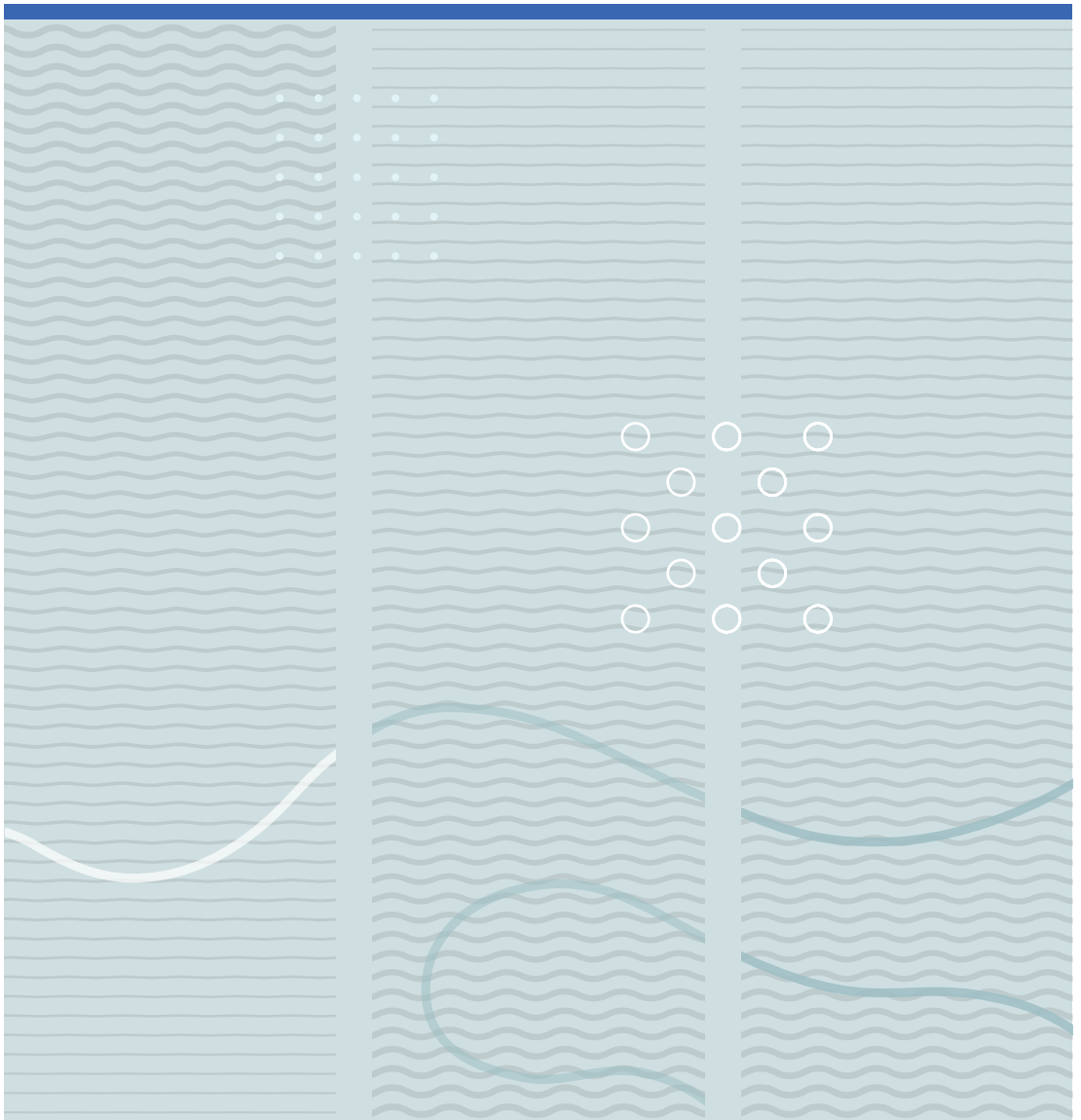Jill Flo

Nursing Intensity in Home Health Care

USN

Jill Flo

Nursing Intensity in Home Health Care

A PhD dissertation in
Person-Centred Healthcare

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This study was carried out at the Faculty of Health and Social Sciences, Department of Nursing and Health Sciences, University of South-Eastern Norway (USN), where I have from spring 2015 been enrolled in the faculty's PhD program in Person-Centered Healthcare.

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Abstract

Background: As people get older, their health needs become more chronic and complex. In that the burden on health and long-term care systems and services will increase alongside the aging population, well-functioning municipal health care systems will be needed. Also, because of the shift from hospital and long-term settings to home health care, nurse leaders need systematic information about patients' care needs for staff resources. To guarantee person-centered and safe care, the correct allocation of staff resources and acceptable nursing workload levels are essential. Consequently, reliable instruments for measuring nursing intensity are needed.

Aims: The overarching aim of the thesis was to identify currently used patient classification systems (PCSs) developed and tested in HHC, with a special emphasis on validity, reliability and staff allocation, and to test the validity and reliability of the modified Oulu Patient Classification (OPCq) instrument. This also included describing nurses' work experiences with and perceptions on the modified OPCq instrument's usability when using it to classify nursing intensity (NI) in an HHC setting.

Theoretical framework: The RAFAELA® system is based on a holistic view of patients and incorporates a nursing perspective with a caring and person-centered approach. In RAFAELA®, a balance is sought between each patient's individual care needs and nursing resources. Developed from a humanitarian point of view, the OPCq instrument is used to measure a patient's physical, social and spiritual/existential needs.

Design, materials and methodology: The study was a part of a municipal research and development program in home health care and realized during 2012-2014 in collaboration with the University of South-Eastern Norway. The modified OPCq instrument was tested in two home health care units. To provide an overview and broader knowledge of the existing patient classification systems used in home health care, a scoping review was conducted.

Paper I was a scoping review and included searches of the Cinahl, Medline, Embase and SweMed electronic databases, resulting in 1247 records being identified; an additional 56 records were identified through searches of the Google and Google Scholar databases and hand searches of key journals. After the removal of duplicates, 1040 records were screened (title and abstract), resulting in 55 records that were re-screened, with 39 being excluded. The remaining 16 full-text articles were assessed for eligibility, and three were excluded with reasons. Consequently, thirteen papers were included in the final review. In Paper II, a descriptive design was used and the study included a questionnaire comprised of a total of 13 questions with set answers and the possibility to comment on eight of the questions; ten questions had a five-point Likert scale. Descriptive analyses and simplified content analyses occurred. Participants, comprised of registered nurses, practical nurses and assistants, answered the questionnaire in spring 2013 and spring 2104. In Paper III, a reliability study, the interrater reliability of the modified OPCq instrument was tested using a new multiple parallel classification method for data collection. The guidelines for Reporting Reliability and Agreement Studies were followed when reporting the study. There were 2010 parallel classifications (335 x 6 sub-areas) conducted during the period November 2013 to February 2014, involving 53 patients. Participants were registered nurses, practical nurses, assistants and nursing students. In Paper IV a qualitative design was used, including focus group interviews to collect data. Four focus group interviews were conducted, two in April 2013 and two in May 2013. A total of 24 registered nurses and practical nurses were invited to participate in the study.

Results: In Paper I, 13 patient classification systems used in home health care were reviewed. All were found to measure patients' needs and/or nursing requirements. Five instruments were or had been tested for validity, five tested for reliability, and one validity and reliability tested and evaluated. How accurately the systems were described varied, with some very well described and others not. Specific information on staff allocation was missing from most of the systems.

In Paper II, participants evaluated the OPCq instrument's sub-areas 1-6 (M=2.98-3.11, MD=3, SD 0.77-0.96). About 80% of the participants evaluated sub-area 1 (planning and

co-ordination of nursing care), sub-area 2 (breathing, blood circulation and symptoms of disease) and sub-area 4 (personal hygiene and secretion) as being very well/well or pretty well described in the instrument. The nursing intensity levels A-D described in the instrument's sub-areas were also assessed (M=2.70-2.90, MD 3, ST= 0.88-0.97). Here the highest scores were given for sub-area 1 (planning and co-ordination of nursing care), sub-area 2 (breathing, blood circulation and symptoms of disease) and sub-area 6 (Teaching, guidance in care and follow up care, emotional support).

In Paper III, consensus in percent in relation to the parallel classification of the OPCq instrument's sub-areas 1-6 was undertaken and seen to be 64.78%-77.61%. Cohens' kappa showed an interrater reliability of 0.49-0.69. Sub-area 4 (Personal hygiene and secretion) showed the highest consensus and sub-area 6 (Teaching, guidance in care and follow up care, emotional support) showed the weakest consensus.

In Paper IV, three themes emerged from the focus group interviews: (a) Classifying the modified Oulu patient classification correctly; (b) Technological problems hinder the use of the instrument; (c) Classifying nursing intensity when time pressure dominates. The nurse participants expressed some uncertainty about the various levels in the OPCq instrument and where or how to classify some tasks or duties. There were also some technical problems with the registering of OPCq measurements. A lack of time during the work day was a significant stress factor when classifying.

Conclusion: While various patient classification systems used in home health care were seen in the scoping review, few were validity and/or reliability tested or evaluated. How well and accurately the patient classification systems were described in the reviewed papers varied, and information about the allocation of staff was lacking.

The OPCq instrument was considered to fulfill the requirements for validity and reliability. However, the OPCq manual should be improved to better suit a home health care setting, specifically sub-areas 1-6 and nursing intensity levels A-D and keywords. The OPCq instrument was considered useful in classifying nursing intensity in home health care, although there was uncertainty about where or how to classify non-patient factors.

List of papers

Paper I

Flo, J., Landmark, B., Tønnessen, S. & Fagerström, L. (2019). Patient classification systems used to classify nursing intensity and assess nursing staffing resources in home health care - a scoping review. *International Journal of Nursing Studies*. Available online 22.May 2019. doi:10.1016/j.ijnurstu.2019.05.009

Article omitted in the online version.

Paper II

Flo, J., Landmark, B., Hatlevik, O. E., Tønnessen, S. & Fagerström, L. (2016). Testing of the Content Validity of a Modified OPCq instrument − A pilot Study in Norwegian Home Health Care. *Open Journal of Nursing.* 6, 1012-1027. doi: 10.4236/ojn.2016.612097

Paper III

Flo, J., Landmark, B., Hatlevik, O.E. & Fagerström, L. (2018). Using a new interrater reliability method to test the modified Oulu Patient Classification instrument in home health care. *Nursing Open.* 1-9. doi: 10.1002/nop2.126

Paper IV

Flo, J., Landmark, B., Tønnessen, S. & Fagerström, L. (2018). Nurses' experiences of measuring nursing intensity in home healthcare: a qualitative study. *Nordic Journal of Nursing Research.* 1-9. doi: 10.1177/2057158518807569.

Article omitted in the online version.

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Abbreviations

APN – Advanced Practice Nurse

CCC - Clinical Care Classification

CCNCS - Community Client Need Classification System

CDS - Care Dependency Scale

CHIRS - Community Health Intensity Rating scale

CIT - Caseload Intensity Tool

CL/WLA - Caseload/Workload Analyses

DominiC - Domiciliary care system in the community

eCAT - Electronic Caseload Analysis Tool

FCG - Finnish Consulting Group Ltd

HCA - health care assistant

HCN - home care nurse

HHC - Home Health Care

IADL - Instrumental Activities of Daily Living

IPLOS – Individual-based care and care statistics

KOSTRA - The Municipality-State-Reporting system (*KOmmune-STat-RApportering)*

NRPC - Norwegian Registry for Primary Health Care

NI – Nursing Intensity

NSD - Norwegian Centre for Research Data

OPCq – Oulu Patient Classification

PAONCIL - Professional Assessment of Optimal Nursing Care Intensity Level

PCN – Person-Centered Nurse

PCC – Person-Centered Care

PCS – Patient Classification System

PHN - Public Health Nurse

PN - Practical Nurse

RAI MDS - Resident Assessment Instrument –Minimum Data Set

R-ESPCI - Easley-Storfjell Patient Classification Instrument

RN- registered nurse

RUG-III - Resource Utilization Groups

SE - Social Educator

TiC - Time in Care

Table of contents

1 Introduction

Using demographic projections, researchers have found that the population of older people in developed countries (Bloom et al., 2015; WHO, 2016a) and in the Nordic countries (Rogne & Syse, 2017; Thorslund, 2010; Tønnessen, Syse, & Aase, 2014) will increase. Life expectancy at age 60 has increased globally (WHO, 2016d, 2018), and in the European Union the number of older people ≥65 years is increasing. In Europe, those aged ≥80 years are projected to more than double between 2017 and 2080 (Eurostat, 2018), with about 34% of the European population estimated to be aged 60 years or over (WHO, 2016c). Until recently, Norway has had a relatively young population (Rogne & Syse, 2017), but it is anticipated that the population of older people will increase rapidly, with those aged ≥70 years doubling during the next 30 years alongside increases in those aged 80-89 and ≥90 years (Tønnessen et al., 2014). Currently, 875 000 people in Norway are ≥65 years (Statistics Norway, 2017), which has never been seen before. Life expectancy in Norway today is 80.6 years for men and 84 years for women, and of those aged 90-100 years, women represent a solid majority (Statistics Norway, 2017).

When people get older their health needs become more chronic and complex (Eurostat, 2015; OECD, 2013), and the increase in diseases such as chronic obstructive pulmonary disease (COPD), diabetes, cancer, cardiovascular disease, musculoskeletal disorders, mental disorders, abuse problems or dementia constitutes a challenge to those organizing health care systems (Norwegian Ministry of Health and Care Services, 2015b; The National Board of Health and Welfare, 2018). The growing number of older people and their associated chronic and complex diseases require well-functioning municipal health and care services; older people will place a large burden on health and long-term care systems (Bloom et al., 2015). In Norway, 12.6% of those aged 67-79, over 50% of those aged 80-89, and 90% of those aged ≥90 receive community-based care (Norwegian Directorate of Health, 2017a). Consequently, home health care (HHC) is one of the fastest growing health care sectors in Norway (Førland & Folkestad, 2016).

Throughout Europe the number of available hospital beds is decreasing (Eurostat, 2016), and when the shift from hospital and long-term settings to HHC occurs, nurse managers

need new methods for the allocation of staff resources. To guarantee patients a person-centered and safe care, the correct allocation of staff resources and acceptable nursing workload levels are essential. Researchers have previously demonstrated in hospital settings a clear association between resources, that is nurses' competence and the number of nurses working on the ward, and patient outcomes, including patient safety and mortality risks (Aiken, Clarke, Cheung, Sloane, & Silber, 2003; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Aiken et al., 2013; Griffiths et al., 2016; Junttila, Koivu, Fagerström, Haatainen, & Nykänen, 2016). In hospital settings, unfinished/missed nursing care is a problem, with time scarcity being the primary driver (Jones, Hamilton, & Murry, 2015) but also organizational factors (Ausserhofer et al., 2014) and long working shifts (Rogers, Hwang, Scott, Aiken, & Dinges, 2004) underlying the problem. In nursing home (NH) settings, researchers have found deficiencies associated with fewer nursing hours (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000). This can be compared to Lee et al., who found a lower rate of pressure ulcers associated with higher nursing hours (Lee, Blegen, & Harrington, 2014). Researchers have also found that inadequate nurse staffing levels are an important reason behind quality problems in NHs (Harrington, Schnelle, McGregor, & Simmons, 2016) and that the highest-staffed NHs provide better care than the lowest-staffed (Schnelle et al., 2004).

While no studies set in an HHC setting in which possible links between nursing resources and patients' mortality risks were found, studies in which researchers investigated links between nursing resources, patients' care needs and missed nursing care were found. In such studies, workload tended to be determined by the urgency of patients' care needs instead of actual staff resources (Elstad & Vabø, 2008), which in turn was linked to job stress and associated with sickness absence. Lack of time can increase the prevalence of task-oriented care and nurses' rationing of the care given to patients (Tønnessen, Nortvedt, & Førde, 2011). In a study set in an HHC setting, researchers found that more nurses were needed during all shifts: weekdays as well as weekends (Gautun & Bratt, 2014). In that study, staff experienced that time pressure resulted in their failure to take sufficient care of patients' needs. In another study, compliance with hygiene routines was linked to understaffing (Lindh, Kihlgren, & Perseius, 2013). In yet another study,

researchers saw that relatives of home-dwelling older persons with dementia experienced a sense of powerlessness due to fragmented services and task-oriented care (Landmark, Aasgaard, & Fagerström, 2013). In Norway, following the implementation of the Coordination Reform (Norwegian Ministry of Health and Care Services, 2009), researchers found that nurses providing HHC services perceived increased pressure in relation to time reduction (lack of time) and increased responsibility (Sæterstrand, Holm, & Brinchmann, 2015), with these nurses noting that especially their increased responsibility for older people with psychiatric disease was complicated. Other researchers have found that work conditions differ between HHC and hospital settings and that the work conditions nurses experience in HHC may not be considered acceptable in a hospital or NH setting (Gautun & Bratt, 2014; Lang et al., 2014).

In the municipality of Drammen, Norway, a need for improved resource allocation was seen, linked to an increased number of older people and subsequent pressure on HHC services. As part of a collaboration between the University of South-Eastern Norway and the Institute for Research and Development for Nursing and Care Services in Drammen, the RAFAELA® Nursing Intensity and Staffing system (RAFAELA® system) was tested in a pilot project in the municipality. Nurse managers can use the RAFAELA® system to balance patients' care needs with nursing workload and provide a platform for the management of nursing resources. The RAFAELA® system is based on a holistic view of the unique human being and has a person-centered approach (Fagerström, 1999, 2000, 2017). The Oulu Patient Classification (OPCq) instrument, part of the RAFAELA® system, has been tested as part of the sub-studies included in this thesis, Papers II-IV. Using the OPCq instrument, it is possible to measure patients' care needs, including how much care, help and support each patient receives when in care (Fagerström, 2017; Fagerström, Lønning, & Andersen, 2014). The OPCq was originally developed for a hospital setting (Andersen, Lønning, & Fagerström, 2014; Fagerström, 2000; Fagerström, Rainio, Rauhala, & Nojonen, 2000b), but was tested for the first time in an HHC setting as part of this thesis.

1.1 The aim of the thesis

The overarching aim of the thesis was to identify currently used patient classification systems (PCSs) developed and tested in HHC, with a special emphasis on validity, reliability and staff allocation, and to test the validity and reliability of the modified OPCq instrument. This also included describing nurses' work experiences with and perceptions on the modified OPCq instrument's usability when using it to classify nursing intensity (NI) in an HHC setting. For the purposes of the sub-studies included in this thesis, the OPCq instrument was modified to better suit an HHC setting.

In the papers included in this thesis, the overall goals were to: 1) Identify developed and tested patient classification systems used in HHC; 2) Test the content validity of the modified OPCq instrument; 3) Test the interrater reliability of the modified OPCq instrument; 4) Describe nurses' work experiences and perceptions of the usability of the modified OPCq when using the instrument to classify nursing intensity.

The research questions were:

Paper I:

- ➢ What is the target population for PCSs used in HHC?
- ➢ Which tools/instruments have been developed to assess nursing care requirements for individual patients and NI?
- ➢ Which PCSs used in HHC have been tested for validity?
- ➢ Which PCSs used in HHC have been tested for reliability?
- ➢ Can PCSs be used for the allocation of staff in HHC?

Paper II:

- ➢ Is the validity of the modified OPCq sufficient in an HHC setting?

Paper III:

- ➢ Is the modified OPCq a reliable instrument for measuring nursing intensity in HHC?

Paper IV:

- ➢ What are nurses' work experiences of the usability of the modified OPCq when measuring nursing intensity in HHC?

1.2 Outline of the thesis

Part I of the thesis includes nine (1-9) chapters. In chapter one, the introduction, the overarching aim, purpose and outline of the thesis are presented. In chapter two, the research background, HHC setting and HHC nursing staff are described while in chapter three, PCSs are described. In chapter four, the RAFAELA® system and the modified OPCq instrument are presented. In chapter five, theoretical perspectives related to a person-centered framework are described. In chapter six, the design and methodology used in the papers part of this thesis (Papers I-IV) are described, and in chapter seven the results from the papers and a summary of the overall results are presented. In chapter eight, the results and findings from all four papers and overall methodological reflections are presented. In chapter nine, the conclusion is seen. Part II of the thesis includes a presentation of Papers I-IV.

Flo: Nursing Intensity in Home Health Care

2   Home health care

Home health care (HHC) is one the fastest growing health care sectors in the Western world (Harris, 2017; WHO, 2016d), and there is a palpable shift underway from the provision of care in hospitals toward care in nursing homes, residential care facilities and HHC (Eurostat, 2016). The number of hospitals and nursing homes facilities have decreased (Eurostat, 2015), leading to a significantly increased need for HHC. There is simultaneously a growing concern about the deficit of nursing and care professionals alongside considerable demands for nursing resources (Eurostat., 2016) and well-functioning municipal health and care services (Bloom et al., 2015). In the World Health Organization's Global strategy and action plan on ageing and health, the vision of a world in which everyone experiences "healthy ageing", defined as "*the process of developing and maintaining the functional ability that enables well-being in older age*" (WHO, 2016a, p. 2), is presented.

There are different views on how HHC as a concept should be defined, including what the concept encompasses, i.e., its content (Marrelli, 2017), and various terms are seen in the relevant literature: home care services, home help services, home care, home based care, community health care and home health care (Andersen, Bendal, & Westgaard, 2015; Bing-Jonsson, Bjørk, Hofoss, Kirkevold, & Foss, 2013; Bôas & Shimizu, 2015; Flöjt, Hir, & Rosengren, 2014; Johansen & Fagerström, 2010; Nielsen & Jørgensen, 2016; Saba, 2002; Tønnessen et al., 2011; Westerberg & Tafvelin, 2014). In the Handbook of Home Health Administration from the United States of America (USA), HHC is defined as, "*the provision of healthcare services to people at any age at home or in other noninstitutional settings*" (Dieckmann, 2017, p. 9). Another more descriptive definition is provided by the National Center for Health Statistics, also from the USA: "*a range of medical and therapeutic services as well as other services delivered at a patient's home or in a residential setting for the purpose of promoting, maintaining, or restoring health or maximizing the effects of disability and illness, including terminal illness*" (Jones, Valverde, & Harris-Kojetin, 2012, p. 7).

2.1 Home health care in Norway

In Norway, HHC is one of the fastest growing health care sectors (Førland & Folkestad, 2016; Norwegian Directorate of Health, 2017a) and is included in Norwegian municipalities as a part of primary health services (Abrahamsen, Allertsen, & Skjøstad, 2016). While the Norwegian health service is essentially publicly owned and operated, it is nonetheless divided into two separate entities: primary health services (run by municipalities) and specialist health services (run by the state)(Grimsmo, Kirchhoff, & Aarseth, 2015). Primary health services include primary medical services, emergency room services, emergency medical preparedness, preventive health services (0-20 years), midwife services, habilitation and rehabilitation services, home services and home nursing, and nursing home services (Abrahamsen et al., 2016; Norwegian Ministry of Health and Care Services, 2006a). Services provided in the patient's home include home services (practical assistance, known as "home help") and home nursing care, and often these two services are provided and used in combination (Førland & Folkestad, 2016).

By legislation in force in Norway, municipalities must offer health and care services to all patient and user groups, including people with somatic or mental illness, injury or suffering, substance abuse problems, social problems or impaired functional capacity (Norwegian Ministry of Health and Care Services, 2011). Through the Patient's Rights Act (Norwegian Ministry of Health and Care Services, 1999), patients are assured access to health and care services that promote social security and involve respect for each individual patient's life, integrity and human dignity. Once an application is made for HHC services, a case officer/manager makes a home visit to the new patient before decisions about the care to be provided are made. As delineated in the Patient's Rights Act (Norwegian Ministry of Health and Care Services, 1999), in Norway the term "user" is applied to all those who need practical assistance.

The Coordination Reform

In Norway, political initiatives have been used to strengthen the development of municipal HHC services (Norwegian Ministry of Health and Care Services, 2006a, 2009, 2013, 2015a, 2015b, 2018). Implemented in 2012, the goal of the Coordination Reform was to ensure that each patient receives proper treatment, in the right place and at the right time (Norwegian Ministry of Health and Care Services, 2009). Underlying the impetus for this reform was the recognition that health and care services in Norway had become too fragmented and were becoming too expensive; one of the overarching goals of the reform was the development of more coherent and coordinated health and care services. Subsequent to the reform, smoother interaction between specialist and primary health services was seen and municipalities were given more responsibility for the provision of health services (Grimsmo et al., 2015).

Continuous evaluation of the impact that the Coordination Reform has had has occurred, and to date it appears that the goal of more comprehensive treatment for patients has not been achieved. With care organized in the form of four regional so-named health trusts, there appears to be an imbalance between how knowledge and expertise are utilized in specialist health services versus knowledge and competence in the municipalities. While evaluations have shown that cooperation between the specialist health trusts and municipalities is generally good, the reform has not led to significant changes in how cooperation is perceived (Research Council of Norway, 2016). Following implementation of the reform, registered nurses' (RNs) experiences have been investigated, and among other things increased workload due to an increased number of patients and patients with more health problems have been noted. A greater degree of transitional care, where patients are transferred between different locations, has been seen, which entails more administration and documentation for nurses. Nursing tasks have also been perceived as becoming more complex, with more complicated procedures and a greater demand for coordination (Haukelien, Vike, & Vardheim, 2015). Greater staff responsibility and a reduction in the amount of time allowed for home visits (Sæterstrand et al., 2015) have also emerged. Investigation of the interaction between hospital staff

and HHC nurses has shown that, e.g., perspectives on what to prioritize differ, with municipal and HHC nurses perceiving that they have limited power and influence (Tønnessen, Kassah, & Tingvoll, 2016). In regard to older patients, evaluations of transitional care and handover post-Coordination Reform have shown that difficulties exist; for example, on admission older patients often present with diffuse and vague symptoms while at discharge they display confusion, tiredness, anxiety, and so on. Researchers have also shown that when older patients are discharged from hospital, neither nurses nor physicians understood what role or function HHC has or can offer (Storm, Siemsen, Laugaland, Dyrstad, & Aase, 2014).

Central health registers

Anchored in Norwegian legislation, there are several patient register systems that municipalities in Norway use. Individual-based care and care statistics (IPLOS), a mandatory central health register implemented in 2006, is a tool for documenting and reporting care needs and is the source from which national statistics for municipal nursing and care services are derived (Gabrielsen, Otnes, Sundby, Kalcic, & Strand, 2010; Norwegian Directorate of Health, 2007; Romøren, Torjesen, & Landmark, 2011). At first, implementation of the IPLOS register was met with opposition, from several patients' organizations, trade-unions and researchers (Christensen, 2012), and even nursing staff perceived the register to be a technology-driven system (Tøndel, 2011). Information about each individual applying for and/or receiving health and care services is registered in IPLOS. IPLOS is also the foundation from which the monitoring, quality assurance, planning, development and overall management of municipal health and care services and health and care administration emanates, and the information held in the register constitutes a database for care research (Norwegian Ministry of Health and Care Services, 2006b).

A total of 42 variables collected in relation to HHC services are registered in IPLOS. These variables include, among other things, information related to patients' personal and residential information and which health care professionals, if any, patients have consulted during the past calendar year. Eighteen "functional variables" are also

collected, which relate to patients' resources, need for services, diagnosis, visual acuity and hearing, among others. Variables and measurements related to sociocultural or spiritual needs are not included in the IPLOS register (Tøndel, 2011).

Some IPLOS data is sent to the Norwegian Registry for Primary Health Care (NRPC), in which information about everyone who receives municipal health and care services is registered (Norwegian Directorate of Health, 2019). The NRCP is used to provide central and municipal authorities with information with which to plan, manage, finance and evaluate primary health care (Norwegian Directorate of Health, 2017c). The Municipality-State-Reporting system, KOSTRA (*KOmmune-STat-RApportering)*, is used to provide care management with information about municipal resource input, priorities and goal achievement, both district and county-wide, in regard to, e.g., nursing and care services in the municipalities (Statistics Norway, 2018).

Welfare technology

Increased attention has been given to those technological developments associated with improving people's welfare, so-named welfare technology. Such technology is considered to be central to meeting future demographic challenges (Norwegian Directorate of Health, 2012). Of all Norwegian municipalities, 55% report having adopted welfare technology, with 99% of these offering patient security alarm systems or other forms of sensor technology. Still, researchers have found that municipal care staff are resistant to the co-creation and implementation of welfare technological solutions (Nilsen, Dugstad, Eide, Gullslett, & Eide, 2016).

Care needs in HHC

There are many kinds of care needs in HHC and many different patient groups: the frail older, people with disability, people with psychological/mental disorders and/or substance abuse, people with dementia or neurological diseases (Norwegian Ministry of Health and Care Services, 2015b). In regard to older people's health and morbidity in Norway, recent research shows that the number of years older people live with disease has not decreased, and there is uncertainty as to how the health of future older

generations will evolve (Rogne & Syse, 2017). As it is estimated that the level of education among older people will increase, if one considers education to be a good indicator of resourcefulness then one can likely expect a more resourceful older population in the future, which can in turn be used to predict that older people in certain geographical areas in the future may be more independent and better able to handle certain challenges in everyday life (Rogne & Syse, 2017). Nevertheless, such a prediction is difficult to make with any certainty; immigration to Norway has increased and consequently the characteristics of the older population will change (Rogne & Syse, 2017). Thus the needs of the older population can also be expected to change.

Recent statistics show that in Norway 50% of those aged 80-89 and 90% of those aged ≥90 use HHC services (Norwegian Directorate of Health, 2017a). This corresponds to a Swedish survey of older people aged ≥100, which showed that of those still living at home about 70% used HHC services and needed help with instrumental activities of daily living (ADL) or household activities and reported several symptoms of illness (Parker, Meinow, Sundberg, & Fors, 2014). Still, while the frail oldest have a great need for help, the need for help among those aged <67 has also increased (Førland & Folkestad, 2016).

"Aging in place" is a concept that has gained global attention among health care providers and policymakers, and it is used to describe a person living in the residence of their choice, for as long as they are able, as they age. According to some researchers, the emergence of such a concept indicates that older people want to choose where and how they age, and the concept is related to a sense of independence and autonomy (Wiles, Leibing, Guberman, Reeve, & Allen, 2012). While many older home-dwelling people retain a good quality of life despite decreasing health, some do not and in such cases an assisted living facility may be a better solution (Munkejord, Eggebø, & Schönfelder, 2018). Researchers have found that older home-dwelling people who live alone report feeling lonely, feeling helplessness, having ill health, and experienced chronic disease, needed help with personal activities of daily living (PADL) and were unsatisfied with life (Tomstad, Dale, Sundsli, Sævareid, & Söderhamn, 2017). In regard to older people's statements about what worries them, researchers have found that older people fear being a burden

on others, fear losing self-government, experienced sadness, fear or anxiety due to losing social ties with family and/or friends, and worried about aging, bodily impairments and aspects of death (Hafskjold et al., 2016). Even when older people work hard to maintain daily routines, they can experience periods of frailty when sickness emerges (Skilbeck, Arthur, & Seymour, 2018).

2.2 Nursing staff in home health care

In Norway, a total of 137 950 staff (calculated in man-years) work in municipal care and care services. In the last decade the number of RNs has increased (18 962 to 23 396), and an increase in RNs with a different kind of postgraduate education or Master's level education has also been seen (1 870 to 3 379), such as geriatric nurses (1 122 to 1 884) and psychiatric nurses (1 164 to 1 502). Conversely, the number of practical nurses/assistant nurses has decreased (35 923 to 27 215) (Statistics Norway, 2007-2017). Already in 2005, the Norwegian government noted the importance of strengthening professional competence in HHC (Norwegian Ministry of Health and Care Services, 2006a). To those means the government has implemented a plan to raise the level of competence in municipal health- and caring systems in relation to recruitment, competence and professional development by 2020 (Norwegian Directorate of Health, 2017b). As part of this plan several interventions have been introduced in municipal-based care, including the recruitment of RNs and practical nurses (PNs), new clinical postgraduate courses for nurses, the evaluation of postgraduate courses, the development of courses for PNs, and the introduction of competence requirements (Norwegian Directorate of Health, 2017b). While there has been a positive staffing development alongside the increase in RNs, one goal yet to be fully achieved is the reduction of the number of staff without any formal education (Norwegian Directorate of Health, 2017a)

In relation to staff and skill-mix in HHC, various terms were seen in the literature from this field of science, for example home nurse (HN) and health care assistant (HCA) in Belgium (De Vliegher et al., 2014; De Vliegher, Declercq, Aertgeerts, & Moons, 2016),

home health caregivers in Denmark (with 1.5 to 3.3 years of formal training) (Nielsen & Jørgensen, 2016), home care assistants (HCA) and district nurses in Sweden (Craftman, Grundberg, & Westerbotn, 2018), public health nurses (PHN) in Ireland (Brady et al., 2007), district nurses in the United Kingdom (UK) and New Zealand (Drennan, 2019; Walker & Hendry, 2009), and RN, licensed practice nurse, home health aide and certified nursing assistant in the USA (Luo, Lin, & Castle, 2013). In Norway, the terms RN, assistant nurse (AN) or nurse assistant are commonly seen (Bing-Jonsson et al., 2013; Hafskjold et al., 2016; Westerberg & Tafvelin, 2014), while the term nurse practitioner (NP), also known as advanced practice nurse (APN), is becoming more common (Fagerström, 2012; Fagerström, 2019).

In Norway, alongside nursing staff, other professionals can provide care and support to HHC patients such as physiotherapists, dieticians and physicians. There are also various assistants working in HHC, who either have no type of formal education for work in health care or are students completing a health care education program. There are even home helpers, who provide only practical assistance with household tasks such as cleaning, washing of patients' garments or taking out the garbage (Abrahamsen et al., 2016). Home help activities and services are regulated by law (Norwegian Ministry of Health and Care Services, 1999).

In Norway, RNs are required to hold a Bachelor's degree (Norwegian Ministry of Education and Research, 2008) while PNs are required to hold a vocational degree or 3-4 years of upper secondary school education (Videregående opplæring, 2019). Both RNs and PNs provide nursing care for patients, with assistants performing "lighter" nursing care. Note that in the papers included as part of this thesis (Papers II-IV) the terms RN, PN and assistant are used.

The various and different roles and level of competence among HHC staff in Norway can constitute a challenge in regard to the improved allocation of staff resources in relation to care activities (Johansen & Fagerström, 2010). Regarding the competence of Norwegian municipal nursing staff, researchers have found that RNs overall are more competent than PNs and assistants, with the exception of certain domains such as

"nursing measure" and "simple procedures", where PNs scored higher than RNs (Bing-Jonsson, Hofoss, Kirkevold, Bjørk, & Foss, 2016). In Norway, RNs are responsible for acute care needs and specialized nursing interventions (Johansen & Fagerström, 2010). In a study in which nursing staff's understanding of competence in an HHC setting was investigated, researchers found that RNs defined competence as "to be prepared" (Flöjt et al., 2014). In other studies, PNs were seen to have a knowledge gap and expressed insecurity (De Vliegher et al., 2016; Flöjt et al., 2014), and in Sweden researchers found that multifaceted tasks that were previously performed by RNs or district nurses were being performed by PNs (Craftman et al., 2018).

To meet the challenges set forth in the Coordination Reform, not only nursing staff but also nursing leadership will need competence, support and guidance (Tingvoll, Sæterstrand, & McClusky, 2016). One goal set by the Norwegian government is the strengthening of municipal management competence by improving the rate of staff's further education at the Master's level (Norwegian Directorate of Health, 2017b).

In the last decade, the average number of hours per week that nursing staff spend on home nursing care and/or practical assistance for older people has increased, to 5.6 hours for those aged 67-79, 4.3 hours for those aged 80-89, and 5.5 hours for those aged >90 (Statistics Norway, 2007-2017). According to estimates, by 2060 nursing and care services may need almost 100,000 more man-years than today's 133,000; and if average life expectancy increases significantly the need will be even greater (Holmøy, Otnes, & Haugstveit, 2016).

Nursing is an essential resource for the sustainable development of HHC, and for good outcomes optimal nursing staff resource allocation is need, both in quantitative (number of nurses and quality) and qualitative terms (nursing competence)(Fagerström, 2012). To develop and guarantee high-quality nursing care and a safe and person-centered care in HHC, new methods whereby nurse leaders can measure patients' care needs and the allocation of nursing staff are needed.

3   Patient classification systems

This chapter is divided into three sections. In 3.1, the different terms and definitions of workload as used in the available literature are presented. In 3.2, the development of PCSs from the early 1960s until today are presented and the two main types of PCSs, prototype and factor-evaluation systems, are described. Also, the essential requirements and critical factors that should be taken into consideration when selecting a system are presented. In 3.3, an overview of PCSs used in HHC are presented, including brief descriptions of those well-known internationally and those well-known in the Nordic countries.

A systematic database search occurred in September 2014 and again in April 2017 in relation to available literature on PCSs in HHC. To gain an in-depth assessment of the literature available and to examine the variety and types of PCSs used to classify NI in HHC in recent years, a scoping review was undertaken (Paper I) in which a framework based on the ideas of Arksey and O'Malley (Arksey & O'Malley, 2005) was used.

3.1   Nursing workload

Due to the increase in the older population (Norwegian Directorate of Health, 2016) and a shift from hospital/institutional settings to HHC in Norway, the delivery of nursing services in the community is an expanding area of health care (Eurostat., 2016; Norwegian Directorate of Health, 2017a). Researchers have found that limited attention has been given to the accurate prediction or measurement of the utilization of nursing resources in HHC (O'Brien-Pallas, Doran, Murray, & Cockerill, 2001).

While the terms nursing work, nursing workload, patient dependency and NI are frequently used to describe the same or similar concepts (Morris, MacNeela, Scott, Treacy, & Hyde, 2007), there are differences between the concepts of *nursing work* and *nursing workload. Nursing work* relates directly to the nursing function and is defined in functional terms, i.e., in terms of the actions, work or activities carried out by a nurse

(Morris et al., 2007). *Nursing workload* is defined according to the amount or level of work that a nurse carries out, i.e., the amount of direct and indirect patient care, patient dependency, complexity of skill-mix, time taken to carry out nursing work, severity of patient illness, indirect care-related nursing activities (phone calls, ordering medication) and further non-patient activities (education, staff meetings) (Morris et al., 2007). Researchers have found non-patient factors that affect total nursing workload to include organization of work, work conditions, self- control and cooperation (Fagerström & Vainikainen, 2014). Hughes defined workload assessment as, "an attempt to predict nursing time and skills required to provide nursing care" (Hughes, 1999, p. 317). The concept of workload in HHC has not been analyzed in relation to the HHC environment of today, and a definition of home care nursing workload, including its attributes, was not seen in the literature (Mildon, 2011). Mildon provided a synthesis and interpretation of her findings on home care nursing workload, stating that it is:

> ...*the totality of the cognitive, emotional and physical effort home care nurses expend to meet the expectations of all stakeholders in providing holistic, outcome directed and patient/family focused care within the context of a short or long-term therapeutic relationship. The workload occurs within a work period that is elastic in nature, sometimes taking more than the allotted time. It entails confident and autonomous decision-making within a specialized, complex and highly variable clinical practice. The workload is generally carried out in isolation from team members, in client-controlled environments and requires attention to safety for the nurse and the patient/family. Flexibility is necessary to manage ever-changing and unexpected organizational and clinical demands including extensive documentation, multi-level communication and ethical dilemmas.* (Mildon, 2011, p. 126)

Nursing dependency relates to "the amount of nursing needed by a patient" (Barr, Moores, & Rhys-Hearn, 1973, p. 195). *Nursing intensity* can be interpreted as including all activities related to patient care, including direct and indirect patient care (Morris et al., 2007). NI is closely related to the concepts patient dependency, acuity and severity

(Morris et al, 2007). Total nursing time encompasses direct nursing activities, indirect nursing activities and non-nursing activities (Alghamdi, 2016). Giovannetti used the term *patient dependency* to encompass the nature of most classification instruments, because PCSs are based on a dependence-independence continuum (Giovannetti, 1984). *Caseload* is defined as, "the number and type of clients assigned to a case manager" (Collister, Slauenwhite, Fraser, Swanson, & Fong, 2014, p. 240), while *caseload management* involves providing quality care to a patient within a given amount of time. Despite their differences, in the literature on workload the terms caseload and PCS were often used interchangeably.

3.2 Development of patient classification systems

Historically, the allocation of nursing staff is linked to both budget and nurses' ability to provide safe nursing care (Giovannetti, 1984). The main purposes of PCSs are to respond to the variable nature of the demand for nursing care (Edwardson & Giovannetti, 1994; Huckabay & Skonieczny, 1981) and to provide a tool whereby managers can determine and allocate nursing staff resources (Edwardson & Giovannetti, 1994; Giovannetti, 1984). During the literature search here, several definitions of what a PCS is were found, including that they are, "*tools designed to categorize patient needs to determine nursing resources required for care in a given setting*" (Fasoli & Haddock, 2010, p. 296). A broader definition was also seen:

> "*the methods and processes of determining, validating and monitoring individual patient's care requirements over time in order to assist in such determination as: unit staffing, patient assignments, case mix analysis, budget planning and defense, per patient cost of nursing services, variable patient billing and the maintenance of quality assurance standards*" (De Groot, 1989a, p. 30).

Patient classification is considered a process whereby patients are categorized according to an assessment of their nursing needs. A *patient classification system* is used to quantify patient classification and measure the nursing efforts required to fulfil patients' care

needs (Giovannetti, 1979). The term *workload measurement system* is also seen alongside PCS (Edwardson & Giovannetti, 1994; Hernandez & O'Brien-Pallas, 1996). For the purposes of this thesis, the terms *PCS* and *NI instruments* are used when referring to the various different measurement systems seen.

PCSs and NI instruments have been developed predominantly in the USA for use in hospital settings, starting from the 1940s. In the earliest, pre-1960s instruments, global standards were used to establish a basis for staffing levels; still, little evidence has been seen to indicate whether they were based on quantitative or qualitative studies (Giovannetti, 1984). Bernstein's 1953 New York Classification System was the first instrument in which patients were classified, followed by the Goddard classification score, the Scottish Home and Health Department care groups, Johns Hopkins categories and the Oxford Regional Hospital Board scheme (Barr et al., 1973). In these various instruments, patients were classified into different dependency groups, e.g., totally ambulant or totally helpless, and continuous time studies were performed (standard minutes), with weighting factors for each care group determined at a later point in time. To create classification groups, patients' needs were first identified and then patients were grouped in accordance with similar/like medical needs (Abdellah & Levine, 1965; Barr et al., 1973).

In the 1980s, economic pressure and a shortage of nurses lead to the need for a well-functioning, valid and reliable PCS (De Groot, 1989a). These first generation PCSs were developed at John Hopkins University (Barr et al., 1973; Giovannetti, 1979) and were used to predict nurse staffing levels from shift to shift. Improvements in computer systems and software allowed for the further development of PCSs (Giovannetti & Johnson, 1990), and the second generation of PCSs was heralded by the Allocation, Resource, Identification and Costing (ARIC) system, which was a computerized PCS developed in 1981 by James Bahr Associates (Giovannetti & Johnson, 1990). Further advancements in computer technology lead to computer-generated PCS models.

PCSs can be categorized through whether they utilize direct or indirect methods (De Groot, 1994a). One example of a direct method is a day-to-day staffing system, where

the allocation of staff can change from shift to shift. Predicting staffing requirements is challenging because it is linked with the timing and classification of an assessment, thus direct method PCSs have been difficult for many organizations to document (De Groot, 1994a). An indirect method can involve general narrative references that are incorporated into a policy and procedure related to the assignment of nursing staff, but which do not explicitly identify patient care needs and/or staffing requirements. Staff often find the use of indirect method PCSs to be frustrating, because they can experience that patients' needs and care requirements are not taken to account into day-to-day staffing (De Groot, 1994a).

It was first in the early 1970s that PCS development and research in the Nordic countries started, and several PCSs were developed and tested in hospital settings, such as the Rush-instrument, the RAFAELA® system, the Zebra system and the Beakta system (Athlin, Engström, Axelsson, & Sandman, 1992; Fagerström, 1999, 2000; Fagerström et al., 2014; Kaustinen, 1995; Levenstam & Bergbom Engberg, 1997; Levenstam & Bergbom, 2002; Levenstam & Engberg, 1993; Perroca & Ek, 2007).

3.2.1 Prototype and factor-evaluation systems

There are two main types of PCSs: prototype and factor-evaluation. Characteristic for prototype PCSs are descriptions of typical patients (prototypes) or typical nursing tasks in every patient class (Abdellah & Levine, 1965; Brady et al., 2007; Giovannetti, 1979; Saba, 2002). While prototype classifications were used at the beginning of the PCS era and have to a certain degree been replaced by factor-evaluation PCSs, they are still in common use (Brady et al., 2007; Rauhala, 2008). Characteristic for factor-evaluation PCSs are that several critical indicators or factors of nursing care are used to determine classification and patients' characteristics are individually rated (Brady et al., 2007; Edwardson & Giovannetti, 1994; Saba, 2002).

3.2.2 Essential elements for patient classification systems

According to De Groot, there are six essential elements that should be included in an operational PCS (De Groot, 1989a). The first element is that the instrument can be used to predict patients' nursing care requirements. This entails that the instrument can be validated and the instrument accurately and adequately used to predict individual patient care requirements. Every observed or completed procedure should have a given weight or number of points and a summative score should be registered. The second element is related to the methods whereby the validation of the amount of care given to the various types of patient and on each unit and shift are achieved. This entails that even if a PCS is validated in one setting, it must be validated in any new setting where it will be used. The third element is related to the revalidation of patient categories and patterns of care delivery on a periodic basis. The entails that a PSC should be periodically reassessed in regard to staff utilization and productivity patterns.

The fourth element is related to the method of evaluating the patterns of care delivery per unit. It is imperative that a PCS allows users to gather information on the diverse staffing levels seen during shifts on different units and to obtain information about how much care each patient in the various patient categories receives. The fifth element is related to nursing care requirements in regard to staff resource allocation. This entails relating nursing care requirements to staff allocation on a shift-by-shift and unit-by-unit basis. De Groot found that while the majority of earlier PCSs did not incorporate this element, this has changed following advancements in computer technology and databases (De Groot, 1989a).

The sixth element is related to the method of monitoring the reliability of a PCS over time. This entails using multiple methods to conduct tests of reliability, such as recording/classifying hypothetical patient situations or a set of patient characteristics described in, e.g., nurses' notes or nursing care plans; how reliability is monitored depends on the type of patient documentation system used. To test reliability on a given shift, staff can classify a hypothetical patient or patient characteristics using the documentation system. Information about the nursing care, medications, treatments and

procedures should be distributed to units using a particular patient classification tool and staff should classify the hypothetical patient without discussing care requirements or rating with other staff. After these ratings are collected, reliability and agreement can be calculated between units, within units, and across all shifts.

3.2.3 Critical factors when selecting a patient classification system

De Groot (1989 b) has also identified six critical factors that should be taken into consideration when selecting a PCS: (1) validity, (2) reliability, (3) simplicity/efficiency (4) utility, (5) objectivity and (6) acceptability.

Validity relates to a PCS accurately and adequately predicting individual patient care requirements, while reliability relates to a PCS consistently predicting patient care requirements. It is essential that these two criteria be met and assessed during the initial development phase of a PCS (De Groot, 1989b). Fasoli and Haddock found in their review study that there were only seven studies in which a PCS was considered to have sufficient validity and reliability, and the RAFAELA® Nursing Intensity and Staffing system was one PCS that met the criteria for validity and reliability testing in a hospital setting (Fasoli & Haddock, 2010).

Simplicity/efficiency relates to that a PCS is easy to use and neither too complex nor time-consuming in terms of including critical care indicators (De Groot, 1989b). Utility relates to that a PCS is simple, efficient and able to be incorporated into a patient's medical records, where it is used to legitimize the purpose, process and outcome of a patient classification while also allowing relevant data to be retrieved later for different analyses. Objectivity relates to acuity, and the acuity rating measure should be clear and easily verifiable. Acceptability is considered in relation to nurses' perspectives, and a PCS should allow subjectivity based on clinical judgement, e.g., in regard to assessments of how well various areas of patient care are represented. Also, a PCS much reflect the multidimensionality of patients' needs, otherwise nurses may consider it to be inadequate and find accepting its use difficult.

3.3 Patient classification systems in home health care

In this section the more well-known PCSs used in HHC are briefly described in relation to their development.

Of the PCSs designed for use with older patients in HHC settings, the majority have been developed in the USA, Canada or the UK (Albrecht, 1991; Brady et al., 2007; Collister et al., 2014; De Groot, 1994a, 1994b; Giovannetti, 1979, 1984; Giovannetti & Johnson, 1990; InterRAI, 2018b; Saba, 2002). Measuring NI and the allocation of staff is complex and different tools, assessment systems and PCSs are used in HHC settings, both in the international and Nordic contexts.

Researchers have found that community care in Europe differs greatly between countries (Carpenter et al., 2004). Great variation was found in the structure and organization of home care agency services, including dissimilarities in (older) patient characteristics and level of care provided. Such variation can explain why so many different PCSs are used.

Clinical Care Classification system

Research by Saba and various colleagues conducted at Georgetown University School of Nursing, USA, in the late 1980s on nursing informatics set the stage for the development of various classification systems, including the Home Health Care Classification System (HHCC), later known as the Clinical Care Classification (CCC) system (Saba, 1992, 2002, 2017). Originally a prototype system, the HHCC was a dependency system used to determine care requirements in HHC, track the home care process, and facilitate data collection, documentation and financial expenditure (Brady et al., 2007). The HHCC was found to be limited to task-oriented descriptions of NI and did not include psychosocial support, case management or health promotion (Brady et al., 2007). Renamed the CCC system in 2004, the system was updated and improved to include the documentation of patient care plans by nurses and other allied health professionals and is still used today in clinical nursing practice, education and research (Saba, 2017).

InterRAI/HC

First developed in 1994, InterRAI is an international collaborative network with researchers in more than 30 countries and includes assessment systems that are used throughout the world. Each of InterRAI's instruments has been developed for a particular population, from acute, child/youth to palliative care, and consequently many different assessment systems exist under the InterRAI umbrella (InterRAI, 2018b). While the InterRAI systems are designed to work together to form an integrated health information system, each system is in and of itself a documentation and assessment tool (InterRAI, 2018b). The first InterRAI system was developed as a part of a set of reforms enacted by the United States Congress. Developed for older people in long-term care settings, the Resident Assessment Instrument-Minimum Data Set (RAI-MDS) was introduced in nursing homes in the USA in 1991 (Hawes et al., 1997). In 1994, the Resident Assessment Instrument-Home Care (RAI-HC) instrument was introduced (Carpenter & Hirdes, 2013) and adopted by the United States Department of Veterans Affairs (Hawes, Fries, James, & Guihan, 2007). The RAI-HC has recently been implemented in a Canadian province (Toye, 2016) and InterRAI instruments have been investigated in research projects in Norway, in both hospital and long-term care settings (Carpenter et al., 2004; Grue, 2011). The RAI-HC facilitates the comprehensive planning of care for older patients and the assessment of patients' needs, and it includes a focus on functional ability and quality of life (InterRAI, 2018a). The RAI-HC is designed to be used by nurses, social workers, physicians, therapists, and so on and is not a daily PCS, but instead an information system and documentation and assessment tool.

Resource Utilization Groups

The Resource Utilization Groups (RUG-III) system is an InterRAI case-mix system that is based on information in the Resident Assessment Instrument (RAI) and the Minimum Data Set (MDS) (Björkgren, Häkkinen, Finne-Soveri, & Fries, 1999; Brown, 2001). Developed in the 1990s in the USA, it was originally intended to facilitate Medicare payments for post-acute institutional (nursing home) care in 11 states (Fries et al., 1994). The RUG-III is based on care residents' resource needs and is divided into seven major

categories. Validation studies of the system have been undertaken in different countries (Björkgren et al., 1999; Carpenter, Ikegami, Ljunggren, Carrillo, & Fries, 1997; Carpenter et al., 2004), and the system has demonstrated consistency notwithstanding carer skill-mix and total time spent with the patient. The RUG-III/HC, for use in home care, has also been developed, which includes Instrumental Activities of Daily Living (IADL) alongside the RUG-III classification variables (Björkgren, Fries, & Shugarman, 2000).

Community Health Intensity Rating scale

Based on the Omaha system and later refined by Hayes et al. in 1999, the Community Health Intensity Rating scale (CHIRS) was developed in the USA in 1988 (Brady et al., 2007; Hays, Sather, & Peters, 1999; Peters, 1988). It is a factor-evaluation PCS with the aim to determine nursing intensity in four domains: psychological, environmental, psychosocial and health behaviors.

Easley-Storfjell Patient Classification Instrument for Caseload/Workload Analyses

The Easley-Storfjell Patient Classification Instrument for Caseload/Workload Analyses (CL/WLA) is a prototype system developed in the USA (Albrecht, 1991; Storfjell, Allen, & Easley, 1997). Since 1977, the system has been used throughout the USA and Canada (Storfjell, Easley, & Easley, 2017). It was revised in 2001 and the name changed to the Easley-Storfjell Patient Classification Instrument (R-ESPCI) (Anderson & Rokosky, 2001). There are two major components in the system: (1) caseload analysis and (2) workload analysis. The R-ESPCI provides a framework from which both direct and indirect components of community nursing work can be measured (Brady et al., 2007) and caseload in relation to time, type of intervention and complexity of care are also measured. The system provides administrative supervisors with valuable management information and has been validated and reliability tested (Storfjell et al., 2017).

Community Client Need Classification System

The Community Client Need Classification System (CCNCS) was adapted from the revised Easley-Storfjell Patient Classification Instrument (R-ESPCI) (Brady, Byrne, Horan,

Macgregor, & Begley, 2008; Byrne, Brady, Horan, Macgregor, & Begley, 2007; Byrne et al., 2006), modified to better fit the setting of the country of Ireland. The CCNCS has been determined to be a useful, valid and reliable tool with which to measure patients' needs and can be used to predict the public health nursing time required for the care for older patients (Brady et al., 2008).

Patient classification systems in the Nordic countries

While an overall systematic use of PCSs in HHC is lacking in the Nordic countries, some PCSs are used in nursing homes and primary health care. In Sweden, the Time in Care instrument (TiC) has been used in municipal nursing homes (Thorsell, 2010), and the RUG III was tested in a mix of nursing homes, rehabilitation facilities and long-stay hospital wards (Carpenter et al., 1997). In Finland, the RAFAELA® Nursing Intensity and Staffing system was tested once in primary health care (Frilund, 2013; Frilund & Fagerström, 2009a, 2009b), and the Resource Utilization Groups RUG-III (RUG-III/22) was tested once in long-term care (Björkgren et al., 1999). The Minimum Data set for Home Care (MDS-HC) instrument was tested in several countries throughout Scandinavia, through the Aged in Home Care project (Carpenter et al., 2004), and the RAI-MDS was tested in Sweden in nursing homes (Hansebo, Kihlgren, Ljunggren, & Winblad, 1998). In Norway, the RAI-HC has been used both in long-term care (RAI-LTCF) and tested as part of an HHC research project (Grue, 2011).

Summary

Many instruments primarily measure patients' functional ability and not their psychological, social and/or spiritual needs. One criticism of factor-evaluation PCSs is that they are too task focused and do not embody the holistic role of the nurse (Brady et al., 2007). Many of the tools mentioned above are from the USA and used by private home nursing agencies, which are reimbursed for the number of visits made to a patient rather than care staff's length of stay. Additionally, many systems are not fully described in the published literature and numerous institutions have modified proprietary systems or created their own.

Despite the implementation of several patient register systems, growing concern about multimorbidity among older people and the increasing need for HHC services and nursing resources, to my knowledge no PCS is currently used for the daily classification of patients' care needs or daily registration of actual nurse staffing resources in HHC. To promote person-centered nursing in HHC, it is necessary to balance the allocation of nursing resources. To guarantee patients safe care and staff an acceptable work situation, nurse managers need methods for the optimal allocation of staff resources. Daily and systematic classification will also help managers realize evidenced-based care (Fagerström, 2017).

4 Presentation of the RAFAELA® Nursing Intensity and Staffing system

In Papers II-IV included in this thesis, the Oulu Patient Classification (OPCq) instrument was tested in an HHC setting. The OPCq is part of the RAFAELA® Nursing Intensity and Staffing system. The RAFAELA® system was developed in the mid-1990s for hospital settings at the Vaasa Central Hospital in Finland (Fagerström, 1999; Fagerström & Rainio, 1999) and is the most commonly used, validity and reliability tested PCS. It has been used for more than 20 years in hospital settings throughout the Nordic countries (Andersen et al., 2014; Fagerström, 1999; Frilund, 2013; Pusa, 2007; Rauhala, 2008).

The OPCq instrument was developed at the Oulu University Hospital during 1991-1993 and is based on the Hospital Systems Study Group (HSSG) instrument. It was modified and implemented at Vaasa Central Hospital in 1995 (Fagerström, 1999; Fagerström & Rainio, 1999). The RAFAELA® system's name is derived from the original research team's surnames: Rainio, Fagerström and Rauhala (Fagerström, 2000; Fagerström et al., 2014; Rainio & Ohinmaa, 2005). The RAFAELA® system is based on a holistic view of the human being from a caring and nursing science perspective and includes complex caring components (Fagerström, 2000, 2009), person-centered perspectives on each individual's care needs and a clear focus on nursing staff's work situation (Fagerström, 2017).

The RAFAELA® system includes three parts:

1. Daily registration of patients' care needs using the OPCq instrument.

2. Daily registration of actual nurse staffing resources.

3. Periodical determination of optimal NI level using the PAONCIL instrument.

Daily registration of patients' care needs using the OPCq instrument

The OPCq instrument is used in the daily registration of patients' care needs. The first version was developed for use in hospital and specialist healthcare settings. Newer versions have been developed for outpatient units and emergency services (POLIHOIq), mental health services (PPC), operating and recovery rooms and day-surgery (PERIHOIq), and radiation therapy (SÄDESHOIq) (FCG). While a specific version for use in HHC has not yet been developed, as part of this actual research study the OPCq instrument was modified to better suit an HHC setting.

In the OPCq instrument, nursing care and care needs are organized into the following six sub-areas: 1. Planning and co-ordination of nursing care; 2. Breathing, blood circulation and symptoms of disease; 3. Nutrition and medication; 4. Personal hygiene and secretion; 5. Activity, sleep and rest; 6. Teaching, guidance in care and follow-up care, emotional support. The NI can range between 1 to 4 points in each sub-area. Points for each sub-area are added up and can range between 6 to 24 points per patient. Using the OPCq instrument, nurses measure the six sub-areas at regular intervals. A=1 point and indicates a patient who manages more or less on his/her own; B=2 points and indicates a patient who is sometimes in need of care, in partial need of help; C=3 points and indicates a patient in repeat need of help, complex situation; D=4 points and indicates a patient in constant need of help, completely helpless, very complex situation (Fagerström & Rainio, 1999).

Based on a total score, patients are classified into five groups. Category 1: 6-8 raw points (minimal need for care); Category II: 9-12 raw points (average need for care); Category III: 13-15 raw points (more than average need for care); Category IV: 16-19 raw points (maximum need for care); Category V: 20-24 raw points (intensive care required) (Fagerström, 2009; Rauhala & Fagerström, 2004).

Daily registration of actual nurse staffing resources

A unit manager registers which nurses have worked with which patients on a unit in a resource register each day. The OPCq score is divided by the number of nurses on the unit, yielding daily NI per nurse, which describes the productivity of nursing care on the unit (Fagerström & Rainio, 1999; Fagerström et al., 2000b).

Periodical determination of optimal NI level using the PAONCIL instrument

The Professional Assessment of Optimal Nursing Care Intensity Level (PAONCIL) method (Fagerström & Rainio, 1999; Fagerström, Rainio, Rauhala, & Nojonen, 2000a; Rauhala & Fagerström, 2004) is based on patients' actual care needs and staff's work situation and trust between staff and nurse leaders (Fagerström, 2017). The optimal NI level is when a nurse working on a unit can manage the standard of good nursing care determined for that unit without compromises. The optimal level is determined periodically for each unit during a period of at least 3-4 weeks. After each shift, each nurse records on a form a numerical/scale estimate of the extent to which he/she had the time to meet patients' care needs. The scale ranges from -3 to +3, with zero considered optimal and indicating that the number of nurses is in balance. The level of nursing care intensity is: 3 = very high, 2 = high, 1 = fairly high, 0 = optimal level, -1 = fairly low, -2 = low and -3 = very low. Each nurse makes an overall assessment of nursing resources, that is whether nursing resources have been sufficient in relation to patients' needs that day. By using the NI score per nurse as an independent variable and the PAONCIL score as the dependent variable (the same day), the results can be analyzed using linear regression analysis.

The implementation process of the RAFAELA® system

The Association of Finnish Local and Regional Authorities owns the RAFAELA® system, and all training and license systems are managed by the Finnish Consulting Group Ltd (FCG) (Finnish Consulting Group, 2017).

The FCG is responsible for introducing the RAFAELA® system and for training nurses in classification. All nurses on the units using the system are presupposed to have taken part

in an introductory educational program. After a test period of 2-3 months, which includes daily classification of NI using the OPCq instrument, parallel classifications occur with about 100-150 patient cases for about 2 months. After the parallel classifications reach at least 70% agreement, the calculation of optimal NI-level with PAONCIL assessment can start (Figure 1). In the papers included in this thesis, the research was limited to the implementation of the first, second and third phases of the system.
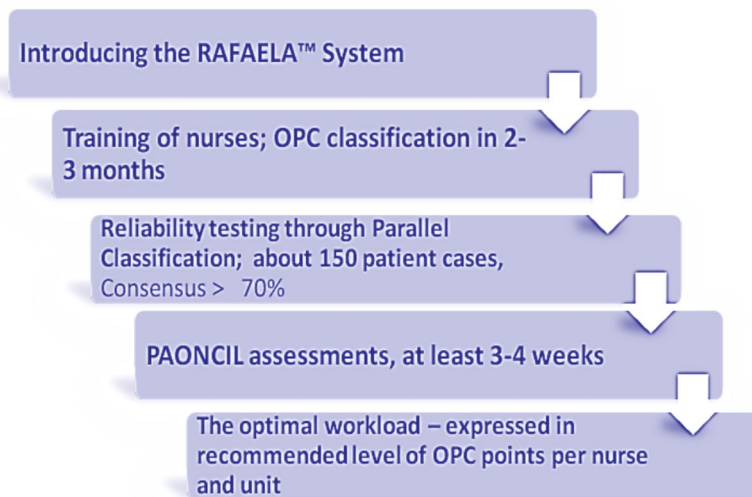
Figure 1: *Implementation process of the RAFAELA® system, Frilund and Fagerström, 2009, (reprinted with permission from the authors).*

5 Person-centered nursing as a theoretical framework

The chapter is divided into two sub-chapters. In 5.1, the different definitions of person-centered care (PCC) and other key concepts are presented. In 5.2, a person-centered nursing (PCN) framework developed by (McCormack & McCance, 2010, 2017a) is presented. This framework is thereafter connected to HHC and the actual papers part of this thesis.

An internationally recognized concept, PCC embodies a shift in focus that has occurred over time. Looking back historically, the American psychologist Carl Rogers influenced the concept of a client-centered/person-centered approach and was the leading spokesperson for humanistic psychology (Kirschenbaum & Jourdan, 2005; Leplege et al., 2007; Rogers, 1951). The client-centered approach emanated from the expanding development of psychotherapeutic procedures during the 1940s and 1950s, and according to Rogers the approach is, "*a product of time and cultural settings*" (Rogers, 1951, p. 4).

PCC has long been associated with nursing (McCormack & McCance, 2010) and the concept's influence is seen in nursing theories and theoretical nursing knowledge going back to the writings of Florence Nightingale (Dunphy, 2010; Kim & Kollak, 2006; Polit & Beck, 2014). During the second half of the 20th century, nursing theories developed rapidly, and since the 1960s nursing theorists have sought to differentiate nursing's scope of practice from that of biomedicine, with a primary difference being the incorporation of a holistic view of humankind (Engebretson, 2012; Erickson, 2007).

Person-centeredness is embedded in several policy initiatives (IAPO, 2018; NICE, 2012; The Health Foundation, 2014; WHO, 2016b) and has been embraced by several person-centered organizations around the world (Kirschenbaum & Jourdan, 2005). Yet despite such initiatives, in a review study that included older adults with chronic conditions and functional impairments, Kogan et al. found a great need for PCC approaches, especially in HHC (Kogan, Wilber, & Mosqueda, 2016). Moreover, during the literature search here, an absence of literature on the subject was seen.

5.1 Definitions of person-centered care

While several definitions of PCC as a concept were seen in the literature, no consensus on its precise meaning was found (Morgan & Yoder, 2012). Even the American Geriatrics Society Expert Panel on Person-Centered Care noted 15 different definitions of PCC or similar terms (Brummel-Smith et al., 2016). Still, some key characterizations and dimensions of PPC can be identified and considered essential, such as being respectful and "seeing" the person behind the disease, i.e., the "whole person" (Entwistle & Watt, 2013). In regard to the terminology seen in the literature on the subject, the term person was used interchangeably with patient, client and resident (Morgan & Yoder, 2012). Researchers have also found similarities between the concepts of PCC and patient-centered care, and although the goals of PCC and patient-centered care differ, nine common themes can be discerned: (1) empathy, (2) respect, (3) engagement, (4) relationships, (5) communication, (6) shared decision-making, (7) holistic focus, (8) individualized focus and (9) coordinated care. Differences include that a more functional care dimension is seen in patient-centered care than in PCC, and one goal of PCC is the realization of a meaningful life for the person receiving care (Håkansson et al., 2018).

Again, in regard to the terminology associated with PCC, the terms person and human are often used interchangeably; associated characteristics include abilities to reason and communicate, act intentionally, self-awareness, self-regulation, and interest in preserving and developing self and identity (Entwistle & Watt, 2013). In nursing theories, the term person is also used interchangeably with human being, human, man, people or patient (Erickson, 2007; Eriksson, 1992; Hall, 1964; Parse, 1981; Parse, 1992; Rogers, 1970; Rogers, 1992; Roy, 2009; Watson, 1988).

Here follow some examples of the different perspectives and uses of the terminology seen, with some of the most well-known definitions and concepts presented. The World Health Organization (WHO) uses the term *people–centered care*, focusing on the health needs and expectations of people and communities rather than diseases. As per the WHO, the concept encompasses individuals, families, communities and society and includes a focus on the individual seeking care (WHO, 2015a, 2015b). The International

Alliance of Patients' Organizations (IAPO) uses the term *patient-centered healthcare* (PCH) to describe a practice in which the patient is placed at the center of care. As per the IAPO, to achieve PCH health care must be based on five principles: respect, choice and empowerment, patient involvement in health policy, access and support, and information (IAPO, 2012). The IAPO expresses a vision that includes to "*see patients at the centre of healthcare throughout the world*" (IAPO, 2018). The Picker Institute defined *eight principles of patient-centered care* as being: (1) Respect for patients' values, preferences and expressed needs; (2) Coordination and integration of care; (3) Information, communication and education; (4) Physical comfort; (5) Emotional support and alleviation of fear and anxiety; (6) Involvement of family and friends; (7) Continuity and transition; (8) Access to care (Picker Institute, 2015). The University of Gothenburg Center for Person-centered Care defines *person-centered care* as having, "*its starting point in the patient's/person's experience, resources and needs*" (The University of Gothenburg, 2018). In *personalized medicine* genetic or phenotype variations are used to explain and predict individual exceptions (Ekman et al., 2011). McCormack and McCance, who developed a PCN framework, now maintain that the term *person-centered care* should be changed to *person-centered cultures*, noting that person-centeredness is:

> *…an approach to practice established through the formation and fostering of healthful relationships between all care providers, service users and others significant to them in their lives. It is underpinned by values of respect for persons (personhood), individual right to self-determination, mutual respect and understanding. It is enabled by cultures of empowerment that foster continuous approaches to practice development.* (McCormack & McCance, 2017a, p. 3)

In sum, many different terms and definitions were seen, and there were noticeable differences in how researchers approach the subject matter (Bergman & Wångby, 2014; Brummel-Smith et al., 2016; Mead & Bower, 2000). Dewing and McCormack maintained that the definition of PCC is not fixed (Dewing & McCormack, 2017). I nonetheless will conclude that, in accordance with each prevailing context and culture, the terms people, person or patient can be used to represent that which we call a human being. What is of

foremost importance is that the care provided is individualized and underpinned by values of respect for each unique human being.

To realize the goal of PCC, all four constructs delineated in McCormack and McCance's PCN framework by will need to be considered: (1) Prerequisites; (2) Care environment; (3) PCN process; (4) Outcome. Also, micro-, meso- and macro-levels must be taken into consideration during the process of realizing PCC (Eide & Cardiff, 2017). Below, all of these aforementioned aspects are highlighted in relation to HCC. Those characteristics concerning an HHC setting and relevant to this thesis will be clarified. Furthermore, the term PCN will hereafter be used in this thesis to represent the amalgamation of these aspects.

5.2 Central aspects of person-centered nursing related to the actual research

Nursing is a profession with a person-centered approach (McCormack & McCance, 2006; McCormack & McCance, 2010; McCormack, van Dulmen, Eide, Skovdahl, & Eide, 2017). The RAFAELA® system, which the OPCq is a part of, was developed based on a person-centered perspective (Fagerström, 2017). McCormack and McCain's PCN framework (Figure 2) (McCormack & McCance, 2006; McCormack & McCance, 2010, 2017a; McCormack et al., 2017), which emanates from empirical studies and nurses' experiences of caring, constitutes the theoretical framework upon which the research is based.
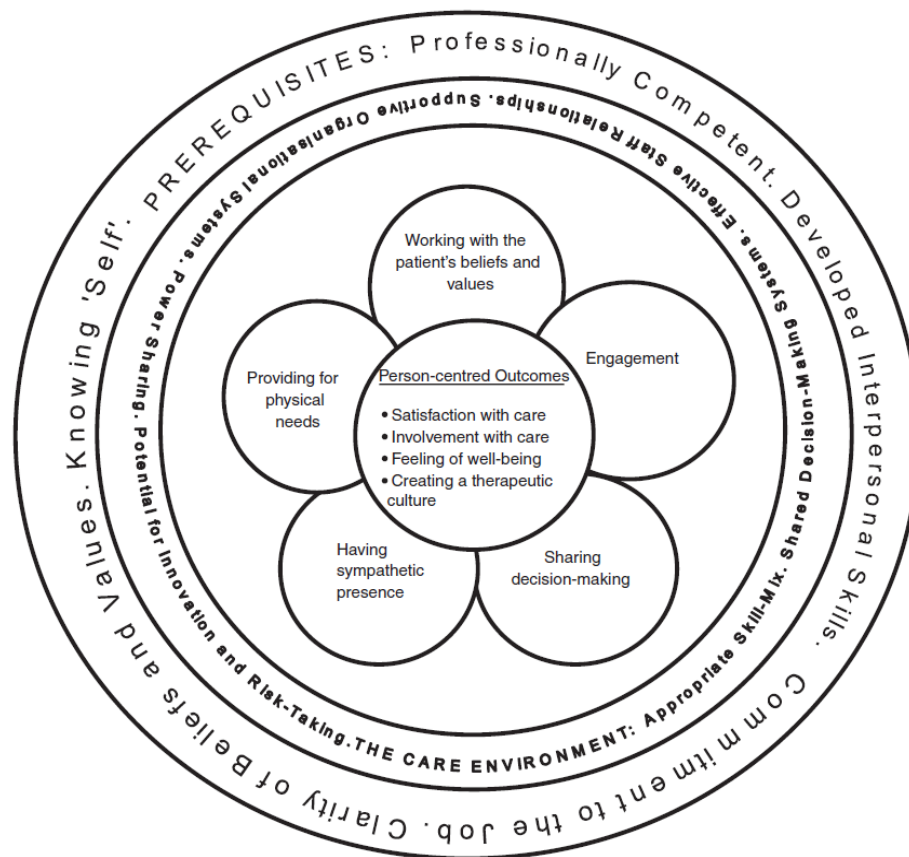
Figure 2: *Person-Centered Nursing framework by McCormack and McCain, 2006 (reprinted with permission from the authors).*

Prerequisites

Nurse attributes such as being professionally competent, developing interpersonal skills, being committed to the job, being able to clarify beliefs and values, and knowing one's "self" are all considered *prerequisites* (Figure 2, outermost ring) for good nursing and the realization of PCN (McCormack & McCance, 2010, 2017b).

McCormack and McCain define being professionally competent as, "*the knowledge and skills of the nurse to make decisions and prioritise care, and includes competence in relation to physical or technical aspects of care*" (McCormack & McCance, 2006, p. 474). Nursing theorists have found that nursing knowledge and skills, which include developing interpersonal skills and knowing one's self, are facilitated through scientific education (Gordon, Touhy, Gesse, Dombro, & Birnbach, 2010; Hall, 1964; Henderson, 1991; Roy,

1989; Roy, 2009). Still, these are the most problematic and difficult to master in nursing (Carper, 2012). In a hospital setting care is mainly provided by RNs, which can be compared to an HHC setting where a broader skill-mix is seen. Still, the specific knowledge and skills needed in an HHC setting can differ from those needed in a hospital setting. Thus, the conditions for achieving PCN in HHC may be somewhat different. In a study in Norway, encompassing experts in nursing care for older persons, researchers found that municipal HHC staff need both broad generalist competence and specific competence in health promotion and prevention, treatment, palliative care, ethics and legislation, assessment and taking action, fulfilling basic needs, communication and documentation, taking responsibility, cooperation and attitudes toward older people (Bing-Jonsson, Bjørk, Hofoss, Kirkevold, & Foss, 2015).

Being committed to one's job as a nurse includes wanting to provide patients with the best possible care (McCormack & McCance, 2010), not a mere "ticking the boxes" type of task fulfillment. The prerequisites for good nursing and the realization of PCN also include interprofessional and interdisciplinary collaboration, which has been highlighted in several nursing theories (Eriksson, 1995; Henderson, 1991; Wiedenbach, 1964). Through a shared vision, teams can realize effective PCN. Also, an organization's workplace culture influences nurses' commitment, and commitment is often associated with superior organizational performance (McCormack & McCance, 2010).

In earlier research in hospital settings, researchers have found that it is possible to improve PCN through the daily classification of patients' actual care needs, and the OPCq instrument has been shown to improve care quality and facilitate risk management (Fagerström, 2017). The RAFAELA® system, of which the OPCq instrument is a part of, has also been proven to improve workforce planning, increase nurses' job satisfaction and decrease staff sick leave (Fagerström, 2017; Rauhala et al., 2007).

Other prerequisites for the realization of PCN are that there are a sufficient number of competent staff in relation to patients' needs (Fagerström, 2017). When there is an insufficient allocation of nursing staff and/or when nurses lack the time to care for patients, it is difficult to realize PCN. During the course of my research, I have found that

this has not to date been sufficiently nor clearly emphasized in the literature related to PCN.

The care environment

The care environment is a complex phenomenon, and it is difficult to delineate its characteristics and qualities (McCormack & McCance, 2010). In McCormack and McCance's PCN framework (Figure 2, second ring from outside), characteristics of the care environment are delineated: appropriate skill-mix, shared decision-making systems (active participation in decision-making), effective staff relationships, supportive organizational systems, power sharing, and potential for innovation and risk-taking.

Appropriate skill-mix in a nursing context is often considered to be the ratio of RNs to PNs (McCormack & McCance, 2017a). In HHC in Norway, a varied skill-mix is seen, including RNs, PNs, assistants without any postsecondary degree, and even physiotherapists, social educators and doctors providing care, as well as NPs, a relatively new professional role in Norway (Fagerström, 2019) and in HHC (Bing-Jonsson, 2019).

The Pickers Institute was the first to identify that PCN also had an organizational-level element and did not solely exist on the interpersonal level (Morgan & Yoder, 2012). Researchers have found that the commitment that an organization's leadership displays is the most single important factor that contributes to the realization of PCN (Pelzang, 2010). An organization's top leadership, including its Chief executive officer and Board of directors, must be committed and engaged if PCN is to be implemented and realized (Shaller, 2007). All organizational levels, macro-, meso- and micro-, are important for developing PCN (Eide & Cardiff, 2017). Researchers have seen that implementing PCN in an NH setting requires high-quality communication between management (leadership) and direct care givers about both the implementation and priority of the intervention, which is demanding and time consuming (Rosemond, Hanson, Ennett, Schenck, & Weiner, 2012). Researchers have found that when implementing the RAFAELA® system organizational leaders should be physically present and nurse staff should know that their manager uses the data and supports the system (Fagerström et al., 2014).

Person-centered nursing process

The PCN process is based on the deliverance of care, which includes working with patients' beliefs and values, showing engagement and having a sympathetic presence. The sharing of decision-making (nurses facilitating patient participation in decision-making through information) and providing for patients' physical needs are also essential in the deliverance of care and the provision of holistic care (McCormack & McCance, 2010) (Figure 2, smaller circles in inner ring).

The nursing process and its various components have developed since the 1950s and 1960s (Polit & Beck, 2004): the core and essence of nursing consists of assessing, planning, implementing and evaluating, all of which are useful in direct patient work (Yura & Walsh, 1978). Nursing theories have also developed in relation to the dynamic nurse-patient relationship (Kim & Kollak, 2006; Peden, Laubham, Wells, Staal, & Rittman, 2010; Peplau, 1952). In McCormack and McCance's PCN framework, the concept *providing holistic care* is used. This concept pertains not only to patients' physical and psychological needs but also their sociocultural and spiritual needs, and is coincident with several other nursing theories and models (Eriksson, 2007; Fortin, 2006; Hartweg & Fleck, 2010; Henderson, 1991; Levin, 1971; Rogers, 1970; Roy, 2009). The researchers behind a study set in Sweden found that older persons experience self-determination when they feel free to choose the support they receive from staff and are in control of their everyday living (Breitholtz, Snellman, & Fagerberg, 2013).

As noted previously, the OPCq instrument measures patient's physical, social and spiritual/existential needs and the nursing activities related to these, in dialogue with the patient (Fagerström, 1999; Fagerström et al., 2000b). The quality level for good nursing care is determined prior to implementation of the RAFAELA® system, in agreement with nursing staff and based on a mutual understanding of what is considered good nursing care on the unit (Fagerström, 2017). Such mutual understanding facilitates discussion on the quality of nursing, both in general and in respect to each of the six sub-areas and NI levels measured using the OPCq instrument, and also enables discussion on the importance of nursing documentation.

Outcomes

The results of PCN, that is its outcomes, are a central component in McCormack and McCance's PCN framework and can be assessed from both staff and patient/family perspectives (McCormack & McCance, 2010). McCormack and McCance identified four central outcomes that should be achieved in relation to the realization of PCN: satisfaction with care, involvement in care, feeling of being well (well-being) and the existence of a therapeutic environment (McCormack & McCance, 2010) (Figure 2, innermost circle). One of the major criticisms of PCN is that it is vague, that is not sufficiently operationalized, and that the measurement of outcomes is therefore impossible (Edvardsson, Sandman, & Rasmussen, 2008). Another criticism is that, because of its complexity, it is difficult to draw conclusions about the impact of PCN interventions in aged-care facilities (Brownie & Nancarrow, 2013).

In a systematic literature review, Kogan et al. found 13 tools used to measure person-centeredness in long-term residential and acute medical settings (Kogan et al., 2016). Only one tool was seen to measure person-centeredness in HHC, the Client-Centered Care Questionnaire (CCCQ) (De Witte, Schoot, & Proot, 2006; Kogan et al., 2016).

The International Alliance of Patients' Organizations (IAPO) have developed a set of process and outcome indicators that can be applied to PCN (respect, choice and empowerment, patient involvement in health policy, access and support and information) and can be used for the evaluation of a PCN intervention and to help stakeholders measure the extent and quality of an organization's efforts at realizing PCN. Still, the IAPO have also concluded that there is a need for a coherent and robust set of indicators whereby PCN can be measured across the entire health system (IAPO, 2012).

Emerging from the literature search here is that recent studies on outcomes related to PCN and older persons in HHC are scarce. One ongoing study with the aim to evaluate the effects and meaning of person-centered care and health promoting interventions was found (Bölenius, Lämås, Sandman, & Edvardsson, 2017). In another study, researchers concluded that patients' perspectives must be valued and each patient respected as a

person (Byrne, Frazee, Sims-Gould, & Martin-Matthews, 2012). In a different study, researchers saw that the implementation of a patient-centered care model (PCCM) posed a range of challenges for staff, including managers and the project team (Silver, Keefer, & Rosenfeld, 2011). In another study, the Client-Centered Care Questionnaire (CCCQ) was used to evaluate to the extent to which care was patient-centered (Bosman, Bours, Engels, & de Witte, 2008). Other researchers saw that PCN was associated with positive influences on staff outcomes, such as job satisfaction and the capacity to provide individualized care (Brownie & Nancarrow, 2013), which points to the importance of work conditions for nurses.

In sum, one can say that to guarantee patients' safe, good-quality care and PCN, it is important that nurses' work situation, workload and the correct allocation of resources be addressed.

6 Research design and methodology

In this chapter, an overview of the research design and methodology used during the course of this thesis is presented. In 6.1, the research design is presented and in 6.2 the research settings and a description of the project are seen, including why and how the OPCq instrument was modified to better suit an HHC setting. In 6.3 an overview of Papers I-IV is given, in which each of the four sub-studies part of this thesis are described and their methodological considerations highlighted. In 6.4, the participants, material and data collection methods seen in the various sub-studies are described, and in 6.5 data analysis is presented. Lastly, in 6.6, ethical considerations are presented.

6.1 Research design

The overarching aim of the thesis was to identify currently used PCSs developed and tested in HHC, with a special emphasis on validity, reliability and staff allocation, and to test the validity and reliability of the modified OPCq instrument. This also included describing nurses' work experiences with and perceptions on the modified OPCq instrument's usability when using it classify NI in an HHC setting. Different methodological approaches were used to answer the research questions, including a scoping review method (Paper I), quantitative methods (Papers II and III) and a qualitative method (Paper IV) (Polit & Beck, 2014).

In the figure below, the research designs and underlying processes used in conjunction with the sub-studies part of this thesis are presented.

The figure shows three stacked chevron stages:

Validity testing of the modified OPCq
- Information about and introduction to the RAFAELA® system and the OPCq instrument
- Training of staff by FCG and project leader in classification using the modified OPCq instrument
- Discussion and reflection in groups
- Questionnaire in two phases

Reliability testing of the modified OPCq
- Continuation of training and classification with the modified OPCq instrument
- Discussion and reflection in groups
- Development of a new method for parallel classification
- Multiple parallel classifications, based on patient cases, undertaken following classification for about 1 year

Usability of the modified OPCq
- Continuation of training and classification with the OPCq instrument
- Discussion and reflection in groups
- Explorative qualitative aproach - focus groups interviews with staff

Figure 3: *Empirical studies' research designs.*

6.2 Research settings and description of the project

In 2009, the Norwegian Directorate of Health granted Drammen municipality status as a *development center* for HHC. As a *development center,* the municipality was considered and expected to be a driving force for knowledge- and quality development. The research that underlies this thesis was conducted as a part of this municipal research and development program, which was overseen by the municipality's Institute for Research and Development for Nursing and Care Services (Appendix) and realized in collaboration with the University of South-Eastern Norway (USN) during 2012-2014. In the municipality a need existed for the correct allocation of resources in accordance with patients' care needs, and a system was sought that could be integrated into the HHC organization's overall management system.

The Institute for Research and Development for Nursing and Care Services' research manager, Bjørg Landmark (BL), was appointed project leader for the project. From the

USN, Professor Lisbeth Fagerström (LF) was appointed to represent the university in regard to the project. Since 1995 LF had participated in the development of the RAFAELA® system in Finland and had experience of the system from both hospital and primary health care settings. Thus it was a natural choice to consider using and adapting the RAFAELA® system to meet the goals of the project, whereby HHC services could be developed. Over the course of several meetings and discussions, the RAFAELA® system was presented to the municipality's HHC services management and its use approved prior to the start of the project.

All nine HHC units in the municipality were given information about the project and invited to participate, with two units participating. The pilot project was conducted in two HHC units (A and B) in Drammen municipality during 2013 and 2014. The two participating HHC units were responsible for nursing care for about >200 patients during the data collection period.

The FCG were responsible for providing information about the RAFAELA® system to the participating units' staff, introducing them to the system, and training them in its use. It was decided that only permanent staff from the units, not temporary staff, would be asked to participate. Thus about 30 RNs and PNs participated in the FCG's introductory educational program. In October 2012, the FCG held an introductory educational program for a total of two days. The program was divided into half-day courses, because of practical issues associated with the continuous provision of HHC services and having staff attend the program. The educational program included a basic introduction to the RAFAELA® system, including the contents of the system (the OPCq instrument and manual) and its uses and purpose, and a basic course in classifying with the OPCq instrument that included exercises with patient cases as examples. Because the RAFAELA® system had previously been used at Oslo University Hospital, the FCG was able to provide a manual for the OPCq instrument that was already translated from its original language, Swedish, into Norwegian. The OPCq manual included instructions on how to use the instrument and descriptions of the instrument's six sub-areas, NI levels, classification system, and keywords. During the course in the program when participants

practiced using the OPCq, classification with the instrument was followed by group discussions and reflection on the instrument's sub-areas and NI levels.

Subsequent to the FCG's introductory educational program, the project leader and a senior staff member from the Institute for Research and Development for Nursing and Care Services continued the participants' education. Gradually, even the assistants and nursing students gaining clinical practice on the two participating units received information about and an introduction to the OPCq instrument.

Modification of the OPCq instrument

The OPCq instrument had been developed for use in a hospital setting. Therefore, after discussions with the nursing staff at the two HHC units that would constitute the research setting, the OPCq manual was modified to better suit an HHC setting. Together with the project leader, two workgroups consisting of 8 HHC staff in total (including RNs, PNs, and managers) met 4-5 times to discuss modifications to the OPCq manual. The modifications were based on what staff considered to be relevant concerning clinical practice in HHC. The project leader regularly discussed the modifications that the workgroup had agreed upon with LF, as a representative of USN, and the FCG Ltd subsequently approved all modifications.

The FCG is owned by the Association of Finnish Local and Regional Authorities, and due to ownership and licensing rights it is not possible to include in this thesis a copy of the modified OPCq manual that was developed and used during the project. Therefore, I will briefly explain the changes made to the manual when it was modified to better suit an HHC setting.

The OPCq instrument manual includes information on the six sub-areas classified with the instrument, including examples of methods used; NI levels A-D; and keywords for each NI level (cf. Chapter 4). Only small adjustments were made when the OPCq instrument was modified to better suit an HHC setting.

The modifications to the OPCq instrument were:

Sub-area 1. Planning and co-ordination of nursing care. For NI levels B-D, the examination program was removed.

Sub-area 2. Breathing, blood circulation and symptoms of disease. The requirement that nursing staff assess electrolyte and acid-base disturbances or increased intracranial pressure was removed. Patient-related positioning in bed was changed to bedridden. No changes were made to the NI levels. An additional keyword was added to NI level B: need for occasional help.

Sub-area 3. Nutrition and medication. Management of prophylactic medication was changed to continuous medication. An additional keyword was added to NI level B: need for occasional help.

Sub-area 4. Personal hygiene and secretion. An additional keyword was added to NI level B: need for occasional help.

Sub-area 5. Activity, sleep and rest. Patient-related positioning in bed was changed to bedridden; management of prophylactic medication was changed to continuous medication. An additional keyword was added to NI level B: need for occasional help.

Sub-area 6. Teaching, guidance in care and follow-up care, emotional support. the need for advice prior to discharge from hospital was removed, because HHC patients are home-dwelling. An additional keyword was added to NI level B: need for occasional help.

6.3 Overview of the studies

Different methods were used to answer the research question. In Table 1, an overview of the four sub-studies is provided.

Paper I is a scoping review, and the purpose was to identify the PCSs currently used to classify NI in the assessment of nursing staffing resources in HHC (2007-2017, updated

2019), with a special emphasis on validity, reliability and staff allocation. 13 PCSs used in HHC were reviewed.

Paper II The purpose was to test the content validity of the modified OPCq instrument. A descriptive design was used and data were collected through a questionnaire with 13 set answers and the possibility to comment on eight questions. Participants were RNs, PNs and assistants (44 in total).

Paper III The purpose was to test the reliability of the modified OPCq instrument. A new method of parallel classification was developed to test the instrument's reliability. The data material consisted of 2010 parallel classifications (335 x 6 sub-areas). Participants were RNs, PNs, assistants and students (67 in total).

Paper IV The purpose was to explore the usability of the modified OPCq instrument. An explorative qualitative approach was used. There were four focus group interviews with RNs, PNs and one social educator (22 in total). Content analyses occurred.

Table 1: *An overview of all four sub-studies included in the thesis.*

Sub-study	Design	Focus	Participants and materials	Data collection	Analysis
Paper I	Literature review: Scoping review	Patient classification systems used in HHC	Cinahl 534 Medline 509 Embase 173 SweMed 31 Grey literature 56 1247 found; after duplicates removed, total = 1040 13 papers included	Electronic database searches, Google, Google Scholar, hand searches of key journals	Charting the data: author (s), year of publication, country of origin, study location, population, sample size and context, type of instrument/tool, validity tested, reliability tested, evaluated
Paper II	Validity study	Validation of the modified OPCq instrument	23 registered nurses 18 practical nurses 1 assistant 2 missing Total = 44	Questionnaire: 13 close-ended questions; Possibility to comment on eight questions	Descriptive analysis: Frequencies correlations; Cronbach's alpha; Content analyses (simplified)
Paper III	Reliability study	Reliability of the modified OPCq instrument	19 registered nurses 26 practical nurses 10 assistants 12 students Total = 67	A new multiple parallel classification method was developed; One main rater and 3-10 second raters	Statistical tests: Agreement in percent; Cohen's kappa; Cronbach's alpha
Paper IV	Explorative qualitative approach	The usability of the modified OPCq instrument	9 registered nurses 12 practical nurses 1 social educator Total = 22	4 focus group interviews	Content analysis

6.4 Participants, material and data collection

Paper I

The search strategy included an electronic database search (Cinahl, Medline, Embase and SweMed), a web search (Google/Google scholar websites) and a hand search of relevant journals. Together with a health sciences librarian with expertise in web-based information systems and systematic review methodology, the electronic database and website searches were conducted. Thesaurus/medical subject headings (MeSH) were used and the keywords were comprised of the search terms used during the electronic database search, with MeSH headings "exploded" where possible. Boolean operators (OR, AND) were used to narrow and expand the search. A total of 1247 records from electronic databases (534 in Cinahl, 509 in Medline, 173 in Embase and 31 in SweMed) and 56 records from "grey literature" and key journals were found, and the results were uploaded to a web-based reference management program (EndNote X8).

After duplicates were removed, 1040 records were seen. For inclusion, papers needed to have a focus on HHC/home care services in the community and a classification system or tool whereby nursing intensity, patient acuity, care dependency, workload or nurse patient ratio was measured. Papers were excluded if they did not meet these criteria. Level one testing (JF, BL) resulted in 55 papers, and level two testing resulted in 16 papers (JF, LF). Of these 16 papers, 13 were eligible for inclusion.

Paper II

The participants (44 in total) at two HHC units, A and B, consisted of RNs with a Bachelor's degree (23), PNs with a vocational degree (18), an assistant with no formal competence (1) and two (2 missing) who did not provide information about their education. The mean age was 40.8, median 39 and a range from 19-69 years was seen. Over 60% of the participants had over 10 years of work experience (Table 2).

Table 2: *Participants' work experience.*

Work experience	1-2 y	3-4 y	5-10 y	> 10 y	
	7 (15.9%)	3 (6.8%)	5 (11.4%)	27 (61.4%)	2 missing

The data were collected by questionnaire (Appendix) in two phases, spring 2013 and spring 2014. The reason for a two-phase collection of data was to allow more staff the opportunity to answer during a second data collection. The inclusion criteria were that the participants worked ≥50%, worked day or evening shifts (staff working night shifts were excluded), and had participated in the FCG-run introductory educational program or been supervised in the use of the OPCq instrument by the project leader. A self-administrated questionnaire was used to collect data (Polit & Beck, 2014). This questionnaire had been used in two earlier studies (Fagerström, 2000; Frilund & Fagerström, 2009b) and was translated from Swedish into Norwegian, and its face validity was tested by six RNs in the municipality prior to data collection.

The questionnaire (Appendix) included a total of 13 questions: close-ended questions with set answers and the possibility to comment on eight questions. Ten questions were answered via a modified version of a Likert scale (Kline, 2005). The questionnaire included background variables such as gender, work experience and educational level.

In spring, 2013, the head nurses at the two units that comprised the setting for the study handed out 31 questionnaires to the units' permanent staff (36), with the exception of the units' head nurses (2) and coordinators (5), who were not invited to participate in the study. The questionnaire was answered individually and the response rate was 71% (22). Because many staff on the units did not have permanent positions, nursing students from the USN once again collected data in spring 2014 to garner more participant responses. The professor at the USN responsible for the running of the project provided the nursing students with information about the study prior to data collection. The nursing students collected data through the same questionnaire previously used and the questionnaire

was answered individually. During the second data collection the nursing students interviewed participants during the work day, and this time 22 participants answered the questionnaire. The total response rate was 44.

During both data collections from 2013 and 2014, the questionnaires were sealed in a reply envelope and returned to the head nurses for each unit, who then contacted the project leader.

Paper III

The participants in the study consisted of RNs, PNs, assistants and students at two HHC units, A and B (Table 3).

Table 3: *Participants' background statistics.*

Education	Frequencies	Percent
Registered nurse	19	28.4
Practical nurse	26	38.8
Assistant	10	14.9
Student	12	17.9
Total	67	100

The data were collected on unit A from November 4, 2013 to April 28, 2014 and on unit B from December 9, 2013 to January 20, 2014 and from February 6, 2014 to February, 14, 2014. The inclusion criteria were that participants worked ≥50%, worked days, and had classified with the modified OPCq instrument. Parallel classifications, with two independent raters (a main and a secondary rater) (McHugh, 2012) as used in hospital settings, were deemed unfeasible in an HHC setting because of practical issues. Nursing staff primarily work alone and it is neither possible nor practical to use a method requiring

two raters at the same time. Therefore a new *multiple parallel classification method* based on oral case presentations was developed.

The nurse managers at the two HCC units (A and B) each morning selected one or two patient cases to be parallel classified during a shift and also determined the main rater. For an even distribution of patient cases, the nurse managers were responsible for ensuring that a range of variables was included: background variables (age, gender), care needs and nursing intensity of the patients. The main rater (RN, PN, assistant or third-year Bachelor's degree program nursing student) classified NI using the modified OPCq instrument after visiting a patient. For practical reasons, the parallel classifications were performed by the secondary rater the same day, at the relevant HHC unit and during the lunch break. The secondary raters did not visit the actual patient, instead their classifications were based on the main raters' oral patient case presentation; a delineated structure was developed for the oral patient case presentations (Appendix). Three to ten secondary raters independently classified each patient case without communicating, discussing or exchanging information during the classification. Participants could act as main or secondary raters several times during the study period. A total of 67 participants conducted the parallel classifications (Table 3).

Paper IV

An explorative qualitative approach using focus group interviews was used (Halkier, 2010; Liamputtong, 2011). A qualitative approach is a trustful way to understand nurses' thoughts about their experiences, especially if the research topic is relatively unresearched. The participants were RNs, PNs and a social educator (SE) with a Bachelor's degree. The project leader (BL) invited the staff to participate in a focus group interview and 24 staff accepted the invitation and met the inclusion criteria. The inclusion criteria were that the participants worked ≥50%, worked day or evening shifts (staff working night shifts were excluded), and had participated in the FCG-run introductory educational program or been supervised in the use of the OPCq instrument by the project leader (BL).

A total of four focus group interviews were conducted. In April 2013, six PNs participated in one focus group interview and five RNs and one SE in a second. The SE was included in the same focus group as the RNs, because the SE had a similar, Bachelor's level education. In May 2013, an additional six PNs participated in a third focus group interview and four RNs in a fourth. A semi-structured thematic guide was used during the focus group interviews (Appendix). The project leader moderated the four focus groups interviews, which took place at the Institute for Research and Development for Nursing and Care Services and lasted about 60 minutes. The focus group interviews were tape-recorded, and a research assistant transcribed the interviews verbatim. The whole transcript material totaled 79 pages.

6.5 Data analysis

Paper I

Following a framework by Arksey and O'Malley, data charting was used to select key items from included papers (Arksey & O'Malley, 2005). A joint decision by the authors (JF, BL, ST, LF) was made, emanating from the research questions, regarding which key items and information should be recorded from the included papers. The first author (JF) charted the data, followed by discussion with the other authors (BL, LF) as to whether the data extraction should be considered consistent with the research questions and purpose.

Based on the data charting, a table was created that included specific information about the included papers: Author(s), year of publication, study location, study population, sample size and context, type of instrument/tool (name of the PCS), validity tested (methods), reliability tested (methods) and evaluated (methods). Quantitative analysis was used to analyze the key items (Grant & Booth, 2009).

Paper II

The data were recorded in Excel by a research assistant, then transferred to SPSS and analyzed. For the analysis of the quantitative data, the IBM Package for Social Sciences (SPSS) Statistics Version 22 was used. Descriptive analyses with frequencies, mean, median and standard deviation were used. The questionnaire's internal consistency was tested by Cronbach's alpha (Pallant, 2015; Polit & Beck, 2014).

Question 11 in the questionnaire was changed between the first data collection in spring 2013 and the second data collection in spring 2014. Consequently, this question was not included in the data analysis.

Both Pearson's r and Spearman's rho correlations were used to describe the strength and direction between two variables (Pallant, 2015). Pearson's r is designed for the interval level and Spearman's rho for the ordinal level or ranked data (Pallant, 2015). Still, Pearson's r can be used if there is one continuous variable and one dichotomous variable.

Inductive content analyses (Graneheim & Lundman, 2004) were used in simplified form to analyze the written comments in the questionnaire.

Paper III

When using the OPCq instrument it is crucial that the instrument is reliable. Reliability is the consistency with which an instrument measures an attribute and is a major criterion for assessing an instrument's quality (Polit & Beck, 2014). Accuracy is another way to define the reliability of an instrument. A reliable instrument is also an instrument that is predictable (DeVellis, 2016), which means that the instrument scores should not change unless there a change in the variables that the instrument is measuring.

There are three different aspects of reliability that are important: *stability, internal consistency* and *equivalence* (Polit & Beck, 2014). *Stability* is assessed though test-retest statistical methods, which refers to the degree to which test results are consistent over time. The same test is given to the same individuals on two different occasions and the scores correlated (DeVellis, 2016; Pallant, 2015). For the modified OPCq instrument, this

was not practical, due to the HHC setting. An instruments' *internal consistency* is to the extent to which the items it measures have the same trait, i.e., whether items "hang together", and this is measured by Cronbach's alpha (DeVellis, 2016; Pallant, 2015; Polit & Beck, 2014). Cronbach's alpha or coefficient alpha is the most widely used index with which to measure the reliability of a scale (DeVellis, 2016; Streiner, 2003). The normal range of values is from .00 to + 1.00; the higher the coefficient, the more accurate the internal consistence (Polit & Beck, 2014). A commonly accepted rule for describing internal consistency is: $\alpha \geq 0.9$ = excellent, $0.9 > \alpha \geq 0.8$ = good, $0.8 > \alpha \geq 0.7$ = acceptable, $0.7 > \alpha \geq 0.6$ = questionable, $0.6 > \alpha \geq 0.5$ = poor, $0.5 > \alpha$ = unacceptable (George & Mallery, 2003). While values above 0.7 are acceptable, values above 0.8 are preferable (Pallant, 2015).

One of the key aspects of measuring an instrument's reliability is its *equivalence* with observational measure (Polit & Beck, 2014). Agreement levels are used to analyze and measure how often two or more observers give the same result to a mark, classification, etc. (Anthony, 1999). In Paper III, the data were analyzed using the interrater reliability method with Cohen's kappa and percent agreement (%) (McHugh, 2012). The consensus of the parallel classification was calculated as percentage (%), which is easy to calculate, directly interpretable and can identify variables that may be problematic (McHugh, 2012). A limitation in regard to the calculation of percentage is that the possibility exists that raters have guessed when they have given their scores, which is not taken into account (McHugh, 2012). The advantage of Cohen's kappa is that this takes into account the possibility of raters guessing, for multiple data collectors, and thus it is by far the most used measure of agreement (McHugh, 2012; Veierød, Lydersen, & Laake, 2012). According to Landis and Koch, Cohen's kappa values < 0 indicate no agreement, 0.-0.20 indicate slight agreement, 0.21-0.40 indicate fair agreement, 0.41 – 0.60 indicate moderate agreement, 0.61-0.80 indicate substantial agreement and 0.81 -1.00 indicate near perfect agreement (Landis & Koch, 1977). The IBM Package for Social Sciences (SPSS) Statistics, Version 23 was used. A research assistant recorded the results into Excel. The data were first transferred to SPSS, followed by analysis.

Paper IV

Content analyses in accordance with Graneheim and Lundman occurred (Graneheim & Lundman, 2004). Content analysis is a research technique for making replicable and valid inference from text, and is according to Krippendorff a scientific tool (Krippendorff, 2004). Accurate transcription is a fundamental first step in data analyses (Dickson-Swift, James, Kippen, & Liamputtong, 2007). In Paper IV, a research assistant performed the transcription, which is common (Kvale, Brinkmann, Anderssen, & Rygge, 2015). While transcription can be viewed as a purely technical task, there are difficulties associated with such in relation to sensitive topics. However, the material was considered to not contain any sensitive topics. Transcription can be considered the act of making a conversation abstracted and fixed in written form (Kvale et al., 2015). The transcription was verbatim.

It is suggested that a *unit of analysis* consist of a whole interview or complete observational protocols (Graneheim & Lundman, 2004). Here the *unit of analysis* was comprised of four focus group interviews with RNs, PNs and a SE. The following steps were included in the analysis: identification of *meaning unit, condensed meaning, condensation, code / categories and theme.*

Elo and Kyngäs noted that there are no simple guidelines for data analysis and that results depend on several factors such as skills, insights, and/or analytic abilities (Elo & Kyngäs, 2008). Here all of the material from the focus group interviews was first read to garner a comprehensive understanding (Lundman & Graneheim, 2008; Malterud, 2003). The first author (JF) conducted the content analysis while the co-authors (LF, BL, ST) were available for supervision. All authors together discussed the results during several phases.

Analysis of what a text "says" is related to the aspect of content, and it describes the visible, obvious components of a text, referred to as a text's manifest content. Here *meaning units* as words, sentences or paragraphs containing aspects related to each other through their content and context were highlighted. This was followed by *condensation*. Shortening a text includes reduction and condensation. Reduction relates

to decreasing a text's size but indicates nothing about the quality of what remains. Condensation relates to a process of shortening a text while still preserving its core. The condensation was followed by a labelling of the meaning units, i.e., assigning a *code*. The next step was *creating categories,* which is the core feature of qualitative content analysis. A category is a grouping of content that shares a commonality. Lastly, a *theme* was created. A *theme* is considered to be a thread of underlying meaning, seen through condensed meaning units, codes or categories on an interpretative level. Content analyses can be used in an inductive or deductive way (Creswell, 2013; Elo & Kyngäs, 2008). Here they were used in an inductive way, because there was insufficient prior knowledge about measuring NI with the modified OPCq instrument in HHC.

6.6 Ethical considerations

During the entire course of this research project and thesis, the Norwegian National Research Ethics Committee's guidelines (The   Norwegian National Research Ethics Committees, 2014) and the Helsinki Declaration (World Medical Assossiation, 2013) have been followed.

All participants have been treated with respect, and good consequences have been sought. The project was implemented fairly and all members of the research team have behaved responsibly, openly and honestly toward one another, the participants and the public.

The Norwegian Center for Research Data (NSD) assessed the research prior to its start (Appendix). Appropriate permission(s) and approval from Drammen municipality have also been sought. The FCG gave the municipality license to use the RAFAELA® system.

Prior to the start of the research, written and oral presentations about the project were given to all of nurses working at the two HHC units encompassed, in which the project was presented as a collaborative research project between the HHC units, the Institute for Research and Development for Nursing Care Service and the USN. The participants in

the studies included in this project were giving sufficient oral and written information about the study they were invited to participant in (Appendix).

In Paper I, the material was treated objectively, thoroughly and as being independent from the authors who published the papers that were subsequently selected for inclusion.

In Paper II, the data collection was anonymous. A questionnaire was handed out in spring 2013, with completed questionnaires returned in sealed envelopes. In spring 2014, nursing students from the USN collected data through structured interviews, based on the same aforementioned questionnaire; data were anonymously handled and returned in sealed envelopes. Prior to the change in data collection method that occurred between 2013 and 2014, permission was sought from the NSD (Appendix).

In Paper III, a new multiple parallel classification method based on an oral presentation of patient cases was developed and used on two HHC units (A and B). After the nurses had completed their classifications, the nurse managers for each respective unit were given the nurses' classification forms (including classification scores). The patients on the units involved were not enrolled in the study and continued receiving nursing care as previously planned, thus no informed consent was required from them.

In Paper IV, prior to each focus group interview the participants were informed that their identities would remain confidential and that they could leave the focus group interview at any time. The written information about the research that the participants had been given earlier was repeated and ethical aspects clarified. All participants consented to participation.

7 Results

In this chapter, the main findings from each of the four papers part of this thesis are presented, followed by a summary of the results.

7.1 Paper I

Patient classification systems used to classify nursing intensity and assess nursing staffing resources in home health care - a scoping review

All of the 13 PCSs reviewed measured patients' needs and/or nursing requirements. Five instruments were or had been tested for validity, five tested for reliability, and one validity and reliability tested and evaluated (Table 4). How accurately the systems were described varied, with some very well described and others not. Those systems not so well described included the DominiC (Bowers & Durrant, 2014), Client Audit Community Care Workload assessment Tool (Cawthorn & Rybak, 2008), Caseload classification tool (Chapman et al., 2017) and The Scottish Community Nursing Workload Measurement Tool (Grafen & Mackenzie, 2015).

Table 4: *A summary table showing author(s), year of publication, instrument/tool, categories/criteria for assessment and whether validity tested, reliability tested or evaluated (*various co-authors).*

Author(s), year of publication, instrument/tool	Categories/criteria for assessment in the instrument	Validity tested	Reliability tested	Evaluated
Bowers and Durrant (2014) DominiC	14 key functions (see Paper I) *No exact information given*	No information given	No information given	General summary- no information about methods used given
*Brady et al. (2008) *Byrne et al. (2007) CCNCS	The seven assessment criteria included: 1) Nursing assessment, 2) Physical care requirements, 3) Teaching needs and health promotion, 4) Carer and family support, 5) Case/care management, 6) Psychosocial support, 7) Environmental factors. Nurses scored patients' needs levels from 1 (low need) to 5 (high need). The travel time per visit (>20 minutes) was also recorded.	Content Validity Index (CVI), overall total CVI at 0.99. Predictive validity. Relationship between needs level and nursing time calculated using Kruskal-Wallis test, Jonckheere-Terpstra test and Mann- Whitney U-test.	Stability through pre- and post-testing. Child case (k 0.593) Older case (k 0.704) Internal consistency by percentage agreement. Child case (91.1% recorded patients level 4 and 5) Older case (91-92% recorded patients level 2 and 3)	Caseload analysis as a method for evaluation and amount of time spent with each patient
Cawthorn and Rybak (2007) The Client Audit Community Care Workload Assessment tool	Identified nursing needs, frequency and length of home visit, how far the patient resides from home office, coordination time required, client stability, client and/or caregiver's coping skill. The weighting score was: low intervention, moderate intervention, high intervention. The Regina Risk Inventory Tool and the Mini-Mental Status were also seen. No further information about these instruments was given.	No information given	No information given	General summary- no information about methods used given

(Çelebioğlu et al. (2007) CHIRS	Included 4 domains (with 15 parameters, 91 items and 975 sub-items): 1. Environmental 2. Psychosocial 3. Physical 4. Health behavior. Scores ranged from 0 (no need for care) to 4 (extreme need for care) and were used as indicators of the intensity of health care needs.	Face validity by experts; seen as suitable, but too long. Predictive validity. Correlation of total scale score (TSS) and total number of household members (p=.001). No correlation between TSS and total numbers of visits (p=.30). Correlation between TSS and total number of health institutions visited (p=.001).	Internal consistency for the overall scale. Cronbach's alpha (0.525). Guttman split-half coefficient (0.629).	No information given
Chapman et al. (2007) Caseload Classification Tool for Community Nursing	The tool focused on assessment, social circumstances, liaison, dignity and respect, intervention, band of staff providing care, expected visit time and length of stay on the caseload. Included 12 differentiated care packages with clinically evidenced-based care plans. Level of care: routine, additional, significant. *No exact information given*	No information given	No information given	Semi-structured interviews
Collister et al.(2014) CIT	Included six categories: A: Clients requiring minimal services B: Clinical condition: stability and predictability C: Clinical condition: complexity factors D: Care response: treatment and therapy process E: Care response: client/family care plan process, F: Care response: system care plan process. The CIT was divided into three levels: level 1 = 1 score, level 2 = 2 scores and level 3 = 3 scores (1 score minimum and 15 maximum), resulting in a raw score, which was then converted into a Client Intensity Scale.	Content validity by literature, key factors and experts. Face validity by collecting qualitative data from staff. Concurrent validity by analyzing the CIT score with staffs' monthly recorded activity Stability: Wilcoxon paired test showed that when time between repeated test was brief, the score	Internal reliability: Cronbach's' alpha (0.79 / 0.95) Interrater reliability (71%)	No information given

Grafen and Mackenzie (2015) The Scottish Community Nursing Workload Measurement Tool	Included 6 activity categories: 1)Face-to face contact (everything occurring when the patient is present) 2) Non-face-to-face context (everything occurring when the patient is not present) 3) Home visits and planned sessions (routine, group and mass clinics/sessions) 4) Associated workload (management, administration, meetings and professional development activity) 5) Travel (including walking, waiting and parking time), and 6) Exception reporting (extraordinary events, e.g., adverse weather, car breakdown). Levels of intervention, ranging from straightforward (level 1) to complex (level 2).	No information given	No information given	General summary- no information about method used given
Hawes et al. (2007) RAI-HC	Consisted of two elements. The MDS-HC collected standardized patient information and assessed 19 key domains related to function, health, social support and service use. The CAPs consisted of 30 problem-focused protocol areas that encompassed common risks for home care clients, organized under the following areas: 1. Functional performance 2. Sensory performance, 3. Mental health, 4. Bladder management, 5. Health problem/syndromes 6. Service oversight.	Tested in earlier studies (Morris et al. 1997)	Tested in earlier studies (Kwan, Chi, Lam, Lam and Shou, 2000; Landi et al., 2000)	General summary- no information about method used given
Kane (2014) eCAT	Included eight categories: 1. Demography (total population) 2. Caseload size (number of patients) 3. Visiting patterns (8 variables) 4. Reason for visit (24 variables) 5. Dependency measure (ADL dependency and team dependency) 6. Caseload throughput 7. Location of care (6 variables) 8. Reviews (8 variables)	No information given	No information given	Focus group interviews

Kottner et al. (2010) CDS	Included 15 items: eating and drinking, continence, body posture, mobility, day/night pattern, getting (un)dressed, body temperature, hygiene, avoidance of danger, communication, contact with others, sense of rules/values, daily activities, recreational activities, learning ability. Scores ranged from completely dependent to completely independent.	No information given	Interrater reliability: (k 0.61-0.79) Agreement (0.67%-0.88 %)	No information given
Poss et al. (2008) RUG-III/HC	Included seven hierarchical levels: 1. Special rehabilitation 2. Extensive services 3. Special care 4. Clinically complex 5 Impaired cognition 6. Behavior problems 7. Reduced physical function	Validity by cost episodes over a 13-week period. Individual client level billing records matched with assessment information from RUG-III/HC.	No information given	No information given
Storfjell et al. (2017) Easley-Storfjell caseload/workload analysis instruments	Assessment of six variables: 1. Clinical judgment required (assessment needs) 2. Teaching needs 3. Physical care needs (technical procedures), 4. Psychosocial support needs 5. Coordination and care management needs 6. Number and severity of problems. The rating was: minimal complexity, very great complexity.	Tested in earlier studies (Anderson and Rokosky, 2001)	Tested in earlier studies (Anderson and Rokosky, 2001)	No information given

Eight systems were relatively well described. The *Community Client Need Classification System* (CCNCS) had seven assessment criteria: (1) Nursing assessment, (2) Physical care requirements, (3) Teaching needs and health promotion, (4) Carer and family support, (5) Case/Care management, (6) Psychosocial support, (7) Environmental factors. Using the CCNCS, nurses scored patients' needs levels from 1 (low need) to 5 (high need). The travel time per visit (>20 minutes) was also recorded, with a score of 5 given when travel time exceeded 20 minutes (Brady et al., 2008; Byrne et al., 2007).

The *Community Health Intensity Rating Scale* (CHIRS) had a Nursing Assessment section that included 15 parameters, 91 items and 974 subitems encompassing 4 domains: 1) Environmental 2) Psychosocial, 3) Physical 4) Health behavior. Scores ranged from 0 (no need for care) to 4 (extreme need for care) and were used as indicators of the intensity of health care needs (Çelebioğlu, Özsoy, & Peters, 2007).

The *Caseload Intensity Tool* (CIT) was used to determine client intensity, and scores for each client were summarized into a six category (A-F) Client Intensity Scale. A= Clients requiring minimal services, B= Clinical condition: stability and predictability, C = Clinical condition: complexity factors, D= Care response: treatment and therapy process, E= Care response: client/family care plan process, F= Care response: system care plan process. The CIT was divided into three levels: level 1 = 1 score, level 2 = 2 scores and level 3 = 3 scores. The CIT score was converted into a Client Intensity Scale, with 1 score becoming 1 (minimal), 4-6 becoming 2 (basic), 7-10 becoming 3 (moderate), 11-13 becoming 4 (significant) and 14-15 becoming 5 (Extreme) (Collister et al., 2014).

The *RAI-HC* consisted of two elements, the Minimum Data Set-Home Care (MDS-HC) and Clinical Assessment Protocols (CAPs). Information about 19 key domains related to function, health, social support and service use was collected using the MDS-HC and reported on. The CAPs consisted of 30 problem-focused protocol areas that encompassed common risks for home care clients. The problem-focused protocol areas included: Functional performance, Sensory performance, Mental health, Bladder management, Health problem/syndromes, and Service oversight. The RAI-HC was found to take about 60 minutes to complete (Hawes et al., 2007).

The *Electronic Caseload Analysis Tool* (eCAT) included eight categories: (1) Demography, (2) Caseload size, (3) Visiting patterns, (4) Reason for visit, (5) Dependency measure, (6) Caseload throughput, (7) Location of care, and (8) Reviews. The categories were not described in the paper (Kane, 2014).

The *Care Dependency Scale* (CDS) was used to measure 15 items (categories), rated using scores ranging from 1 (completely dependent) to 5 (completely independent). The scores

from all 15 categories were summed up, yielding sum scores that ranged from 15–75: *low sum scores* indicated *high care of dependency* and *high sum scores* indicated *independency.* The categories/items were reported on (Kottner, Halfens, & Dassen, 2010).

The *Resource Utilization Groups Version III for home care* (RUG-III/HC) is a case-mix system that included seven hierarchical levels: (1) Special rehabilitation, (2) Extensive services, (3) Special care, (4) Clinically complex, (5) Impaired cognition, (6) Behavior problems and (7) Reduced physical functions. Each hierarchical level had different criteria, for example: *Extensive services* included tracheostomy, respirator, respiratory therapy; *Special care* included stage 3 or 4 pressure ulcer, enteral tube feeding, diagnosis of Multiple Sclerosis, treatment for burns, radiation treatment, intravenous, fever; *Behavior problems* included wandering, verbally abusive, physically abusive, socially inappropriate, hallucinations. The RUG-III/HC's care diagram and criteria were well described. The RUG-III/HC was considered suitable for older people who receive HC services for longer than 60 days (Poss, Hirdes, Fries, McKillop, & Chase, 2008).

The analysis process part of the *Easley-Storfjell Instruments for Caseload/Workload* (CL/WLA) consisted of four steps. Step 1: Analyze each case to predict the number of visits required and determine complexity of nursing care. Step 2: Chart time and complexity ratings on visual graph. Step 3: Calculate time for noncaseload work requirements or duties. Step 4: Summarize findings and compare number of required visits with workload analysis projection. In step 1, the number of visits was rated from 1 to 4, with 1 = 1 visit or fewer per month, 2 = 2-3 visits per months, 3 = 1-2 visits per week and 4 = 3-5 visits per week. The tool was used to determine complexity of care based on the assessment of six variables: A: Clinical judgment required (assessment needs), B: Teaching needs, C: Physical care needs (technical procedures), D: Psychosocial support needs, E: Coordination and care management needs, F: Number and severity of problems (Storfjell et al., 2017).

In the papers included in this scoping review, specific information on staff allocation such as registration and recording of staff situation was not seen. Nonetheless, included in the

papers were various findings: one instrument provided a real-time overview of patients' needs (Bowers & Durrant, 2014); one was used to analyze the relationship between the level of need and nursing time (Byrne et al., 2007); one included a high-quality assessment and care planning design (Hawes et al., 2007); one provided contemporaneous information on district nursing caseload (Kane, 2014); one showed that staff requirements became more transparent after weighting of each patient's score (Cawthorn & Rybak, 2008). More specific information about how to use the CL/WLA system instrument included a caseload analysis roster, caseload analyzer graph, time allocation worksheet and caseload/workload summary (Storfjell et al., 2017).

7.2 Paper II

Testing of the Content Validity of a Modified OPCq instrument - A Pilot Study in Norwegian Home Health Care

The aim of this study was to test the content validity of a modified OPCq instrument. How well the modified instrument's sub-areas were described was investigated, with the results showing that participants considered sub-areas 1 (Planning), 2 (Breathing and circulation) and 4 (Personal hygiene) to be most well described. How well the NI levels A-D were described was also investigated, with the highest scores being given to sub-areas 1 (Planning), 2 (Breathing and circulation) and 6 (Teaching) (Table 5).

Table 5: *Participants' opinions on how well the sub-areas and NI levels A-D were described in the modified OPCq instrument: mean, median and standard deviation.*

Sub-areas	Sub-areas described			NI levels A-D described		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation
Planning and coordination of nursing care	3.06	3	0,82	2,9	3	0,93
Breathing, blood circulation and symptoms of disease	3,09	3	0,77	2,9	3	0,93
Nutrition and medication	3	3	0,86	2,7	3	0,9
Personal hygiene and secretion	3,11	3	0,87	2,86	3	0,88
Activity, sleep and rest	2,98	3	0,82	2,84	3	0,97
Teaching, guidance in care and follow-up, emotional support	3	3	0,86	2,98	3	0,92

In regard to how well the sub-areas were described, about 80% of participants scored the sub-areas 1, 2 and 4 "very well", "well" or "pretty well" (Figure 4).
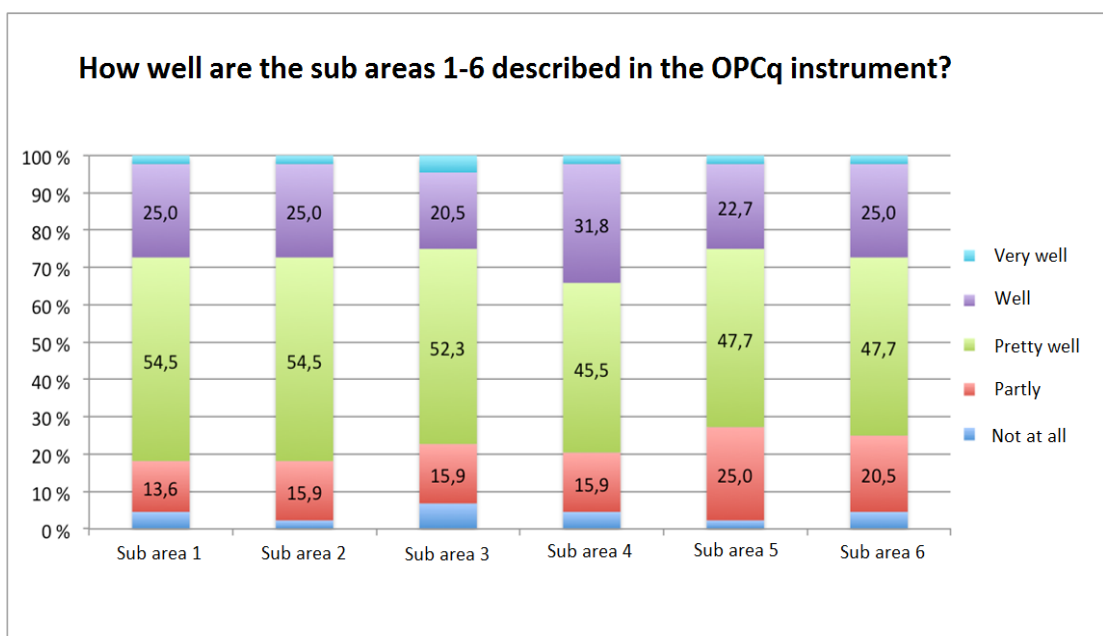
Figure 4: *How well are the sub-areas 1-6 described in the modified OPCq instrument?*

In regard to how well the NI levels A-D were described, the participants' scores were overall slightly lower. Also here sub-areas 1, 2 and 4 had the highest scores, alongside sub-area 6. Participants gave sub-area 3 (Nutrition and medication) the lowest score (Figure 5).
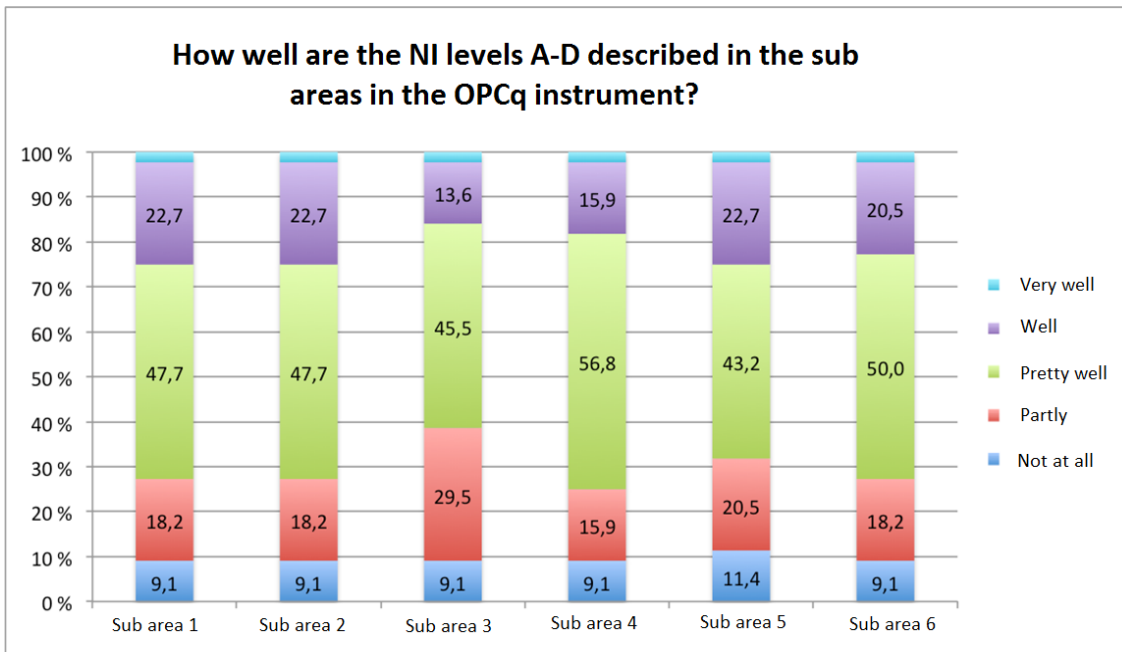
Figure 5: *How well are the NI levels A-D described in the sub-areas in the modified OPCq instrument?*

Additional analyses (Spearman's rho) of the participants' answers to the study questionnaire revealed a moderate correlation (0.36; p<0.05) between questions Question 12 (*How motivated are you to classify patients' NI?*) and Question 13 (*How do you like working in HHC?*). No correlation (Pearson r) was seen between Question 12 (*How motivated are you to classify patients' NI?*) and work experience. In regard to those questions in the questionnaire that were related to participants' opinion of the OPCq instrument (Questions 2,4,5,6,7,8), analysis with Cronbach's alpha (Pallant, 2015; Polit & Beck, 2014) showed that the instrument had excellent internal consistency (0.96) (George & Mallery, 2003).

Qualitative findings

The participants had the possibility to leave comments on seven of the questionnaire's questions. The number of participants commenting on each question varied, ranging from eight (18%) to 19 (43%) (n=44), and the questions most commented on are presented here.

In regard to Question 3 (*Does a need exist for additional sub-areas?),* nineteen (43%) participants commented and two categories were discerned: *Some sub-areas do not match* and *Poorly adapted to HHC*. Regarding *Some sub-areas do not match,* the participants noted that the sub-areas should be more clearly defined, because there was a degree of overlapping and uncertainty between levels B and C. Regarding *Poorly adapted to HHC*, the participants noted that the ability to classify practical things such as washing of patients' garments, support stockings, weather or driving conditions were missing.

In regard to Question 4 (*In your opinion, how well are the NI levels A-D described in the following sub-areas in the OPCq instrument?)*, fourteen (32%) participants commented and two categories were discerned: *Some unclear* and *Time.* Regarding *Some unclear,* the participants noted that there were only slight differences between the levels and that it was difficult to understand and distinguish between levels C and D. Regarding *Time*, they noted that they could not properly register the time they spent with a patient because of, e.g., needing to make phone calls to doctors. Nevertheless, the participants considered some sub-areas to be well described and as having good coverage, though which sub-areas they considered well described were not revealed.

In regard to Question 12 (*How motivated are you to classify patient's NI?)*, eleven (25%) participants commented and two categories were discerned: *Motivation* and *Time.* The participants noted that they possessed the *Motivation* to classify, but that technical problems such as software compatibility or password issues lowered their motivation. The participants noted that a lack of *time* was a factor that made using the RAFAELA® system difficult.

In regard to Question 13 (D*o you enjoy working in HHC?)*, thirteen (30%) participants commented and two categories were discerned: *Working environment* and *Relationship with the patients*. Regarding *Working environment,* the participants mentioned positives such as a good working environment of high professional quality. Regarding *Relationship with the patients,* contact with patients and a variable workday were also mentioned. Some negatives were even noted, including a lack of time and high workload.

7.3 Paper III

Using a new interrater reliability method to test the modified Oulu Patient Classification instrument in home health care

The aim of this study was to test the interrater reliability of the modified OPCq instrument. Both consensus in percentage (%) and Cohen's kappa were used to measure the interrater reliability, and Cronbach's alpha was used to measure the internal consistency. A total of 2010 (335 x 6 sub-areas) parallel classifications were made. Of the 53 patients, classified background variable data was available for 44 (83%), while nine had moved to NH or passed away. Most were female 30 (68.2%) and 14 (31.8%) were male, with a mean age of 83 years (MD 84, SD 9.6). Patients were classified the categories: category I: 6 (11.3%), category II: 24 (45.3%), category III: 11 (20.8%), category IV: 11 (20.8%) and category V: 1 (1.9%). The majority of patients were classified into classes II, III and IV, which indicated that there was an average, more than average or maximum need for care.

The results showed that the modified OPCq instrument was reliable, with consensus in percent for the parallel classification for sub-areas 1-6 being 64.8%-77.61% and Cohen's kappa showing a moderate to substantial agreement (k 0.49-0.69). The highest agreement was seen for sub-area 4 (Personal hygiene and secretion) (k 0.69), followed by sub-areas 3 (Nutrition and medication) (k 0.61) and 5 (Activity, sleep and rest) (0.57). Cronbach's alpha differed from 0.81-0.94 (Table 6).

Table 6: *Parallel classifications, sub-areas 1-6 of the OPCq instrument, consensus in per cent, Cohen's kappa and Cronbach's alpha.*

Sub-areas	Consensus %	Cohen's kappa	Cronbach's alpha
Planning and coordination of nursing care	70.45	0.56	0.84
Breathing, blood circulation and symptoms of disease	70.45	0.52	0.81
Nutrition and medication	73.43	0.61	0.87
Personal hygiene and secretion	77.61	0.69	0,94
Activity, sleep and rest	71.64	0.57	0,83
Teaching, guidance in care and follow-up, emotional support	64.78	0.49	0,85

Classification in this study was based on raw score. The results show that 282 (84.2%) classifications differed from zero to two points, 313 (93.5%) classifications from zero to three points (Table 7).

Table 7: *Classification based on raw scores and differences in points.*

Raw score/points	N	%
0 point difference in raw score	91	27.2
1 point difference in raw score	131	39.1
2 point difference in raw score	60	17.9
3 point difference in raw score	31	9.3
4 point difference in raw score	12	3.6
5 point difference in raw score	6	1.8
6 point difference in raw score	2	.6
7 point difference in raw score	2	.6
Total	335	100.0

7.4 Paper IV

Nurses' experiences of measuring nursing intensity in home health care – qualitative study

The aim of this study was to describe nurses' work experiences and perceptions of the usability of the OPCq instrument when classifying NI in HHC. Three themes emerged from the content analysis: 1) Classifying the modified OPCq levels correctly; 2) Technological problems hinder use of the instrument; 3) Classifying NI when time pressure dominates (Figure 5).

Classifying the modified OPCq correctly	•A grey zone •Does not fit •Classification as a learning process
Technological problems hinder use of the instrument	•Difficulties logging in •Use of a personal digital assistant
Classifying nursing intensity when time pressure dominates	•Classifying under time pressure •Prioritizing patient's individual needs
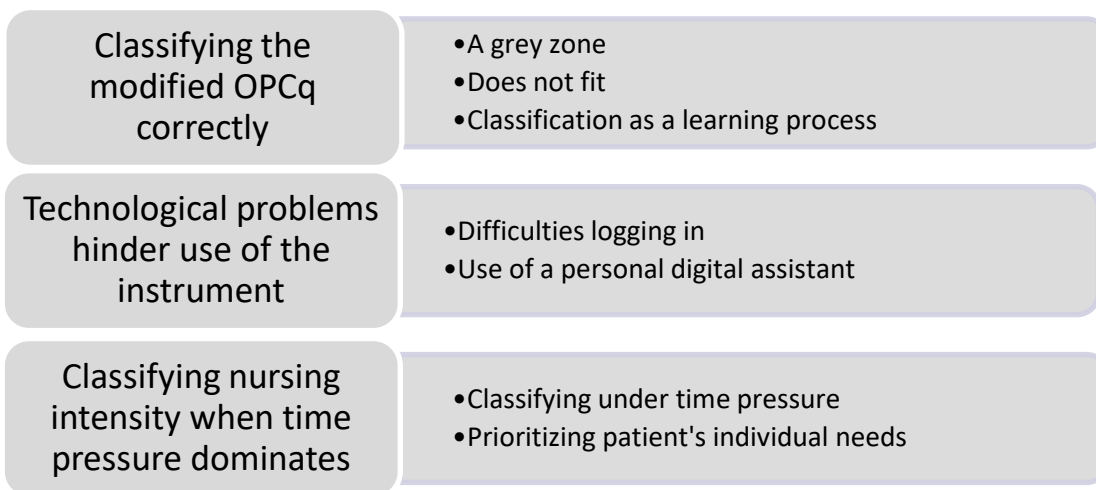
Figure 6: *Themes and categories.*

In *Classifying the modified OPCq levels correctly*, three categories were seen. The participants experienced *A grey zone* and were uncertain about choosing between the NI levels A, B, C and D, especially regarding levels B and C. The participants also experienced *Does not fit*, noting that there were tasks or duties that they engaged in but which were not specifically listed in the modified OPCq instrument or else they were uncertain where to place tasks or duties. This included typical indirect patient care, e.g., phone calls, ordering medication or going to the pharmacy. In *Classification as a learning process,* they pointed out that classifying together with other nurses helped them to learn how to use the instrument and led to an increased sense of mastery and competence.

In *Technological problems hinder use of the instrument*, two categories were seen. The participants noted *Difficulties logging in* to the RAFAELA® system when they were supposed to register scores, e.g., problems with passwords. The participants also stated that they preferred the *Use of a personal digital assistant* (PDA), using for example a PDA to register OPCq scores immediately and continuously when out working.

In *Classifying NI when time pressure dominate,* two categories were seen. The participants experienced *Classifying under time pressure*, noting that a lack of time during their work day was a significant stress factor when they classified. While classifying with the modified OPCq instrument could become an additional stress factor, they considered the instrument to be a useful tool. They often experienced situations that were not taken into account when schedules were determined, e.g., weather conditions such as snow build-up, acute/unexpected events and phone calls. The participants experienced that *Prioritizing patients' individual needs* was important, such as demonstrating respect for patients' individual needs and desires, giving patients a sense of security and trust, and seeing patients' actual care needs as well as following up on these needs. Nonetheless, because the time allocated for each patient was insufficient, they had to prioritize tasks and duties and thereby experienced a lot of stress. The participants also mentioned that they wanted to do more for patients than care plans allowed.

7.5 Summary of the results

In Paper 1, the scoping review, 13 PCSs that measured patients' needs and/or nursing requirements were found. Five instruments had been tested for validity, five tested for reliability, and one validity and reliability tested and evaluated. How accurately the PCSs were described varied, and there was lack of information in regard to the allocation of staff.

In Papers II, III and IV, in which the validity, reliability and the usability of the modified OPCq instrument were assessed, the modified OPCq instrument was shown to be a trustful instrument for measuring NI in HHC after minor adjustments. From the papers'

analyses, it emerged that the OPCq manual should be slightly improved to better suit an HHC setting. The keywords in the manual should be made more suitable. Among other things, HHC staff found it difficult to register indirect-care-related activities, e.g., washing of patient's garments, phone calls, taking out the garbage. Also it was difficult to know where to register non-patient activities, e.g., weather or driving conditions, which are not included in the manual.

The new multiple parallel method presented in Paper III can be used when parallel classification with two raters is not suitable. While the results for the HHC setting here were slightly lower when compared to studies in primary health care and hospital settings, one should note that a total raw score was used, versus the use of patient categories I-V as seen in previous studies, which makes comparisons difficult.

Overall, the participants considered the modified OPCq instrument useful in classifying and illuminating the actual work situation in HHC. The findings show that despite time constraints, staff were aware of patients' individual needs and cared for each patient as a unique person. It should still be noted though, that when implementing a new PCS it is crucial that all technological systems work satisfactorily so that the staff do not lose valuable time due to technical problems.

8 Discussion

In sub-chapters 8.1, 8.2, 8.3 and 8.4, an overall discussion of the research seen in Papers I-IV is seen. In sub-chapter 8.5, methodological reflections on the research topic are presented. Lastly, in sub-chapter 8.6 suggestions for further research are highlighted.

8.1 Patient classification systems currently used in home health care

In Paper I, a scoping review, the identification of the PCSs currently used in HHC occurred. A scoping review was considered useful, because it can provide a broad overview of the subject matter, i.e., the PCSs used in HHC. Scoping reviews incorporate a broader "scope" and have less restrictive inclusion criteria than, e.g., systematic reviews. One aim of a scoping review is to yield a comprehensive identification of published or unpublished studies and reviews, and a framework by Arksey and O'Malley was followed when conducting the scoping review seen in Paper I (Arksey & O'Malley, 2005). While only published research was included in Paper I's scoping review, it is also possible to include ongoing research and/or unpublished literature (Grant & Booth, 2009). A limitation (Elliott, Begley, Sheaf, & Higgins, 2016; Grant & Booth, 2009) that limits the value of using the results of a scoping review to, e.g., provide recommendations for clinical practice (Boström, Slaughter, Chojecki, & Estabrooks, 2012) is that they neither include a formal assessment of the quality of the research studies included nor delineate the process whereby the studies underwent quality assessment (Grant & Booth, 2009). The purpose of including a scoping review in this research was to provide a broader "scope" of the developed, tested and available PCSs currently used in HHC; the aim was not to offer recommendations to policymakers or for clinical practice or, but instead to inform policymakers (Grant & Booth, 2009).

The results in Paper I showed that various PCSs were used in HHC to measure NI and nursing staffing resources. The 13 PCSs selected during the charting of data (Arksey &

O'Malley, 2005) had been tested on various age group populations in HHC. With a PCS, one initiates a process to categorize patients according to nursing needs (Giovannetti, 1979), and it is essential that an instrument can predict nursing care requirements, which is the first essential element that should be included in a PCS (De Groot, 1989a). Based on the findings, the different instruments seen in Paper I seem to incorporate a holistic approach to patients and capture patients' individual needs, which is one of the essential elements of PCN (IAPO, 2018; Picker Institute, 2015) and nursing theories (Erickson, 2007; Henderson, 1991; Levin, 1971; Rogers, 1970; Roy, 1989). In Paper I, PCSs that measure and identify nursing assessment and nursing needs; carer-, family- and psychosocial support; patients' mental health and environmental factors were seen, but the addressing of patients' spiritual needs was not seen and this is a weakness. Also, the transparency of the instruments differed, which is another uncertainty and of note.

Another essential element and a selection criteria for the successful implementation of a PCS is validity (De Groot, 1989b), i.e., whether the instrument is or can be validated in the different settings the instrument is used in (service units or patient type). In Paper I, only five of the thirteen PCSs seen were tested for validity. The most common was face validity, which refers to whether an instrument adequately measures a construct. However, face validity should not be considered primary evidence for an instrument's validity (Polit & Beck, 2004), because it is a weaker form of validity (Giovannetti, 1979). In Paper I, content validity testing (the degree to which degree an instrument has an adequate sample of items) was also seen, with high agreement (CVI 0.99) in reported in Brady et al. (CCNCS) and 68% perceiving that scores reflected what the intensity should be in Collister et al. (CIT) (Brady et al., 2008; Collister et al., 2014). Criterion-related validity, seen as predictive validity, was significant in Brady et al. (CCNCS) and Çelebioğlu et al. (CHIRS), and the concurrent validity of the instrument studied by Collister et al. (CIT) showed that it was a good predictor (Brady et al., 2008; Çelebioğlu et al., 2007; Collister et al., 2014). The other instruments in Paper I were not tested for validity, but that does not necessarily mean that an instrument lacks validity, it instead can be a question of degree (Pallant, 2015; Polit & Beck, 2004). A further essential element is that a PCS should be capable of revalidating care on a periodic basis (De Groot, 1989a). Still, in light of De

Groot's requirements for an operational PCS, the validation methods used for and reported on for most of the PCSs found in Paper I were limited.

Reliability is also one of De Groot's six essential elements and a selection criteria for an operational PCS (De Groot, 1989a, 1989b). In Paper I, different methods for reliability testing were seen in all of the five studies that reported on the instrument's reliability, and reliability can be assessed in in various ways (Polit & Beck, 2004), with stability, internal consistency, and equivalence all used. The most widely used statistical approach to reliability among nurse researchers is Cronbach's alpha (internal consistency) (Polit & Beck, 2004), which was reported as poor (0.525) in Çelebioğlu et al. (CHIRS) and good (0.79) to excellent (0.95) in Collister et al. (CIT) (Çelebioğlu et al., 2007; Collister et al., 2014). Still, Cronbach's alpha does not take into account variation, e.g., from day to day or from observer to observer (Streiner, Norman, & Cairney, 2015) and this a weakness if only Cronbach's alpha is used to test reliability.

Equivalence is the most important type of reliability testing (Giovannetti, 1979). Only Brady et al. (CCNCS) and Kottner et al. (CDS) included agreement among data collectors and interrater reliability (Brady et al., 2008; Kottner et al., 2010). Given such, one can presume that interrater reliability testing in HHC is difficult. Kottner et al. showed a substantial agreement (0.61-0.79 k) and good percent agreement (0.67%-0.88%). Brady et al. showed a moderate and substantial agreement (child case 0.593 k/older case 0.704 k) (Brady et al., 2008). Collister et al. (CIT) tested interrater reliability by percent agreement and saw good agreement (71%) (Collister et al., 2014).

Simplicity and efficiency are selection criteria for a PCS, if a tool or instrument is to be used to predict nursing care requirements for individual patients (De Groot, 1989a, 1989b). In Paper I, in eleven out of thirteen papers the tool or instrument being investigated on were reported with a good overview, even though the assessment criteria/critical indicators of care and weighting scores varied. The CHIRS (Çelebioğlu et al., 2007), RAI-HC (Hawes et al., 2007) and RUG-III/HC (Poss et al., 2008) were all found to have more complex instruments that included a higher level of assessment criteria/critical indicators. Yet the CHIRS, e.g., was found to be difficult to use because of

its long and comprehensive scale (Çelebioğlu et al., 2007). According to De Groot, the assessment criteria/critical indicators are not meant to be a complete or exhaustive list of all nursing care activities (De Groot, 1989b) and long and comprehensive PCSs are not meant to be used as direct methods whereby the daily allocation of staff is determined but instead as indirect methods (De Groot, 1994a), which can provide benefits in long-term budget planning. In sum, when planning staff allocation, the PCS used should be simple and efficient.

In Paper I's scoping review, while the various PCSs were evaluated from different angles, for most instruments precise information on the method used for evaluation was not given. Only Kane and Chapman et al. reported the evaluation method used: post-implementation evaluation of the eCAT through a series of focus groups interviews (Kane, 2014) and staff interviews on experiences of using the Caseload classification tool (Chapman et al., 2017). According to De Groot, simplicity/efficiency and utility are both important in regard to the evaluation of a PCS, and both enhanced when evaluation is performed by nursing staff (De Groot, 1989b).

In Paper 1, limited research was seen on the effective and balanced allocation of staff in HHC, which must be considered when discussing PCN. Of the PCSs included and reviewed, few had been validity and/or reliability tested, and only one had been validity and reliability tested and evaluated. There is limited research on PCSs that are considered fully operational in HHC. Managers will be able to balance nursing resources and patients' needs through the use of a PCS scientifically tested for an HHC setting, which in turn will give HHC nurses more opportunities to work in a person-centered way.

8.2 Validity of the modified OPCq instrument

In Paper II, the content validity of the modified OPCq instrument was tested. In accordance with De Groot's six essential elements that should be included in an operational PCS, the first element is the ability to predict nursing care requirements and the second element is the ability to validate the care given in accordance with each

category/patient type on each shift and unit (De Groot, 1989a). The OPCq instrument had been previously tested for validity in hospital settings (Andersen et al., 2014; Fagerström, 2000; Fagerström, Eriksson, & Engberg, 1999) and once in a primary health care setting in Finland (Frilund & Fagerström, 2009b). It was therefore important here to test its validity, because HHC was a new setting. As mentioned previously, the most common method used to test validity is face validity, and to these means a total of 8 RNs, PNs and managers discussed the OPCq instrument and its modification. Content validity, related to how representative the sub-areas and NI levels were in an HHC setting, was tested through the use of a summative questionnaire including a total of 13 questions (one question excluded). According to Streiner et al., both face validity and content validity are technical descriptions of whether a scale looks reasonable (Streiner et al., 2015).

The results showed that the participants evaluated sub-areas 1-6 to be relatively well described while the NI levels were evaluated as being slightly less well described (Table 5). The results were similar to the findings seen in a Finnish study with a primary health care setting (Frilund & Fagerström, 2009b). The participants here, however, noted that they lacked the ability to classify indirect-care-related activities such as washing of patients' garments, phone calls, taking out the garbage, support stockings or interdisciplinary collaboration. This was also noted in regard to non-patient activities such as weather or driving conditions, or unexpected events. Interprofessional and interdisciplinary collaboration are both prerequisites in McCormack & McCance's PCN framework (McCormack & McCance, 2010), and in HHC there are a lot of indirect-care-related and non-patient activities that must be taken into account if PCN is to be realized.

The OPCq instrument is used to measure both direct nursing activities, i.e., how dependent a patient is on the care provided, and indirect care related activities. (Fagerström, 2017). In other words, on can say that the OPCq measures how much care, help and support a patient receives during a certain period, i.e., how "nursing intensive" the patient is. Those indirect-care-related and non-patient activities (Morris et al., 2007) noted by participants as missing from the instrument during this project have obviously not been taken into account clearly enough in the modified OPCq instrument.

As concepts, NI is not equivalent to nursing workload, which is both direct and indirect patient care and non-patient activities (Morris et al., 2007). Still, indirect-care-related activities are included in the OPCq instrument's various sub-areas: e.g., sub-area 1 (Planning and co-ordination of nursing care), sub-area 6 (Teaching, guidance in care and follow-up care, emotional support). In an HHC setting, nursing workload is comprised of aspects not necessarily seen in other settings, such as cognitive, emotional and physical effort; complex and highly variable clinical practice; unexpected organizational and/or clinical demands; and multilevel communication (Mildon, 2011). Thus all of these aspects of nursing workload in an HHC setting, should be taken into consideration.

In Norway, driving time is an essential part of nursing workload. In a study set in the north of Norway, researchers showed that driving time was approximately 20% of nurses' total shift time (Holm & Angelsen, 2014). In Paper II, the participants mentioned that they lacked the ability to classify weather and driving conditions, both examples of non-patient activities and important aspects of nursing workload in an HHC setting.

Following implementation of the Coordination Reform in 2012 (Norwegian Ministry of Health and Care Services, 2009), nursing staff in HHC in Norway must provide nursing care to a range of different patients (Norwegian Ministry of Health and Care Services, 2015b). As a result, nurses in HHC perform more complex tasks, have more responsibility, have more interaction with hospital staff and manage patients' discharge from hospital to HHC (Haukelien et al., 2015; Storm et al., 2014; Sæterstrand et al., 2015; Tønnessen et al., 2016). In light of such tasks, prerequisites such as being professional and developing interpersonal skills have become even more important, and researchers have found that municipal HHC staff in Norway need broad generalist competence (Bing-Jonsson et al., 2015).

Validity is extremely important in relation to PCSs and must be established before an instrument can be used with confidence (Giovannetti, 1979). Overall, the validity of the modified OPCq instrument was acceptable, but some adjustments are needed. Nurses need the possibility to clearly and easily register indirect-care-related activities and non-patient activities in the RAFAELA® system. If the RAFAELA® system is modified to fully suit

an HHC setting, its use will provide an efficient platform for the management of nursing resources and the balanced allocation of nursing staff resources through which PCN can be promoted. Each patient is unique, and each patient's needs vary over time. Therefore, to improve PCN, the daily classification of the patients' actual care needs with the modified OPCq instrument will provide a clear nursing care structure.

8.3 Reliability of the modified OPCq instrument

Reliability is one of the six essential elements that should be included in an operational PCS (De Groot, 1989a) and used as a selection criterion for evaluation when choosing a PCS (De Groot, 1989b). The reliability of the modified OPCq instrument was tested during the course of this project, through both agreement among data collectors and interrater reliability (McHugh, 2012) in Paper III. Interrater reliability is estimated when two or more raters simultaneously but independently classify a patient in accordance with an instrument's instructions (Polit & Beck, 2004). Because of the work situation in HHC this is difficult; nursing staff typically work alone and working in pairs will be resource consuming. In Paper III, one sees a new method for parallel classification that was developed with the specifics of an HHC setting in mind, involving a main rater who classified a patient using the modified OPCq instrument when visiting the patient and secondary raters who performed the classification without visiting the actual patient, based on the main rater's same-day oral case presentation. In this new multiple parallel classification method, only the main rater met the patient being classified, which may be a limitation. The method might be more reliable if both main and secondary raters actually met the patient on the (same) day of classification. There were additional benefits associated with this new parallel classification method, such as in regard to learning: when staff learned to use the method they could discuss the different patient cases post-classification. When considered in light of the PCN process (McCormack & McCance, 2010), it is positive that staff can together discuss a patient's needs, including physical, psychological, sociocultural and spiritual needs. The provision of holistic care can be highlighted, and staff encouraged to exchange experiences.

For parallel classifications, different methods can be used. Using the CCNS instrument (Brady et al., 2008; Byrne et al., 2007), a PHN rated two different scenarios (one child case, one older person case) and then again rated the same cases after 10 days (10-day-interval-rating). One limitation to such a method is that changes can occur in a patient's needs from day to day, and this is especially true in an HHC setting where complex patient situations are common (Norwegian Ministry of Health and Care Services, 2015b) and a sufficiently long testing interval may not be possible, e.g., 10 days as seen here. In Kottner et al.'s study, using the CDS instrument, the nurse primarily responsible for a patient's care performed a first classification while another nurse performed a second classification following an interval of 1-3 days (Kottner et al., 2010). While this may be a viable method, in terms of the continuity of the nurse-patient relationship it is perhaps not so suitable because it would require that several different nurses provided a single patient's care. It is also possible to gather secondary data from patient records, following an initial classification (Altafin et al., 2010; Liljamo, Kinnunen, Ohtonen, & Saranto, 2017; Stafseth, Tønnessen, My, & Fagerstrøm, 2018). Still, this method also has limitations because in HHC nursing documentation can be considered inconsistent and of variable quality (Gjevjon & Hellesø, 2010).

In an assessment of the modified OPCq in Paper III, Cronbach's alpha showed good to excellent internal consistency (George & Mallery, 2003) of the instrument's sub-areas 1-6, which is possibly attributable to the relatively homogenous staff group. Streiner found that Cronbach's alpha is higher for homogeneous groups than non-homogeneous group, thus it should therefore be used and interpreted with some degree of caution (Streiner, 2003). Measurement through Cohen's kappa was also used in Paper III, and De Vet et al. noted that the Cohen's kappa value is not sufficiently informative, because it is a measure of reliability, not agreement, between raters. Thus Cohen's kappa should not be used to measure of observer variation in clinical practice (De Vet, Mokkink, Terwee, Hoekstra, & Knol, 2013). Furthermore, a low kappa value may not always be indicative of low agreement (Gisev, Bell, & Chen, 2013).

Despite the inclusion of different professional groups with different educational and competence levels, the new interrater reliability method developed and assessed in Paper III revealed that the modified OPCq instrument was reliable for use in HHC.

8.4 Usability of the modified OPCq instrument

In addition to sufficient validity and reliability, the usability of an instrument is also essential. Simplicity/efficiency and utility are also part of De Groot's six essential elements and selection criteria for an operational PCS. A PCS should be easy and not too time consuming to use, and also a permanent part of the patient record (De Groot, 1989b).

Half a year after the implementation of the modified OPCq instrument, four focus groups interviews were conducted (Paper IV) with the aim to describe nurses' work experiences and perceptions of the usability of the modified OPCq instrument when classifying NI in HHC. Both in Papers II and IV, the participants experienced that some ambiguity exists between the different NI levels B, C and D, especially B and C. Level A is a patient who manages more or less on his/her own, and for the nursing staff assessment on this level was no problem. Yet between levels B (a patient sometimes in need of care, in partial need of help), C (a patient in repeat need of help, complex situation) and D (a patient in constant need of help, completely helpless, very complex situation) the participants expressed uncertainty. Even though the participants had quite lengthy work experience and work experience specific to an HHC setting, they found it difficult to discern between these levels. The Coordination Reform was implemented in 2012 (Norwegian Ministry of Health and Care Services, 2009), and this sub-study conducted in spring 2013. Perhaps one reason why the participants expressed more uncertainty about levels B, C and D can be explained by the increase in more complex patient cases in HHC, stemming from the Coordination Reform. Researchers have found that at the time municipal health care system chairmen, chief administrative officers and administration managers all expressed that nursing staff competence was too low to accommodate the systematic (Coordination Reform) changes being implemented and that it was also difficult to find

nurses with specialist competence, e.g., NPs, APNs or cancer specialist nurses (Kassah, Tønnessen, & Tingvoll, 2014). Increased transitional care, increased nursing staff responsibility and more complex tasks (Haukelien et al., 2015; Sæterstrand et al., 2015) all require increased nursing staff competence. If PCN is to be realized, it is essential that nursing staff are professionally competent and have developed or are developing interpersonal skills. According to the Norwegian Directorate of Health, the plan is to contribute to a professionally strong service and ensure that municipal health and care services have adequate and competent staffing (Norwegian Directorate of Health, 2017b). To these means, several initiatives have been introduced, e.g., investigations into the establishment of new clinical Master's degree level educational program for RNs; investigations into whether the content of current continuing education programs for RNs will meet municipal needs; continuing education programs for PNs. Because there has been an increase in various post-graduation or Master's level programs for RNs (Statistics Norway, 2007-2017), one can expect that ease of discernment between levels B, C and D will increase alongside nursing staff competence. One should also not forget the inherent complexity of an HHC setting, where the older frail, people with handicaps or disabilities, mental disorders, alcohol and/or drug problems, dementia or other neurological diseases receive care (Norwegian Ministry of Health and Care Services, 2015b). The OPCq was first developed in a hospital setting (Fagerström, 2000; Fagerström et al., 1999), where units are specialized for typical patient groups and there is a high rate of RNs in comparison to HHC.

In Paper IV, the participants noted that they performed several tasks and duties that "did not fit" into the OPCq instrument, and common examples included helping a patient with support stockings or "all the phone calls". In a PCN process, the ability to record every task and duty is essential, including where the deliverance of care occurred (McCormack & McCance, 2010).

The RAFAELA® system currently includes classification instruments for five different types of units: PPCq for mental health care; POLIHOIq for outpatient units and emergency service; PERIHOIq for operating and recovery rooms, day-surgery; SÄDEHOIq for radiation

therapy (Fagerström, 2017). There may exist a need for a RAFAELA® system instrument specifically designed for an HHC setting, however as seen here in this thesis the OPCq instrument is useful in HHC but some adjustments will be needed. As De Groot has noted, for maximum usability a classification instrument should exist in a format that is a permanent part of a patient's record (De Groot, 1989b). When the RAFAELA ®system is fully operated, the OPCq instrument is a part of the patient's record.

Technical issues

As seen here, some practical difficulties arose when the RAFAELA® system was implemented, specifically the documentation of the modified OPCq instrument. The RNs, PNs or assistants providing care to patients made classifications with the modified OPCq instrument after each HHC visit. At first, the participants wrote down their classifications by hand and entered the data into the RAFAELA® database at the end of each day. Yet due to the high numbers of HHC visits per nurse, this was deemed too time consuming. The participants experienced that it could be difficult to log in to the RAFAELA® database at the end of a shift, because there were too few computers available, and at times they had to wait for an available computer when back at their units. Because of these problems, the FCG Ltd and the municipality decided to develop a mobile application for a PDA, which is a mobile, handheld computer that can be used to access the Internet. Still, despite these measures, some problems remained. While the mobile application saved time, occasional poor mobile network coverage resulted in the participants still sometimes having to write down their classifications by hand, which caused additional stress. A sufficient number of new computers had been ordered for the two HHC units to help remedy the problem, but, while physically present at the units, they were not yet installed for use when the focus group interviews were conducted.

In Paper I, technical problems in relation to the development and implementation of other PSCs were seen including: insufficiency of computerized data bases when testing the CHIRS instrument (Çelebioğlu et al., 2007), staff found it difficult to record results on an Excel spreadsheet when the CIT was tested (Collister et al., 2014), and a lack of computer programming skills when the DominiC was developed (Bowers & Durrant,

2014). Yet in research on the development and implementation of PCSs in elderly care, eventual technical issues are nearly never mentioned (Byrne et al., 2007; Byrne et al., 2006; Carpenter et al., 1997; Churness, Kleffel, & Onodera, 1991; Hawes et al., 1997; Thorsell, Nordström, Fagerström, & Sivberg, 2010). Because technical problems may be an issue when a new system is implemented, this should be considered valuable information and such issues therefore both investigated and reported.

It is important that nursing staff are knowledgeable and comfortable with any technological solutions that are introduced, and it is essential that all technology work satisfactorily. The PCN framework in care environment a complex phenomenon (McCormack & McCance, 2010) and when a new PCS is introduced it is essential that a functioning, supportive organizational system is in place. For the implementation of the RAFAELA® system to continue, the aforementioned new computers needed to be installed and use of the specifically-developed mobile application facilitated through working and viable network connections or other solutions for the PDAs given to participants. Developments in Information Technology systems have made PCSs possible and allowed the analysis of large amounts of data, but there are still everyday technical issues that should be solved.

8.5 Methodological reflections

The methodological reflections include a discussion on the strengths and limitations of the papers part of this thesis. Also be elucidated in this section are the different methods, purposes and research questions seen in each paper.

A scoping review can be undertaken to examine the extent, range and nature of research activity and to map the key concepts underpinning a research area (Arksey & O'Malley, 2005; Levac, Colquhoun, & O'Brien, 2010). A strength of **Paper I** is that Arksey and O'Malley's framework and methodology for scoping reviews was followed (Arksey & O'Malley, 2005; The Joanna Briggs Institute, 2015), which included both a systematic database search as well as a search for "grey literature" in Google/Google Scholar and

key journals occurred. In regard to charting the data, Levac et al. recommended that two researchers should independently extract data from the first 5-10 included studies using a data-charting form (Levac et al., 2010). One limitation may be that this did not occur in Paper I. However the first author (JF) performed the charting, which was followed by with the co-authors (BL, ST, LF). Another limitation may be that the decision was made not to contact policymakers, health departments, nurse managers etc. for more detailed information, because of the extensive number of countries involved. Also, because Paper I was a scoping review, the quality of the studies included was not assessed.

There are several strengths with a questionnaire, such as cost and anonymity (Polit & Beck, 2004). In **Paper II** the questionnaire was self-administered, which was considered more appropriate than collecting questionnaire data through the mail as that tends to yield a low response rate (Polit & Beck, 2014). One strength is that the same questionnaire had been used in earlier studies of the OPCq instrument (Fagerström, 2000; Frilund & Fagerström, 2009b), and using the same questionnaire as in earlier studies can facilitate the comparison of results even if the setting is not exactly the same. The participants in Paper II had the possibility to comment on eight questions, which may strengthen the study because this allows participants to respond in their own words (Polit & Beck, 2004). One limitation may be that there were no open-ended questions in the questionnaire, which give depth and richness (Kline, 2005). Still, this possible limitation was considered to be balanced by the strength of allowing participants the possibility to comment on some (eight) questions. While a type of Likert scale was used (Kline, 2005), there was no midpoint (undecided) (Likert, 1932) but instead a category, "cannot say", which make it possible for the participants to respond if they felt that they could not answer the question.

There were limitations with the data collection in Paper II. The questionnaire (Appendix) was distributed through in-person distribution on two occasions, spring 2013 and spring 2014. The head nurses of the included units handed out the questionnaire, which may have affected the response rate in 2013, which was 71%. To elicit more responses, in spring 2014 the method whereby data were collected was changed. This may constitute

a weakness. In spring 2014, nursing students interviewed participants emanating from the same questionnaire that was used in 2013. The nursing students received information about the study before performing the interviews, but interviewers' bias can affect a distortion in the results of the study (Polit & Beck, 2014). Also, the one-year gap between data collection dates may have affected the results. A further limitation is that for the spring 2014 collection, no information was given about how many nursing staff were invited to participate. Lastly, the two units (A and B) where the data collection took place were quite small. Still, a response rate of a total 44 was considered acceptable.

In **Paper III** a new method for reliability testing was used because the most common method for parallel classification up until that point, two independent raters at the same time (Kottner et al., 2011), was deemed unfeasible for the HHC context. Two strengths are that prior to the actual data collection, the nursing staff had participated in an educational/training program and learned how to classify with the OPCq instrument through exercises and patient cases examples and thus used to classifying patient cases. Another strength is that the new parallel classification method worked well; it allowed for opportunities to deepen understanding of how classification should take occur and provided a structure for nursing care and good training opportunities.

Researchers had previously determined that two nurses conducting classifications of the same patient at the same time would probably yield the most correct test results (Andersen et al., 2014; Frilund & Fagerström, 2009b; Liljamo et al., 2017). Yet in Paper III only the main rater actually met and classified the patient while the second raters made their classifications based on the main rater's case presentation. Nevertheless, a delineated structure for describing nursing care was used when the main rater presented the case, so that every main rater followed the exact same structure each time, which is a methodological strength. If the main rater had not properly followed the delineated structure, variation would have been seen between the main and secondary raters' classifications, which would have revealed a weakness.

There are recommended guidelines (GRRAS) for reporting interrater reliability and agreement studies, which help improve the reporting (Kottner et al., 2011). In Paper III,

GRRAS guidelines stating that both characteristics of raters and subjects should be reported were followed (Kottner et al., 2011), which is a strength. One limitation is that little information on the participants' background statistics was seen, even though type of education (RN, PN, assistant, student) and whether they worked more than 50 % or during the day were reported. Participants' work experience and age could have been reported, alongside more patient background statistics, e.g., diagnosis, stage of disease, need for assistance, aid requirements, length of time receiving HHC services.

In **Paper IV,** a qualitative design was used with focus group interviews, which provides empirical data on a group level and social interaction as the source of data (Halkier, 2010). Collecting data on a group level can be a strength but also a weakness. In Paper IV it was considered a strength, realized in the form of group interviews that included RNs and an SE and PNs who had used the modified OPCq instrument. Some researchers recommend that focus groups not to be too homogenous (Halkier, 2010), but in this setting homogenous groups were considered the best way to collect data about nurses' experiences and perceptions of the usability of the OPCq instrument. The RNs/SE and the PNs were interviewed separately, with the motivation that both groups would speak more freely if they had the same educational level. Also, the participants knew one another because they worked at the same unit, and that was useful in respect to the research question and the social interaction in the group.

Interview participants can feel privileged, become desensitized, develop attachments, or feel vulnerable, guilty or exhausted, which should be considered important when dealing with sensitive data (Dickson-Swift et al., 2007). This focus group interviews in Paper IV did not deal with sensitive data, and the participants were providing important information that could be useful in the improvement of care for older people. If any feelings of guilty arose, e.g., because it was revealed that the participants did not always have the time to give patients the care they wanted to, an opportunity to reflect on the issue was provided in the form of the group discussion.

Corbin and Morse (2003) found that interviewing is a skill and that in order to interview others training is needed. The moderator in this study was trained in interviewing and

had experience from several focus group interviews (Corbin & Morse, 2003). Self-disclosure and ensuring that the researcher-participant relationship was nonhierarchical were practiced during the interviews (Dickson-Swift et al., 2007). Furthermore, the moderator, who was the project leader (BL) and well-known among the participants, was not given a hierarchical position. Thus it was assumed that an asymmetrical power relation (Kvale, 2006) was avoided during the interview. Detailed field notes, photos, and description of the room in an interview setting can be beneficial (Dickson-Swift et al., 2007), but were not considered essential in the context. However, a supportive note taker (Liamputtong, 2011; Wong, 2008) might have strengthened the method, and thereby provided richer data.

8.6 Suggestions for further research

During the course of this project, in which the PCSs used to classify NI and assess nurse staffing resources in HHC were revealed, the content validity of the OPCq instrument tested, a new interrater method developed to test the OPCq's interrater reliability and nurses' experiences of measuring NI in HHC were investigated, several areas for further research were revealed. In the future, it would be recommended to:

1. Test the modified OPCq instrument in relation to its validity, reliability and usability in additional HHC units, making sure to include units in both larger and smaller municipalities and rural areas. This was a pilot project, and more evidence will be gained if a larger study is performed.

2. Further modify the OPCq instrument, emanating from the results of this research project (presented in Papers II-IV) and from the various participants' experiences of using the OPCq. Following some small modifications, the OPCq will be even more well suited to an HHC setting

3. Develop a list of additional non-patient factors that can be added to the OPCq instrument and incorporated into the assessment of staff allocation in HHC.

4. Investigate HHC staff's experiences of person-centeredness in their work, prior to and following the implementation prior to and following use of the RAFAELA ®system. Also, in conjunction, patients' experiences of care in regard to person-centeredness should be investigated.

5. Introduce the implementation of the RAFAELA® system's 5 phases in HHC care, because a fully operational PCS that can be used in the allocation of nursing resources is needed.

9 Conclusion

The main findings can be summarized as follows:

During the past decade little advancement has been made in regard to published research on validity and reliability tested or evaluated PCSs used in an HHC setting and linked to nurse staffing allocation. Limited research exists in which PCSs are shown to be fully operational for use in an HHC setting.

As seen here, the modified OPCq instrument appears to fulfill the requirements for validity in an HHC setting. Regarding reliability testing of the OPCq instrument using by a new multiple parallel method, the results seen here were slightly lower than those seen in previous studies conducted in primary health care and hospital settings. Still, comparisons between studies are difficult, because a total raw score was used in calculations in this study versus patient categories I-V, which have been used in other studies.

Nurses considered the modified OPCq to be useful in the classification of NI in HHC, noting that through use of the instrument their work reality, including the time pressure they experience, was accurately illuminated.

Overall the modified OPCq instrument was demonstrated to be trustful. Nevertheless, the manual should be improved and some instrument aspects changed to better correspond to the specific needs of an HHC setting, both in regard to the instrument's sub-areas and NI levels.

Because the research presented in Papers II-IV was based on a small sample, further research is needed on NI and the optimal allocation of nursing staff in an HHC setting.

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Paper 1

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Paper II

Testing of the Content Validity of a Modified OPCq Instrument—A Pilot Study in Norwegian Home Health Care

Jill Flo[1*], Bjørg Landmark[1,2], Ove Edward Hatlevik[3], Siri Tønnessen[4], Lisbeth Fagerström[1,5]

[1]University College of Southeast Norway, Campus Drammen, Drammen, Norway
[2]Institute for Research and Development for Nursing and Care Services, Drammen, Norway
[3]Department of Teacher Education and School Research, University of Oslo, Oslo, Norway
[4]University College of Southeast Norway, Campus Vestfold, Vestfold, Norway
[5]Åbo Akademi University, Åbo, Finland
Email: *Jill.Flo@hbv.no, Bjorg.Th.Landmark@drmk.no, o.e.hatlevik@ils.uio.no, Siri.Tonnessen@hbv.no, lisbeth.fagerstrom@hbv.no

Abstract

Aim: To test the content validity of a modified Oulu Patient Classification instrument (OPCq), part of the RAFAELA Nursing Intensity and Staffing system in home health care (HHC) in Norway. **Background:** Due to the growing number of patients in HHC, a Patient Classification System (PCS) whereby the systematic registration of patients' care needs, nursing intensity (NI) and the allocation of nursing staff can occur is needed. The validity and reliability of the OPCq instrument have been tested with good outcomes in hospital settings, but only once in an HHC setting. In this study, the OPCq is tested for the first time in HHC in Norway. **Methods:** A pilot study with a descriptive design. The data were collected through a questionnaire (n = 44). Both qualitative and quantitative analyses were used. **Results:** The OPCq fulfills the requirements for validity in HHC, but the manual may need some minor adjustments. **Discussion:** The OPCq seems to be useful for measuring nursing intensity in HHC. Staff training and guidance, high-quality technological solutions and that all technology works satisfactorily are important when implementing a new PCS. Further research is needed in regard to NI and the optimal allocation of nursing staff in an HHC setting.

Keywords

Nursing Intensity, OPCq, Home Health Care, Patient Classification System

1. Introduction

The percentage of older people in the population of many countries is rising, concur-

rent with a widespread trend to refocus health care services away from hospital care and into municipal-based care. The number of beds in hospitals and nursing homes facilities has decreased in the European Union [1], which has resulted in a significantly increased need for home health care (HHC) services and, consequently, an increased need for nursing resources. Until now, research on the allocation of nursing resources in HHC has been scarce [2], and relatively few instruments for classifying and measuring patients' care needs in HHC have been developed and regularly used [3] [4] [5] [6].

As delineated by the Norwegian Ministry of Health and Care Services in the Coordination Reform, municipalities are now responsible for the care of individuals with complex medical and psychosocial needs [7]. A person-centered approach in primary health care is also recommended [8]. During the last decade, several researchers have found that a person-centered, holistic approach improves the quality of care that older and vulnerable patients receive [9] [10]. In a person-centered approach, one important objective is the fulfillment of patients' physical, psychological, sociocultural and spiritual needs [11]. Yet organizational structures also affect whether patients' needs can be fulfilled, especially in regard to staff resources: both in terms of educational level and number of nurses and/or nursing hours. An optimal nursing workload ensures that nurses can meet patients' needs. Aiken *et al.* [12] found associations between higher mortality in hospitals and fewer nurses qualified at bachelor's degree level. In a recent study, a clear association between a nursing workload above the optimal level and mortality was found [13].

We maintain that if nursing resources are not matched to patients' care needs and nursing intensity (NI), adverse events and mortality will increase in HHC. It is therefore essential that the continual classification and measuring of patients' care needs and NI occur. New instruments and systems for the systematic monitoring of NI are needed, so that nurse staffing resources can be purposely planned and quality of care ensured.

NI as a concept is closely related to the concepts "patient dependency", "acuity" and "severity" [14] [15] [16]. NI can be defined as how nursing-intensive a situation is and how dependent a patient is on the care provided: how much care, help and support a patient receives [14] [15].

The RAFAELA Nursing Intensity and Staffing system is a classification system developed in Finland in the early 1990s for hospital settings [17] [18]. The RAFAELA system provides a rational, systematic and objective foundation for evidence-based human resource management [19]. It is a well-functioning, tested administrative tool for nurse managers, which has been used in Finland, Norway and Iceland and on different health care and hospital organizational levels [17] [18] [20] [21] [22]. In an integrative review of PCS, Fasoli and Haddock [23] found that RAFAELA was one of a small number that met the criteria for validation and reliability in hospital settings.

RAFAELA is composed of two instruments, the Oulu Patient Classification/Qualisan (OPCq) instrument and the Professional Assessment of Optimal Nursing Care Intensity Level (PAONCIL) instrument. The OPCq was developed for hospital use and incor-

porates a holistic approach to care, measuring basic physical needs, emotional needs and nursing care activities. The validity of the OPCq has been tested in HHC once in Finland [4]. In this paper, we describe the process whereby the OPCq was modified to suit a Norwegian HHC setting and present the results of a pilot study of the content validity of the modified OPCq, assessed through nurses' evaluation of the instrument.

2. Background

PCS and NI instruments were first developed in the USA in the 1940s for use in hospital settings; similar development and research in the Nordic countries started first in the early 1970s. Of those designed for use with older patients in HHC settings, the majority have been developed in the USA. We found several tools: Clinical Care Classification (CCC) [24], Resident Assessment Instrument (inter RAI), Resource Utilization Groups (RUG III) [5], Community Health Intensity Rating scale (CHIRS), Easely-Storefjell Patient Classification Instrument (R-ESPCI) [3] and Caseload Intensity Tool (CIT) [6]. Some instruments estimate functional capacity instead of NI, for example the Katz Index of Independence in Activities of Daily Living [25] and the modified Katz ADL [26].

In Sweden, the Time in Care instrument (TiC) has been used in some municipalities [27]. In Norway the *Individbasert statistikk for pleie-og omsorgstjenesten i kommunene* (IPLOS) register, a central health register that forms the basis for national statistics for the nursing and care services, is used in Norwegian municipalities to catalogue individual patient's resources and need for assistance [28]. The IPLOS register is not all-encompassing and mainly classifies functional capacity; it does not register sociocultural or spiritual needs. Norwegian nurses consider it to be a technology-driven register whereby interpersonal skills are diminished [29]. The need exits to test an instrument that captures all dimensions of nursing care, such as the RAFAELA system, which is the most commonly used system in the Nordic countries [14] [22] [30] [31].

3. Description of the RAFAELA System and the Modification of the OPCq for a HHC Setting

When using the RAFAELA system, it is possible to gather information on each patient's need for individual care and ensure the realization of a person-centered care. HHC Nurse Managers can use the RAFAELA system to balance patients' needs and nurse staffing resources and realize an optimal nurse staffing level. The RAFAELA system is used to ensure that the workload per nurse (expressed in NI points per nurse) is on the optimal NI level. This makes it possible to ensure the quality of nursing, good patient outcomes, good working conditions and the effective use of available resources [21].

The validity and reliability of RAFAELA in hospital settings has been assessed in several dissertations [14] [30] [31] and in primary health care in one dissertation [4]. With RAFAELA it is possible to respond to the constant variation in patients' needs, and it consists of the following components: 1) Daily registration of patients care needs using the OPCq instrument; 2) Daily registration of actual nurse staffing resources; 3. Periodical determination of optimal NI level using the PAONCIL instrument.

In the OPCq, nursing care and care needs are organized into the following six sub-areas: 1) Planning and co-ordination of nursing care; 2) Breathing, blood circulation and symptoms of disease; 3) Nutrition and medication; 4) Personal hygiene and secretion; 5) Activity, sleep and rest; 6) Teaching, guidance in care and follow-up care, emotional support. Using the OPCq, nurses measure the six sub-areas at regular intervals, with A = 1 point (independent), B = 2 points (partial need of help), C = 3 points (repeat need of help, complex) or D = 4 points (constant need of help, very complex); the sum provides a total NI per patient per day in hospital or per HHC visit. Total NI can thus vary from 6 to 24 points.

This project was a collaboration between a municipality in southeast Norway and a regional University College and lasted from 2012-2014. The Finnish Consulting Group Ltd. (FCG) [32] supplied the RAFAELA system and led a two-day introduction (educational program) to the RAFAELA system for all nursing staff at the participating HHC units in October 2012. The FCG also provided a manual for the OPCq instrument, which included instructions for its use and descriptions of the six sub-areas, classification system and key terms. Prior to the start of the project, the OPCq manual was modified for use in an HHC setting. Two workgroups consisting of 8 people in total (including registered nurses (RNs), practical nurses (PNs) and organizational leaders) met 4 - 5 times to discuss modifications to the OPCq manual with the internal project leader. Modifications were based on what staff considered to be relevant concerning clinical practice in HHC. The internal project leader regularly discussed the modifications that the workgroup had agreed upon with an external project leader/professor from the University College, and the experts at FCG thereafter approved all modifications.

Modifications were made as follows. Examination program at regular intervals B-C was removed from sub-area 1 (Planning and co-ordination of nursing care). The requirement that nursing staff assess electrolyte and acid-base disturbances or increased intracranial pressure was removed and patient positioning was changed to bedridden in sub-area 2 (Breathing, blood circulation and symptoms of disease). Management of prophylactic medication was changed to continuous medication in sub-area 3 (Nutrition and medication). The need for advice prior to discharge from hospital was removed from sub-area 6 (Teaching, guidance in care and follow-up care, emotional support), because the patients were already living in their own homes. Modifications were additionally made to the *key terms* listed in the manual: "occasional" was adjusted to "need for occasional help" in sub-areas 2 - 6.

Prior to implementation of the instrument, all nursing staff at the two participating HHC units were given an introduction to the modified OPCq instrument. The project leader was responsible for all subsequent education related to the project and/or use of the OPCq instrument.

While in hospital settings measurement of the OPCq occurs daily, this was not considered feasible in an HHC setting. Instead, measurement of the modified OPCq occurred after each HHC visit. Following each visit, the nurses first wrote down their classifications by hand and then entered the data into the RAFAELA database after-

wards. However, due to the high number of visits per nurse, the daily classifications were assessed as being too time consuming and the FCG and the municipality decided to develop a mobile OPCq classification application. While the final mobile application saved time, during its development and whenever there was poor mobile network coverage the participants were required to continue to write down their classifications by hand, which caused additional stress.

4. Aim

The aim of this present study was to test the content validity of the modified OPCq instrument, part of the RAFAELA Nursing Intensity and Staffing system, in HHC in Norway.

5. Ethical Considerations

Approval was sought from and provided by the Norwegian Social Science Data Services (NSD) prior to commencement of the study and appropriate permission was sought from the municipality. A license from the FCG to use the RAFAELA system was sought by the municipality and granted.

6. Methods

6.1. Design and Settings

This is a pilot study with a descriptive design. Validity testing of the OPCq instrument through the use of a summative questionnaire was carried out on two HHC units in a medium-size city, about 70,000, in southeast Norway during 2013 and 2014. The study was a part of a municipal research and development program and realized in collaboration with a regional University College during 2012-2014.

6.2. Participants and Data Collection

The data collection was conducted in two phases. Inclusion criteria were that participants worked 50% or more, worked day or evening shifts and had participated in the RAFAELA educational program for instruction in the use of the OPCq instrument. In spring 2013 the head nurses at two HHC units handed out 31 questionnaires. The HHC units had a total of 36 staff members, 24 RN and 12 PN or assistants. The head nurses and the coordinators were not included in the study. The questionnaire was answered anonymously and were returned, sealed in a reply envelope, to the same head nurses with a response rate of 71% (n = 22). In order to garner more participant responses, nursing students from the University College collected data in spring 2014 through the use of structured interviews, with interviewers basing their questions on the same questionnaire previously used. Twenty-two participants responded this time. The questionnaires, sealed in a reply envelope, were returned to the external project leader/professor leading the research project. The main items in the questionnaire concerned background variables (age, gender, education and work experiences), questions about the

sub areas 1 - 6 and NI, education and training in OPCq classification and motivation to classify. All participants provided written informed consent for participation in the study and were informed that they could withdraw from the study at any time.

Of the participants (n = 44), 23 (52.3%) were RNs with bachelor degrees, 18 (40.9%) were PNs with vocational degrees and one was an assistant without formal competence (2 missing). A total of 27 (61.4%) had ten years or more work experience, 5 (11.4%) between 5 - 10 years, 3 (6.8%) between 3 - 4 years and 7 (15.9%) between 1 - 2 years (2 missing). The mean age was 40.8 years (MD 39), with a range from 19 - 69 years. The majority were women, with only two men. The participants had classified patients' NI about 7 months before the 2013 data collection and 18 months before the 2014 data collection.

The OPCq has been evaluated using the same questionnaire in two earlier studies: once in a hospital setting [14] and once in a primary health care setting [4]. For this study, the questionnaire was translated from Swedish into Norwegian and slightly modified to suit an HHC setting. The face validity was tested by six RNs at the municipal research unit prior to data collection. The internal consistency was measured using Cronbach's alpha, with a reliability of 0.96 [33] [34]. A reliability coefficient of 0.70 or higher is considered acceptable [34].

The questionnaire comprised 13 questions with set answers and the possibility to comment on eight of the questions. Ten questions had a five-point Likert scale with the variables: 1 = not at all, 2 = partly, 3 = pretty well, 4 = well, 5 = very well: as well as the alternative 0 = cannot say. One question had a five point Likert scale with the variables: 1 = not motivated, 2 = partly motivated, 3 = motivated, 4 = very motivated and 5 = highly motivated. The remaining two questions pertained to demographic variables (gender, work experience, educational level) and whether the OPCq's six measurement sub-areas should be modified. One question was excluded from the questionnaire in that it had different content in the first and second data collections.

6.3. Data Analysis

IBM Statistical Package for Social Sciences (SPSS) Version 22 was used for descriptive analyses. Pearson's *r* and Spearman's rho correlations were also used: both are recommended for use when calculating ordinal scales [33]. Inductive content analysis [33] [35] was used in a simplified form to analyze qualitative comments.

7. Results

The data findings are presented quantitatively and qualitatively below. Note that in the tables, but not the analysis, the questionnaire scoring options were sorted into four categories: very well/well, pretty well, partly/not at all and cannot say.

Q2: *In your opinion, how well are the sub-areas* 1 - 6 *described in the OPCq instrument?*

About 80% of participants scored sub-areas 1, 2, and 4 using very well/well or pretty well. Sub-area 5 was given the lowest score (Table 1).

Table 1. Q2: In your opinion, how well are the sub-areas 1 - 6 described in the OPCq instrument?

Sub-areas	Very well/well	Pretty well	Partly/not at all	n	Mean	Median	SD
1. Planning	27.3% (12)	54.5% (24)	18.2% (8)	44	3.06	3	0.82
2. Breathing circulation	27.3% (12)	54.5% (24)	18.2% (8)	44	3.09	3	0.77
3. Nutrition medication	25% (11)	52.3% (23)	22.7% (10)	44	3.00	3	0.96
4. Personal hygiene	34.1% (15)	45.5% (20)	20.5% (9)	44	3.11	3	0.87
5. Activity, sleep	25% (11)	47.7% (21)	27.3% (12)	44	2.98	3	0.82
6. Teaching guidance	27.3% (12)	47.7% (21)	25% (11)	44	3.00	3	0.86

Q3: *Does a need exist for additional sub-areas?*

Fourteen participants (n = 44) replied that additional sub-areas were needed, 14 that none were needed and 15 cannot say (1 missing).

Qualitative findings. Nineteen participants left written comments, from which two categories were discerned: *some sub-areas do not match* and *poorly adapted to HHC.*

In *some sub-areas do not match,* participants specified that some sub-areas did not match and should be more clearly defined: a degree of overlapping existed and there was uncertainty in regard to the OPCq's NI classification levels B and C. Participants also noted that there were too many situations included in each sub-area. Nevertheless, participants considered some sub-areas to be well described, full of detail and as having good coverage. Still, the use of more suitable keywords was sought.

In *poorly adapted to HHC*, participants mentioned that they lacked the ability to classify practical things such as: garbage, activities, the washing of garments, support stockings, weather conditions, driving conditions, phone calls, interdisciplinary collaboration and unexpected events.

Q5: *How well do sub-areas* 1 - 6 *describe the patient's total NI?*

More than half of the participants 25 (56.8%) indicated that sub-areas 1 - 6 describe NI very well, well or pretty well, while 18 (40.9%) scored this partly or not at all (1 missing) (Figure 1).

Qualitative findings. Eight (*n* = 44) participants left written comments. While some indicated that the sub-areas were well described, one replied (without further elaboration) that they should be more specific. Some sought better keywords and the ability to register unexpected events and better express concepts such as emotional support and persuasion.

Q8: *How well does the OPCq's interpretation of the patient's NI correspond to the interpretation that your experience leads you to?*

Twenty-one (47.7%) participants replied using well or pretty well, 14 (31.8%) partly, six (13.6%) not at all and two cannot say (1 missing).

Q6: *How well do the sub-areas* 1 - 6 *differentiate from one another?*

Twenty-three (52.3%) participants replied using very well, well or pretty well while 19 (43.2%) replied partly or not at all (2 missing) (Figure 2).

How well do sub-areas 1 - 6 describe the
patient's total nursing intensity?
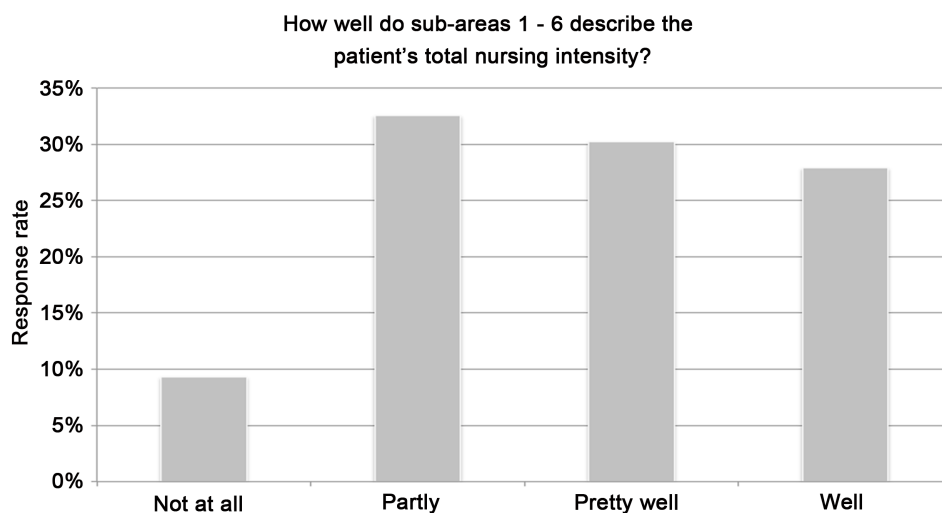
Figure 1. Q5: How well do sub-areas 1 - 6 describe the patient's total nursing intensity?

How well do the sub-areas 1 - 6 differentiate
from one another?
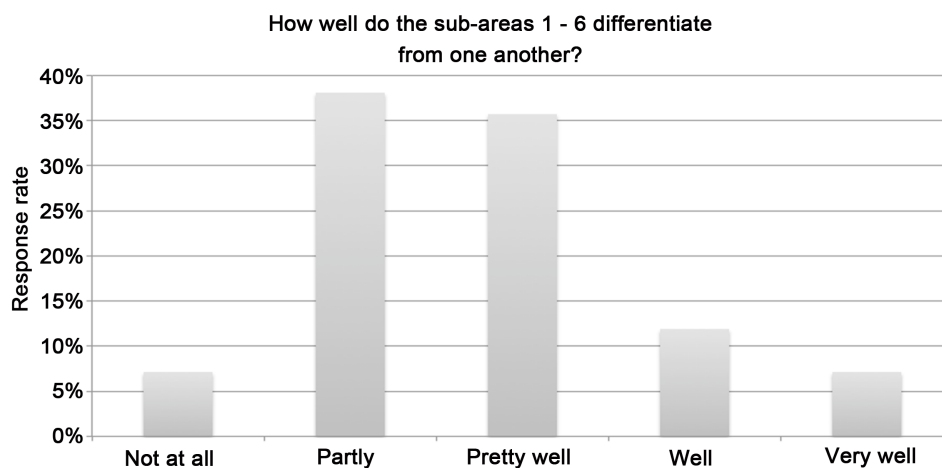
Figure 2. Q6: How well do the sub-areas 1 - 6 differentiate from one another?

*Q*4: *In your opinion, how well are the NI levels A-D described in the following sub-areas in the OPCq instrument?*

Two thirds of participants replied using very well, well or pretty well. The highest estimated sub-area was personal hygiene and secretion (sub-area 4) and the lowest estimated was nutrition and medication (sub-area 3) (Table 2).

Qualitative findings. Fourteen participants left written comments from which two categories were discerned: *some unclear* and *time*. In *some unclear*, participants noted that some NI levels were unclear and difficult to understand: there were only slight differences between the levels, making classification difficult; it was difficult to address nuances when selecting a level; and it was difficult to distinguish between levels C and D. A few mentioned that the instrument was not suited for use in HHC. In *time*, participants noted that they could not properly register the time they spend with patients, e.g., making phone calls to doctors or other authorities: "*It is difficult to account for the*

Table 2. Q4: In your opinion, how well are the NI levels A-D described in the following sub-areas in the OPCq instrument?

Sub-areas	Very well/well	Pretty well	Partly/not at all	n	Mean	Median	SD
1. Planning	25% (11)	47.7% (21)	27.3% (12)	44	2.90	3	0.93
2. Breathing circulation	25% (11)	47.7% (21)	27.3% (12)	44	2.90	3	0.93
3.Nutrition medication	15.9% (7)	45.5% (20)	38.6% (17)	44	2.70	3	0,90
4. Personal hygiene	18.2% (8)	56.8% (25)	25% (11)	44	2.86	3	0.88
5. Activity sleep	25% (11)	43.2% (19)	31.8% (14)	44	2.84	3	0.97
6. Teaching guidance	22.8% (10)	50% (22)	27.3% (12)	44	2.89	3	0.92

time". Some participants even remarked that a lack of time made it difficult to classify the patients' NI.

Q7: *In your opinion, how practical and concrete is the OPCq instrument?*

More than half of the participants replied using very well, well or pretty well in regard to the question's three sub-categories: instrument instructions (manual's written instructions), concepts and support words, NI levels A-D (Table 3).

Q9: *In your opinion, has the training been sufficient?*

More than half of the participants replied using very well, well or pretty well in regard to the question's four sub-categories: electronic scheduling, OPCq as a method used to measure, sub-areas 1-6 and NI (Table 4).

Q10: *Has the training provided you with practical skills in the use of the OPCq instrument?*

Twenty-six participants (59.1%) replied using very well, well or pretty well, thirteen (29.5%) replied partly or not at all and five (11.4%) cannot say.

Qualitative findings. Nine participants left written comments. A number considered the educational program to be good.

Q12: *How motivated are you to classify patients' NI?*

Twenty-six participants (59.1%) replied using motivated, very motivated or highly motivated and 17 (38.7%) partly motivated or not at all (1 missing). Additional analyses revealed a moderate correlation (0.36; $p < 0.05$) between Q12 (*How motivated are you to classify patients' NI?*) and Q13 (*How do you like working in HHC?*). While no correlation was seen between Q12 and work experience, PNs (a lower educational level) were more motivated than RNs (0.34; $p < 0.05$).

Qualitative findings. Eleven participants left written comments from which two categories were discerned: *motivation* and *time.* In *motivation,* participants noted that they were motivated to use the OPCq but that some technical problems (PC-to-instrument software compatibility, password issues) lowered their motivation. In *time*, participants mentioned a lack of time as one of the factors that made using the OPCq

Table 3. Q7: In your opinion, how practical and concrete is the OPCq instrument?

	Very well/well	Pretty well	Partly/not at all	n = 44	Mean	Median	SD
Instruments	20.5% (9)	38.6% (17)	36.3% (16)	42	2.78	3	0.92
Concepts support words	15.9% (7)	40.9% (18)	25% (17)	42	2.69	3	1.07
NI levels	20.5% (9)	43.2% (19)	20.5% (14)	42	2.78	3	0.97

Table 4. Q9: In your opinion, has the training been sufficient?

	Very well/well	Pretty well	Partly/not at all	Cannot say	n	Mean	Median	SD
1) scheduling	20.5% (9)	34.1% (15)	34.1% (15)	9.1% (4)	43	2.41	3	1.31
2) OPCq	31.8% (14)	34.1% (15)	20.4% (9)	6.8% (3)	41	2.87	3	1.20
3) Sub-areas	38.6% (17)	27.3% (12)	22.7% (10)	4.5% (2)	41	2.95	3	1.16
4) NI	31.8% (14)	27.3% (12)	27.2% (12)	6.8% (3)	41	2.73	3	1.24

difficult: "*The motivation is certainly present, but out of everything that should be done RAFAELA is prioritized last*".

*Q*13: *Do you enjoy working in HHC?*

The majority of participants 43 (97.7%) replied using very well, well or pretty well; only one replied using partly.

Qualitative findings. Thirteen participants left written comments from which two categories were discerned: *working environment* and *relationship with the patients*. Participants mentioned positives including a good working environment of high professional quality, contact with the patients and a variable workday. Still some mentioned negatives, including a lack of time and high workload: "*The environment is good, but the workload and intensity are too great after the new coordination reform.*"

8. Discussion

The RAFAELA system's OPCq instrument has been tested for the first time in an HHC setting in Norway. The content validity of the modified OPCq instrument, evaluated using a summative questionnaire, was estimated as being quite good. The modified OPCq instrument's sub-areas were overall assessed favorably (very well, well or pretty well), though some disagreement was seen. Sub-area 1 (Planning and coordination), sub-area 2 (Breathing, blood circulation and symptoms of disease) and sub-area 4 (Personal hygiene and secretion) were given the highest scores while sub-area 5 (Activity, sleep and rest) was given the lowest score. The sub-areas given the highest scores may be those areas that the participants feel confident classifying. Sub-area 5 may be difficult to classify, because of the short time spent with the patient. Furthermore, the low score given to sub-area 5 could result from that decisions related to activities and/or psychosocial needs are not common in the care of HHC patients. Instead, those care services directly related to illness/disease, elimination, medication or hygiene are common.

In this study, only day and evening shift nursing staff used the modified OPCq instrument. Some participants expressed a need for additional sub-areas, which may indicate that the instrument should be further adjusted for use in HHC. Participants specifically mentioned items such as support stockings, garbage, weather and driving conditions. While a few expressed that the sub-areas did not describe patients' NI at all, more than two-thirds considered the assessment of the NI levels A-D to be very well, well or pretty well. Still, participants indicated that some ambiguity exists between the levels, especially between C and D, which may reflect the lower level of education among the staff. Similar results were seen in a study by Frilund and Fagerström [4] in Finland. More than half assessed the OPCq manual as being practical and clear, but critique in regard to the written instructions may indicate that some adjustments may be needed. Participants assessed the educational programs lead by the FCG and the project leader as being good.

The participants were primarily RNs and PNs, with only one assistant without formal education. The educational level of nursing staff is relevant, because professional assessments often correspond to educational level [36] [37] [38]. In Norwegian HHC, RNs and PNs often perform the same tasks and help with personal activities of daily living (PADL). While this reflects the HHC context, RNs are nonetheless more often responsible for acute care needs and specialized nursing interventions [39]. The participants had quite a lot of work experience, which may be a benefit when implementing a new PCS. While the majority here were motivated to use the OPCq instrument, the PNs were more motivated than the RNs. A lack of time was mentioned as a negative factor, also seen in a study by Flöjt, Hir and Rosengren [40]. Likewise, Gautun and Bratt [41] showed that when nurses experience great pressure in regard to time, not enough time could be given to individual patients. According to Tønnessen, Nortvedt and Førde [42], nurses ration care on a daily basis due to time constraints, consequently prioritizing medical and physiological needs over psychosocial and spiritual needs. This is not congruent with a person-centered approach [11], in which each patient's emotional, sociocultural and spiritual needs are supported. The OPCq, which does include a holistic approach congruent with a person-centered approach, includes emotional support and dialog in its sixth sub-area [14] [17] [18]. A lack of time may negatively affect one's ability to engage in dialog or cooperation with patients and, as such, may increase a task oriented way of working [42] [43] [44]. When the participants in this study felt that they did not have sufficient time to complete all tasks, they ceased prioritizing using the OPCq, which has an adverse effect. If patients' care needs are not systematically monitored, a correct and complete depiction of nurses' workload is not possible and the calculation of staff resources will, accordingly, be incorrect.

There was a high level of work satisfaction among the participants, despite their lack of time and a high workload. Nübling *et al.* [45] showed that HHC staff evaluate their psychosocial work situation more positively than other employees in professional geriatric care and that a high rate of part-time workers in HHC could affect results. While an indication of this was also seen in our study, exact data is unavailable.

This was a pilot study with relatively good results. The use of a PCS that measures NI is relatively new in an HHC setting, and it takes time to introduce a new system. Further clinical projects and research are needed to guarantee care and care results (outcome) and for the optimal allocation and calculation of nursing staff resources.

Based on the presented results, nurse leaders on varying levels in HHC can use the OPCq instrument, after some slight modifications, to measure and classify NI and as a workforce planning tool for nurse staffing. Use of the OPCq makes leaders aware of actual care needs and need for resources, but more focus should be placed on training nurse leaders to use systematic data in the allocation of nurse staffing resources. The shift from institutional to municipal-based care [7] [8] and the growing population of older people [2] make this essential.

Methodological Considerations

For more reliable results, a larger study is needed; this was a pilot study comprised of two HHC units with a limited number of participants. Due to low participant response in 2013, a new data collection was assessed as necessary and conducted in 2014. Technological problems such as poor mobile network coverage prevented the participants from using the mobile classification application, which caused stress and could thereby have affected the findings negatively.

One strength was that the summative questionnaire had been used in earlier studies [4] [17]. The questionnaire used in a study in Finnish primary health care for older people [4] showed a reliability of 0.89 (Cronbach's Alpha), while the questionnaire used in this study showed a reliability of 0.96 (Cronbach's Alpha). Another strength is that open responses from self-completed questionnaires can complement frequency distribution.

9. Conclusion

The results showed that the modified OPCq instrument, one of two instruments' part of the RAFAELA Nursing Intensity and Staffing system developed for use in a hospital setting, seems to fulfill the requirements for validity in an HHC setting. However, the OPCq manual should be improved and some instrument aspects changed to better correspond to the specific needs in HHC. Based on the findings in this study, our recommendation is to improve the manual slightly to better adapt to HCC, both in regarding to sub areas 1 - 6 and the NI levels A-D. It might be a need for more clearly defined levels A-D and keywords that are more suitable. Staff training and guidance are important when implementing a new PCS and that all technology works satisfactorily. Given that the complexity of care and the number of patients are increasing in HHC, further research is needed in regard to NI and the optimal allocation of nursing staff in an HHC setting.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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Abbreviation Note List

=equal to, is, are

e.g. for ek sample

<less than

Paper III

RESEARCH ARTICLE

WILEY NursingOpen

Using a new interrater reliability method to test the modified Oulu Patient Classification instrument in home health care

Jill Flo[1] | Bjørg Landmark[2] | Ove Edward Hatlevik[3] | Lisbeth Fagerström[1]

[1]Faculty of Health and Social Sciences, Department of Nursing and Health Sciences, University College of Southeast Norway, Drammen, Norway

[2]Institute for Research and Development for Nursing and Care Services, Drammen, Norway

[3]Faculty of Education and International Studies, Department of Primary and Secondary Teacher Education, Oslo and Akershus University College of Applied Sciences, Oslo, Norway

Correspondence
Jill Flo, Faculty of Health and Social Sciences, Department of Nursing and Health Sciences, University College of Southeast Norway, Drammen, Norway.
Email: Jill.Flo@usn.no

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Abstract

Aim: To test the interrater reliability of the modified Oulu Patient Classification instrument, using a multiple parallel classification method based on oral case presentations in home health care in Norway.

Design: Reliability study.

Methods: Data were collected at two municipal home healthcare units during 2013–2014. The reliability of the modified OPCq instrument was tested using a new multiple parallel classification method. The data material consisted of 2 010 parallel classifications, analysed using consensus in per cent and Cohen's kappa. Cronbach's alpha was used to measure internal consistency.

Results: For parallel classifications, consensus varied between 64.78–77.61%. Interrater reliability varied between 0.49–0.69 (Cohen's kappa), the internal consistency between 0.81–0.94 (Cronbach's alpha). Analysis of the raw scores showed 27.2% classifications had the same points, 39.1% differed one point, 17.9% differed two points and 16.5% differed ≥3 points.

KEYWORDS
home health care, interrater reliability, nursing intensity, Oulu Patient Classification instrument, patient classification system

1 | INTRODUCTION

A gradual increase in life expectancy has resulted in a larger ageing population in developed countries and concern is growing about a probable healthcare professional deficit due to considerable demands for nursing resources in home health care (HHC) (European Union, Eurostat, 2016a, 2016b). An increased range of healthcare services will therefore be needed soon to meet the requirements of increasingly older populations. The number of available hospital beds is decreasing, with an evident shift towards beds in nursing homes, residential care facilities or HHC (European Union, Eurostat, 2016a, 2016b). To ensure good quality care, nurse managers need a workforce planning tool to follow-up and monitor nursing intensity (NI) and the allocation of nursing resources. NI relates to how demanding a nursing situation is and

how much care, help and support a patient has received (Fagerström, 1999; Morris, MacNeela, Scott, Treacy, & Hyde, 2007).

In hospital settings, a clear association between nursing resources (competence and numbers) and patient outcomes (patient safety and mortality) has been seen (Aiken, Clarke, Sochalski, & Silber, 2002; Aiken et al., 2014; Junttila, Koivu, Fagerström, Haatainen, & Nykänen, 2016). In nursing homes, fewer nursing hours have been associated with deficiencies (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000), while higher nursing hours show lower rates of pressure ulcers (Lee, Blegen, & Harrington, 2014). Corresponding studies in an HHC setting have not been found, but our supposition is that the correct allocation of nursing resources is crucial to ensuring quality care in such a setting.

Older and ageing populations have complex care needs (European Commission 2013, European Union, Eurostat, 2016a, 2016b) and

there are many challenges involved in the realization of HHC. HHC services are fragmented and task-oriented (Landmark, Aasgaard, & Fagerström, 2013), with patients experiencing delayed access to services, equipment supplies or medication and nursing staff experiencing unacceptable working conditions (Gautun & Bratt, 2014; Lang et al., 2014). Differences in staff competence and/or roles can also constitute a challenge in the allocation of nursing resources (Bing-Jonsson, Hofoss, Kirkevold, & Bjørk, 2016; De Vliegher, Declercq, Aargeerts, & Moons, 2016; Flöjt, Hir, & Rosengren, 2014; Johansen & Fagerström, 2010; Luz & Hanson, 2015).

Measuring NI and the allocation of nursing resources is complex and several tools and patient classification systems (PCS) have been developed for use with older patients in HHC settings: e.g. the Clinical Care Classification (CCC) system (Saba, 2002), Resident Assessment Instrument (interRAI), Resource Utilization Groups (RUG III) (Carpenter & Hirdes, 2013), RAI-HC (Toye, 2016), Community Health Intensity Rating scale (CHIRS), Easely-Storefjell Patient Classification Instrument (R-ESPCI) (Brady et al., 2007), Community Client Need Classification System (CCNCS) (Byrne, Brady, Horan, Macgregor, & Begley, 2007) and Caseload Intensity Tool (CIT) (Collister, Slauenwhite, Fraser, Swanson, & Fong, 2014). The Katz Index of Independence in Activities of Daily Living (Katz, Ford, Moskowitz, Jackson, & Marjorie, 1963) and the modified Katz ADL (Laan et al., 2014) measure functional ability and are well known. Some municipalities in Sweden use the Time in Care instrument (TiC) (Thorsell, 2011). In Norway, individual patients' resources and needs for assistance are registered in a central health register (IPLOS), from which national statistics for nursing and care services are derived (Norwegian Directorate of Health 2013). Most of the above-mentioned instruments primarily measure patients' functional ability, not their psychological, social or spiritual needs nor the nursing care related to these. There is limited knowledge of NI in HHC and reliable instruments for measuring NI and nursing resources in such a setting are missing.

In the Nordic countries, the RAFAELA system is the most commonly used PCS. Used to measure NI and nurse staffing in hospital settings, the RAFAELA system is based on a holistic and person-centred perspective, where balance is sought between each patient's individual care needs and the nursing resources needed to thereby guarantee good care for patients and good working conditions for staff (Andersen, Lønning, & Fagerström, 2014; Fagerström, 1999; Frilund, 2013; Pusa, 2007; Rauhala, 2008). Nurse managers can use the RAFAELA system to assure nursing quality, good patient outcomes and good working conditions for staff and to reduce sick leave among nurses (Junttila et al., 2016; Rauhala et al., 2007). It is an effective tool whereby resource allocation can be managed (Fagerström, Lønning, & Andersen, 2014; Fagerström & Rauhala, 2007). The RAFAELA system can be integrated into an organization's pre-existing management or patient administrative system and has a positive effect on nurses' clinical practice, which consequently influences patient outcomes (Fagerström et al., 2014).

The RAFAELA system is one of the few PCSs that meet the criteria for validity and reliability testing (Fasoli & Haddock, 2010). In the RAFAELA system, patients' care needs are classified daily through the Oulu Patient Classification instrument (OPCq). The actual study was a part of a research project investigating the use of the RAFAELA system in a Norwegian HHC setting. The aim of this study was to test the reliability of the modified OPCq instrument in HHC using a new method, a multiple parallel classification method based on oral reports of patient cases.

1.1 | Description of the OPCq instrument as part of the RAFAELA system

The RAFAELA system gives a professional overview of daily NI per patient and daily workload per nurse through the daily classification of patients' care needs and daily registration of nursing resources. The RAFAELA system consists of the following components: 1. Daily registration of patients' NI using the OPCq instrument; 2. Daily registration of actual nurse staffing resources; and 3. Determination of each unit's optimal NI level using the Professional Assessment of Optimal Care Intensity Level instrument (PAONCIL) (Rauhala & Fagerström, 2004; Rainio & Ohinmaa, 2005; Rauhala & Fagerström, 2007; Rauhala et al., 2007; Fagerström & Rainio, 1999; Fagerström et al., 2014; for a detailed description of the RAFAELA system, please see earlier research).

The OPCq instrument consists of six sub-areas: 1. Planning and coordination of nursing care; 2. Breathing, blood circulation and symptoms of disease; 3. Nutrition and medication; 4. Personal hygiene and secretion; 5. Activity, sleep and rest; and 6. Teaching, guidance in care and follow-up care, emotional support. In a hospital setting, nurses measure these sub-areas at regular intervals once per calendar day, in an HHC setting after visiting the patient. Each sub-area is scored from 1 to 4, with A = 1 point (a patient who manages more or less on his/her own), B = 2 points (a patient who occasionally is in need of care), C = 3 points (repeated need for care, complex) or D = 4 points (in need of continuous or very complex care and cannot manage unaided at all) (Fagerström, 1999; Fagerström, Rainio, Rauhala & Nojonen, 2000). The sum of these yields a raw score, which can vary from 6 to 24 and is the total NI points per patient per day. Higher scores indicate increased care and complexity levels. Patients are classified into five categories based on this raw score. Category 1: 6–8 points (minimal need for care), category II: 9–12 points (average need for care), category III: 13–15 points (more than average need for care), category IV: 16–19 points (maximum need for care) and category V: 20–24 points (intensive care required) (Fagerström, 2009; Rauhala & Fagerström, 2004). The resulting NI points can be recorded directly as raw scores or categories (I–V) (Rauhala & Fagerström, 2004; for a detailed description of the OPCq instrument, please see earlier research). The OPCq instrument used in the actual study was a modified version designed for use in an HHC setting (Flo, Landmark, Hatlevik, Tønnessen, & Fagerström, 2016). The modification of the OPCq instrument occurred as follows: the requirement that nursing staff assess electrolyte and acid–base disturbance or increased intracranial pressure was removed (sub-area 1), patient positioning was changed to bedridden (sub-area 2), management of prophylactic medication was changed to continuous medication (sub-area 3) and the need for advice prior to discharge from hospital was

removed (sub-area 6). The key term "occasional" was adjusted to "need for occasional help" (sub-areas 2–6).

A 2-day introduction (educational programme) for registered nurses (RNs) and practical nurses (PNs) was held in October 2012 at the two HHC units included in the study by the Finish Consulting Group (FCG Ltd.) (2017). All subsequent and further education in relation to the project was the responsibility of the project leader. The assistants and students participating in the project were introduced to and trained in the use of the OPCq classification system in clinical practice by RNs or PNs.

According to RAFAELA system guidelines, the reliability of the OPCq should be tested annually at each unit where the system is in daily use using an independent parallel classifications by two nurses. The reliability of the OPCq instrument has been tested from various angles. Determined through consensus in per cent, the reliability of the instrument in hospital settings (category I–V) was on average 77% (Fagerström & Rauhala, 2007), with the main reliability value being 73.2% for 2006 and 78.7% for 2007 (Fagerström, 2009). In a study by Andersen et al. (2014), the reliability of the instrument using consensus in per cent varied between 70.1 and 89% and, using Cohen's kappa (k), variation in the patient categories was 0.59–0.81 and in the sub-areas 0.45–0.90. In another study in a primary healthcare setting, a consensus in per cent of the parallel classifications varied between 66% and 77% (in total 71%), with Cohen's weighted kappa (Kw) 0.24–0.71 and Crohnbach's alpha 0.45–0.88 (Frilund & Fagerström, 2009). In a recent study in a hospital setting by Liljamo, Kinnunen, Ohtonen, and Saranto (2017), the results indicate that the consensuses in per cent for NI categories I–V was 70.8%, although a variation between periods was seen (50.5–93.2%). The Kw was 0.87 (varying between 0.40–0.96) and K 0.57 (varying between 0.27 and 0.87).

In all above-mentioned studies, traditional parallel classifications have been used for reliability testing, that is two nurses caring for the same patient on the same day independently classify the patient's care needs and NI. Analyses of such classifications, used as the base for comparisons between two raters/nurses, have always previously been based on categories and not raw points, except the recent study by Liljamo et al. (2017).

2 | METHODS

2.1 | Aim

The aim of the study was to test the interrater reliability of the modified OPCq instrument, using a new multiple parallel classification method based on oral case presentations in home health care in Norway.

2.2 | Design

The research design was based on interrater reliability testing, which is the extent of agreement among data collectors (McHugh, 2012). For the purposes of the actual study, a new multiple parallel classification method was developed. The guidelines for Reporting Reliability and Agreement Studies (GRRAS) (Kottner et al., 2011) were followed during reporting of the actual study.

2.3 | Setting

Part of a municipal research and development programme, the study was realized in collaboration with a regional University College during 2012–2014. The study was conducted in two HHC units (A and B) in a medium-size city, population about 70,000, in southeast Norway during 2013 and 2014. During the period of data collection, about 214 patients received nursing care through the two HHC units. In HHC in Norway, RNs, PNs and assistants provide nursing care and assist patients with personal activities of daily living (PADL). RNs are, however, more often responsible for acute care needs and specialized nursing interventions (Johansen & Fagerström, 2010). While RNs, PNs and assistants can help patients with daily household tasks, it is home aid workers who primarily bear the responsibility for such in patients' homes. Due to the limited scope of their duties, home aid workers were not included in this study.

2.4 | Participants

The participants consisted of RNs, PNs, assistants and students. Inclusion criteria were working at least 50% and during the day. Staff working night shifts were not invited to participate in the study. In HHC in Norway, RNs hold a bachelor's degree and are responsible for the planning and management of patients' care and the supervision of other healthcare workers. PNs hold a vocational degree, provide basic nursing care and are typically supervised by RNs. Assistants, who are not required to hold any postsecondary degree and students at different levels also participated. A total of 67 participants conducted the parallel classifications and of these 19 (28.4%) were RNs, 26 (38.8%) PNs, 10 (14.9%) assistants and 12 (17.9%) students. Most of the participants had independently classified patients' NI from between a couple of months to 1 year before participation in the study.

2.5 | Data collection and development of a new method for parallel classification

A new *multiple parallel classification method* based on oral case presentations was developed, because the most common method for testing interrater reliability, parallel classifications with two independent raters (a main and a secondary rater) (McHugh, 2012) as used in hospital settings (Andersen et al., 2014; Fagerström, 2009; Fagerström & Rauhala, 2007), was deemed not feasible for use in an HHC setting. In HHC, nursing staff primarily work alone and it is therefore neither possible nor practical to use a method requiring two raters at the same time. Two nursing staff visiting the same patient during the testing period was deemed too costly/resource demanding, so a new method based on oral case presentations was developed.

The study periods were 4 November 2013–28 April 2014 at unit A and 9 December 2013–20 January 2014 and 6 February 2014–14

February 2014 at unit B, weekdays only. Each morning the nurse managers at the two units (A and B) selected one or two patient cases to be parallel classified during the shift and also determined the main rater. The nurse managers were responsible for an even distribution of patient cases concerning background variables (age, gender), care needs and NI. After visiting the selected patient, the main rater (RN, PN, assistant or student) classified NI using the modified OPCq instrument. For practical reasons, the parallel classifications were performed by the secondary raters the same day during their lunch break. The secondary raters did not visit the actual patient, so the classifications were based on the main rater's oral case presentation. A special structure was developed for the oral case presentations.

The main rater presented the patient case in accordance with a delineated structure, including the variables age, gender, diagnoses, problems or needs, observations, performed nursing activities, and treatments during the HHC visit. The main raters' NI classifications and scores were kept from the secondary raters. After the main rater's presentation, 3–10 secondary raters were asked to independently classify the patient's NI without communicating, discussing or exchanging information with one another during the process; only clarifying questions were allowed. During the study periods, participants could act as main or secondary raters several times. A classification form was used for all classifications, with the main rater collecting all forms after each parallel classification and giving them to the nurse managers at the HHC unit. The respective nurse managers then collected all forms and distributed them to the project leader.

2.6 | Ethical considerations

The Norwegian Social Science Data Services (NSD) provided approval prior to commencement of the study. Appropriate permission from the municipality was sought and given for the study, likewise a license from the Finish Consulting Group (FCG) giving the municipality permission to use the RAFAELA system. The nurses in the study gave informed consent. The patients received nursing care through the two HHC units as previously planned during the project period and because all patient data were anonymized, no informed consent was required from them.

2.7 | Statistical analyses

The interrater reliability method (McHugh, 2012) was used to analyse the data: consensus in per cent and Cohen's kappa and Cronbach's alpha were used to measure internal consistency (Pallant, 2015; Polit & Beck, 2014). The calculation of consensus as per cent agreement and Cohen's kappa were in raw scores instead of categories I–V. Raw scores are more sensitive than categories and therefore more correct and reliable. For reliability analyses, the steering group of the RAFAELA system in Finland has indicated a preference for the use of raw scores.

The interrater reliability method was used to test interrater agreement of the OPCq sub-areas. Consensus in per cent was used for the parallel classifications as this is easy to calculate, is directly interpretable and allows the identification of possibly problematic variables (McHugh, 2012). In a hospital setting, the recommendation is ≥70% consensus (Fagerström & Rauhala, 2007; Rauhala et al., 2007). However, consensus in per cent does not make allowances for the possibility that raters may guess when rating some variables due to uncertainty (McHugh, 2012). Cohen's kappa was calculated for every main rater compared with every secondary rater, i.e. each RN, PN, assistant or student rating the same patient case. Of the 53 patient cases rated, differences between 3 and 10 secondary raters were seen.

While Cohen's kappa does take into account the possibility of guessing among multiple data collectors, it is by far the most used measure of agreement (McHugh, 2012; Veierød, Lydersen, & Laake, 2012). Cohen's kappa is an important supplement to consensus in per cent and is a robust statistical method. Kappa can range from −1 to +1, where 0 represents agreement that can be expected from random chance and +1 represents perfect agreement (Altman, 1999). As recommended (Altman, 1999 guidelines; Anthony, 1999; Kirkwood & Sterne, 2003), Landis and Koch's (1977) guidelines were followed. The kappa results were interpreted as follows: values ≤0 no agreement, 0.01–0.20 none to slight, 0.21–0.40 fair, 0.41–0.60 moderate, 0.61–0.80 substantial and 0.81–1.00 almost perfect (Landis & Koch, 1977). As noted by McHugh (2012), while 80% agreement is recommended, because kappa values 0.41–0.60 are considered moderate, the lowest value 0.40 (k) may be considered adequate. Still, McHugh (2012) suggested that any kappa lower than 0.60 indicates inadequate agreement. According to De Vet, Mokkink, Terwee, Hoekstra, and Knol (2013), kappa is a relative measure and not sufficiently informative; it is a measure of reliability, not agreement and not recommended for use in measuring observer variation in clinical practice. A low kappa value may not always be indicative of low agreement according to Gisev, Bell, and Chen (2013). Nevertheless, in this study both consensus in per cent and Cohen's kappa were used to make the results more comparable with previous studies (Andersen et al., 2014; Fagerström, 2009; Fagerström & Rauhala, 2007; Frilund & Fagerström, 2009).

Cronbach's alpha is widely used to measure the internal consistency of an instrument (Polit & Beck, 2014), and in this study, it was used to estimate the reliability of the modified OPCq instrument when testing in a new context, HHC. In relation to scales, internal consistency refers to whether items 'hang together' (Pallant, 2015) and the less variation seen in repeated measurements, the higher an instrument's reliability. A commonly accepted rule for describing internal consistency when using Cronbach's alpha is: $\alpha \geq 0.9$ = excellent, $0.9 > \alpha \geq 0.8$ = good, $0.8 > \alpha \geq 0.7$ = acceptable, $0.7 > \alpha \geq 0.6$ = questionable, $0.6 > \alpha \geq 0.5$ = poor, $0.5 > \alpha$ = unacceptable (George & Mallery, 2003). While values above 0.7 are acceptable, values above 0.8 are preferable (Pallant, 2015).

In this study, a research assistant entered the parallel classifications (the scores) into an Excel (Microsoft office) database. The data were then transferred into an IBM Package for Social Sciences (SPSS) Statistics Version 23 database.

3 | RESULTS

A total of 2010 parallel classifications (335 * 6 sub-areas) took place during the period November 2013–February 2014. A total of 53 patient cases were classified by the main raters into the following categories: category I: 6 (11.3%); category II: 24 (45.3%); category III: 11 (20.8%); category IV: 11 (20.8%) and category V: 1 (1.9%). The majority of patient cases were classified into classes II, III and IV, indicating average, more than average or maximum need for care.

Of the 53 patient cases/patients, the background variable data for 44 patients (83%) were available. The remaining nine had either moved to nursing homes/residential homes or passed away. Most patients (N = 44) were female, 30 (68.2%) and 14 (31.8%) were male. The mean age was 83 years (median = 84 years, SD 9.6), with patients aged 48–101 years. A complex patient health status was seen, and several had chronic diagnoses.

Of the 335 classifications, 91 (27.2%) had the same raw scores. Disagreement was one point in 131 classifications (39.1%), two points in 60 (17.9%) and three points or over in 53 (15.9%) (Table 1).

The consensus in per cent of the parallel classifications for sub-areas 1–6 was 64.78%–77.61%. (Table 2). Cohen's kappa showed an interrater reliability of 0.49–0.69 (Table 2). The highest consensus was found for sub-area 4 (Personal hygiene and secretion) (77.61%, k 0.69). Sub-area 6 (Teaching, guidance in care and follow-up care, emotional support) showed a weaker consensus (64.78%) and the lowest

TABLE 1 Classification based on raw scores and differences in points

Raw score/points	N	%
0 point difference in raw score	91	27.2
1 point difference in raw score	131	39.1
2 point difference in raw score	60	17.9
3 point difference in raw score	31	9.3
4 point difference in raw score	12	3.6
5 point difference in raw score	6	1.8
6 point difference in raw score	2	0.6
7 point difference in raw score	2	0.6
Total	335	100.0

kappa (k 0.49). For sub-areas 1–6, Cronbach's alpha was 0.81–0.94 (Table 2). Good internal consistency was seen for sub-areas 1, 2, 3, 5 and 6, while sub-area 4 had excellent internal consistency (Table 2).

Using a calculation of the total raw scores for sub-areas 1–6 of the OPCq instrument, the consensus was 71%. Using a calculation for patient categories I–V, the kappa was 0.60, which according to McHugh (2012) indicates adequate agreement. Here, in that a difference of 1 point in total is considered a deviation, the kappa is deemed acceptable even though lower than usual.

4 | DISCUSSION

Using a new multiple parallel classification method, we tested the interrater reliability of the modified OPCq instrument in two HHC units in a Norwegian municipality. We found slightly lower consensus in per cent than in a study conducted in Finland in primary health care (≥70%) (Frilund & Fagerström, 2009) or in other studies in hospital settings (≥70%) (Andersen et al., 2014; Fagerström, 2009; Fagerström & Rauhala, 2007; Liljamo et al., 2017).

The calculations here were based on raw scores, a method which is more sensitive and perhaps more accurate than in previous studies, which have calculations based on categories (I–V). In our results, we see that 282 (84.2%) classifications differed from zero to two points, while only 53 (15.9%) differed over three points, this is slightly higher results than the study of Liljamo et al. (2017). When calculations are based on categories (I–V), classifications can differ up to four points while agreement and interrater reliability remain constant. In earlier studies (Andersen et al., 2014; Fagerström, 2009; Fagerström & Rauhala, 2007; Frilund & Fagerström, 2009), patient categories, not raw NI points, were used in the calculation of both percentage agreements and interrater reliability. Thus, this should be taken into consideration when comparing the results of the actual study with earlier studies.

Here the agreement shows a consensus in per cent of 64.78%–77.61% and Cohen's kappa indicating moderate to slight agreement according to Landis and Koch (1977). Cronbach's alpha was interpreted as good and excellent (Table 2). While these are slightly lower results than those seen in a study by Frilund and Fagerström (2009),

TABLE 2 Parallel classifications, sub-areas 1-6 of the OPCq instrument, consensus in per cent, Cohen's kappa and Cronbach's alpha

Sub-areas	Consensus %	Cohen's kappa	Cronbach's alpha
1. Planning and coordination of nursing care	70.45%	0.56	0.84
2. Breathing, blood circulation and symptoms of disease	70.45%	0.52	0.81
3. Nutrition and medication	73.43%	0.61	0.87
4. Personal hygiene and secretion	77.61%	0.69	0.94
5. Activity, sleep and rest	71.64%	0.57	0.83
6. Teaching, guidance in care and follow-up care, emotional support	64.78%	0.49	0.85

that study had a healthcare centre setting and not an HHC setting and moreover only included RNs and PNs.

In this study, disagreement was greatest in relation to the classifications of sub-area 1 (Planning and coordination of care), sub-area 2 (Breathing, blood circulation and symptom of disease), sub-area 5 (Activity, sleep and rest) and sub-area 6 (Teaching, guidance/follow-up care and emotional support). We concluded that these sub-areas are more difficult for nurses to assess than sub-areas 3 (Nutrition and medication) and 4 (Personal hygiene and secretion), which is consistent with earlier findings (Andersen et al., 2014; Fagerström et al., 2000; Frilund & Fagerström, 2009; Liljamo et al., 2017). Sub-area 4 had the highest consensus and a substantial agreement according to McHugh (2012); this is acceptable. We interpret the Cronbach's alpha of sub-area 4 as being excellent and indicative of care needs well known to nurses. This is also in line with similar findings in earlier studies (Andersen et al., 2014; Fagerström et al., 2000; Frilund & Fagerström, 2009).

The lowest agreement was seen in sub-area 6. The difficulties that nurses have when assessing this sub-area can emanate from different sources, such as decisions that a municipality has made in regard to care plans; sub-area 6 might not be prioritized in a delineated care plan. Also, according to Tønnessen, Nortvedt, and Førde (2011), nurses ration care due to time constraints, consequently prioritizing medical or physiological needs over psychosocial and spiritual needs. McCormack and McCain (2010) maintain that providing holistic care is essential in a person-centred process, yet time constraints can hinder such. Sub-areas 1 and 5 showed a consensus slightly above the recommended level (>70%) and a kappa of 0.56–0.57. According to Landis and Koch (1977), this kappa indicates moderate agreement, while McHugh (2012) argues that kappa below 0.60 indicates inadequate agreement. Sub-areas 1 and 5 can be difficult for nurses in HHC to assess because each patient visit is short, making an overview of the situation problematic. Another aspect is that RNs are tasked with the planning and coordination of HHC care but PNs, assistants and students are not. In sub-area 2, consensus was slightly above 70% but kappa showed a moderate agreement according to Landis and Koch (1977). Of the study participants, only 28.4% were RNs, while the remainder were PNs, assistants or students, which likely influenced the classifications in this sub-area.

This study was a part of a larger research project where participants assessed the educational programme overseen by the FCG and the project leader as being good (Flo et al., 2016). Different educational and staff competence levels in HHC (Bing-Jonsson et al., 2016) probably influenced the participants' understanding of the different classification levels. In future, the possibility to regularly discuss the sub-areas, different levels A-D and keywords together with colleagues is recommended. Training in classifying and regular practice in performing parallel classifications may positively influence common understanding of the different classification levels.

One probable limitation of the multiple parallel classification method used in this study is that, on the day of classification, only the main rater met the patient being classified. If when using the OPCq instrument the main rater did not properly follow the delineated

structure for describing nursing care, variation will be seen between the main and secondary raters' classifications. We surmise therefore that it would be more reliable if both main and secondary raters actually met the patient on the day of classification, but this is not possible in an HHC setting. For parallel classifications, it would even be possible to gather the secondary data from patient records (Altafin et al., 2014; Liljamo et al., 2017; Stafseth, Tønnessen, Diep, & Fagerström, 2017). Nevertheless, that method also has its limitations in that nursing documentation, especially in Norwegian HHC, can be considered inconsistent and of variable quality.

In a study by Kottner, Halfens, and Dassen (2010) on the use of the care dependency scale (CDS) in HHC, the nurse primarily responsible for the selected patient's care completed the first classification while a different nurse performed the second classification 1–3 days later. Given that we assume that care needs fluctuate continuously, we developed a new method of interrater reliability testing to ensure that classifications occurred on the same day. It will also probably be valuable in future studies to ensure that the main rater is an RN or PN and has adequate experience of working in an HHC setting.

The population of older and fragile people is growing, as is their need for care. Hasseler, Görres, Altmann, and Stolle (2006) maintained that a gap exists between the provision of nursing services and the need for care. In the care environment in a person-centred approach, a focus should exist on the context where care is delivered and the factors that should be taken into consideration should include, among other things: appropriate skill mix, supportive organizational systems and effective staff relationships (McCormack & McCance, 2010). To meet the requirements for implementing person-centred care, managers need access to systems that help them with the allocation of staff resources. The RAFAELA system, of which the OPCq instrument is part, enables the allocation of nursing resources in accordance with patients' care needs and safety during a certain period of time (Fagerström et al., 2014).

5 | LIMITATIONS

There is limited information about the participant background variables, such as working experience, etc. Nurses with different educational backgrounds may interpret patients' NI differently, especially those without postsecondary degrees. In other studies on interrater reliability, the various individuals collecting data may experience and interpret the data differently (McHugh, 2012). In this study, all participants participated in a training programme and learnt how to use the OPCq instrument prior to participation. They furthermore, according to guidelines (Kottner et al., 2011), had performed classifications using the OPCq instrument by themselves to ensure that they were sufficiently trained prior to participation. In future studies, participants' clinical backgrounds and work experience should be investigated, because these factors may heavily influence reliability and agreement estimates (Kottner et al., 2011). In this study, the patient cases included mainly older patients with different care needs. It is important to specify the data on the subject population of interest,

according to Kottner et al. (2011) and as such this could have been more well specified in this study, including e.g. diagnosis, stages of disease, assistance, aid requirements and/or length of time receiving HHC services.

6 | CONCLUSION

The investigation of this new, multiple parallel classification method that is based on oral case presentation shows that this is a method that can be used in HHC when parallel classification with two independent raters is not feasible.

The results seen here are slightly lower than those seen in previous studies conducted in primary healthcare and hospital settings. A total raw score was used in the calculations in this study, versus other studies where patient categories I-V are used, except one recent study in hospital setting used raw score, which makes comparisons somewhat difficult. While participants' assessments of the different sub-areas were in line with previous studies, some sub-areas may need improvement to better correspond to an HHC setting. For those that showed low agreement here, more detailed description in the RAFAELA manual is needed. As this study was based on a small sample, a need exists for additional research.

AUTHOR CONTRIBUTIONS

All authors meet at least one of the following criteria, as per ICMJE recommendations (http://www.icmje.org/recommendations/), and have agreed on the final version.

- substantial contribution to the conception and design of the article, acquisition of data or analysis and interpretation of data;
- drafting or critical revision of the article for important intellectual content.

ORCID

Jill Flo [iD] http://orcid.org/0000-0003-3089-9101

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Paper IV

Article omitted in the online version.

Appendix

1. Confirmation of collaboration

2. Questionnaire

3. Description of new parallel classification method

4. Semi-structured thematic guide

5. Norwegian Center for Research Data (NSD)

6. Request to participate in the research project and declaration of consents

7. Norwegian Center for Research Data (NSD)

DRAMMEN KOMMUNE

Project leader: Lisbeth Fagerstrøm

Confirmation of collaboration

Regarding the research project related to the: **Use of the Rafaela system in the municipality of Drammen.**

Drammen municipality are positive to clinical research projects. We are cooperating with Buskerud University College trough the Development center for healthcare in Buskerud. Bjørg Th. Landmark and Sissel Eriksen will collaborate in the project as an expert in the project according to the project plan.

A new model in how to classify the patients who are dependent on homecare, will help the municipality in resource allocation.

Drammen 15.10.12

Hege T. Rokke   Tone Merethe Svenkerud

Evaluering av OPCq instrumentets innhold og validitet

1. Bakgrunnsvariabler

Alder: _____

Kjønn: _____

Avdeling: _____

Utdanningsnivå:
(sett kryss)

Høyskole	Vgs	Ufaglært

Arbeidserfaring:
(sett kryss)

1-2 år	3-4 år	5-10 år	>10 år

2. Hvor godt anser du at behovsområdene 1-6 er beskrevet i OPCq instrumentet?

	Svært bra 5	Meget bra 4	Bra 3	Delvis bra 2	Ikke bra 1	Ingen for-mening 0
Behovsområde 1						
Behovsområde 2						
Behovsområde 3						
Behovsområde 4						
Behovsområde 5						
Behovsområde 6						

3. Finnes det behov for ytterligere behovsområder?

Ja	Nei	Ingen for-mening

Kommentarer: _____

_____

_____

4. Hvor godt anser du at pleieintensitetsnivåene A-D beskrives innen følgende behovsområder i OPCq instrumentet?

	Svært bra 5	Meget bra 4	Bra 3	Delvis bra 2	Ikke bra 1	Ingen for-mening 0
Behovsområde 1						
Behovsområde 2						
Behovsområde 3						
Behovsområde 4						
Behovsområde 5						
Behovsområde 6						

Kommentarer: _____

Evaluering av OPCq instrumentets innhold og validitet

5. Hvor godt beskriver behovsområdene 1 - 6 pasientens totale pleieintensitet?

Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
5	4	3	2	1	0

Kommentarer:

6. Hvor godt skiller behovsområdene 1 - 6 seg fra hverandre?

Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
5	4	3	2	1	0

7. Hvor praktisk og konkret anser du at OPCq instrumentet?

	Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
	5	4	3	2	1	0
Instrumentets anvisninger (manualens skriftlige instruksjoner)						
Begrep og støtteord						
Pleieintensitetsnivåene A-D						

8. Hvor godt stemmer OPCq:s bilde av pasientens pleieintensitet med det bildet som din erfaring gir deg?

Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
5	4	3	2	1	0

Kommentarer:

9. Anser du at opplæringen har vært tilstrekkelig?

	Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
	5	4	3	2	1	0
Elektronisk planlegging						
OPCq målemetode						
Behovsområde 1-6						

Evaluering av OPCq instrumentets innhold og validitet

Pleieintensitetsnivå								

10. Har opplæringen gitt deg praktiske ferdigheter i å bruke OPCq-instrumentet?

Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
5	4	3	2	1	0

Kommentarer:

11. Opplæring og veiledning i RAFAELA- systemet

	Svært bra	Meget bra	Bra	Delvis bra	Ikke bra	Ingen for-mening
	5	4	3	2	1	0
Konkret nok						
Tilstrekkelig teori						
Tilstrekkelig med praktiske eksempler						

Kommentarer:

12. Hvor motivert er du til å klassifisere pasientenes pleieintensiet?

Svært motivert	Meget motivert	Motivert	Delvis motivert	Ikke motivert
5	4	3	2	1

Kommentarer:

13. Hvordan trives du med å jobbe i hjemmetjenesten?

Svært bra	Meget bra	Bra	Delvis bra	Ikke bra
5	4	3	2	1

Kommentarer:

Utprøving av metode for OPCq parallellklassifisering i hjemmetjenesten – Drammen kommune.

Overordnede prinsipper:
- Utprøvingen gjennomføres likt på   og
- Utprøvingen gjennomføres ved at det klassifiseres to case (pasienter) pr dag pr enhet i to uker (10 dager, mandag-fredag) i juni 2013.
- Kun personell som har fått opplæring i klassifisering kan være med på utprøvingen
- Det må påses at det er spredning i case ifht alder, kjønn og pleiebehov
- Det må påses at det er spredning hos personalet som utfører hhv. hoved-klassifiseringen og parallellklassifiseringen ifht kjønn, alder, erfaring og utdanningsnivå, og det tilstrebes at flest mulig av personellet er i begge rollene.
- Dersom det konkluderes med at metoden er tilfredsstillende så inkluderes resultatene fra testene i studien

Gjennomføring:
1. Avdelingsleder velger ut på morgenen to pasienter som skal parallellklassifiseres og hvilke pleiere som skal gjennomføre hovedklassifiseringen. Pasientene blir da case som skal parallellklassifiseres.
2. Avdelingsleder fører sameliste (P1) med alle klassifiseringene. Denne innholder dato, Gerica id. nummerpå pasienten, alder, kjønn, navn på hovedklassifiserer og dennes nivå, navn på parallellklassifiserere og deres nivå.
3. Pleierne klassifiserer på vanlig måte på nettet. I tillegg fyller de ut skjema (P2)med caseopplysninger og nivå innen de seks områdene, dette skjemaet blir en del av dokumentasjon på parallellklassifiseringen.
4. I lunchmøte presenterer pleierne caset for andre pleiere som har fått opplæring i klassifisering. Caset presenteres i en kort fremstilling, som samtidig gir et helhetsbilde av situasjonen. Det skal oppgis gerica id. nummer, alder og kjønn, samt problem/behov, observasjoner og utførte tiltak innenfor hvert behovsområde. Det skal ikke oppgis hvilke nivå man har satt på de ulike områdene. De som skal parallellklassifisere kan stille oppklarende spørsmål, men caset kan ikke diskuteres utover dette.
5. Pleierne som har lyttet til casene fyller ut et klassifiseringsskjema (P3) ut fra egen bedømming for hvert case. Dette gjennomføres uten at man diskuterer med hverandre.
6. Den som legger frem caset samler alle klassifiseringene, stifter skjemaene (P2 og P3) for caset sammen og overleverer dette til avdelingsleder som overfører dataene til samles skjema (P1).
7. Når dette er gjennomført i to uker så samles all dokumentasjon (P1, 2 og 3), og overleveres til prosjektleder som sørger for at leder for forskningsdelen får dokumentasjonen.
8. Leder for forskningsdelen (Lisbeth), prosjektleder (Bjørg) og eventuelt assistent (Heidi) møtes for å reflektere rundt om dette er en egnet metode.
9. Dersom det er enighet om at dette er en egnet metode så vil leder for forskningsdelen avklare med FCG om de kan godkjenne metoden.

Spørsmål om klassifisering og måling av pleietyngd for fokusgruppe intervjuer med personal innen hjemmetjenesten

1. Hvordan ønsker du å beskrive god pleie og omsorgskvalitet for brukene innen hjemmetjenesten?
2. Hva er tekken på god kvalitet og tekken på dårlig kvalitet?
3. Hva er deres oppfatting om hvorfor brukernes pleietyngde må klassifiseres og måles? Hva tror ni er nytten med dette?
4. Kan ni fortelle om deres erfarenheter av å klassifisere og måle brukenes pleietyngde etter vært besøk hos brukeren i hjemmetjenesten?
5. Syns du at den målte pleietyngden i poeng gir en bilde av deres virkelighet om hvor krevende brukeren var under besøket?
6. Hvordan syns du at OPCq instrumentet og manualen beskriver brukernes pleie og omsorgsbehov?
7. Har du synspunkter på skoleringen/utdanningen i hvordan klassifisere med OPCq instrumentet?
8. Hvordan bedømmer du din kompetanse i å klassifisere med OPCq?
9. Hvordan beskriver du en situasjon og arbeidsdag da pleietyngdsnivåen er optimal?
10. Hvordan beskriver du en situasjon og arbeidsdag da pleietyngden er over det optimale, det vil si brukernes behov og pleietyngde er krevende og din tid ikke er tilstrektlig?
11. Hvordan beskriver du en situasjon og arbeidsdag da pleietyngden er under det optimale, det vil si da du har mer tid enn hva brukernes behov krever?
12. Hvilke andre faktorer enn brukernes behov innvirker på din totale arbeidsmengde under en arbeidsdag?

Norsk samfunnsvitenskapelig datatjeneste AS

NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Lisbeth Fagerstrøm
Institutt for sykepleievitenskap
Høgskolen i Buskerud
PO Box 7053
3007 DRAMMEN

Vår dato: 21.03.2013   Vår ref:33559 / 3 / MSI   Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 25.02.2013. Meldingen gjelder prosjektet:

33559	*Validitets- og reliabilitetstesting av RAFAELA systemet i hjemmebaserte tjenester. Delstudie: Testing av Oulu pasient klassifisering (OPC)*
Behandlingsansvarlig	*Høgskolen i Buskerud, ved institusjonens øverste leder*
Daglig ansvarlig	*Lisbeth Fagerstrøm*

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

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven og 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/meldeplikt/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://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 31.12.2015, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvedt Kvalheim

Marte Sivertsen

Marte Sivertsen tlf: 55 58 33 48
Vedlegg: Prosjektvurdering

Avdelingskontorer / District Offices:
OSLO: NSD. Universitetet i Oslo, Postboks 1055 Blindern, 0316 Oslo. Tel: +47-22 85 52 11. nsd@uio.no
TRONDHEIM: NSD. Norges teknisk-naturvitenskapelige universitet, 7491 Trondheim. Tel: +47 73 59 19 07. kyrre.svarva@svt.ntnu.no
TROMSØ: NSD. SVF, Universitetet i Tromsø, 9037 Tromsø. Tel: +47-77 64 43 36. nsdmaa@sv.uit.no

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Data samles inn gjennom spørreskjema og intervju. Det tas høyde for at personopplysninger blir behandlet elektronisk ifm. datainnsamlingen, da det skal gjøres lydopptak som behandles på pc eller tilsvarende.

Ifølge prosjektmeldingen skal det innhentes skriftlig samtykke basert på skriftlig informasjon om prosjektet og behandling av personopplysninger. Personvernombudet finner informasjonsskrivet tilfredsstillende utformet i henhold til personopplysningslovens vilkår, forutsatt at det tilføyes at dersom det ikke blir aktuelt med oppfølgingsstudier, vil datamaterialet være anonymisert senest innen 31.12.2015.

Personvernombudet legger til grunn at forsker setter seg inn i og etterfølger Høgskolen i Buskerud sine interne rutiner for datasikkerhet, spesielt med tanke på bruk av privat pc til oppbevaring av personidentifiserende data. Dersom direkte personidentifiserende opplysninger knyttes til datamaterialet, anbefaler personvernombudet at det benyttes en kode som viser til en koblingsnøkkel og at disse lagres adskilt fra det øvrig materialet i prosjektperioden.

Datamaterialet vil lagres med personidentifikasjon etter prosjektslutt frem til utgangen av 2015, i påvente av eventuelle oppfølgingsstudier, jf. telefonsamtale 21.03.2013. Dersom det ikke blir aktuelt med oppfølgingsstudier, vil datamaterialet være anonymisert senest innen 31.12.2015. Anonymisering innebærer at direkte personidentifiserende opplysninger som navn/koblingsnøkkel slettes, og at indirekte personidentifiserende opplysninger (sammenstilling av bakgrunnsopplysninger som f.eks. yrke, stilling, arbeidsplass, alder, kjønn) fjernes eller grovkategoriseres slik at ingen enkeltpersoner kan gjenkjennes i materialet.

Til

Medarbeidere i hjemmebaserte tjenester ved virksomhetene
Drammen kommune.

Forespørsel om å delta i forskningsprosjektet
"Validitets- og reliabilitetstesting av RAFAELA systemet i hjemmebaserte tjenester.
Delstudie: Testing av Oulu pasient klassifisering (OPC)"

Utviklingssenteret for hjemmetjenester i Buskerud, Drammen kommune, har fått midler fra
Helsedirektoratet til følgende utviklingsprogram:

> "Videreutvikle tjenesten til mottakere av hjemmesykepleie i Drammen kommune ved
> bruk av RAFAELA klassifikasjonssystem".

Erfaringsbasert kunnskap etter innføring av Samhandlingsreformen viser at det er større press
på kommunale tjenester og økt behov for kompetanse. Dette synliggjør viktigheten av å gi
tjenester hvor det er samsvar mellom tjenestemottakerens behov og personalets kompetanse.
Ved å benytte et klassifikasjonssystem som avdekker tjenestemottakeres behov, helsefaglige
ressurser og pleietyngde vil kommunen ha et styringsverktøy som bidrar til en helhetlig og
koordinert helse- og omsorgstjeneste.

I tilknytning til utviklingsprogrammet gjennomføres også et forskningsprosjekt i samarbeid
med Høgskolen i Buskerud.

RAFAELA systemet er tredelt og består av: a) daglig registrering og klassifisering av
tjenestemottakers behov med OPCq instrumentet; b) registrering av personalressurser; c)
beregning av den optimale arbeidsmengde pr avdeling ved å anvende instrumentet PAONCIL

Kommunen forventer at ved å ta i bruk en systematisk kartlegging av tjenestemottakers pleie-
og omsorgsbehov, ved å anvende RAFAELA, vil en få et troverdig bilde og kunne tilby og
utøve gode og virkningsfulle pleie- og omsorgstjenester. Ved å benytte det systemet får en
oversikt over den totale arbeidsmengde og kan få en optimal fordeling av tilgjengelige
ressurser. Videre vil en kunne sikre at kompetanse anvendes riktig. Systemet vil også kunne
bidra til en jevnere fordeling av arbeidsmengden mellom de ulike avdelinger.

I første omgang utprøves systemet i to avdelinger i hjemmebaserte tjenester;   og
            Dokumenterte erfaringer innvunnet gjennom utprøvingen vil kunne avdekke
om systemet er egnet for kommunale tjenester generelt, og for hjemmebaserte tjenester
spesielt.

Denne informasjonen går ut til alle medarbeidere ved hjemmebaserte tjenester i
virksomhetene   og   Deltakelse i studien kan for deg innebære at
- vi ber deg om å delta i fokusgruppeintervju dersom du er en del av gruppen som blir
  utvalgt
- du blir bedt om fylle ut et spørreskjema om OPC-instrumentet

Hensikten med å samle disse dataene er for å teste om OPC-instrumentet er egnet til bruk i
hjemmebasere tjenester.

Videreformidling av kunnskap fra studien vil kunne skje på et lokalt, nasjonalt og internasjonalt nivå. Systematisk samarbeid og fagutvikling mellom høgskole og det kliniske felt kan øke høgskolens kompetanse og omsorgstjenestens status. Prosjektet vil kunne bidra til å innfri intensjonene bak forslagene i St. melding 47 (17). Studien vil også kunne frembringe forskningsområder og bidra til utvikling av klinisk, praksisnær forskning.

Det er helt frivillig å delta i forskningsdelen av prosjektet og du kan på hvilket som helst tidspunkt trekke deg, uten å måtte begrunne dette nærmere. Hvorvidt du velger å delta i studien eller ikke, har ingen betydning for ditt ansettelsesforhold i kommunen.

Resultatene av studien vil bli publisert uten at den enkelte kan gjenkjennes. Det er mulig at det vil bli aktuelt å gjennomføre en oppfølgingsundersøkelse før 2015. I så fall vil du motta ny informasjon og ny forespørsel om å delta.

Prosjektet er tilrådd av Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste (NSD).

Dersom du ønsker å delta i forskningsdelen av prosjektet, er det fint om du signerer vedlagte samtykkeerklæring og returnerer den i frankert konvolutt så snart som mulig.

Har du spørsmål i forbindelse med denne henvendelsen, eller ønsker å bli informert om resultatene fra undersøkelsen når de foreligger, kan du gjerne ta kontakt med undertegnede.

Med vennlig hilsen

Lisbeth Fagerstrøm
Professor i helsevitenskap
Høgskolen i Buskerud
Postboks 7053

3007 DRAMMEN

Tlf: 45 50 38 73

Bjørg T. Landmark
FoU-leder
Wergelandsgate 13
3009 DRAMMEN

Tlf: 47 61 43 90

Samtykkeerklæring:

Jeg har mottatt skriftlig informasjon og er villig til å delta i studien.

Signatur .... Telefonnummer ....

BEKREFTELSE PÅ ENDRINGSMELDING

Vi viser til endringsmelding mottatt 27.01.2014 for prosjekt:

33559. Validitets- og reliabilitetstesting av RAFAELA-systemet i hjemmebaserte tjenester. Delstudie: Testing av Oulu pasient klassifisering (OPC)

Personvernombudet har registrert at datainnsamlingen endres fra utfylling av spørreskjema til strukturerte intervjuer (med samme skjema). Det inkluderes studenter i prosjektet som gjennomfører intervjuene. Vi legger til grunn at informantene får informasjon om disse endringene i prosjektet.

Vi legger til grunn at prosjektopplegget for øvrig er uendret. Du vil motta en statushenvendelse ved prosjektslutt.

Ta gjerne kontakt dersom du har spørsmål.

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Vennlig hilsen / Best regards

Marte Byrkjeland
Rådgiver / Adviser

Norsk samfunnsvitenskapelig datatjeneste AS
(Norwegian Social Science Data Services)

Personvernombud for forskning
(Data Protection Official for Research)

Harald Hårfagres gate 29, 5007 BERGEN
Tlf. direkte: (+47) 55 58 33 48
Tlf. sentral: (+47) 55 58 81 80
Faks: (+47) 55 58 96 50
Epost: marte.byrkjeland@nsd.uib.no
www.nsd.uib.no/personvern

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