsformer hadde du ved institusjonen? Du kan sette flere kryss

- | | |
|--|--|
| <input type="checkbox"/> Individuell trening | <input type="checkbox"/> Gruppetrening |
| <input type="checkbox"/> Individuell samtalebehandling | <input type="checkbox"/> Undervisning i gruppe |

Hvilken behandlingsform hadde du **mest nytte** av?

- | | |
|--|--|
| <input type="checkbox"/> Individuell trening | <input type="checkbox"/> Gruppetrening |
| <input type="checkbox"/> Individuell samtalebehandling | <input type="checkbox"/> Undervisning i gruppe |

Hvilket utbytte har du hatt av oppholdet i forhold til følgende:

(Kryss av ett alternativ på hver linje)

| | Ikke i det hele tatt | I liten grad | I noen grad | I stor grad | I svært stor grad | Ikke aktuelt |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Hvilket utbytte har du hatt, alt i alt, av rehabiliteringsoppholdet? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Din fysiske helse | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Din psykiske helse | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mestre daglige gjøremål | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Delta i sosiale aktiviteter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste spørsmålene handler om dine behandlere samt tiden etter oppholdet.

(Kryss av ett alternativ på hver linje)

| | Ikke i det hele tatt | I liten grad | I noen grad | I stor grad | I svært stor grad | Ikke aktuelt |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Opplevde du at behandlerne samarbeidet godt om rehabiliteringsopplegget ditt? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Opplevde du at det var en fast gruppe behandlere som tok hånd om deg? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Laget institusjonen et opplegg for deg som det er mulig å gjennomføre etter at du kom hjem? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Samarbeider institusjonen godt med det lokale tjenesteapparatet etter det du selv kan bedømme? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Har du fått tilstrekkelig oppfølging av det lokale tjenesteapparatet etter at du kom hjem fra institusjonen? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Har du i løpet av de siste 12 månedene vært på oppfølgingsopphold ved samme rehabiliteringsinstitusjon?

Ja Nei

Hvis Nei: Er det planlagt oppfølgingsopphold ved samme rehabiliteringsinstitusjon?

Ja Nei

De neste spørsmålene handler om din helse og livsvaner

Har du, eller har du noen gang hatt, noen av disse plagene? (Sett et kryss per diagnosekategori)

| | Ja | Nei | | Ja | Nei |
|--------------------------------------|--------------------------|--------------------------|--|--------------------------|--------------------------|
| Hjerteinfarkt..... | <input type="checkbox"/> | <input type="checkbox"/> | Psoriasis..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Angina pectoris (hjertekrampe).. | <input type="checkbox"/> | <input type="checkbox"/> | Leddgikt (reumatoid artritt) | <input type="checkbox"/> | <input type="checkbox"/> |
| Hjertesvikt..... | <input type="checkbox"/> | <input type="checkbox"/> | Epilepsi..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Annen hjertesykdom..... | <input type="checkbox"/> | <input type="checkbox"/> | Bechterews sykdom..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Hjerneslag/hjerneblødning..... | <input type="checkbox"/> | <input type="checkbox"/> | Kreftsykdom..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Astma..... | <input type="checkbox"/> | <input type="checkbox"/> | Sarkoidose..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Kronisk bronkitt, emfysem, KOLS..... | <input type="checkbox"/> | <input type="checkbox"/> | Psykiske plager som du har søkt hjelp for..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Diabetes (sukkersyke)..... | <input type="checkbox"/> | <input type="checkbox"/> | Fibromyalgi..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Nyresykdom..... | <input type="checkbox"/> | <input type="checkbox"/> | Slitasjegikt..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Eksem på hendene..... | <input type="checkbox"/> | <input type="checkbox"/> | Beinskjørhet (osteoporose)..... | <input type="checkbox"/> | <input type="checkbox"/> |

Hvordan vil du gradere de smertene du har hatt i løpet av den siste uke. (Sett ring rundt ett tall)

0 1 2 3 4 5 6 7 8 9 10
Ingen smerter så vondt som det går an å ha

Røyker du? (Sett et kryss)

- Nei, jeg har aldri røykt.....
- Nei, men jeg røykte tidligere.....
- Ja, sjeldnere enn en gang i uka
- Ja, hver uke..... Antall sigaretter hver uke
- Ja, hver dag..... Antall sigaretter hver dag

Hvor ofte driver du mosjon? (Sett et kryss)

Med mosjon mener vi at du f.eks. går tur, går på ski, svømmer eller driver trening/idrett.

- Aldri
- Sjeldnere enn en gang i uken ...
- En gang i uken
- 2-3 ganger i uken
- Omtrent hver dag

Bruk av helsetjenester

Har du i løpet av de siste 12 månedene vært i kontakt med? (Sett et kryss pr.linje, og spesifiser hvis ja)

| | Ja | Nei | Hvis ja, omtrent hvor mange ganger | | |
|---|--------------------------|--------------------------|------------------------------------|--------------------------|--------------------------|
| | | | 1-2 | 3-5 | Mer enn 5 |
| Allmennlege/fastlege..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Legespesialist utenfor sykehus..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Legespesialist på sykehus..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Psykolog eller psykiater..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fysioterapeut..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Ergoterapeut..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Kommunal pleie og omsorgstjeneste..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Har du siste 12 måneder vært innlagt på sykehus..... | <input type="checkbox"/> | <input type="checkbox"/> | Antall ganger: | | |
| Har du siste 12 måneder vært innlagt på rehabiliteringsinstitusjon..... | <input type="checkbox"/> | <input type="checkbox"/> | Antall ganger:..... | | |
| Har du siste 12 måneder vært innlagt på sykehjem..... | <input type="checkbox"/> | <input type="checkbox"/> | Antall ganger:..... | | |

Individuell plan

De som har behov for flere helsetjenester over lengre tid kan ha rett til «Individuell plan», hjemlet i Pasientrettighetsloven, som hjelp til et bedre samordnet helsetilbud.

Kjenner du til «Individuell plan»? Ja Nei

Hvis ja, har det vært foreslått? Ja Nei

Har du «Individuell plan»? Ja Nei

Vi er interessert i din erfaring med helsetjenester og helsepersonell du har vært i kontakt med de siste 12 månedene.

For hver påstand skal du krysse av det alternativet som best beskriver din mening. Det er ingen svar som er riktig eller feil. Det er din personlige mening og erfaring som teller. Hvis en gruppe påstander ikke er aktuelle for deg går du videre til neste gruppe med påstander.

De neste påstandene handler om din oppfatning av din fastlege. Hvis du ikke har hatt kontakt med fastlegen din de siste 12 månedene kan du fortsette på neste gruppe påstander.

| | Svært enig | Enig | Hverken enig eller uenig | Uenig | Svært uenig | Vet ikke |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Jeg kjenner fastlegen min godt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen min kjenner godt til min sykehistorie | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen vet hva han/hun har gjort ved tidligere besøk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen har god kjennskap til familieforholdene mine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen kjenner godt til mine daglige gjøremål | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen tar kontakt med meg dersom det er nødvendig, uten at jeg må be om det | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen vet godt hva jeg mener er viktig i behandlingen og oppfølgingen av min sykdom | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen har tilstrekkelig kontakt med meg når jeg blir behandlet av annet helsepersonell | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste påstandene handler om din oppfatning av samarbeidet mellom helsepersonell i kommunen som du har hatt kontakt med (for eksempel: fastlegen, fysioterapeuter, ergoterapeuter, sykepleiere, logoped). Hvis dette ikke er aktuelt for deg kan du fortsette på neste gruppe påstander.

| | Svært enig | Enig | Hverken enig eller uenig | Uenig | Svært uenig | Vet ikke |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| De ulike faggruppene i kommunen er flinke til å dele informasjon seg i mellom | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| De ulike faggruppene i kommunen samarbeider godt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Behandlingen og oppfølging fra de ulike faggruppene henger godt sammen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| De ulike faggruppene er alltid orientert om hverandres behandling og oppfølging | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste påstandene handler om din oppfatning av den behandler du hadde mest kontakt med på rehabiliteringsinstitusjonen.

| | <i>Svært enig</i> | <i>Enig</i> | <i>Hverken enig eller uenig</i> | <i>Uenig</i> | <i>Svært uenig</i> | <i>Vet ikke</i> |
|--|--------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|--------------------------|
| Jeg kjenner denne behandleren godt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren kjenner godt til min sykehistorie | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren vet alltid hva han/hun har gjort ved tidligere besøk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren har god kjennskap til familieforholdene mine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren kjenner godt til mine daglige gjøremål | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren tar kontakt med meg hvis det er nødvendig, uten at jeg må be om det | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren vet godt hva jeg mener er viktig i behandlingen og oppfølgingen av min sykdom | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Denne behandleren har tilstrekkelig kontakt med meg når jeg blir behandlet av annet helsepersonell | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste påstandene handler om din oppfatning av samarbeidet mellom lege, fysioterapeut, ergoterapeut, sykepleier og andre behandlere på rehabiliteringsinstitusjonen.

| | <i>Svært enig</i> | <i>Enig</i> | <i>Hverken enig eller uenig</i> | <i>Uenig</i> | <i>Svært uenig</i> | <i>Vet ikke</i> |
|---|--------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|--------------------------|
| De ulike faggruppene er flinke til å dele informasjon seg i mellom | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| De ulike faggruppene samarbeider godt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Behandlingen og oppfølgingen fra de ulike faggruppene henger godt sammen. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| De ulike faggruppene er alltid orientert om hverandres behandling og oppfølging | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste påstandene handler om din oppfatning av samarbeidet mellom din fastlege og rehabiliteringsinstitusjonen.

| | <i>Svært enig</i> | <i>Enig</i> | <i>Hverken enig eller uenig</i> | <i>Uenig</i> | <i>Svært uenig</i> | <i>Vet ikke</i> |
|--|--------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|--------------------------|
| Fastlegen og rehabiliteringsinstitusjonen er flinke til å dele informasjon seg i mellom | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen og rehabiliteringsinstitusjonene samarbeider godt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Behandlingen fra fastlegen og rehabiliteringsinstitusjonen henger godt sammen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Fastlegen og rehabiliteringsinstitusjonen er alltid orientert om hverandres behandling og oppfølging | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste spørsmålene handler om vanskeligheter du har på grunn av din helsetilstand.

Helsetilstand omfatter sykdommer, andre kortvarige eller langvarige helseproblemer, skader, mentale eller følelsesmessige problemer, og problemer med alkohol eller narkotika.

Tenk tilbake på de siste 4 ukene, og svar på disse spørsmålene om mye vanskeligheter du har hatt med å gjøre følgende aktiviteter. For hvert spørsmål, vennligst sett ring rundt kun **ett** svar.

| I løpet av de siste 4 ukene, hvor store <u>vanskeligheter</u> har du hatt med: | | | | | |
|--|-------|------|--------|-------|-----------------------------|
| Forståelse og kommunikasjon | | | | | |
| Å konsentrere deg om å gjøre noe i ti minutter? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å huske å gjøre viktige ting? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å analysere og finne løsninger på problemer i dagliglivet? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å lære noe nytt, f.eks. hvordan å komme fram til et nytt sted? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å stort sett forstå hva andre sier? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å starte en samtale og holde den i gang? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å bevege deg rundt | | | | | |
| Å stå oppreist over lengre tid, slik som i 30 minutter? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å reise deg opp fra sittende stilling? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å komme deg rundt i ditt eget hjem? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å komme deg ut av ditt eget hjem? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å gå en lengre strekning, slik som én kilometer? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Egenomsorg | | | | | |
| Å vaske deg over hele kroppen? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å kle på deg? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å spise selv? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å være alene noen få dager? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Samvær med andre | | | | | |
| Å ha med personer å gjøre som du ikke kjenner? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å pleie vennskap? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å komme overens med personer som står deg nær? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å få nye venner? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Seksuelle aktiviteter? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Hverdagsaktiviteter | | | | | |
| Å ivareta de oppgavene du har ansvar for i husholdningen? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å gjøre de viktigste oppgavene i husholdningen godt nok? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å få gjort alt det husarbeidet som du trengte å gjøre? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å få gjort husarbeidet ditt raskt nok? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |

Hvis du arbejder (lønnet, ulønnet, selvstendig) eller er under utdanning, besvar de 4 neste spørsmålene. Hvis ikke, fortsett fra spørsmålene **Deltakelse i samfunnet**.

| I løpet av de siste 4 ukene, hvor store <u>vanskeligheter</u> har du hatt med: | | | | | |
|--|-------|------|--------|-------|-----------------------------|
| Ditt daglige <u>arbeid eller skolegang</u> ? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å gjøre de viktigste arbeids- eller skoleoppgavene dine <u>bra nok</u> ? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å få <u>gjort</u> alt det arbeidet du trengte å gjøre? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Å få gjort arbeidsoppgavene dine <u>raskt nok</u> ? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |

| Deltakelse i samfunnslivet | | | | | |
|--|--------------------------------|------|--------|-------|-----------------------------|
| I løpet av de siste 4 ukene: | | | | | |
| Hvor store problemer har du hatt med å <u>delta i aktiviteter i lokalsamfunnet</u> (f.eks. på festlige tilstelninger eller andre aktiviteter)? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Hvor store problemer har du hatt på grunn av <u>hindringer</u> i omgivelsene dine? | Ingen | Litt | En del | Store | Svært store |
| Hvor store problemer har du hatt med å <u>leve på en verdig måte</u> på grunn av andres holdninger eller handlinger? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Hvor mye <u>tid</u> har <u>du</u> brukt på helsetilstanden din eller på <u>følgene</u> av den? | Ingen | Litt | En del | Mye | Svært mye |
| Hvor stor har den <u>følelsesmessige påvirkningen</u> av helsetilstanden vært for <u>deg</u> ? | Ingen | Litt | En del | Stor | Svært stor |
| Hvor stor har <u>belastningen</u> vært på din eller familiens <u>økonomi</u> på grunn av helsetilstanden din? | Ingen | Litt | En del | Stor | Svært stor |
| Hvor store problemer har <u>familien</u> din hatt på grunn av helsetilstanden din? | Ingen | Litt | En del | Store | Svært store |
| Hvor store problemer har du hatt med å gjøre ting på <u>egenhånd</u> for å <u>slappe av</u> eller <u>hygge deg</u> ? | Ingen | Litt | En del | Store | Svært store/ klarte ikke |
| Totalt sett i de siste 4 ukene, <u>hvor mange dager</u> var disse vanskelighetene til stede? | Før opp antall dager: | | | | |
| I de siste 4 ukene, hvor mange dager var du <u>fullstendig ute av stand</u> til å utføre vanlige aktiviteter eller arbeid på grunn av noe ved helsetilstanden din? | Før opp antall dager: | | | | |
| I de siste 4 ukene, uten å regne med de dagene du var fullstendig ute av stand, hvor mange <u>dager kuttet du ned på</u> eller <u>reduserte</u> dine vanlige aktiviteter eller arbeid på grunn av noe ved helsetilstanden din? | Før opp antall dager: | | | | |

WHODAS 2.0

De neste spørsmålene omhandler hvordan du ser på din egen helse (SF-36®)

Disse opplysningene vil hjelpe oss til å få vite hvordan du har det og hvordan du er i stand til å utføre dine daglige gjøremål.

Hvert spørsmål skal besvares ved å krysse av det alternativet som passer best for deg. Hvis du er usikker på hva du skal svare, vennligst svar så godt du kan.

- (kryss av ett alternativ)
- Stort sett, vil du si helsen din er:
- Utmerket
 - Meget god
 - God
 - Ganske god
 - Dårlig

- (kryss av ett alternativ)
- Sammenliknet med for ett år siden, hvordan vil du si at helsen din stort sett er nå?
- Mye bedre nå enn for ett år siden
 - Litt bedre nå enn for ett år siden
 - Omtrent den samme som for ett år siden
 - Litt dårligere nå enn for ett år siden
 - Mye dårligere nå enn for ett år siden

De neste spørsmålene handler om aktiviteter som du kanskje utfører i løpet av en vanlig dag. Er helsen din slik at den begrenser deg i utførelsen av disse aktivitetene nå? Hvis ja, hvor mye?

(Kryss av ett alternativ på hver linje)

- | | Ja,
begrenser
meg mye | Ja,
begrenser
meg litt | Nei,
begrenser
meg ikke i
det hele tatt |
|--|--------------------------------------|---------------------------------------|--|
| a. Anstrengende aktiviteter som å løpe, løfte tunge gjenstander, delta i anstrengende idrett | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Moderate aktiviteter som å flytte et bord, støvsuge, gå tur eller drive med hagearbeid | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Løfte eller bære en handlekurv | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Gå opp trappen flere etasjer | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Gå opp trappen en etasje | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Bøye deg eller sitte på huk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g. Gå mer enn to kilometer | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Gå noen hundre meter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| i. Gå hundre meter | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| j. Vaske deg eller kle på deg | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

I løpet av de siste 4 ukene, har du hatt noen av følgende problemer i ditt arbeid eller i andre av dine daglige gjøremål på grunn av din fysiske helse?

(Kryss av ett alternativ på hver linje)

- | | JA | NEI |
|--|--------------------------|--------------------------|
| a. Har du redusert tiden du har brukt på arbeidet ditt eller andre aktiviteter? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Har du utrettet mindre enn du hadde ønsket? | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Har du vært hindret i visse typer arbeid eller andre aktiviteter? | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Har du hatt vanskeligheter med å utføre arbeidet ditt eller andre aktiviteter (f.eks. fordi det krevde ekstra anstrengelser)? | <input type="checkbox"/> | <input type="checkbox"/> |

I løpet av de siste 4 ukene, har du hatt noen av følgende problemer i ditt arbeid eller i andre av dine daglige gjøremål på grunn av følelsesmessige problemer (f.eks. fordi du har følt deg deprimerert eller engstelig)?

(Kryss av ett alternativ på hver linje)

- | | JA | NEI |
|---|--------------------------|--------------------------|
| e. Har du redusert tiden du har brukt på arbeidet ditt eller andre aktiviteter? | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Har du utrettet mindre enn du hadde ønsket? | <input type="checkbox"/> | <input type="checkbox"/> |
| g. Har ikke arbeidet eller utført andre aktiviteter like nøye som vanlig | <input type="checkbox"/> | <input type="checkbox"/> |

- (kryss av ett alternativ)
- I løpet de siste 4 ukene, i hvilken grad har din fysiske helse eller følelsesmessige problemer hatt innvirkning på din vanlige sosiale omgang med familie, venner, naboer eller foreninger?
- | | |
|--------------------------|----------------------|
| <input type="checkbox"/> | Ikke i det hele tatt |
| <input type="checkbox"/> | Litt |
| <input type="checkbox"/> | En del |
| <input type="checkbox"/> | Mye |
| <input type="checkbox"/> | Svært mye |

- (kryss av ett alternativ)
- Hvor sterke kroppslige smerter har du hatt i løpet av de siste 4 ukene?
- | | |
|--------------------------|--------------|
| <input type="checkbox"/> | Ingen |
| <input type="checkbox"/> | Meget svake |
| <input type="checkbox"/> | Svake |
| <input type="checkbox"/> | Moderate |
| <input type="checkbox"/> | Sterke |
| <input type="checkbox"/> | Meget sterke |

- (kryss av ett alternativ)
- I løpet av de siste 4 ukene, hvor mye har smerter påvirket ditt vanlige arbeid (gjelder både arbeid utenfor hjemmet og husarbeid)?
- | | |
|--------------------------|----------------------|
| <input type="checkbox"/> | Ikke i det hele tatt |
| <input type="checkbox"/> | Litt |
| <input type="checkbox"/> | En del |
| <input type="checkbox"/> | Mye |
| <input type="checkbox"/> | Svært mye |

De neste spørsmålene handler om hvordan du har følt deg og hvordan du har hatt det de siste 4 ukene. For hvert spørsmål, vennligst velg det svaralternativet som best beskriver hvordan du har hatt det. Hvor ofte i løpet av de siste 4 ukene har du:

- (Kryss av ett alternativ på hver linje)
- | | Hele tiden | Nesten hele tiden | Mye av tiden | En del av tiden | Litt av tiden | Ikke i det hele tatt |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------|
| a. Følt deg full av tiltakslyst | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Følt deg veldig nervøs | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Vært så langt nede at ingenting har kunnet muntre deg opp | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Følt deg rolig og harmonisk | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Hatt mye overskudd | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Følt deg nedfor og trist | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | Hele tiden | Nesten hele tiden | Mye av tiden | En del av tiden | Litt av tiden | Ikke i det hele tatt |
|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| g. Følt deg sliten | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Følt deg glad | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| i. Følt deg trett | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

(kryss av ett alternativ)

I løpet av de siste 4 ukene, hvor mye av tiden har din fysiske helse eller følelsesmessig problemer påvirket din sosiale omgang (som det å besøke venner, slektninger osv.)?

- Hele tiden
 Nesten hele tiden
 En del av tiden
 Litt av tiden
 Ikke i det hele tatt

Hvor RIKTIG eller GAL er hver av de følgende påstander for deg?

(Kryss av ett alternativ på hver linje)

| Påstander om din helse | Helt riktig | Delvis riktig | Vet ikke | Delvis gal | Helt gal |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Det virker som om jeg blir lettere syk enn andre | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Jeg er like frisk som de fleste jeg kjenner | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Jeg forventer at helsen min vil bli dårligere | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Helsen min er utmerket | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

De neste spørsmålene omhandler hvorledes du føler deg (HADS)

(Sett ett kryss for hvert spørsmål)

| Jeg føler meg nervøs og urolig |
|---|
| <input type="checkbox"/> Mesteparten av tiden |
| <input type="checkbox"/> Mye av tiden |
| <input type="checkbox"/> Fra tid til annen |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg gleder meg fortsatt over tingene slik jeg pleide før |
|--|
| <input type="checkbox"/> Avgjort like mye |
| <input type="checkbox"/> Ikke fullt så mye |
| <input type="checkbox"/> Bare lite grann |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg har en urofølelse som om noe forferdelig vil skje |
|---|
| <input type="checkbox"/> Ja, og noe svært ille |
| <input type="checkbox"/> Ja, ikke så veldig ille |
| <input type="checkbox"/> Litt, bekymrer meg lite |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg kan le og se det morsomme i situasjoner |
|---|
| <input type="checkbox"/> Like mye nå som før |
| <input type="checkbox"/> Ikke like mye nå som før |
| <input type="checkbox"/> Avgjort ikke som før |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg har hodet fullt av bekymringer |
|--|
| <input type="checkbox"/> Veldig ofte |
| <input type="checkbox"/> Ganske ofte |
| <input type="checkbox"/> Av og til |
| <input type="checkbox"/> En gang i blant |

| Jeg er i godt humør |
|--|
| <input type="checkbox"/> Aldri |
| <input type="checkbox"/> Noen ganger |
| <input type="checkbox"/> Ganske ofte |
| <input type="checkbox"/> For det meste |

| Jeg kan sitte i fred og ro og kjenne meg avslappet |
|--|
| <input type="checkbox"/> Ja, helt klart |
| <input type="checkbox"/> Vanligvis |
| <input type="checkbox"/> Ikke så ofte |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg føler meg som om alt går langsommere |
|---|
| <input type="checkbox"/> Nesten hele tiden |
| <input type="checkbox"/> Svært ofte |
| <input type="checkbox"/> Fra tid til annen |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg føler meg urolig som om jeg har sommerfugler i magen |
|--|
| <input type="checkbox"/> Ikke i det hele tatt |
| <input type="checkbox"/> Fra tid til annen |
| <input type="checkbox"/> Ganske ofte |
| <input type="checkbox"/> Svært ofte |

| Jeg bryr meg ikke lenger om hvordan jeg ser ut |
|--|
| <input type="checkbox"/> Ja, jeg har sluttet å bry meg |
| <input type="checkbox"/> Ikke som jeg burde |
| <input type="checkbox"/> Kan hende ikke nok |
| <input type="checkbox"/> Bryr meg som før |

| Jeg er rastløs som om jeg stadig må være aktiv |
|--|
| <input type="checkbox"/> Uten tvil svært mye |
| <input type="checkbox"/> Ganske mye |
| <input type="checkbox"/> Ikke så veldig mye |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg ser med glede frem til hendelser og ting |
|--|
| <input type="checkbox"/> Like mye som før |
| <input type="checkbox"/> Heller mindre enn før |
| <input type="checkbox"/> Avgjort mindre enn før |
| <input type="checkbox"/> Nesten ikke i det hele tatt |

| Jeg kan plutselig få følelse av panikk |
|---|
| <input type="checkbox"/> Uten tvil svært ofte |
| <input type="checkbox"/> Ganske ofte |
| <input type="checkbox"/> Ikke så veldig ofte |
| <input type="checkbox"/> Ikke i det hele tatt |

| Jeg kan glede meg over gode bøker, radio og tv |
|--|
| <input type="checkbox"/> Ofte |
| <input type="checkbox"/> Fra tid til annen |
| <input type="checkbox"/> Ikke så ofte |
| <input type="checkbox"/> Svært sjelden |

De siste spørsmålene omhandler din helsetilstand (EQ-5D-5L)

Under hver overskrift ber vi deg krysse av den ENE boksen som best beskriver helsen din I DAG.

| GANGE | |
|--------------------------|--|
| <input type="checkbox"/> | Jeg har ingen problemer med å gå omkring |
| <input type="checkbox"/> | Jeg har litt problemer med å gå omkring |
| <input type="checkbox"/> | Jeg har middels store problemer med å gå omkring |
| <input type="checkbox"/> | Jeg har store problemer med å gå omkring |
| <input type="checkbox"/> | Jeg er ute av stand til å gå omkring |

| PERSONLIG STELL | |
|--------------------------|---|
| <input type="checkbox"/> | Jeg har ingen problemer med å vaske meg eller kle meg |
| <input type="checkbox"/> | Jeg har litt problemer med å vaske meg eller kle meg |
| <input type="checkbox"/> | Jeg har middels store problemer med å vaske meg eller kle meg |
| <input type="checkbox"/> | Jeg har store problemer med å vaske meg eller kle meg |
| <input type="checkbox"/> | Jeg er ute av stand til å vaske meg eller kle meg |

| VANLIGE GJØREMÅL (f.eks. arbeid, studier, husarbeid, familie- eller fritidsaktiviteter) | |
|--|--|
| <input type="checkbox"/> | Jeg har ingen problemer med å utføre mine vanlige gjøremål |
| <input type="checkbox"/> | Jeg har litt problemer med å utføre mine vanlige gjøremål |
| <input type="checkbox"/> | Jeg har middels store problemer med å utføre mine vanlige gjøremål |
| <input type="checkbox"/> | Jeg har store problemer med å utføre mine vanlige gjøremål |
| <input type="checkbox"/> | Jeg er ute av stand til å utføre mine vanlige gjøremål |

| SMERTER / UBEHAG | |
|--------------------------|---|
| <input type="checkbox"/> | Jeg har verken smerter eller ubehag |
| <input type="checkbox"/> | Jeg har litt smerter eller ubehag |
| <input type="checkbox"/> | Jeg har middels sterke smerter eller ubehag |
| <input type="checkbox"/> | Jeg har sterke smerter eller ubehag |
| <input type="checkbox"/> | Jeg har svært sterke smerter eller ubehag |

| ANGST / DEPRESJON | |
|--------------------------|---|
| <input type="checkbox"/> | Jeg er verken engstelig eller deprimert |
| <input type="checkbox"/> | Jeg er litt engstelig eller deprimert |
| <input type="checkbox"/> | Jeg er middels engstelig eller deprimert |
| <input type="checkbox"/> | Jeg er svært engstelig eller deprimert |
| <input type="checkbox"/> | Jeg er ekstremt engstelig eller deprimert |

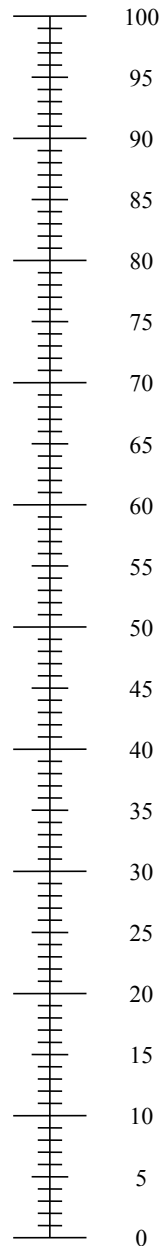
fortsett på siste side



Den beste helsen
du kan tenke deg

- Vi vil gjerne vite hvor god eller dårlig helsen din er I DAG.
- Denne skalaen er nummerert fra 0 til 100.
- 100 betyr den beste helsen du kan tenke deg.
0 betyr den dårligste helsen du kan tenke deg.
- Sett en X på skalaen for å angi hvordan helsen din er I DAG.
- Skriv deretter tallet du merket av på skalaen inn i boksen nedenfor.

HELSEN DIN I DAG =



Takk for at du svarte på alle spørsmålene

Den dårligste
helsen du kan
tenke deg

7. Norwegian Social Science Data Service
(reference no. 29128)

Sverre A. Størkson
Helse Fonna HF
Postboks 2170
5528 HAUGESUND

Vår dato: 27.01.2012

Vår ref: 29128 / 3 / LT

Deres dato:

Deres ref:

KVITTERING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 19.12.2011. All nødvendig informasjon om prosjektet forelå i sin helhet 26.01.2012. Meldingen gjelder prosjektet:

29128

Behandlingsansvarlig
Daglig ansvarlig

Valideringsstudien

Helse Fonna HF, ved institusjonens øverste leder
Sverre A. Størkson

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstillende kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven/helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/forsk_stud/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://www.nsd.uib.no/personvern/prosjektoversikt.jsp>.

Personvernombudet vil ved prosjektets avslutning, 01.05.2014, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen


Vigdis Namtvedt Kvalheim


Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77

Vedlegg: Prosjektvurdering



Det gis skriftlig informasjon og samtykke for deltakelse er ensbetydende med returnering av skjema. Personvernombudet finner skrevet godt utformet, men forutsetter som nevnt over telefon 26.01.2012, at det angis dato for prosjektslutt, her 01.05.2014. Personvernombudet legger til grunn for sin godkjenning at revidert skriv ettersendes før det tas kontakt med utvalget.

Kopi av endelig spørreskjema er ikke vedlagt søknaden, så personvernombudet ber om at dette ettersendes før det tas kontakt med utvalget.

Innsamlede opplysninger anonymiseres og lydbåndopptak makuleres ved prosjektslutt, senest 01.05.2014. Med anonymisering innebærer at navnelister slettes/makuleres, og ev. kategorisere eller slette indirekte personidentifiserbare opplysninger. Ved publisering vil ingen enkeltpersoner kunne gjenkjennes.

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Vår dato: 09.02.2012

Vår ref: 29128 LT/RF

Deres dato:

Deres ref:

ENDRING I FORSKNINGSPROSJEKT

Vi viser til mottatt endringsskjema 27.01.2012 for prosjektet:

29128 *Valideringsstudien*

Vi tar endringene til orientering og har ingen merknader til disse. Vi finner revidert skriv mottatt 04.02.2012 tilfredsstillende.

Personvernombudet vil ved prosjektets avslutning, 01.03.2011, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen



Vigdis Namtvedt Kvalheim



Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77

**8. Regional Committee for Medical research Ethics
in Western Norway (REK- No. 2014.1636)**

| | | | | |
|----------------|-----------------------|-----------------|--------------------|-------------------------|
| Region: | Saksbehandler: | Telefon: | Vår dato: | Vår referanse: |
| REK vest | Trine Anikken Larsen | 55978497 | 14.07.2015 | 2014/1636/REK vest |
| | | | Deres dato: | Deres referanse: |
| | | | 01.07.2015 | |

Vår referanse må oppgis ved alle henvendelser

Sturla Gjesdal
Kalifarveien 31

2014/1636 Rehabilitering i Helse Vest

Forskningsansvarlig: Helse Bergen HF, Universitetet i Bergen
Prosjektleder: Sturla Gjesdal

Vi viser til søknad om prosjektendring datert 01.07.2015 for ovennevnte forskningsprosjekt. Søknaden er behandlet av leder for REK vest på fullmakt, med hjemmel i helseforskningsloven § 11.

Vurdering

Omsøkt endring

Det søkes om flere endringer i prosjektet:

1. Ny prosjektmedarbeider
2. Endring av prosjektslutt
3. Nye analyser av innsamlete prosjektdata
4. Utvidelsen av prosjektet ved å gjennomføre en tilleggsinnsamling av data fra de ansatte på rehabiliteringsinstitusjonene.

Vurdering

Eva Biringer skal inkluderes som ny prosjektmedarbeider. REK vest har ingen innvendinger til dette.

Prosjektperioden skal forlenges til 31.12.2018. Prosjektleder gir ingen begrunnelse for hvorfor forskergruppen ønsker å forlenge prosjektperioden, men REK vest godkjenner forlengelsen frem til 31.12.2018.

Forskergruppen ønsker å koble data innsamlet via helsepersonell i de syv rehabiliteringsinstitusjonene som er med i prosjektet, for å få kunnskap om hvordan det tverrfaglige arbeidet er organisert og fungerer. Basert på survey-instrumentet Relational Coordination Survey (RCS), vil forskergruppen kartlegge teamarbeid og beregne RCS-score for ulike kvaliteter i det interdisiplinære teamarbeidet i rehabiliteringsinstitusjonene. REK vest har ingen innvendinger til dette.

Det er utarbeidet en forespørsel om deltakelse og samtykkeerklæring som skal gis til de ansatte som skal delta i studien. REK vest setter som vilkår om at informasjonsskrivet må revideres ut fra følgende punkter:

- Deltakelse i studien skal være frivillig. Første setning i tredje avsnitt ("I samarbeid med ledelsen i rehabiliteringsinstitusjonene ber vi alle ansatte om å fylle ut et spørreskjema (...)") må fjernes, da dette virker ledende for deltakelse i studien.

- Det fremgår at "alle svar vil behandles anonymt og det vil ikke være mulig å knytte dine svar til deg." Det oppgis imidlertid i endringsøknaden at det er mulig å spore tilbake til personene som har svart på spørreskjema. Dette må derfor endres i informasjonsskrivet.

REK vest anbefaler at forskergruppen anvender mal for informasjonsskriv som finnes på våre nettsider: helseforskning.etikkom.no. Revidert informasjonsskriv sendes til REK vest.

Vilkår

- Revidert informasjonsskriv i henhold til ovennevnte punkter sendes til REK vest.

Vedtak

REK vest godkjenner prosjektendringen på betingelse av at ovennevnte vilkår tas til følge.

Klageadgang

Du kan klage på komiteens vedtak, jf. forvaltningsloven § 28 flg. Klagen sendes til REK vest. Klagefristen er tre uker fra du mottar dette brevet. Dersom vedtaket opprettholdes av REK vest, sendes klagen videre til Den nasjonale forskningsetiske komité for medisin og helsefag for endelig vurdering.

Med vennlig hilsen

Ansgar Berg
Prof. Dr.med
komitéleder

Trine Anikken Larsen
førstekonsulent

Kopi til: postmottak@helse-bergen.no; postmottak@uib.no

9. Additional tables included in the thesis

Table A9.1 Mean (95% confidence interval) for RCR subscale scores among 23 care processes included in the valid sample, Paper I (N=263)

| Care process | RC Communication Mean (95% CI) | RC Relationship Mean (95% CI) |
|---|---|--|
| 1. Acute stroke | 4.3 (4.15 – 4.52) | 4.2 (3.92 – 4.42) |
| 2. In vitro fertilization | 4.3 (4.14 – 4.52) | 4.5(4.28 – 4.64) |
| 3. Stroke treatment | 4.2 (3.76 – 4.58) | 4.0 (3.63 – 4.43) |
| 4. Stroke rehabilitation | 4.2 (3.93 – 4.43) | 4.3 (4.04 – 4.60) |
| 5. Hip fracture | 4.0 (3.50 – 4.42) | 4.5 (4.32 – 4.68) |
| 6. Psychosis (outpatient) | 3.8 (3.44 – 4.24) | 3.8 (3.47 – 4.21) |
| 7. Psychosis (planned admission) | 3.8 (3.51 – 4.13) | 3.9 (3.68 – 4.20) |
| 8. Cerebral palsy, children | 3.8 (3.55 – 4.11) | 3.8 (3.48 – 4.06) |
| 9. Attention-Deficit/Hyperactivity Disorder, diagnostic process 2 | 3.5 (3.34 – 3.66) | 4.1 (3.86 – 4.32) |
| 10. Knee arthroplasty | 3.3 (2.87 – 3.77) | 3.4 (3.02 – 3.87) |
| 11. Hip arthroplasty | 3.3 (2.98 – 3.52) | 3.9 (3.58 – 4.20) |
| 12. Tonsillectomy/adenotomy, children | 3.3 (3.04 – 3.47) | 3.7 (3.50 – 3.92) |
| 13. Psychosis | 3.2 (2.89 – 3.57) | 3.3 (3.00 – 3.64) |
| 14. Breast cancer surgery | 3.2 (2.74 – 3.74) | 3.5 (3.00 – 3.96) |
| 15. Chronic Obstructive Pulmonary Disease | 3.2 (3.01 – 3.47) | 3.7 (3.47 – 3.85) |
| 16. Diabetes treatment, children | 3.2 (2.91 – 3.39) | 3.7 (3.56 – 3.83) |
| 17. Attention-Deficit/Hyperactivity Disorder, diagnostic process 1 | 3.1 (2.74 – 3.46) | 3.9 (3.72 – 4.14) |
| 18. Tonsillectomy, adult | 3.0 (2.52 – 3.56) | 3.6 (3.31 – 3.85) |
| 19. Sinus surgery | 3.0 (2.72 – 3.32) | 3.6 (3.41 – 3.81) |
| 20. Arthroscopy knee, meniscus surgery | 2.9 (2.60 – 3.37) | 3.7 (3.44 – 4.02) |
| 21. Lung cancer- diagnostic process | 2.9 (2.66 – 3.33) | 3.6 (3.27 – 3.93) |
| 22. Respiratory diseases, emergency department | 2.7 (2.52 – 3.00) | 3.2 (2.94 – 3.60) |
| 23. Venous thrombosis, diagnostic process and treatment | 2.7 (2.53 – 2.87) | 3.3 (2.96 – 3.60) |

Table A9.2. The association between individual-level characteristics and RCS subscale scores, including the variance explained by the fixed (predictor) and random effects, Paper I (N=263)

| | Univariate | | | | Multivariate | | | |
|------------------------------|------------|---------------|--------------------|--------|--------------|--------------|--------------------|--------|
| | Estimates | | Explained variance | | Estimates | | Explained variance | |
| | B | 95%CI | fixed | random | B | 95%CI | fixed | random |
| RC Communication | | | | | | | | |
| Individual predictors | | | | | | | | |
| Age | 0.03 | (-0.04,0.09) | 0.002 | 0.420 | - | - | - | - |
| Age (>=40) | 0.05 | (-0.09,0.19) | 0.001 | 0.421 | 0.05 | (-0.09,0.19) | 0.020 | 0.414 |
| Sex | 0.09 | (-0.06,0.24) | 0.004 | 0.416 | 0.12 | (-0.06,0.29) | - | - |
| Use of clinical procedures | 0.18 | (-0.02,0.37) | 0.010 | 0.437 | 0.20 | (0.00,0.41) | - | - |
| Physician | 0.01 | (-0.14,0.17) | 0.000 | 0.415 | 0.14 | (-0.04,0.32) | - | - |
| RC Relationship | | | | | | | | |
| Individual predictors | | | | | | | | |
| Age | 0.02 | (-0.04,0.08) | 0.001 | 0.258 | - | - | - | - |
| Age (>=40) | 0.04 | (-0.09,0.18) | 0.001 | 0.259 | 0.06 | (-0.08,0.20) | 0.034 | 0.281 |
| Sex | -0.17 | (-0.32,-0.03) | 0.017 | 0.273 | -0.10 | (-0.26,0.07) | - | - |
| Use of clinical procedures | 0.09 | (-0.09,0.28) | 0.004 | 0.260 | 0.11 | (-0.08,0.30) | - | - |
| Physician | 0.18 | (0.03,0.33) | 0.020 | 0.255 | 0.17 | (0.00,0.34) | - | - |

Table A9.3. The association between team-level characteristics and RCS subscale scores, including the variance explained by the predictor (R^2), Paper I (N=263)

| | Univariate | | | Multivariate | | |
|---------------------------------|------------|--------------|--------------------|--------------|--------------|--------------------|
| | Estimates | | Explained variance | Estimates | | Explained variance |
| | B | 95%CI | R^2 | B | 95%CI | R^2 |
| RC Communication | | | | | | |
| Team specific predictors | | | | | | |
| Women fracture | 1.68 | (0.51,2.85) | 0.30 | 2.37 | (-0.10,4.83) | 0.31 |
| Fraction of team member > 40 | 0.46 | (-0.76,1.67) | 0.03 | 0.01 | (-1.42,1.45) | - |
| Use of clinical procedures | 0.21 | (-0.89,1.31) | 0.01 | 0.34 | (-0.95,1.63) | - |
| Proportion of physicians | -0.32 | (-1.21,0.56) | 0.03 | 0.81 | (-0.90,2.53) | - |
| Team size | -0.02 | (-0.05,0.02) | 0.03 | - | - | - |
| RC Relationship | | | | | | |
| Team specific predictors | | | | | | |
| Women fracture | 0.99 | (0.12,1.85) | 0.21 | 1.45 | (-0.41,3.31) | 0.28 |
| Fraction of team member > 40 | -0.05 | (-0.91,0.81) | 0.00 | -0.31 | (-1.39,0.77) | - |
| Use of clinical procedures | 0.53 | (-0.24,1.29) | 0.12 | 0.58 | (-0.39,1.55) | - |
| Proportion of physicians | -0.25 | (-0.86,0.37) | 0.03 | 0.57 | (-0.72,1.86) | - |
| Team size | -0.01 | (-0.03,0.02) | 0.01 | - | - | - |

Table A9.4. Mean (95% CI) for RCS communication and relationship subscale score among interprofessional teams working in rehabilitation centres in Western Norway, Paper II (N=124)

| Team | RC¹ Communication Mean (95% CI²) | RC¹ Relationship Mean (95% CI²) |
|--------------|---|--|
| 1 | 4.3 (4.02 – 4.66) | 4.4 (4.12 – 4.47) |
| 2 | 4.2 (3.87 – 4.65) | 4.5 (4.20 – 4.85) |
| 3 | 4.2 (3.90 – 4.48) | 4.3 (4.04 – 4.59) |
| 4 | 4.2 (3.90 – 4.44) | 4.2 (3.83 – 4.61) |
| 5 | 4.2 (3.73 – 4.57) | 4.3 (3.97 – 4.69) |
| 6 | 4.1 (3.73 – 4.46) | 4.3 (4.11 – 4.55) |
| 7 | 4.1 (3.85 – 4.33) | 4.0 (3.81 – 4.25) |
| 8 | 3.9 (3.66 – 4.22) | 4.3 (4.08 – 4.57) |
| 9 | 3.7 (3.29 – 4.19) | 3.8 (3.40 – 4.24) |
| 10 | 3.7 (3.11 – 4.18) | 4.0 (3.46 – 4.56) |
| 11 | 3.7 (3.21 – 4.10) | 3.8 (3.43 – 4.07) |
| 12 | 3.6 (2.81 – 4.40) | 3.9 (3.25 – 4.63) |
| 13 | 3.6 (3.24 – 3.98) | 3.6 (3.31 – 3.95) |
| 14 | 3.4 (2.99 – 3.81) | 3.9 (3.55 – 4.29) |
| 15 | 3.4 (3.02 – 3.70) | 3.8 (3.50 – 4.19) |
| Total | 3.9 (3.78 – 4.00) | 4.1 (3.97 – 4.17) |

¹ RC= relational coordination communication and relationship mean subscale score for each team

² CI= 95% confidence interval of the mean

Table A9.5. Mean (95% CI) RCS subscales scores on team-level, as reported by the health care professionals and mean (95% CI) rehabilitation benefit and NCQ-N scores, as reported by the patient

| Team | RC ¹ Communication | RC ¹ Relationship | Overall rehabilitation benefit | Physical health benefit | Mental health benefit | Activities of daily living | Social participation |
|--------------|-------------------------------|------------------------------|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Mean (95% CI) ² | Mean (95% CI) ² | Mean (95%CI) ² | Mean (95% CI) ² | Mean (95% CI) ² | Mean (95% CI) ² | Mean (95% CI) ² |
| 1 | 4.3 (4.02 – 4.66) | 4.4 (4.12 – 4.47) | 3.74 (3.39 – 4.09) | 3.47 (3.10 – 3.84) | 3.54 (3.09 – 3.99) | 3.37 (3.00 – 3.74) | 3.22 (2.83 – 3.61) |
| 2 | 4.2 (3.87 – 4.65) | 4.5 (4.20 – 4.85) | 3.80 (3.51 – 4.09) | 3.38 (3.03 – 3.73) | 3.40 (3.01 – 3.79) | 3.31 (2.98 – 3.68) | 3.39 (3.04 – 3.74) |
| 3 | 4.2 (3.90 – 4.48) | 4.3 (4.04 – 4.59) | 4.10 (3.86 – 4.34) | 3.80 (3.51 – 4.09) | 3.31 (2.90 – 3.72) | 3.71 (3.38 – 4.04) | 3.37 (3.02 – 3.72) |
| 4 | 4.2 (3.90 – 4.44) | 4.2 (3.83 – 4.61) | 3.37 (3.08 – 3.66) | 3.16 (2.91 – 3.41) | 2.94 (2.59 – 3.29) | 3.19 (2.97 – 3.41) | 3.00 (2.69 – 3.31) |
| 5 | 4.2 (3.73 – 4.57) | 4.3 (3.97 – 4.69) | 3.79 (3.54 – 4.04) | 3.65 (3.36 – 3.94) | 3.25 (2.90 – 3.60) | 3.31 (3.00 – 3.62) | 2.90 (2.59 – 3.21) |
| 6 | 4.1 (3.73 – 4.46) | 4.3 (4.11 – 4.55) | 3.74 (3.49 – 3.99) | 3.58 (3.33 – 3.83) | 3.25 (2.90 – 3.60) | 3.37 (3.08 – 3.66) | 3.13 (2.82 – 3.44) |
| 7 | 4.1 (3.85 – 4.33) | 4.0 (3.81 – 4.25) | 3.70 (3.33 – 4.07) | 3.40 (3.05 – 3.75) | 3.35 (2.90 – 3.80) | 3.50 (3.15 – 3.87) | 3.56 (3.21 – 3.91) |
| 8 | 3.9 (3.66 – 4.22) | 4.3 (4.08 – 4.57) | 3.55 (3.24 – 3.86) | 3.34 (3.07 – 3.61) | 2.96 (2.61 – 3.31) | 3.13 (2.76 – 3.50) | 2.73 (2.30 – 3.16) |
| 9 | 3.7 (3.29 – 4.19) | 3.8 (3.40 – 4.24) | 3.83 (3.38 – 4.28) | 3.78 (3.37 – 4.19) | 3.50 (2.97 – 4.03) | 3.41 (2.84 – 3.98) | 3.44 (2.93 – 3.94) |
| 10 | 3.7 (3.11 – 4.18) | 4.0 (3.46 – 4.56) | 3.95 (3.64 – 4.25) | 3.58 (3.25 – 3.91) | 3.12 (2.69 – 3.55) | 3.17 (2.80 – 3.54) | 3.06 (2.67 – 3.45) |
| 11 | 3.7 (3.21 – 4.10) | 3.8 (3.43 – 4.07) | 3.71 (3.39 – 4.02) | 3.42 (3.13 – 3.71) | 3.40 (3.07 – 3.73) | 2.97 (2.64 – 3.30) | 3.08 (2.77 – 3.39) |
| 12 | 3.6 (2.81 – 4.40) | 3.9 (3.25 – 4.63) | 3.59 (3.30 – 3.88) | 3.39 (3.06 – 3.72) | 3.03 (2.70 – 3.36) | 2.95 (2.60 – 3.30) | 2.82 (2.45 – 3.19) |
| 13 | 3.6 (3.24 – 3.98) | 3.6 (3.31 – 3.95) | 3.62 (3.31 – 3.93) | 3.26 (2.91 – 3.61) | 3.12 (2.73 – 3.51) | 3.00 (2.69 – 3.31) | 2.97 (2.62 – 3.32) |
| 14 | 3.4 (2.99 – 3.81) | 3.9 (3.55 – 4.29) | 4.24 (4.08 – 4.40) | 3.94 (3.76 – 4.12) | 3.51 (3.27 – 3.75) | 3.27 (3.00 – 3.54) | 3.13 (2.88 – 3.38) |
| 15 | 3.4 (3.02 – 3.70) | 3.8 (3.50 – 4.19) | 3.75 (3.02 – 4.48) | 2.75 (2.02 – 3.46) | 3.00 (2.57 – 3.43) | 2.71 (2.36 – 3.06) | 2.43 (1.59 – 3.27) |
| Total | 3.9 (3.78 – 4.00) | 4.1 (3.97 – 4.17) | 3.79 (3.73 – 3.88) | 3.52 (3.45 – 3.60) | 3.27 (3.19 – 3.38) | 3.24 (3.15 – 3.32) | 3.09 (3.01 – 3.19) |

| Team | NCQ-N ³ Personal continuity 'knows me' | NCQ-N ³ Personal continuity 'shows commitment' | NCQ-N ³ Team continuity | NCQ-N ³ Cross-boundary continuity |
|--------------|--|---|------------------------------------|---|
| | Mean (95%CI ²) | Mean (95% CI ²) | Mean (95% CI ²) | Mean (95% CI ²) |
| 1 | 3.11 (2.82 – 3.40) | 3.13 (2.70 – 3.56) | 3.81 (3.46 – 4.16) | 2.75 (2.28 – 3.22) |
| 2 | 2.83 (2.54 – 3.12) | 2.80 (2.47 – 3.13) | 3.75 (3.50 – 4.00) | 2.54 (2.09 – 2.99) |
| 3 | 3.33 (3.04 – 3.62) | 3.16 (2.75 – 3.57) | 3.75 (3.44 – 4.06) | 3.05 (2.48 – 3.62) |
| 4 | 3.24 (2.97 – 3.51) | 2.93 (2.66 – 3.20) | 3.30 (3.08 – 3.52) | 3.28 (2.95 – 3.61) |
| 5 | 2.96 (2.69 – 3.23) | 2.65 (2.38 – 2.92) | 3.52 (3.30 – 3.74) | 2.96 (2.71 – 3.21) |
| 6 | 3.15 (2.88 – 3.42) | 2.90 (2.55 – 3.25) | 3.43 (3.16 – 3.70) | 3.04 (2.67 – 3.41) |
| 7 | 2.74 (2.25 – 3.23) | 2.45 (2.04 – 2.86) | 3.52 (3.01 – 4.03) | 2.83 (2.30 – 3.36) |
| 8 | 2.71 (2.24 – 3.18) | 2.57 (2.10 – 3.04) | 3.90 (3.53 – 4.27) | 2.83 (2.30 – 3.36) |
| 9 | 2.63 (2.14 – 3.12) | 2.64 (2.03 – 3.25) | 3.77 (3.36 – 4.18) | 2.72 (1.98 – 3.46) |
| 10 | 3.21 (2.90 – 3.52) | 2.99 (2.60 – 3.38) | 3.75 (3.42 – 4.08) | 2.83 (2.48 – 3.18) |
| 11 | 3.15 (2.91 – 3.39) | 2.98 (2.57 – 3.38) | 3.80 (3.43 – 4.17) | 3.30 (2.85 – 3.75) |
| 12 | 3.03 (2.79 – 3.27) | 2.87 (2.58 – 3.16) | 3.45 (3.20 – 3.70) | 2.79 (2.48 – 3.10) |
| 13 | 2.95 (2.71 – 3.19) | 3.04 (3.07 – 3.37) | 3.74 (3.49 – 3.99) | 2.73 (2.30 – 3.16) |
| 14 | 2.96 (2.76 – 3.16) | 2.64 (2.37 – 2.91) | 3.94 (3.76 – 4.12) | 2.78 (2.43 – 3.13) |
| 15 | 2.86 (2.13 – 3.59) | 2.50 (2.38 – 3.72) | 3.63 (2.98 – 4.28) | 3.08 (2.00 – 4.16) |
| Total | 3.02 (2.96 – 3.11) | 2.83 (2.76 – 2.94) | 3.68 (3.61 – 3.76) | 2.89 (2.81 – 3.02) |

Table A9.6 Frequency (n), mean and standard deviation (SD) of items of the Nijmegen Continuity Questionnaire at one-year follow-up (N=701)

| | Svært enig | Enig | Hverken enig eller uenig | Uenig | Svært uenig | Vet ikke | Missing responses | Item Mean (SD) |
|---|------------|----------|--------------------------|----------|-------------|----------|-------------------|----------------|
| | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) | |
| 1. De neste påstandene handler om din oppfatning av din fastlege | | | | | | | | |
| 1. Jeg kjenner fastlegen min godt | 260 (37) | 252 (36) | 106 (15) | 38 (5) | 18 (3) | 5 (1) | 22 (3) | 4.04 (1.00) |
| 2. Fastlegen min kjenner godt til min sykehistorie | 299 (43) | 265 (38) | 61 (9) | 23 (3) | 16 (2) | 15 (2) | 22 (3) | 4.22 (0.91) |
| 3. Fastlegen vet hva han/hun har gjort ved tidligere besøk | 285 (41) | 272 (39) | 70 (10) | 22 (3) | 8 (1) | 17 (2) | 27 (4) | 4.22 (0.86) |
| 4. Fastlegen har god kjennskap til familieforholdene mine | 180 (26) | 200 (29) | 130 (19) | 79 (11) | 49 (7) | 35 (5) | 28 (4) | 3.59 (1.23) |
| 5. Fastlegen kjenner godt til mine daglige gjøremål | 154 (21) | 238 (34) | 150 (21) | 72 (10) | 32 (5) | 26 (4) | 29 (4) | 3.63 (1.10) |
| 6. Fastlegen tar kontakt med meg dersom det er nødvendig, uten at jeg må be om det | 122 (17) | 182 (26) | 143 (20) | 104 (15) | 72 (10) | 47 (7) | 31 (4) | 3.30 (1.27) |
| 7. Fastlegen vet godt hva jeg mener er viktig i behandlingen og oppfølgingen av min sykdom | 165 (24) | 244 (35) | 160 (23) | 44 (6) | 30 (4) | 29 (4) | 29 (4) | 3.73 (1.05) |
| 8. Fastlegen har tilstrekkelig kontakt med meg når jeg blir behandlet av annet helsepersonell | 96 (14) | 173 (25) | 202 (29) | 87 (12) | 51 (7) | 59 (8) | 33 (5) | 3.30 (1.14) |
| 2. De neste påstandene handler om din oppfatning av samarbeidet mellom helsepersonell i kommunen som du har hatt kontakt med | | | | | | | | |
| 9. De ulike faggruppene i kommunen er flinke til å dele informasjon seg imellom | 12 (2) | 51 (7) | 135 (19) | 65 (9) | 34 (5) | 204 (29) | 200 (29) | 2.84 (0.99) |

| | | | | | | | | |
|---|---------|----------|----------|----------|----------|----------|----------|--------------|
| 10. De ulike faggruppene i kommunen samarbeider godt | 9 (1) | 47 (7) | 134 (19) | 60 (9) | 28 (4) | 221 (32) | 202 (29) | 2.86 (0.95) |
| 11. Behandlingen og oppfølgingen fra de ulike faggruppene henger godt sammen | 11 (2) | 57 (8) | 136 (19) | 65 (9) | 31 (4) | 199 (28) | 202 (29) | 2.89 (0.98) |
| 12. De ulike faggruppene er alltid orientert om hverandres behandling og oppfølging | 10 (1) | 36 (5) | 128 (18) | 81 (12) | 36 (5) | 207 (30) | 203 (29) | 2.71 (0.98) |
| 3. De neste påstandene handler om din oppfatning av den behandler du hadde mest kontakt med på rehabiliteringsinstitusjonen | | | | | | | | |
| 13. Jeg kjenner denne behandleren godt | 42 (6) | 181 (26) | 201 (29) | 154 (22) | 42 (6) | 37 (5) | 44 (6) | 3.05 (1.04) |
| 14. Denne behandleren kjenner godt til min sykehistorie | 46 (7) | 244 (35) | 185 (36) | 91 (12) | 25 (4) | 68 (10) | 42 (6) | 3.34 (0.969) |
| 15. Denne behandleren vet alltid hva han/hun har gjort ved tidligere besøk | 43 (6) | 195 (28) | 190 (27) | 64 (9) | 25 (4) | 124 (18) | 60 (9) | 3.31 (0.96) |
| 16. Denne behandleren har god kjennskap til familieforholdene mine | 15 (2) | 88 (13) | 171 (24) | 176 (25) | 101 (14) | 100 (14) | 50 (7) | 2.52 (1.02) |
| 17. Denne behandleren kjenner godt til mine daglige gjøremål | 20 (3) | 163 (23) | 192 (27) | 132 (19) | 55 (8) | 87 (12) | 52 (7) | 2.90 (1.02) |
| 18. Denne behandleren tar kontakt med meg hvis det er nødvendig, uten at jeg må be om det | 23 (3) | 86 (12) | 151 (22) | 150 (21) | 115 (16) | 122 (17) | 54 (8) | 2.52 (1.14) |
| 19. Denne behandleren vet godt hva jeg mener er viktig i behandlingen og oppfølgingen av min sykdom | 42 (6) | 209 (30) | 170 (24) | 76 (11) | 52 (7) | 101 (14) | 51 (7) | 3.20 (1.089) |
| 20. Denne behandleren har tilstrekkelig kontakt med meg når jeg blir behandlet av annet helsepersonell | 26 (4) | 100 (14) | 171 (24) | 134 (19) | 92 (13) | 128 (18) | 50 (7) | 2.68 (1.12) |
| 4. De neste påstandene handler om din oppfatning av samarbeidet mellom lege, fysioterapeut, ergoterapeut, sykepleier og andre behandlere på rehabiliteringsinstitusjonen | | | | | | | | |
| 21. De ulike faggruppene er flinke til å dele informasjon seg imellom | 91 (13) | 272 (39) | 134 (19) | 30 (4) | 13 (2) | 121 (17) | 40 (6) | 3.75 (0.87) |
| 22. De ulike faggruppene samarbeider godt | 93 (13) | 276 (39) | 139 (20) | 23 (3) | 12 (2) | 119 (17) | 39 (6) | 3.77 (0.85) |

| | | | | | | | | |
|---|---------|----------|----------|---------|--------|----------|--------|-------------|
| 23. Behandlingen og oppfølgingen fra de ulike faggruppene henger godt sammen | 85 (12) | 259 (37) | 162 (23) | 32 (5) | 14 (2) | 109 (16) | 40 (6) | 3.68 (0.88) |
| 24. De ulike faggruppene er alltid orientert om hverandre behandling og oppfølging | 75 (11) | 224 (32) | 184 (26) | 32 (5) | 11 (2) | 135 (19) | 40 (6) | 3.62 (0.86) |
| 5. De neste påstandene handler om din oppfatning av samarbeid et mellom din fastlege og rehabiliteringsinstitusjonen | | | | | | | | |
| 25. Fastlegen og rehabiliteringsinstitusjonen er flinke til å dele informasjon seg imellom | 24 (3) | 134 (19) | 165 (24) | 61 (9) | 44 (6) | 241 (34) | 32 (5) | 3.08 (1.04) |
| 26. Fastlegen og rehabiliteringsinstitusjonen samarbeider godt | 20 (3) | 85 (12) | 183 (26) | 70 (10) | 45 (6) | 262 (37) | 36 (5) | 2.91 (1.01) |
| 27. Behandlingen fra fastlegen og rehabiliteringsinstitusjonen henger godt sammen | 24 (3) | 111 (16) | 196 (28) | 74 (11) | 44 (6) | 216 (31) | 36 (5) | 2.99 (1.01) |
| 28. Fastlegen og rehabiliteringsinstitusjonen er alltid orientert om hverandres behandling og oppfølging | 19 (3) | 83 (12) | 179 (26) | 70 (10) | 52 (7) | 264 (38) | 34 (5) | 2.87 (1.03) |

Table A9.7. Unadjusted analyses of associations between RCS subscale scores and patient-reported PasOpp benefit scores, including the variance explained by the fixed (predictor) and random effects, Paper II (N=655)

| RC Communication | Univariate | | | Explained variance | |
|-------------------------|-------------------|-----------------------------|----------------|---------------------------|---------------|
| | B | Estimates 95% CI | p-value | fixed | random |
| Overall benefit | 0.26 | -0.09, 0.62 | 0.145 | 0.009 | 0.023 |
| Physical benefit | 0.31 | -0.06, 0.61 | 0.097 | 0.009 | 0.022 |
| Mental health benefit | 0.30 | -0.00, 0.61 | 0.053 | 0.007 | <0.001 |
| ADL | 0.29 | 0.01, 0.58 | 0.044 | 0.007 | <0.001 |
| Social participation | 0.25 | -0.06, 0.55 | 0.112 | 0.005 | 0.000 |
| RC Relation | | | | | |
| Overall benefit | 0.35 | -0.04, 0.73 | 0.079 | 0.011 | 0.020 |
| Physical benefit | 0.35 | -0.05, 0.75 | 0.083 | 0.009 | 0.020 |
| Mental health benefit | 0.28 | -0.06, 0.56 | 0.109 | 0.000 | <0.001 |
| ADL | 0.04 | -0.28, 0.37 | 0.786 | 0.000 | 0.002 |
| Social participation | 0.06 | -0.30, 0.42 | 0.751 | 0.000 | 0.005 |

Table A9.8. Univariate analysis of associations between RCS subscale scores and patient-reported NCQ-N personal, team and cross-boundary continuity, including the variance explained by the fixed (predictor) and random effects, Paper II (N=655)

| RC Communication | Univariate | | | Explained variance | |
|-----------------------------------|-------------------|-----------------------------|----------------|---------------------------|---------------|
| | B | Estimates 95% CI | p-value | fixed | random |
| NCQ-N Personal 'knows me' | -0.33 | -0.58, -0.09 | 0.008 | 0.016 | <0.001 |
| NCQ-N Personal 'shows commitment' | -0.40 | -0.71, -0.09 | 0.011 | 0.016 | <0.001 |
| NCQ-N Team continuity | 0.25 | -0.06, 0.56 | 0.114 | 0.009 | 0.013 |
| NCQ-N Cross-boundary continuity | -0.35 | .072, 0.01 | 0.056 | 0.010 | <0.001 |
| RC Relation | | | | | |
| NCQ-N Personal 'knows me' | -0.40 | -0.67, -0.13 | 0.004 | 0.019 | <0.001 |
| NCQ-N Personal 'shows commitment' | -0.50 | -0.83, -0.16 | 0.004 | 0.020 | <0.001 |
| NCQ-N Team continuity | 0.36 | 0.05, 0.68 | 0.024 | 0.017 | 0.007 |
| NCQ-N Cross-boundary continuity | -0.42 | -0.80, -0.04 | 0.030 | 0.016 | <0.001 |

Table A9.9 The univariate analyses of association between NCQ-N subscale scores and EQ-VAS scores, including the variance explained by the predictor (R^2), Paper III (N=701)

| EQ-VAS | Univariate | | |
|--|------------|-------------|--------------------|
| | Estimates | | Explained variance |
| | B | 95%CI | R^2 |
| NCQ-N <i>Personal continuity: 'knows me'</i> | 2.67 | 0.81, 4.53 | 0.33 |
| NCQ-N <i>Personal continuity: 'shows commitment'</i> | 1.56 | -0.19, 3.31 | 0.26 |
| NCQ-N <i>Team continuity</i> | 2.09 | 0.18, 4.00 | 0.29 |
| NCQ-N <i>Cross-boundary continuity</i> | 2.75 | 0.92, 4.58 | 0.34 |

Table A9.10 The univariate analyses of association between NCQ-N subscale scores and WHODAS 2.0 domain and total scores, including the variance explained by the predictor (R^2), Paper III (N=701)

| | WHODAS 2.0 domain and global score | | |
|--|------------------------------------|--------------|--------------------|
| | Univariate | | |
| | Estimates | | Explained variance |
| | B | 95%CI | R^2 |
| NCQ-N Personal continuity: 'knows me' | | | |
| Cognition | 0.09 | -1.49, 1.67 | 0.07 |
| Mobility | 0.58 | -1.82, 2.98 | 0.14 |
| Self-care | 0.84 | -0.65, 2.33 | 0.21 |
| Getting along | -0.97 | -2.93, 0.99 | 0.19 |
| Life activities | -0.26 | -2.85, 2.34 | 0.09 |
| Participation | -0.06 | -2.12, 1.99 | 0.05 |
| Global score | -0.05 | -1.56, 1.46 | 0.05 |
| NCQ-N Personal continuity: 'shows commitment' | | | |
| Cognition | 0.59 | -0.81, 1.99 | 0.18 |
| Mobility | -0.13 | -2.30, 2.03 | 0.07 |
| Self-care | 0.58 | -0.74, 1.90 | 0.18 |
| Getting along | -0.75 | -2.60, 1.10 | 0.18 |
| Life activities | 0.20 | -2.14, 2.54 | 0.08 |
| Participation | 0.12 | -1.72, 1.96 | 0.07 |
| Global score | 0.16 | -1.19, 1.51 | 0.10 |
| NCQ-N Team continuity | | | |
| Cognition | -2.06 | -3.65, -0.47 | 0.31 |
| Mobility | -2.68 | -5.00, -0.36 | 0.29 |
| Self-care | -0.76 | -2.31, 0.79 | 0.20 |
| Getting along | -3.13 | -5.17, -1.10 | 0.34 |
| Life activities | -2.25 | -4.93, 0.44 | 0.25 |
| Participation | -3.11 | -5.22, -1.00 | 0.34 |
| Global score | -2.21 | -3.74, -0.68 | 0.33 |
| NCQ-N Cross-boundary continuity | | | |
| Cognition | -0.15 | -1.72, 1.42 | 0.09 |
| Mobility | -1.65 | -3.92, 0.62 | 0.23 |
| Self-care | 0.30 | -1.13, 1.74 | 0.13 |
| Getting along | -1.47 | -3.37, 0.43 | 0.24 |
| Life activities | -3.70 | -6.17, -1.24 | 0.34 |
| Participation | -2.23 | -4.21, -0.24 | 0.29 |
| Global score | -1.50 | -2.97, -0.03 | 0.28 |

**Errata for
Do interprofessional teams matter?**

*A survey-based study of patients and team members in hospitals and
rehabilitation centres in secondary health in Western Norway*

Merethe Hustoft



Thesis for the degree philosophiae doctor (PhD)
at the University of Bergen

5.mai 2020, Merethe Hustoft

(date and sign. of candidate)

7. Mai 2020, Marit Øilo

(date and sign. of faculty)

Errata

| | |
|------------|---|
| Page 18 | References were not ascended, changed to: [45,53] |
| Page 18 | References were not ascended, changed to: [11,27-30] |
| Page 31 | Misspelling: 'p4 team' – corrected to '94 team' |
| Page 39 | Misspelling: 'papers I, II and III' – corrected to 'papers II and III' |
| Appendix 1 | Paper I: Missing 'women' as a subheading in the second column under main heading 'valid responses' in table 1. |
| Appendix 3 | Paper III: misspelling: 'The Nijmegen Continuity Questionnaire (NCQ) is a generic survey measuring continuity of care from the perspectives of the patients and consists of 28 items divided into six subscales'. The correct number of subscales is seven. |



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