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Ingrid Taylor

Advanced practice nursing students' development of clinical competence – A Norwegian mixed-methods study

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Dedication

Til alle nåværende og fremtidige avanserte kliniske allmennsykepleiere

Til alle undervisere og forskere ved avanserte kliniske allmennsykepleiere utdanninger

Til alle ledere som er med på å skape vår fremtidige helsetjeneste

Forord

Bak denne doktorgradsavhandlingen er det flere personer jeg ønsker å takke som har bidratt til at avhandlingen både kunne startes opp og fullføres.

Først vil jeg takke alle som deltok i doktorgradsprosjektet, studenter ved utdannelsen avansert klinisk sykepleie/avansert klinisk allmensykepleie, og sensorene ved OSCE. Spesielt takk til det første student kullet ved Universitetet i Sørøst-Norge for den tiden vi var sammen. Det var både inspirerende og lærerikt å følge dere.

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Abstract

Advanced practice nursing roles are developing globally and have now been introduced in Norway. The Norwegian government recently regulated master's education in advanced practice nursing, which encompasses the nurse practitioner role, and established role regulations for graduates. To support a credible and sustainable evolvement of the advanced practice nursing role in Norway, a doctoral study project was designed with the aim of investigating the development of advanced practice nursing students' clinical competence.

This aim was reached by achieving the objectives of three sub-studies as follows. Sub-study I: (a) to describe and analyse the self-assessment of clinical competence and the need for further training at the beginning of the student's education, and (b) to analyse the possible predictive variables in students' self-assessments. Sub-study II: to explore and describe students' and examiners' experiences with the Objective Structured Clinical Examination (OSCE). Sub-study III: to analyse the development of students' self-assessed clinical competence from the beginning of their education to after the completion of their clinical studies.

A sequential equal-status mixed methods design was employed for this doctoral study project. For sub-studies I (n = 97) and III (n = 36), data were collected from advanced practice nursing/nurse practitioner students through the Professional Nurse Self-Assessment Scale of clinical core competencies II (PROFFNurse SAS II). For sub-study II, data were collected from focus groups and interviews with nurse practitioner students (n = 15) and examiners (n = 5) after the students had completed their OSCE.

The findings of sub-study I show that at the beginning of their education, the students self-assessed their clinical competence regarding responsibility and cooperation as high but self-assessed their direct clinical practice competence at lower levels. Work experience and previous higher education were not significant predictors of the total score for clinical competence or of the need for further training. The findings in sub-study II show that the students and examiners found the OSCE to be an appropriate method of assessment for

advanced clinical competence, although some challenges were experienced regarding the exam form in terms of preparing for the examination, the process for the examination and assessment and demonstrating clinical competence at an advanced level. The findings in sub-study III show that the students developed their self-assessed clinical competence for direct clinical practice to the greatest degree. The findings indicate a lack of development regarding clinical leadership in the student's workplace. Similar to the findings of sub-study I, sub-study III revealed that previous higher education was not a significant predictor of clinical competence. However, somewhat different from sub-study I, the findings of sub-study III indicate that previous work experience in primary health care is a significant, although minor, predictor.

Overall, the findings of this doctoral study project indicate that the students developed direct clinical practice appropriate for an advanced practice nursing role and some aspects of indirect nursing, such as health promotion and disease prevention. Indirect nursing in such areas as clinical leadership, which is essential to leading change in health care services, was found to be lacking on a systemic level. Current regulations in Norway do not include a full scope of practice for the nurse practitioner role, as they exclude such elements as the authority to diagnose, prescribe medications and treat patients, which limits the possibilities for clinical competence development for students in line with international standards.

This doctoral study project is the first study in the Nordic countries to investigate education in advanced practice nursing. The project contributes to advanced practice nursing education by identifying areas of the educational programmes that are in need of improvement, specifically the indirect nursing aspect and, especially, clinical leadership. This project informs further research that uses patient outcomes to measure advanced practice nursing graduates' impact on patient care to investigate whether advanced practice nurses are safe practitioners. Lastly, this project supports collaboration among education, research and the clinical field to develop new advanced practice nursing models that can facilitate the development of clinical competence that is in line with international standards.

Keywords: Advanced practice nursing, advanced practice nurse, nurse practitioner, clinical competence, assessment, objective structured clinical examination, OSCE, questionnaire, self-assessment, development, longitudinal, nursing education

Sammendrag

Avanserte sykepleieroller er nå introdusert i Norge etter en lengre global utvikling. Den norske regjeringen har nylig fastsatt forskrift om nasjonal retningslinje for masterutdanning i avansert klinisk allmennsykepleie (AKS) som omfatter rollen *nurse practitioner*, og etablert en tilhørende forskrift om spesialistgodkjenning i AKS. For å støtte en pasientsikker og bærekraftig utvikling av AKS i Norge, ble det utviklet et doktorgradsstudieprosjekt med mål om å undersøke utviklingen av kliniske kompetanse for masterstudenter i AKS.

Tre delstudier er inkludert i dette doktorgradsarbeidet med følgende formål. Delstudie I: (a) å beskrive og analysere egenvurderingen av klinisk kompetanse og behovet for videre opplæring i starten av studentenes utdanning, og (b) å analysere mulige prediktive variabler i studentenes egenvurderinger. Delstudie II: å utforske og beskrive studenters og sensorers erfaringer med objective structured clinical examination (OSCE). Delstudie III: å analysere utviklingen av studentenes egenvurderte kliniske kompetanse fra begynnelsen av utdanningen til etter fullførte kliniske studier.

Et sequential equal-status mixed methods design ble brukt for dette doktorgradsarbeidet. For delstudier I (n = 97) og III (n = 36) ble data samlet inn fra AKS studenter gjennom Professional Nurse Self-Assessment Scale of clinical core competencies II (PROFFNurse SAS II). For delstudie II ble data samlet inn fra fokusgrupper og intervjuer med AKS studenter (n = 15) og sensorer (n = 5) etter at studentene hadde fullført OSCE.

Funnene fra delstudie I viser at studentene ved starten av utdanningen selvvurderte sin kliniske kompetanse om ansvar og samarbeid som høy, men selvvurderte sin direkte kliniske praksiskompetanse på lavere nivåer. Arbeidserfaring og tidligere høyere utdanning var ikke signifikante prediktorer for totalskåren for klinisk kompetanse eller for behovet for videre opplæring. Funnene i delstudie II viser at studentene og sensorene fant OSCE som en hensiktsmessig vurderingsmetode for avansert klinisk kompetanse, selv om de erfarte noen utfordringer når det gjaldt eksamensformen. Dette handlet om forberedelse til eksamen,

gjennomføring av eksamen, og vurdering og demonstrasjon av klinisk kompetanse på et avansert nivå. Funnene i delstudie III viser at studentene i størst grad utviklet sin egenvurderte kliniske kompetanse for direkte klinisk praksis. Funnene indikerer manglende utvikling når det gjelder klinisk lederskap på studentens arbeidsplass. I likhet med funnene i delstudie I, viste delstudie III at tidligere høyere utdanning ikke var en signifikant prediktor for klinisk kompetanse. Men, noe forskjellig fra delstudie I, indikerer funnene fra delstudie III at tidligere arbeidserfaring i primærhelsetjenesten er en betydelig, men liten, prediktor.

Samlet sett tyder funnene fra dette doktorgradsarbeidet på at studentene utviklet sin egen klinisk kompetanseområde for direkte klinisk praksis og enkelte aspekter ved indirekte sykepleie, som helsefremmende og sykdomsforebyggende praksis hensiktsmessig for en avansert sykepleierolle. Indirekte sykepleie på områder som klinisk ledelse, som er essensielt for å lede endringer i helsetjenester, ble funnet å mangle på et systemisk nivå. Gjeldende regelverk i Norge omfatter ikke rettigheter for AKS til å utøve sin rolle, da det utelukker elementer som myndighet til å diagnostisere, forskrive medisiner og behandle pasienter, noe som begrenser mulighetene for klinisk kompetanseutvikling for studenter i tråd med internasjonale standarder.

Dette doktorgradsarbeidet er det første avhandlingsarbeidet i Norden som undersøker utdanning i AKS. Avhandlingen bidrar til å identifisere områder av utdanningsprogrammet i AKS som kan forbedres; det indirekte sykepleieaspektet og spesielt klinisk ledelse. Dette doktorgradsarbeidet informerer videre forskning som bruker pasientresultater til å måle AKS utdanningens påvirkning på pasientbehandlingen for å undersøke om masterprogrammet i AKS utdanner trygge utøvere. Til slutt støtter dette doktorgradsarbeidet samarbeid mellom utdanning, forskning og det kliniske feltet for å utvikle nye avanserte sykepleiemodeller som kan legge til rette for utvikling av klinisk kompetanse som er i tråd med internasjonale standarder.

List of papers

Paper I

Taylor, I., Bing-Jonsson, P., Wangensteen, S., Finnbakk, E., Sandvik, L., McCormack, B., & Fagerström, L. (2020). The self-assessment of clinical competence and the need for further training: A cross-sectional survey of advanced practice nursing students. *Journal of Clinical Nursing, 29*(3–4), 545–555. https://doi.org/10.1111/jocn.15095

Paper II

Taylor, I., Bing-Jonsson, P., Johansen, E., Levy-Malmberg, R., & Fagerström, L. (2019). The Objective Structured Clinical Examination in evolving nurse practitioner education: A study of students' and examiners' experiences. *Nurse Education in Practice, 37*, 115–123. https://doi.org/10.1016/j.nepr.2019.04.001

Paper III

Taylor, I., Bing-Jonsson, P. C., Finnbakk, E., Wangensteen, S., Sandvik, L., & Fagerström, L. (2021). Development of clinical competence—a longitudinal survey of nurse practitioner students. *BMC Nursing*, *20*(1), 130. https://doi.org/10.1186/s12912-021-00627-x

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Abbreviations

APN	Advanced Practice Nurse
ECTS	European Credit Transfer System
ICN	International Council of Nurses
NP	Nurse Practitioner
NSD	Norwegian Social Science Data Services
OSCA	Objective Structured Clinical Assessment
OSCE	Objective Structured Clinical Examination
OECD	Organisation for Economic Co-operation and Development
PROFFNurse SAS	Professional Nurse Self-Assessment Scale of clinical core competencies
RN	Registered Nurse
The ICN NP/APN network	International Council of Nurses' International Nurse Practitioner/Advanced Practice Nursing Network

Table of contents

1 INTRODUCTION

Advanced nursing roles have been implemented in healthcare operations all around the world to achieve a competent and sustainable healthcare workforce (Heale & Rieck Buckley, 2015; Maier et al., 2018; World Health Organization, 2020). The literature identifies the shortage of healthcare workers, issues related to access to care and cost as factors that are driving policymakers to invest in advanced practice nursing roles (Maier et al., 2017; Maier et al., 2018; World Health Organization, 2020). Advanced practice nurses (APNs) play complementary roles in the provision of health care services, rather than serving as substitutes for medical practice providers, where innovative models of nursing can contribute to improved health outcomes for patients (Bryant-Lukosius et al., 2004; Hamric & Tracy, 2019).

Research findings suggest that care provided by APNs is likely to generate patient health outcomes that are similar to or better than the outcomes of physician-provided care; higher levels of patient satisfaction, for a broad range of patient conditions in primary health care (PHC), were also uncovered by some studies (Chavez et al., 2018; Laurant et al., 2018; Martinez-Gonzalez et al., 2014; Swan et al., 2015). While Laurant et al. (2018) doubted that maintaining an APN on staff is more cost-effective than maintaining a physician due to longer consultations compared to those held with physicians, Swan et al. (2015) found two studies with findings that indicated patients receiving care from APNs required fewer consultations over time. Research findings also indicate that APNs working in specialised health care can have a positive impact on mortality, function and length of stay in the context of hip fracture care (Allsop et al., 2021) and that APNs providing acute care can diminish the physician shortage in tertiary-care adult medical intensive care units with regard to training, physician oversight and hospital support (Landsperger et al., 2016). Fagerström (2021) presented four reasons for investing in the development of APNs: (1) to improve the current need for access to nursing, care and treatment; (2) to more effectively meet the increased demand for health care services using available resources; (3) to support a clinical career path for nurses and, thus, contribute to the recruitment of future nurses; and (4) to contribute to the sustainable development of health care services.

Advanced practice nursing is an umbrella term for multiple advanced nursing roles, nurse practitioner (NP) being one of the more commonly recognised positions (Schober, 2016). In the white paper *The Primary Health and Care Services of Tomorrow—Localised and Integrated* (Norwegian Ministry of Health and Care Services, 2015), the Norwegian government expressed support for establishing NP master's programmes to meet the increased demand for community health care services. On 1 February 2020, regulations for specialist approval for APNs and regulations on national guidelines for a master's education in advanced practice nursing (*avansert klinisk allmennsykepleie*) were approved (Norwegian Ministry of Education and Research, 2020a, 2020b).

This doctoral study project is part of the research project 'Providing Person-Centred Healthcare – By New Models of Advanced Nursing Practice in Cooperation with Patients, Clinical Field and Education' (Research project: PraksisVEL; Application number: ES530499; Project number: 239991), funded by the Norwegian Research Council and facilitated by Professor Lisbeth Fagerström as the research project leader. The overall aim of this umbrella research project is to contribute to new models of organising, managing and delivering high-quality health care services to persons in need of health care and thereby contribute to person-centred and effective health care services based on cooperation between community health care, hospitals and education. PraksisVEL is based on the Master's Programme in Advanced Practice Nursing at the University of South-Eastern Norway (USN). The master's programme aligns with the NP role, as described by the International Council of Nurses, or ICN (2020). The research project and master's programme were developed in response to healthcare reforms that address the growing need for clinical competence related to the care of the increasing proportion of older people in the population, as well as patients with complex and complicated health conditions (Norwegian Ministry of Health and Care Services, 2009). Previously published research from the PraksisVEL project includes work on the emergency care context; understandings of the NP role (Boman et al., 2019a), the scope of practice of RNs and nurse specialists (Boman et al. 2020), patient outcomes (Boman et al. 2021), a new model of care related to the NP role (Boman et al. 2022), and work on the primary healthcare context; advanced geriatric nursing

(Boman, et al., 2019b), a new model of care related to the NP role (Hansen, et al. 2020), and role implementation (Hansen et al., 2021). This PhD project is one of three studies associated with the PraksisVEL research project. This research was initially intended to evaluate whether the master's programme in advanced practice nursing improves students' competence and skills in the clinical judgment of patients with acute and minor illnesses and/or long-term needs and whether the learning outcomes meet the needs for the new APN roles in clinical settings. The aim of this project has since been further developed: as presented in detail in Chapter 4, the project focuses on clinical competence development for advanced practice nursing students rather than on an evaluation of the educational advanced practice nursing programme as a whole. The findings of this PhD project – knowledge about advanced practice nursing students' clinical competence development – can be useful for improving master's programmes in line with the NP role to ensure consistency with international standards.

This PhD project consists of three sub-studies: (I) a cross-sectional survey of NP/advanced practice nursing students' self-assessment of their clinical competence and need for further training, (II) a descriptive qualitative study of NP students' and examiners' experiences with the Objective Structured Clinical Examination (OSCE) to assess clinical competence and (III) a longitudinal study of NP students' development of self-assessed clinical competence.

This thesis contains nine chapters. Chapter 1 serves as an introductory chapter, and Chapter 2 provides the background for the thesis and an overview of NP/APN roles and clinical competence. Chapter 3 presents the conceptual frameworks of the thesis: the Caring advanced practice nurse (APN) model and andragogical assumptions. Chapter 4 states the aim of the thesis, while Chapter 5 describes the overall mixed methods design and the methods applied when conducting the three sub-studies. Chapter 6 documents the results of the three sub-studies and is followed by a discussion in Chapter 7. Finally, Chapter 8 outlines the conclusion and offers some reflections regarding the implications for NP/advanced practice nursing education and further research.

2 BACKGROUND

2.1 Definition of an advanced practice nurse

Nursing can be performed on three levels: (1) generalist level, which involves basic nursing and care provided by a registered nurse (RN) with a bachelor's or postgraduate degree; (2) specialist level, at which the RN is specialised in a specific clinical area or patient group (such as wounds or diabetes) and has pursued further education, such as specialised courses or on-the-job-training and (3) advanced level, which is provided by RNs with a master's degree or beyond who have increased responsibility and functions (Fagerström, 2021). The term 'advanced practice nurse' (APN), as used in this thesis, refers to 'a nurse who practices and engages in nursing on an advanced level' (Fagerström, 2021, p. 23). The International Council of Nurses International Nurse Practitioner/Advanced Practice Nursing Network (ICN NP/APN Network) launched in 2002 offers the following definition to facilitate a common understanding and guide further development of NP/APN roles globally (Schober, 2016, p. 3):

> [The] APN is a registered nurse who has acquired the expert knowledge base, complex decision-making skills, and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A master's degree is recommended for entry-level.

Along with this definition, the ICN also provided overarching assumptions about APNs, statements regarding the preparation and recognition of APNs and the characteristics of an APN, including educational preparation, the nature of the practice and regulatory mechanisms (Table 1; International Council of Nurses [ICN], 2020). The ICN NP/APN Network 2002 definition is cited in numerous international research papers. However, the definition has also been criticised for blending the APN and NP roles, as the definition aligns with what many countries recognise as the characteristics of the NP role (Gardner et al., 2013). The definition has also received criticism for not paying attention to varying legislated frameworks of practice, which has led to a call for the regulation and delineation of the NP role (Gardner et al., 2016). In 2020,

the ICN published *Guidelines on Advanced Practice Nursing 2020*, which included an updated definition of an APN (ICN, 2020, p. 6).

> Advanced Practice Nurse (APN)
>
> An Advanced Practice Nurse (APN) is a generalist or specialised nurse who has acquired, through additional graduate education (minimum of a master's degree), the expert knowledge base, complex decision-making skills and clinical competencies for Advanced Nursing Practice, the characteristics of which are shaped by the context in which they are credentialed to practice (…). The two most commonly identified APN roles are CNS [Clinical Nurse Specialist] and NP [Nurse Practitioner].

In the updated APN definition, NPs and clinical nurse specialists (CNSs) are acknowledged as the most common APN roles (ICN, 2020). Also commonly referred to is the North American model, in which four professional roles are distinguished: the certified registered nurse anaesthetist (CRNA), the certified nurse–midwife (CNM), the clinical nurse specialist (CNS) and the certified nurse practitioner (CNP) (American Association of Colleges in Nursing, 2008). The ICN (2020, p. 6) provides the following definitions for NPs and CNSs:

> Nurse Practitioner (NP)
>
> A Nurse Practitioner is an Advanced Practice Nurse who integrates clinical skills associated with nursing and medicine to assess, diagnose and manage patients in primary healthcare (PHC) settings and acute care populations as well as ongoing care for populations with chronic illness.

> Clinical Nurse Specialist (CNS)
>
> A Clinical Nurse Specialist is an Advanced Practice Nurse who provides expert clinical advice and care based on established diagnoses in specialised clinical fields of practice along with a systems approach in [a] practicing speciality as a member of the healthcare team.

The ICN (2020) guidelines make several distinctions between the NP and CNS roles. NPs are generalists at an advanced level; they are autonomous clinicians who can diagnose and treat conditions based on evidence-informed guidelines and who commonly work in PHC and other out-of-hospital settings or in acute care contexts. CNSs are specialists at an advanced level who are expert clinicians and who provide complex speciality care while improving the quality of health care delivery. They commonly work in hospital or institutional healthcare settings with a speciality focus. The ICN (2020) guidelines emphasise that a CNS is not the same as a 'specialist nurse', as the latter specialises in a certain area but has no advanced clinical competence in a master's level practice involving the clinical assessment of patients' health problems. Though the two roles share many common features, an NP is traditionally more involved in diagnosing, treating and prescribing treatments for various conditions or illnesses, while a CNS develops evidence-based guidelines or protocols for care and staff development activities (ICN, 2020). However, these definitions have limitations with respect to capturing a common understanding of the APN role, as the educational requirements to practice, the scope of practice and the process of licensing renewal differ internationally, leading to a situation in which similar roles are found in multiple countries but with different names, including NP, CNS, nurse specialist (NS), APN and more (Heale & Rieck Buckley, 2015). In general, APN roles include an expanded scope of practice that has traditionally belonged to the medical domain (Heale & Rieck Buckley, 2015; Maier et al., 2017).

Fagerström (2021) has developed the Caring advanced practice nursing model (Caring APN model; see Section 3.1 for a description of the model) upon which this thesis is built. Fagerström (2021, pp. 43–44) developed the following definition of advanced practice nursing that is visionary in terms of having an advanced practice nursing role with clear clinical autonomy and the necessary rights, including the right to prescribe medications, referrals, laboratory tests or radiographic examinations.

A nurse with advanced clinical competency shall be able to independently assess, diagnose and treat common acute health problems and conditions related to disease as well as take responsibility for the management of the follow-up and nursing needed for chronic health

problems. Advanced practice nursing is characterized by a holistic view of the patient, caritative caring, and ethos as a person-centred fundamental ethical attitude, where both objective and subjective health are focused on. The advanced practice nurse works in an evidence-based manner and is capable of systematically carrying out the comprehensive physical examination of a patient, investigating the patient's health history, and determining the patient's health needs on an advanced level. Based on his/her clinical assessment, the advanced practice nurse has the capacity and is able to make decisions about the patient's health needs and can realize the nursing and treatment measures required. He/she has the right to organize and refer patients for tests, such as laboratory tests or radiographic examinations, the right to prescribe medications, the right to referral as well as the right to admit or discharge patients, i.e., he/she can provide holistic and person-centred caritative nursing, care and treatment. The advanced practice nurse takes responsibility for, leads and coordinates health promotive and health preventative work. Other important areas of responsibility include the evaluation and development of healthcare services, quality assurance and research in own professional field. The advanced practice nurse holds a Bachelor's degree in nursing, has sufficient work experience and has an education equivalent to a Master's level degree in advanced practice nursing.

In this thesis, the terms APN and NP are used interchangeably to some extent for several reasons. First, the definition and role delineated for an APN must be fulfilled for any independent advanced practice nursing role. Second, the literature is not clear on which specific role is being referred to in some contexts; however, the research cited in this final thesis is considered relevant for the NP role. Lastly, the terms are used interchangeably when discussing the sample included in this PhD project, as the data were collected before the role and education were regulated in Norway.

Table 1: Assumptions and characteristics of advanced practice nursing

Assumptions about Advanced Practice Nursing

• are practitioners of nursing, providing safe and competent patient care
• have their foundation in nursing education
• have roles or levels of practice which require formal education beyond the preparation of the generalist2 nurse (minimum required entry level is a master's degree)
• have roles or levels of practice with increased levels of competency and capability that are measurable, beyond that of a generalist nurse
• have acquired the ability to explain and apply the theoretical, empirical, ethical, legal, care giving, and professional development required for Advanced Practice Nursing
• have defined APN competencies and standards which are periodically reviewed for maintaining currency in practice, and
• are influenced by the global, social, political, economic and technological milieu.

Advanced Practice Nursing Characteristics

Educational Preparation

• Educational preparation beyond that of a generalist or specialised nurse education at a minimum requirement of a full master's degree programme (master's level modules taken as detached courses do not meet this requirement). It is acknowledged that, for some countries, the requirement of a master's degree may be an aspirational goal as they strive to achieve this standard. Transitional programmes and bridging courses can be defined to progress to this standard.
• Formal recognition of educational programmes preparing nurses specifically for Advanced Practice Nursing (CNS or NP) (e.g. accreditation, approval or authorisation by governmental or nongovernmental agencies).
• A formal system of credentialing linked to defined educational qualifications.
• Even though some countries require clinical experience for a nurse to enter an APN education programme, no evidence was found to support this requirement.

Nature of Practice

• A designated role or level of nursing that has its focus on the provision of care, illness prevention and cure based on direct and indirect healthcare services at an advanced level, including rehabilitative care and chronic disease management. This is beyond the scope of practice of a generalist or specialised nurse.
• The capability to manage full episodes of care and complex healthcare problems including hard to reach, vulnerable and at-risk populations.
• The ability to integrate research (evidence informed practice), education, leadership and clinical management.
• Extended and broader range of autonomy (varies by country context and clinical setting).
• Case-management (manages own case load at an advanced level).
• Advanced assessment, judgement, decision-making and diagnostic reasoning skills.
• Recognised advanced clinical competencies, beyond the competencies of a generalist or specialised nurse.
• The ability to provide support and/or consultant services to other healthcare professionals emphasising professional collaboration.
• Plans, coordinates, implements and evaluates actions to enhance healthcare services at an advanced level.
• Recognised first point of contact for clients and families (commonly, but not exclusively, in primary healthcare settings).

Regulatory mechanisms – Country specific professional regulation and policies underpinning APN practice:

• Authority to diagnose
• Authority to prescribe medications
• Authority to order diagnostic testing and therapeutic treatments
• Authority to refer clients/patients to other services and/or professionals
• Authority to admit and discharge clients/patients to hospital and other services
• Officially recognised title(s) for nurses working as APNs
• Legislation to confer and protect the title(s) (e.g. Clinical Nurse Specialist, Nurse Practitioner)
• Legislation and policies from an authoritative entity or some form of regulatory mechanism explicit to APNs (e.g. certification, credentialing or authorisation specific to country context

Source: (International Council of Nurses, 2020, pp. 9-10)

2.2 APNs and impact on patient care

As previously stated, international studies have documented APNs' contribution to patient health outcomes and patient satisfaction within PCH (Chavez et al., 2018; Laurant et al., 2018; Martinez-Gonzalez et al., 2014; Swan et al., 2015) and in hospital settings (Allsop et al., 2021; Landsperger et al., 2016). England and the United States are at a more advanced stage than Norway when it comes to implementing APNs (Poghosyan & Maier, 2022); thus, outcome research on APNs is predominantly published in these countries. For example, an English retrospective cohort study by Stewart et al. (2021) demonstrated that amongst 108,115 lung cancer patients there was observed an association between survival and unplanned hospital admissions when the patients were assessed by a lung cancer nurse specialist (APN). In another recent US study, Yang et al. (2021) sampled 12,991 Medicaid-insured youths ages 0 to 20 years and did not find any major difference in the prescribing of psychotropic medications between NPs and physicians. A scoping review of APNs within critical care in Europe (Kaldan et al., 2021), however, found that education, supportive policy, and legislation were lacking and advocated for studies comparing nurses and physicians in terms of performance and patient outcomes needed to improve the legislation of APNs.

Amongst the Nordic countries, Sweden was the first to introduce an educational programme for APNs in 2003 (Hallman et al., 2005) followed by Finland in 2005 (Glasberg et al., 2005). Finland has developed APN roles for the last 15 years (Jokiniemi et al., 2020) and offers a post-graduate nurse prescribing course (45 ECTS) for RNs with at least 3 years of work experience (Ministry of Social Affairs and Health, 2015). Previous research findings in the Nordic countries have concluded that APNs represent a resource for health care services. Two Swedish studies were the first to evaluate APNs. Lindblad et al. (2010) evaluated APNs in a hospital setting and Altersved et al. (2011) in a primary healthcare team and both studies found that APNs were considered a resource in terms of improving access to care. Similar findings of APN's ability to improve patient care have been reported in the first evaluation in Finland within hospital settings and PCH (Fagerström & Glasberg, 2011; Wisur-Hokkanen, et al., 2015) and in Norway in an emergency context (Boman et al., 2019) and PCH (Henni et al., 2018; Hansen et al., 2020).

While APN is considered a resource by clinical leaders from Sweden, Norway, the Faroe Islands and Denmark (Christiansen & Fagerström, 2016), studies in Sweden, Norway, Denmark and Finland have reported that implementing APN in different healthcare contexts is challenging due to the lack of a role description, formally recognised education, and legislation for APNs and cited limited autonomy and the inability to prescribe medication as barriers to implementing the APN role (Altersved et al., 2011; Boman et al., 2022; Lindblad et al., 2010; Jokiniemi et al., 2015; Piil et al., 2012). Nevertheless, several studies have reported positive experiences of APNs from patients or other healthcare providers in interprofessional teamwork. Eriksson et al. (2018) reported that patients in Sweden perceived APNs in PCH as knowledgeable and skilful with a respectable and flexible approach that led to patients experiencing holistic care. Another Swedish study by Kvarnström et al. (2018) reported that the APNs in a surgical ward exerted clinical assessment and decision-making as a clinical leader, bridging team colleagues by alternating between occupying positions traditionally assigned to either an RN or a physician and acting as a tutor for others such as junior and resident physicians. Lastly, in a non-inferiority study including 335 cases in Norway, APNs demonstrated the ability to diagnose and treat minor orthopaedic injuries without compromising the quality of care compared to the standard (physician-led) care model (Boman et al., 2021).

As showcased, APN and its impact on patient care are gaining interest in research in Europe and the Nordic countries. There is a consensus that APNs can be a resource and make an impact on patient care, and APN research in Norway is steadily growing. Using practice-specific quality metrics in patient outcome research in APN care is essential when it comes to providing a rationale for APN roles (Kapu et al. 2021). Moving forward, more outcome research that explores how APNs can impact patient care is needed.

2.3 Nurse practitioner—An international and national perspective

Over time, APN roles have been developed globally; indeed, NP/APN roles currently are estimated to exist in approximately 70 countries (ICN, 2022). However, the stage of development for these roles varies from country to country (ICN, 2020).

In 2012–2013, at least one-third of the Organisation for Economic Co-operation and Development (OECD) countries reported having had a strategy in place to expand the role of non-physician care providers, such as NPs, for the previous five years (Moreira & Lafortune, 2017). Of the OECD countries, Australia, Canada, Finland, Ireland, the Netherlands, the United States, the United Kingdom and New Zealand authorise NPs to work at high levels of advanced practice (Maier & Aiken, 2016; Maier et al., 2018). The highest number of NPs in the OECD countries can be found in the United States (40.5 per 100,000 population), followed by the Netherlands (12.6), Canada (9.8), Australia (4.4) and Ireland and New Zealand (both with 3.1) (Maier et al., 2016).

In Asian countries, such as China, the CNS role is more evolved than the NP role, and the differentiation between a speciality nurse and a CNS working in a speciality area is gradually being recognised (Wong, 2018). India, Thailand and Taiwan have adopted the NP role; however, development of the role has been hindered by physician opposition and the lack of consensus on the requirements and regulations for NP certification and the scope of practice across the countries (Kooienga & Carryer, 2015). Botswana, Africa, was among the first countries globally to develop and adopt a family NP role as a response to healthcare reforms and the population's needs (ICN, 2020). While many challenges exist in Africa related to development of this role, including limited resources, opposition from the medical profession and inefficient regulations and policies, as well as a lack of context-specific programmes that are responsive to the actual and potential needs of the continent, case studies that illustrate that the NP role is gaining recognition indicate some progress has been made (Geyer & Christmals, 2020). Support to develop an NP role in the PHC setting is found in health policy documents in the Eastern Mediterranean Region (Al-Darazi & Al-Maqbali, 2020) and in Latin America and the Caribbean (Cassiani et al., 2020).

The authority of NPs to prescribe medications for their patients has been an important component impacting full implementation of the role in the United States (Scudder, 2006). While Australia, Canada, the United Kingdom, Ireland, New Zealand and the United States expanded prescriptive authority for nurses from 2010 through 2016, Cyprus, Estonia, Finland,

France, the Netherlands, Poland and Spain adopted laws to confer prescriptive authority on RNs (Maier et al., 2017). Globally, all countries have regulatory and minimum educational requirements in place to ensure patient safety, and the majority require some form of physician oversight (Maier, 2019). The ICN launched guidelines on prescriptive authority for nurses with the intent 'to protect the public by making sure that only nurses who are appropriately educated, qualified, competent and ethical in practice are credentialed' (ICN, 2021, p. 25). NPs' prescriptive authority is key to the autonomy of the role, as research from the United States demonstrated that independent practice and prescriptive authority for NPs resulted in statistically significant increases in NP visits and decreases in primary care physician visits (Park et al., 2020). Norway has not passed any laws related to NPs' prescriptive authority.

Though several reasons can be cited for developing APN roles globally, the shortage of physicians has been highlighted as the primary reason (Maier et al., 2017; Zhang et al., 2020). The World Health Organization (2020) recently reported that 58% of 95 responding countries described APN roles as occurring more frequently in areas with low physician densities. However, Norway is one of the OECD countries with the highest density of both physicians and RNs, with 5.0 practising physicians and 17.9 practising RNs per 1,000 population (Organisation for Economic Co-operation and Development [OECD], 2021). Although these numbers are promising on a global scale, national surveys document a shortage of healthcare workers. According to the findings of one study, Norway is lacking a total of 6,900 RNs, specialist nurses and midwives (Gjerde, 2021). While the COVID-19 pandemic has worsened the situation, research has shown RNs to be one of the professions with the greatest reported shortages in Norwegian work life prior to the pandemic (Kalstø, 2019). Geographical differences may also present obstacles to ensuring access to care in the future, as district municipalities are faced with the double-sided challenge of ageing populations and fewer young people who can work in health care services (Norwegian Ministry of Health and Care Services, 2019).

In addition to securing a sufficient number of RNs, the level of clinical competence of the nurses who provide care is also important to ensuring appropriate patient safety and quality of care (Maier et al., 2017; OECD, 2021). Previous research has indicated that nursing staff (RNs,

assistant nurses and assistants) have insufficient competence to deliver safe patient care in community elderly care (Bing-Jonsson et al., 2016). Educating APNs in line with the ICN definition of the NP role (Norwegian Directorate of Health, 2021) was one of the suggested measures to improve recruitment, competence and professional development of healthcare workers in the '*Kompetanseløftet* 2025' ('Competence Increase 2025') action plan. The aim of the Norwegian Ministry of Health and Care Services was to train a sufficient number of competent healthcare workers in PHC services (Norwegian Ministry of Health and Care Services, 2021).

2.4 Nurse practitioner education

Internationally, the first established NP education programme was a four-month programme in paediatrics offered at the University of Colorado in 1965 (Lusk et al., 2019). The programme was successful, and in the years that followed, more programmes within multiple speciality areas were developed (Sheer & Wong, 2008). However, the NP role actually already existed in clinical practice in the primary care setting since the late 19th century (Lusk et al., 2019). Poor and marginalised patients with little access to physician-provided medical care contributed to the development of the autonomous practice associated with the NP role. It was not until the 1930s that the Frontier Nursing Service, an organisation that provided nursing care and education in rural areas, informally modelled what would later become the primary care NP role. With permission from the organisation's medical advisory committee, nurses gained considerable autonomy to diagnose patients and to treat them with medicine, including morphine (Lusk et al., 2019).

The literature describes an interesting international trend by which designing an education programme for APNs and regulating the advanced practice nursing profession often are among the last steps to implementing the role (Sheer & Wong, 2008). The process followed in these countries can be understood as a bottom-up process in which the NP role first was evolved in the clinical field in response to patient needs and then further developed until being recognised by the government. Norway, conversely, has followed a top-down process to implement the

NP role, in that the educational component was addressed first, swiftly followed by support from the government to regulate the NP role and education. The University of Oslo was the first in Norway to launch an APN master's programme, inspired by the NP role with a geriatric speciality (*avansert geriatrisk sykepleie*), which was described as a 'new form of nursing' that aimed to improve the quality of and access to health care services for the elderly with health issues (Hauge et al., 2011). Only a few years later, in 2015, development of an NP educational programme at the master's level in Norway was supported in a white paper (Norwegian Ministry of Health and Care Services, 2015), and in 2020, an APN role and APN master's programme with 120 European Credit Transfer and Accumulation System (ECTS) credits were regulated (Norwegian Ministry of Education and Research, 2020a, 2020b). The national guidelines for a master's education in advanced practice nursing emphasise four learning outcomes:

- Clinical assessment, decision and action competence
- Health competence, patient education and guidance
- Professional management and coordination
- Knowledge-based professional development, service improvement and innovation

The national guidelines state that the purpose of an advanced practice nursing education is to strengthen the quality of PHC services (Norwegian Ministry of Education and Research, 2020b). However, the Norwegian Directorate of Health supports including the specialist healthcare setting in the national guidelines (Norwegian Directorate of Health, 2021). The national guidelines target patients of all ages with acute, short-term and chronic conditions, with an emphasis on patients with chronic diseases and multiple and complex conditions, including somatic, mental health and drug-related health challenges and illnesses. This is in addition to declaring that an APN must work independently in line with their competence and current regulations and in close collaboration with physicians and other healthcare personnel. Furthermore, natural and social science knowledge and knowledge of research methods and crucial scientific and ethical theories relevant to APNs are highlighted in the national guidelines. Finally, the national guidelines state that the education must include clinical studies guided by a preceptor consisting of 12 weeks of 40 hours per week (total of 480 hours), in addition to a

minimum of 6 weeks of 40 hours per week (total of 72 hours) that shall consist of skill training, simulations and critical reflection (Norwegian Ministry of Education and Research, 2020b).

As NP educational programmes are inconsistent, varying across countries, the ICN (2020) guidelines include several recommendations which it proposes all countries should follow. The ICN (2020) recommends that a master's degree at the postgraduate level be considered the minimum standard for entry-level NP practice. The Council also recommends that a master's programme be designated for NPs that focuses on preparing RNs to practice at an advanced level in clinical settings, such as by educating them on advanced physical assessments, advanced clinical reasoning and diagnostic decision-making, pharmacology/pharmacokinetics, clinical and professional leadership and practice-based research (ICN, 2020). Furthermore, the ICN guidelines (2020) emphasise the significance of supervised clinical practice in preparing nurses to practice at an advanced level. The number of hours of guided clinical study required in Norway is close to the United States requirement of 500 supervised direct patient care clinical hours (National Organization of Nurse Practitioner Faculties, 2017).

2.5 Defining clinical competence

The definition of clinical competence has been extensively debated; in this context, three broad models stand out: 1) behavioural, 2) general attributes and 3) holistic (Immonen et al., 2019). However, consensus is developing on a definition that includes a holistic approach (Wu et al., 2015; Yanhua & Watson, 2011). In a focused review of the nursing literature, Cowan et al. (2005) presented a holistic definition of clinical competence that requires a complex combination of knowledge, performance, skills, values and attitudes. The NP definition provided within the ICN (2020) guidelines emphasises the integration of nursing and medical skills. In NP education, medically oriented content is the key to the autonomous practitioner graduate (Ljungbeck et al., 2021); however, concerns have been raised that medicine is prioritised over nursing in NP/APN education (Arslanian-Engoren et al., 2005; Ljungbeck et al., 2021) and that the potential for advanced practice nursing roles is diminished when APNs are viewed as substitutes for physicians, or so-called 'mini-physicians' (Fagerström, 2021; Hamric

& Tracy, 2019). The learning process for medical topics in NP education should focus on the holistic approach that serves as the foundation of nursing, which includes providing patient-centred care (Ljungbeck et al., 2021) and balancing the integrated use of knowledge from competency domains in line with the ICN (2020) guidelines. This is supported by previous studies, which have evidenced that when an APN provided holistic care, the patient experienced the care they received as safe and high in quality (Cowley et al., 2016; Eriksson et al., 2018; Wisur-Hokkanen et al., 2015).

A common factor found in the APN definition (ICN, 2020), the Caring APN model (Fagerström, 2021) and Norway's national guidelines for a master's education in advanced practice nursing (Norwegian Ministry of Education and Research, 2020b) is a three-fold operationalisation of clinical competence.

The APN definition includes an 'expert knowledge base, complex decision-making skills, and clinical competencies for expanded practice' (ICN, 2020, p. 6). The definition indicates that higher levels of clinical competence are expected of APNs than of RNs, as APNs are expected to be able to independently conduct patient health assessments and perform clinical reasoning based on their theoretical knowledge and technical skills in order to make clinical decisions to reach the desired patient outcome.

The Caring APN model (Fagerström, 2021; further described in Section 3.1) is grounded in the three-dimensional view of knowledge by Gustavsson (2000), which was inspired by Aristotle: episteme (scientific knowledge), techne (expertise) and phronesis (practical wisdom). Gustavsson (2000) argued for a knowledge synthesis, *knowledge in action*, in which all three forms of knowledge are equally important. Fagerström (2021) explained that it is through action that the three-dimensional knowledge view becomes concrete; thus, the synthesis of knowledge can be described as a dialectical tension between the general and the specific. Clinical competence on an advanced level in the Caring APN model is achieved through the eight core competency domains: direct clinical practice, ethical decision-making, coaching and guidance, consultation, collaboration, case management, leadership and research and

development. In clinical practice, the scope of practice determines which competencies the APN especially develops (Fagerström, 2021). For example, an APN who works in an acute care unit is often especially skilled in performing physical assessments, part of the direct clinical practice competency domain, while an APN who works with patients with chronic conditions is usually especially skilled in motivating patients to make lifestyle changes, part of the coaching and guidance competency domain (Fagerström, 2021).

The national guidelines for a master's education in advanced practice nursing ensure the standardisation of a common final competence when a student has graduated (Norwegian Ministry of Education and Research, 2020b). In the guidelines three descriptors indicate the learning outcome with the operationalisations as noted in the following (Norwegian Ministry of Education and Research, 2012a, p. 2).

1. Knowledge
    - An understanding of theories, facts, principles, procedures in subject areas and/or occupations, skills and general competence
2. Skills
    - The ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills)
3. General competence
    - The ability to utilise knowledge and skills in an independent manner in different situations

The national guidelines state that an advanced practice nursing graduate shall have extensive clinical assessment, decision-making and action competence in line with their role, their own competence and current regulations for an independent practice in close collaboration with physicians and other healthcare personnel (Norwegian Ministry of Education and Research, 2020b).

The holistic definition of clinical competence and the three-fold operationalisation of clinical competence described herein can be viewed as in agreement conceptually by incorporating

behaviour, psychological constructs, values and the nursing contexts. A fundamental view in this PhD project is that for all APNs, a holistic definition of clinical competence in education and practice is vital to the evolution of innovative advanced nursing roles that provide complementary care rather than substituting for existing medical services in healthcare. This means that this PhD project has a multi-faceted understanding of clinical competence, which leads to a discussion on how to conduct an appropriate assessment of clinical competence at an advanced practice nursing level in education and research.

2.6 Assessing clinical competence in research and education

Assessing clinical competence in nursing involves some form of measurement of one person by another (Watson et al., 2002): this means the person conducting the assessment must indicate the level of competence demonstrated by the person being assessed. This leads to many questions: is a rating of 90% competent on an observed task sufficient, or is only 100% acceptable? Can clinical competence be assessed by addressing several individual competencies; if so, are they equally important or should some competencies be weighted in an assessment? (Watson et al., 2002). The consensus seems to be that no one single assessment method or approach exists that can evaluate all the components of clinical competence at the same time; thus, plurality is needed in clinical competence assessment (Cowan et al., 2005; Miller, 1990). A systematic review revealed that various assessment tools, such as scales, portfolios, formal documents, videos, skills laboratories and learning contracts, have been used to appraise nurses' clinical competence (Immonen et al., 2019). For this PhD project, the Objective Structured Clinical Examination (OSCE) and self-assessment are the two assessment strategies employed to measure clinical competence.

2.6.1 Objective Structured Clinical Examination

The OSCE has been described as an assessment strategy by which 'students demonstrate their competence under a variety of simulated conditions' (Watson et al., 2002, p. 424). Harden and Gleeson (1979) published the first article that comprehensively described using the OSCE to assess medical students' clinical competence. Prior to the development of the OSCE, medical

students were assessed in a clinical setting with a small number of real patients (Harden, 2016; Rushforth, 2007). Harden (2016) reported various deficiencies in this method, such as 'the luck of the draw' on the type of patient seen by the student. Thus, the OSCE was developed to establish a reliable exam form that included predefined clinical stations with related checklists and rating scales to be completed by examiners (Harden, 2016).

The OSCE in advanced practice nursing education is usually structured so that the student rotates around multiple stations, completing a task specific to each station (Stirling & Henderson, 2021), often with the use of simulated scenarios and standardised patients (Aronowitz et al., 2017; Goh et al., 2019). Several approaches to the OSCE can be taken in nursing, such as the multi-station OSCE (a series of short stations to be completed by all students), scenario-based OSCE (one or two long stations concerning several elements of the same patient-centred scenario), the 'top-to-toe' assessment (a full and systematic physical assessment) and a simulated assessment with a random allocation of selected stations (Rushforth, 2007). The Objective Structured Clinical Assessment (OSCA) has emerged as a newer approach to the OSCE in nursing and is often used in NP education to assess communication and history taking, physical examination, clinical reasoning and diagnostic decision-making, interpretation and understanding of investigations and treatment and management of the patient (Ward, 2009). To date, the OSCE has been adopted globally and by various educational programmes, both within and outside healthcare, such as in law enforcement (Harden, 2016). Table 2 outlines the learning outcomes of the NP master's programme at USN, together with the learning outcomes and description of the OSCE and the course leading up to the OSCE. Appendix 1 includes a sample from the OSCE checklist that the examiners used in sub-study II.

Table 2: Objective Structured Clinical Examination in a nurse practitioner master's programme at the University of South-Eastern Norway

<table>
<tr><td colspan="2"><u>Learning outcomes in the NP master's programme</u>
The overall learning outcome for the master's programme is to educate NPs with advanced clinical competence according to the International Council of Nurses (ICN) definition of an NP/APN to prepare them to take on an expanded and independent role with considerable direct patient care that promotes person-centred health care. The master's programme is part-time (three to four years) and comprises 120 European Credit Transfer and Accumulation System (ECTS) credits.

The learning outcome of the Systematic Clinical Assessment and Health Evaluation course was to enable students to acquire a health history, conduct a structured physical assessment and make independent clinical decisions based on the information gleaned. The course is 10 ECTS credits. The course exam was an OSCE.</td></tr>
<tr><td><u>The Course:</u>
The course was preclinical and aimed to prepare the NP students for a 15-week clinical placement supervised by a physician. Each block consisted of lectures, group- and casework, video-based e-learning and guided exercises in the clinical skills lab. The students were advised to practice physical assessments in their places of work. The course examination was an OSCE, which was arranged right after the last block week of the course.

Before taking the Systematic Clinical Assessment and Evaluation course, the students had completed the following courses: Introduction to APN (5 ECTS), Pathology (10 ECTS) and Pharmacology (10 ECTS).

This was the second time the course was arranged, but it was the first time the course was offered as a part of the NP master's programme.</td><td><u>The OSCE:</u>
The OSCE was set up with three stations: abdominal, respiratory and neurology. However, the NP students only went through two of the three stations. The students needed to obtain an exam mark of 40% or higher to pass the course. All students passed the OSCE. The OSCE assessed how the students used the knowledge they acquired on pathology, history taking and physical assessment techniques to suggest medical and differential diagnoses and to make clinical decisions.

During the OSCE, the students went through the stations with a simulated patient and two examiners possessing a checklist. Before entering each station, they were presented with generic history information about the patient (e.g. 'the patient is feeling unwell'). Each station lasted 30 minutes: 10 minutes for history taking, 15 to 20 minutes for physical assessment and approximately 5 minutes for the examiners to ask the student about 'red flags' (i.e. any suspicious symptoms of any serious medical condition, differential diagnoses or further check-ups, such as x-rays, or further treatment for a condition).

The checklist was developed by experienced OSCE nurse educators and included three columns of performance ratings.

Approximately one to two weeks after the exam, the students were given written feedback on their performance.</td></tr>
</table>

Source: Taylor et al., 2019, p. 117.

The OSCE assessment strategy has been described as having the potential to both serve as a standardised assessment and reflect the real life of clinical practice (Harden, 2016; Rushforth, 2007). The OSCE's potential can be viewed in the context of other forms of assessment. To this end, Miller's (1990) framework for clinical competence assessment can be helpful (see Figure 1).

Figure 1: Miller's (1990) framework for clinical assessment

Source: Miller, 1990, p. 63.

The first level of the pyramid concerns students' knowledge base, to *know* what is required to function effectively, and the second level relates to *knowing how* to function adequately in terms of having the competence of knowledge, judgment, skills or strength (Miller, 1990). These levels are usually assessed using multiple-choice questions, essays and oral tests (Wass et al., 2001). The third level of the pyramid, *shows how*, refers to students' performance when they are faced with a patient, while the fourth level and pinnacle of the pyramid pertains to the actions component of what a graduate *does* in terms of professional behaviour when functioning independently in clinical practice (Miller, 1990). While *shows how* is assessed *in*

vitro (simulated patient encounters), *does* is assessed *in vivo* (actual performance on the wards or in the consulting room) (Wass et al., 2001). Literature reviews have revealed many benefits of the OSCE, such as more objectivity compared to other assessment forms, reduced risk of examiner bias and variations in the assessment, positive perceptions on the part of students and lecturers, a broader range of skills tested, reduced coincidence and increased consistency of experience between students, motivation for learning and a high level of reliability and validity (Rushforth, 2007; Smith et al., 2012). Indeed, the OSCE has been regarded as 'the gold standard' of assessment (Rushforth, 2007). However, this assessment strategy is limited to assessing the *shows how*, which sits just beneath the pinnacle of the pyramid, represented by *does* (Wass et al., 2001). Thus, more research is needed to identify an assessment strategy that evaluates a student's actual performance in the wards or in the consulting room (Wass et al., 2001).

2.6.2 Self-assessment

Self-assessment is a method of collecting data directly from the person who is being studied, using instruments such as questionnaires (Polit & Beck, 2020). Student self-assessment is defined by Andrade (2019, p. 10) as 'the act of monitoring one's processes and products in order to make adjustments that deepen learning and enhance performance'. Self-assessment can be used in education to promote the professional development of students (Lovrić et al., 2015) and is used in research to investigate whether a nurse's clinical competence is optimal relative to patient care (Meretoja et al., 2004). Polit and Beck (2020) claimed that the strongest argument for using self-assessment in research is that it can efficiently yield information about what a person thinks, believes or plans that would be impossible to gather by any other means. Self-assessment is often closely aligned with self-monitoring and reflection on actions (Tillema, 2010). Previous research has found that increasing students' reflection skills helps them to move past blaming contextual and situational factors and to discover their power to react differently in the future, enabling them to provide compassionate care and demonstrate their new skills during summative assessments (Adam & Taylor, 2014). Thus, self-assessment can be viewed as appropriate for a person-centred approach in nursing education research relevant to supporting students' attentiveness to their thoughts or beliefs about themselves. Moreover,

in the competency standards related to advanced practice nursing education in England, ongoing self-assessment is highlighted as one element of demonstrating accountability within the practice, which further supports the use of self-assessment in the current research (Health Education England, 2017).

Several instruments can be used to assess clinical competence for bachelor's level nursing (Cowan et al., 2008; Meretoja et al., 2004; Nilsson et al., 2014; Wu et al., 2016). The common denominator for all scales is that they are based on self-assessment. The questionnaire by Bing-Jonsson et al. (2021) seems to be the only one to rank RNs' demonstration of clinical decision-making based on a predefined score. However, it is important to have instruments that can evaluate nursing roles and clinical competence on an advanced level in line with international standards (Sevilla-Guerra & Zabalegui, 2019). Few existing instruments are suitable for an advanced nursing level. Sevilla-Guerra and Zabalegui (2019) explored and analysed existing instruments that identified domains of advanced practice nursing and found only one instrument to be valid and reliable. The instrument identified was Chang et al.'s (2010) modified Strong Model of Advanced Practice, based on the Strong Model of Advanced Practice by Mick and Ackerman (2000). This instrument has been validated with factor analysis and has been utilised worldwide, including in Brazil (MinossoI & TosoI, 2021), Australia (Gardner et al. 2016), Finland (Jokiniemi, et al., 2022), Spain (Sevilla Guerra et al., 2018), and Singapore (Woo et al., 2019). Nevertheless, the Modified-Strong Model instrument does not specifically measure clinical competence level in nursing but rather identifies the scope of practice where working activities are arranged according to appropriate domains for APN practice (Chang et al.2010). Thus, the instrument is useful for identifying nurses who exercise advanced practice and those who do not (Sevilla-Guerra & Zabalegui, 2019). An APN-specific competency assessment instrument is the Advanced Practice Nursing Competency Assessment Instrument (APNCAI) (Sastre-Fullana, 2017). APNCAI is a more recent instrument that was designed to operate independently of national/local legislative development, professional practice setting and/or regulatory context (Sastre-Fullana, 2017). The instrument was first published after I started to collect data for this PhD project. However, when I compared the competency domains in the instrument to the APN frameworks by Fagerström (2021) and Hamric (Hamric & Tracy, 2019),

I found that it was lacking items regarding direct clinical practice, which is the central and most important domain in clinical competence at an advanced nursing level and in the APN role (Fagerström, 2021; Hamric & Tracy, 2019; ICN, 2020).

At the time this PhD project was planned, the Professional Nurse Self-Assessment Scale I and II (PROFFNurse SAS I and II) was the only available and appropriate instrument to assess self-assessed clinical competence at an advanced level of nursing as it emphasises direct clinical care, namely assessing the patient (Finnbakk et al., 2015, Nieminen & Fagerström, 2006). For this PhD project, the PROFFNurse SAS II was utilised (Wangensteen et al. 2018), a successor to the PROFFNurse SAS I.

2.6.3 PROFFNurse SAS I and II

Nieminen and Fagerström (2006) set out to develop an instrument suitable for APNs and created the instrument the Nurse Clinical Competence Scale (NCCS) in Swedish in 2004 with 67 items. The NCCS was inspired by the Nurse Competence Scale (NCS) by Meretoja et al., (2004), a generic instrument based on Benner's (1984) domains of clinical practice to some extent, but mostly inspired by the Hamric APN model (Hamric & Tracy, 2019). Because the aim of the NCCS was to assess clinical competence at the APN level, items specific to assessing advanced clinical skills were included such as history taking, physical assessment, and clinical decision-making (Finnbakk et al., 2015, Nieminen & Fagerström, 2006). The NCCS was further improved to assess clinical competence at different educational levels, and seven new items were added to strengthen the patient perspective and supplement the medical and skills aspects before the instrument was subjected to psychometric testing (exploratory factor analysis) that resulted in a 51-item questionnaire called the Professional Nurse Self-Assessment Scale I (Finnbakk et al., 2015,). Six components of the exploratory factor analysis were found in the instrument: direct clinical practice (19 items), professional development (5 items), ethical decision-making (11 items), clinical leadership (6 items), cooperation and consultation (6 items) and critical thinking (4 items). The six dimensions are supported by the theoretical framework and epistemology of the Nordic APN model (the predecessor of the Fagerström's Caring APN model (2021) which is

further described in chapter 3.1) and a holistic approach to clinical competence that synthesises knowledge, performance, skills, values, and attitudes (Cowan et al., 2005).

Wangensteen et al. (2018) sought to improve the PROFFNurse SAS I questionnaire with a content validity assessment. They removed 7 items from PROFFNurse SAS I from the following components: direct clinical practice (5 items), ethical decision-making (1 item) and clinical leadership (2 items), and added 6 others that related to assessing and giving health promotion advice via telephone, e-mail or other electronic devices; giving health promotion and illness preventive recommendations; providing support and guidance for patients and their relatives; and reporting incidents in accordance with safety systems. Several of the items that were added to the PROFFNurse SAS II had loadings that were too low to meet the criteria for inclusion in the first version of the questionnaire. However, Finnbakk et al. (2015) recommended including these items in the next step of the questionnaire's development, as they were found to capture an important dimension of coaching and guidance for the APN role. The result was a modified questionnaire, PROFFNurse SAS II, with 50 items (Wangensteen et al., 2018). In addition, the PROFFNurse SAS II includes two scales: the A-scale represents self-assessed clinical competence, and the B-scale represents self-assessed need for further training. The PROFFNurse SAS II has not yet been psychometrically tested to determine whether the sub-scales from PROFFNurse SAS I are still valid. Nevertheless, Willman et al. (2020) collected data from newly graduated nurses in acute care hospitals with the PROFFNurse SAS II and utilised the sub-scales from PROFFNurse SAS I. They found that all domains except for clinical leadership had an acceptable Cronbach's alpha value above 0.7 (Willman et al., 2020).

The items in PROFFNurse SAS II include a response scale ranging from 1–10 with 1 indicating the minimum score (poor level of clinical competence) and 10 indicating the maximum score (excellent level of clinical competence). "Entirely missing competence" was an additional option on the A-scale. "No need" and "competency not covered in the programme" were additional options on the B-scale. The respondents were asked to take their future role into account when assessing their level of clinical competence and need for further training.

2.7 Development of clinical competence for nurse practitioner students

My search of the literature for research relevant to NP education or the development of clinical competence in NP students produced sparse results.

Gardner et al. (2006) examined NP education in Australia and New Zealand to develop educational standards that could be applied in both countries. Of the 14 advanced practice nursing programmes in Australia and New Zealand leading to the award of an NP qualification, 13 were master's degree programmes. Entry requirements across the 14 programmes were highly consistent, with the main variation being in the requirement for experience in a speciality, varying from zero to five years. Certain assumptions were common across all curricula. These related to the importance of adult learning principles, collaborative learning, use of the clinical field under the guidance of a clinical mentor/preceptor, use of experiential/situated learning and promotion of self-directed/lifelong learning skills. The clinical environment was found to be an essential context for NP education (Gardner et al., 2006).

Rugen et al. (2018) conducted a longitudinal study of an NP residency programme in the United States in which the participants executed self-assessments after completing 1, 6 and 12 months of the programme. The participants were either in an NP master's programme or had graduated from an advanced practice nursing master's programme, with a mean of 5.46 years of experience as an RN. At the beginning of the programme, the participants regarded patient-centred care as the domain in which they performed best. Throughout the three measuring points, the participants almost exclusively focused on improving their clinical competence in direct clinical practice (assessing, diagnosing, treating and managing health conditions) or their professional development for successful independent practice (Rugen et al., 2018).

By studying NPs precepting NP students, Roberts et al. (2017) and Staples and Sangster-Gormley (2018) analysed a fundamental aspect of NP education. Precepting is a long-standing, effective method of clinical education, and the clinical experience of NP students is an essential

component of their education. Typical preceptors in NP programmes are NPs or physicians. NP programmes have grown both nationally and internationally; hence, the need for qualified, engaged preceptors is growing. In a study from the United States, Roberts et al. (2017) found that NP preceptors valued the learning they experienced when precepting, while a lack of support from the preceptor's employer, including a lack of space and staff support, was seen as a barrier. Overall, the findings showed that strong support existed among NP colleagues for assisting with educating future NPs. In their study of Canadian conditions, Staples and Sangster-Gormley (2018) identified that NP programmes have too many students for the number of available clinical sites and preceptors, resulting in NP preceptors' overutilisation, burnout or refusal to take students. Given the small number of NP programmes in Canada, Staples and Sangster-Gormley (2018) pointed to the need for NP faculty to look for improved ways to recruit and retain NP preceptors.

Two studies explored the content of an NP education (Jeffery et al., 2020; Ljungbeck et al., 2021). The first was a scoping review that included 16 research papers and aimed to identify research findings on the content of NP education programmes to contribute to determining the appropriate level of theoretical and practical knowledge needed for an NP education (Ljungbeck et al., 2021). Two main theme categories, each with related subcategories, were identified as necessary to facilitate NP students' development into their new professional role as NPs. The first category – the professional NP role – concerned NPs' contributions to healthcare organisations and how NPs themselves can further develop their role. Three subcategories emerged from this theme: 1) research and nursing theories, 2) leadership and collaboration and 3) organisational, political, economic, regulatory and legislative issues. The second category – becoming an autonomous practitioner – concerned the knowledge that NPs need to independently manage patients. Two subcategories emerged in this area: 1) health promotion and disease prevention and 2) medically oriented content (Ljungbeck et al., 2021). The second study involved a comparative analysis of NP education standards based on 24 NP programmes in 6 countries (Australia, Canada, Finland, Norway, the Netherlands and the United States). The data extracted from the NP educational programmes included admission criteria, curricular content, clinical requirements, teaching methods, programme delivery and

assignment and evaluative methods (Jeffery et al., 2020). Based on their findings, the researchers who conducted this study concluded that NP education varied within and across countries, resulting in a lack of cohesiveness that may hinder development of the NP role and practice nationally and internationally (Jeffery et al., 2020), a conclusion supported by other research outcomes as well (Carney, 2016; Heale & Rieck Buckley, 2015).

Jangland et al. (2016) explored the first NPs in surgical care in Sweden. Through the lens of the Nordic APN model (Fagerström, 2011), they found that the newly graduated NPs had developed their new role in relation to direct clinical praxis (direct clinical care in the Caring APN model by Fagerström 2021), consultation, cooperation, case management and coaching. Some of the NPs experienced that their newfound clinical competence was accepted in interprofessional surgical teams with the support of their leader. Others lacked this kind of support from their leader, experienced RNs, or physicians and found themselves becoming passive and not using their competence to its full potential. Nevertheless, the NPs experienced that they had gained a holistic view of their patients, which allowed them to follow up patients and family members more effectively based on their development of deeper knowledge as well as extended scope of practice. This, together with the positive feedback from patients, was the driving force in their new role as a NP.

In Norway, Silje Henni conducted the first doctorate-level project concerning APNs (Henni, 2020). Henni et al. (2018) interviewed 21 advanced geriatric nurses (AGNs). Inspired by the NP role, advanced geriatric nursing specialises in the care of older adults and is intended to be practiced in PHC. The AGNs reported that they had developed direct clinical practice skills in the form of new knowledge and systematic assessment skills and had acquired indirect care experience, related to such functions as consulting, quality development, knowledge-based practice and ethical decision-making. The combination of the development of direct and indirect care skills resulted in the AGNs' ability to see a broader spectrum of medical, social and environmental problems and helped them to discover patient problems at an earlier stage. However, the AGNs also experienced challenges in their workplace in developing their role. They all used individual strategies related to their management and college education to make

the best possible use of their knowledge and skills (Henni et al., 2018). Furthermore, Henni et al. (2019) found that of 23 AGNs in Norway involved who answered an online questionnaire, the majority used their clinical competence to its full potential when providing direct care. Nevertheless, only a minority used their full potential for indirect care and functions, such as teaching/supervision and coordination. Among the 192 colleges attended by the AGNs who answered an online questionnaire, over half of the colleague were positive about the AGNs' scope of practice as a health care service for older adults.

To summarise, too little research has been conducted on NP education (Ljungbeck et al., 2021), as consensus regarding what knowledge NPs should have after graduation has not been reached (MacKay et al., 2018; Schallmo et al., 2019). This issue is likely fortified by the inconsistencies in the NP education programmes across the globe (Carney, 2016; Heale & Rieck Buckley, 2015; Jeffery et al., 2020). The ICN guidelines (2020) emphasise the importance of providing the qualifications necessary for NP practice to support the credibility and sustainability of the NP role. Thus, countries with evolving NP roles that are in an early stage of development, such as Norway, must investigate whether students' development of clinical competence is evolving according to the international standards described in the ICN (2020) guidelines.

2.8 Getting to know the research context

The first time I was introduced to advanced practice nursing was when I read the advertisement seeking candidates for the current PhD position to contribute to the overreaching research project PraksisVEL, as previously described. I signed on to this doctoral project with little knowledge or understanding of what an APN was. Thus, I needed to engage in relevant activities to gain knowledge about the research context for this project. These activities, which I describe in this section, were essential to shaping my understanding of the development of clinical competence in advanced practice nursing education.

For the first year of the project's first cohort of advanced practice nursing students at USN, I followed approximately 80% of their educational content, such as lectures and pre-clinical skills training, leading up to the OSCE. I also observed parts of the OSCA. After the students examined their patients, I observed the examination process of an NP student with their clinical and educational supervisor. I engaged in informal conversations with the students during their breaks and on train rides and learned their perceptions of how they balanced being a part-time advanced practice nursing student with an often full-time RN position and a personal life. The reflections I made based on these observations and conversations contributed to the discussion chapter regarding andragogy.

The overreaching research project PraksisVEL that the current research contributes to comprises three subprojects centred around three contexts: advanced practice nursing education, community health care and specialised health care. I was involved in the data collection for the community health care subproject and participated in meetings for the study conducted by Hansen et al. (2020) for that subproject. I also contributed to the organisation of the international conferences aimed at the clinical field, clinical leaders, RNs and advanced practice nursing students and their colleges that were arranged through the PraksisVEL project. Participating in the PraksisVEL project gave me insights into the potential possibilities and barriers for implementing the APN role in a clinical setting.

During my time as a PhD student, I had the privilege to meet APNs performing an NP role in Vasa, Finland, and Glasgow, Scotland. In Finland, I met an NP in a community health care clinic, and in Scotland, I met one NP in an acute care setting in a hospital and another in a general physician's (GP's) office. Meeting with the NP in the GP's office was a turning point in my grasp of the APN role. Before this, my understanding was theoretical and based on previous research; however, I was confused about what *advanced* referred to in the terminology 'advanced practice nurse'. Sitting down one-on-one with an NP who explained how she collaborated with GPs and her decision-making abilities that she applied in her clinical work profoundly impressed upon me the complexity of the role through themes such as professional boundaries, the scope

of practice, caring versus medical dominance, patient safety and finding new solutions for old challenges in health care.

In addition to meeting APNs/NPs in the clinical field, I also had the privilege of visiting three NP/advanced practice nursing educational settings: South Bank University in London, England; McMaster University in Ontario, Canada; and Linköping University in Sweden. I was shown the nursing skills laboratories at both South Bank University and McMaster University, and the staff there explained how they conducted their OSCEs. At South Bank, I was allowed to observe NP students as they completed their OSCEs and the discussion that followed when processing the OSCE checklist in terms of pass or fail. Both visits occurred after data were collected for sub-study II.

Lastly, to meet the objective of communicating research findings from this PhD project, I presented abstracts at two international conferences arranged by the ICN NP/APN Network, one in the Netherlands and the other in Hong Kong. At both conferences I gained insights into the challenges surrounding the evolvement of the APN role and standards from a global perspective.

3 THEORETICAL FRAMEWORK

The theoretical framework of this PhD project is Fagerström's (2021) Caring APN model and Knowles et al.'s (2020) andragogical assumptions. In what follows, I present my rationale for choosing these theoretical perspectives to address the overall aim of the PhD project.

A literature review by Sastre-Fullana et al. (2014) identifies several appropriate frameworks for APNs. The review includes competency-related elements (competency models/frameworks, competency maps and competency assessment scales/instruments) and identifies research, leadership or expert clinical judgement as a regular pattern in APNs' competencies (Sastre-Fullana et al., 2014). Examples of conceptual models that encompass these competencies and are cited in previous research and literature are the Strong Model of Advanced Practice (Ackerman et al., 1996), Hamric's APN model (Hamric & Tracy, 2019), and the Nordic APN and Caring APN models, both by Fagerström (2011, 2021)).

When this PhD project was planned, the Nordic APN model was chosen for two reasons: first, it supports the dimensions in the PROFFNurse SAS I (Finnbakk et al., 2015), and second, it was developed for the Nordic context and includes the theoretical perspective of caritative care. Later, the Caring APN model (Fagerström, 2021) was adopted in this PhD project. The structure (i.e. the core, core competency domains, and critical contextual factors) are identical in the Nordic APN and Caring APN model; however, the latter was published as a part of a series of monographs endorsed by the ICN to explore aspects of APN at the international level (Fagerström, 2021). The Caring APN model distinguishes itself from the other frameworks by having the nurse-patient relationship at the core of APN and is thus in line with a person-centred perspective on "the formation and fostering of healthful relationships" (McCormack et al., 2013).

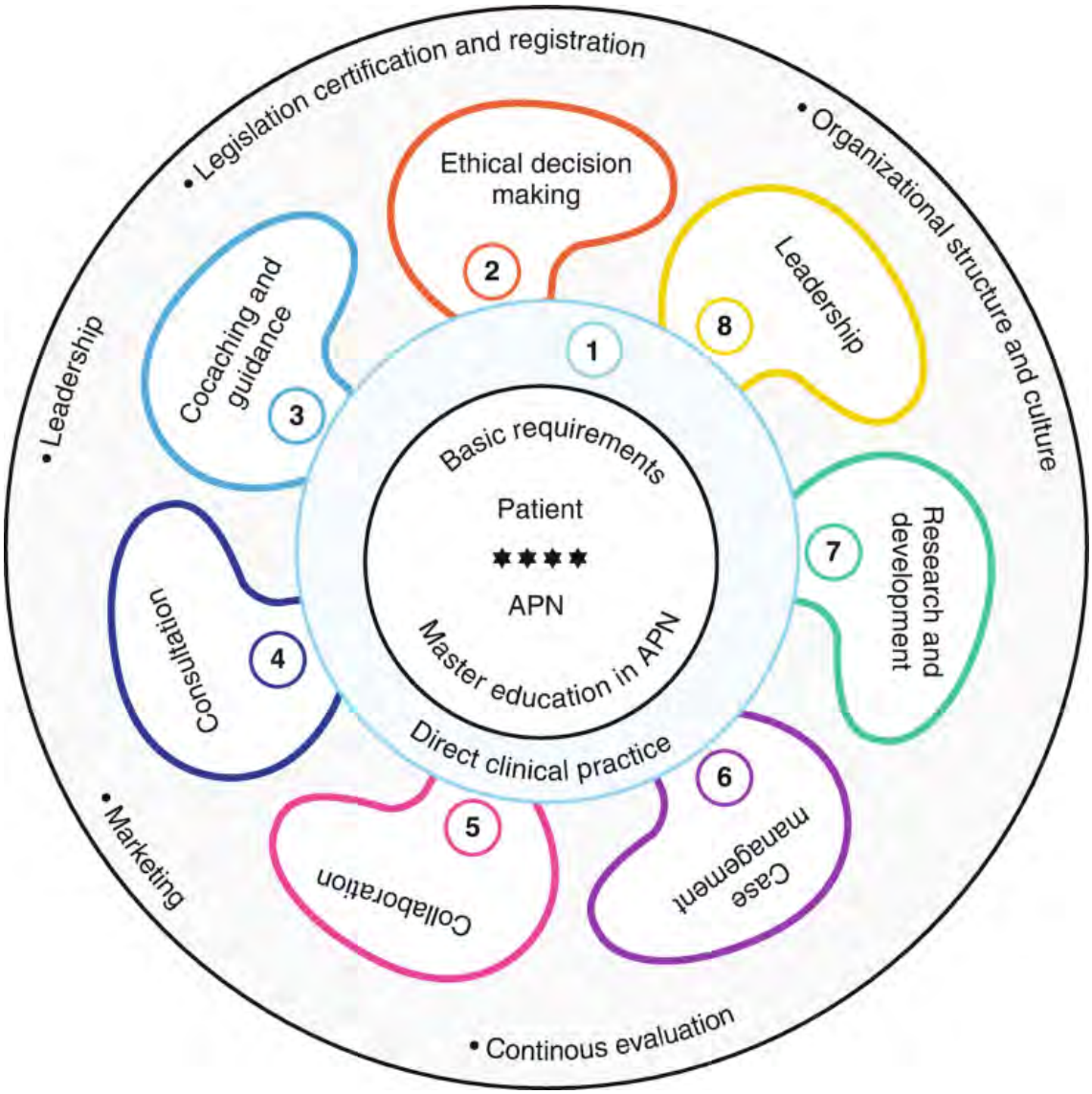
As a PhD student in the Person-centred Health Care programme at the University of South-Eastern Norway, I took a mandatory course in "The Science and Practice of Person-centred Research", one of the intended learning outcomes of which is to be able to "situate and ground

the PhD project in theories of person-centeredness" (from the course plan for The Science and Practice of Person-centred Research). The course was taught by Professors Hilde Eide and Brendan McCormack. In the first week, Professor McCormack asked all the PhD students "Who is the person in your PhD project? I must admit, my first thought was the patient. But then I thought to myself, was it though? In all honesty, it was an embarrassing moment, but also a humbling one, and it allowed me to clarify my values. The answer to the question should have been obvious since my PhD project concerns APN students' development of clinical competence. Of course, the student is the person in my project! I was baffled by why my mind would go to the patient. Throughout my bachelor's education in nursing, I repeatedly heard the phrases "patient first" and "being the patient's advocate", and I never really questioned them. I simply adopted and recited them and incorporated them into my value system in which the patient was the only person of relevance. I realised that up until that point I had thought that the only person of relevance in healthcare was the patient.

Thus, my search began for a research theory that would allow me to incorporate values in line with a person-centred perspective when investigating APN students' development of clinical competence. At this point, I had collected some of the data material included in this PhD project and attended several APN lectures at USN and other institutions in Norway and Sweden with NP/APN programmes. My first impression of the APN students was that they were resourceful and highly engaged. They were not afraid to raise their hands in lectures and ask for clarification or express a critical perspective on the lecture topic. Thus, when I read Malcolm Knowles' theory of andragogy, I knew immediately that this was a highly suitable theoretical perspective that would be relevant for building students' personal autonomy of the student in a context where self-direction is a central aspect of learning. Knowles's aim in outlining his assumptions of andragogy was to focus on the learner and to provide an alternative perspective to method-centred instructional design which he found to be dominant in teaching (Knowles, et al., 2020). I appreciate andragogy as I find it to be in line with a person-centred perceptive of learning with its focus on the person as a learner rather than the method of teaching, as well as with the international literature on expectations for developing autonomy as a nurse at an advanced level (ICN, 2020).

3.1 The Caring advanced practice nursing model

Figure 2: The Caring advanced practice nursing model



Source: Fagerström, 2021. Reprinted with permission.

The Caring APN model (Fagerström, 2021) is the successor to the Nordic APN model (Fagerström, 2011) and is based on Hamric's APN model (Hamric & Tracy, 2019) and the ICN (2020) guidelines. Hamric's APN model was one of the earliest efforts to synthesise a model for APNs and has been widely cited in the advanced practice nursing literature (Arslanian-Engoren, 2019). The model consists of primary criteria (education, certification and focus on clinical practice with patients), seven core competencies and seven critical environmental elements (Hamric & Tracy, 2019).

The Caring APN model was inspired by the Nordic theory of caritative care by Katie Eriksson regarding the nurse–patient relationship in addition to a person-centred perspective on nursing (Fagerström, 2021). The epistemological view employed in the model is the three-dimensional view of knowledge by Gustavsson (2000). The Caring APN model consists of three constructs: the core, eight core competency domains and five critical contextual factors.

The core

The core of the Caring APN model is the mutual and dynamic nurse–patient relationship (Fagerström, 2021). The quality and outcomes of nursing are influenced by the nurse's view of knowledge and theoretical perspectives, as these perspectives are decisive for the nurse's thoughts, feelings, decisions and actions. The centre of the Caring APN model contains four stars that represent the following four theoretical standpoints on the nurse–patient relationship; these viewpoints influence the formulation of goals for the patient's health process through dialogue in the nurse–patient relationship:

- ★ A holistic view of mankind and human beings, related to life context
- ★ Ethos as a person-centred fundamental ethical attitude
- ★ Caring as the core of advanced practice nursing
- ★ Health as the primary focus of all nursing

(Fagerström, 2021, p. 68)

Holism, according to which a human being is viewed as a unity of body, mind, spirit and the circumstances of life, is the contrast to reductionism, which divides the human being into various parts for examination (Fagerström, 2021). Ethos is an essential ethical attitude that can be understood as a fundamental position of dignity and respect for the patient as a person, and caritas represents compassionate love, while mercy and virtue can be viewed as forces. Caring is the core of advanced practice nursing and can be expressed by being emotionally accessible and maintaining a therapeutic relationship with the patient. Health is the dialectic tension between the pathogenic perspective (thesis) and the salutogenic perspective (antithesis) that are synthesised to create a new understanding of the unique person (Fagerström, 2021). The core also includes the primary criteria of a master's degree in advanced practice nursing (Fagerström, 2021; Hamric & Tracy, 2019). Fagerström (2021) recommended 3–5 years of clinical work experience as an RN as a criterion for enrolling in an advanced practice nursing education programme to ensure sufficient prerequisites of knowledge and clinical skills to develop an advanced level of nursing practice.

Core competency domains

The functions or areas of practice of the APN role are represented by eight core competency domains in the Caring APN model (Fagerström, 2021), which are as follows:

- Direct clinical practice
- Ethical decision-making
- Coaching and guidance
- Consultation
- Collaboration
- Case management
- Research and development
- Leadership

Direct clinical practice refers to the activities and interventions that an APN performs during direct patient contact (Fagerström, 2021; Tracy, 2019). These tasks are related to the APN's

clinical competence to assess the patient (history taking and physical assessment), clinical decision-making (a process through which arguments and alternatives are found), choosing appropriate methods or measures of nursing care and management of the patient's health issues. Similar terms, such as direct clinical practice, direct patient care and direct care, are used in the literature to describe this concept. Of the eight core competency domains, direct clinical practice is the most important and central core competency in the Caring APN model. Indirect care, as opposed to direct clinical practice, involves activities and interventions outside direct contact with the patient, such as consultations with other healthcare staff, discharge planning and coordination of care and treatment, as well as instructing and guiding colleagues. However, distinguishing between the two concepts can be difficult as they are often intertwined in clinical situations (Fagerström, 2021; Tracy, 2019).

Ethical decision-making involves the APN's understanding of ethical dilemmas or issues and their ability to make ethical decisions that can offer solutions to more complex ethical dilemmas (Fagerström, 2021; Wocial, 2019). The ethical decision-making of an APN can be organised into four elements: knowledge development, knowledge application, creating an ethical environment and promoting social justice within the healthcare system (Wocial, 2019). Knowledge development and knowledge application are most relevant for a master's level education, while creating an ethical environment and promoting social justice are considered appropriate at a doctorate level (Fagerström, 2021).

Coaching and guidance encompass the APN's skills related to health education methods, person-centred guidance, coaching during the transition between the patient's life phases and coaching as a motivational conversation (Fagerström, 2021; O'Grady & Johnson, 2019). When coaching, an APN should focus on the patient's own goals and assist them in understanding their capacity to achieve those goals. Guidance is provided by the APN as an expert in terms of the competency domain of direct clinical practice and implies that the APN gives advice or educates the patient about expected health processes (Fagerström, 2021; O'Grady & Johnson, 2019).

Consultation is concerned with the sharing of knowledge and experience and is centred around the client, consultee or programme (Fagerström, 2021; Pearson, 2019). During client-centred consulting, the APN assesses the patient, develops an effective treatment plan and makes recommendations for further care and treatment. Consultee-centred consultation is primarily aimed at improving patient care but also involves supporting or helping colleagues. Programme-centred consulting is an administrative consultation with an emphasis on the planning and administration of health care services (Fagerström, 2021; Pearson, 2019).

Collaboration is associated with teamwork and partnerships for which nursing and treatment are dependent on the sharing of a common objective for patient care (Carter et al., 2019; Fagerström, 2021). Collaboration occurs when an APN consults a physician or other healthcare professional when developing patient treatment recommendations. Collaboration is a complex notion that emphasises the importance of mutual dependence to achieving the common objective but, at the same time, includes an openness to differences in opinions and attitudes (Carter et al., 2019; Fagerström, 2021).

Case management is the management of patient pathways and continuous patient follow-up (Fagerström, 2021). The concept of case management is also often used in combination with the term 'care pathway', which is defined as 'the activities (diagnosis, care, nursing, treatment) that a patient with a particular disease or condition undergoes in the meeting with different care actors during a certain time period' (Fagerström, 2021, p. 136). The objective of assigning APNs as case managers is to promote patient health and prevent disease through the coordination of a variety of health care services between institutions and authorities. The length of the case management varies from patient to patient; it continues until the patient is cured, the treatment is finished or for a defined period of time, such as 1–2 years for patients with chronic conditions (Fagerström, 2021).

Research and development refers to the capacity and skills to engage in research and professional development (Fagerström, 2021; Gray, 2019). Three dimensions of research and development are described in the Caring APN model. An evidence-based approach to practice

is the first dimension of this competency domain, which emphasises that APNs' clinical decisions should be based on scientific research. The second dimension is the evaluation of practice to ensure that APNs can have a positive effect on patient treatment and are cost effective. APNs' participation in research and development is the third dimension and concerns an investigation of relevant research questions from a clinical perspective (Fagerström, 2021; Gray, 2019).

Leadership refers to APNs' influence and leadership for developing health care services. Four types of leadership for APNs are described in the Caring APN model: clinical, professional, system-level and health policy (Carter & Reed, 2019; Fagerström, 2021). Clinical leadership is mainly concerned with the health care needs of the patient and the APN's ability to plan nursing and treatment; to speak with the patient, their family, colleagues or other healthcare staff; and to be a group or system leader. Professional leadership primarily focuses on the APN's ability to guide and empower colleagues through support or by being an active participant in leading professional networks with others who work in the same clinical area or activities. Leadership at the system level concerns APNs' contributions to the reorganisation of health care services so that a system is improved in terms of better meeting patients' needs and desires, such as by investigating the reasons behind an increase in falls or infections on a unit (Carter & Reed, 2019; Fagerström, 2021).

Critical contextual factors

A variety of health care delivery environments shape the possibility for advanced practice nursing and are essential for the development of APNs (Fagerström, 2021; Hamric & Tracy, 2019). The Caring APN model references five critical contextual factors: the organisation's structure and culture, legislation and certification, leadership, continuous evaluation and marketing (Fagerström, 2021). The organisational structure and culture in health care services can be medically dominated; the implementation of advanced practice nursing can challenge attitudes and prejudices about professional boundaries. Legislation and certification are critical to APNs' approval to have prescription authority and to practice as certified APNs. Clear and strategic leadership at all levels in the organisation, as well as in the health care services, is

crucial to the successful implementation of an APN role. Continuous evaluation through research is important for the sustainable development of APNs, and marketing refers to presenting information on what APNs are and is crucial in the introductory phase of implementation of the role to clinical healthcare workers, teachers, researchers, patients, co-workers, policymakers, politicians and, last but not least, the public (Fagerström, 2021).

3.2 Assumptions of andragogy

In this PhD project, the development of clinical competence is understood as the learning process followed by the students to achieve the knowledge, skills and competencies identified in the ICN (2020) guidelines' regarding the NP/APN role. While constructive alignment (Biggs, 2011) was a learning theory utilised in paper II, I chose andragogy to understand the empirical findings of the PhD project to answer the overall aim. Whereas constructive alignment is an outcomes-based approach (Biggs, 2011), andragogy pertains to the characteristics, not the outcomes, of the learning transaction (Knowles, 2020). I view the self-directed learning concept as applicable to gaining insights into the process of becoming an autonomous practitioner, which delineates the APN roles (ICN, 2020).

Knowles (2020) developed assumptions related to andragogy as an attempt to provide a student-centred rather than methodological-centred perspective in education. He criticised the use of teacher-directed education, where the teacher has full responsibility for making all decisions about *what-how-when* it will be learned or has been learned, leaving the learner in a submissive role. Instead, he argued for the andragogy model, which is based on how to facilitate self-directed learning by building students' personal autonomy. Knowles claimed that adults become self-directed when dependency decreases as they age and when they arrive at a self-concept of being responsible for their own lives (Knowles, 2020).

Knowles' perspective on andragogy has been placed in the context of self-directed learning derived from humanistic theories, human freedom and the dignity of achieving one's full potential, together with the perspectives of Rogers and Maslow (Mukhalalati & Taylor, 2019).

Influence from Rogers' approach to education is especially evident in Knowles' (2020) assumptions of andragogy. Rogers work regarding student-centred teaching makes the learning relevant to the learner by shifting the focus from what the teacher does to what is happening in the student (Knowles, 2020; Rogers, 1961).

Knowles (2020) presents six core assumptions of andragogy:

1. Learner's need to know – why, what, how: Before starting to learn something, adults need to know why they need to learn it in the first place. When adults learn something on their own, they invest considerable energy in considering the benefits of learning that fact or concept and the negative consequences of not learning it. An educator can make a case for the value of learning to raise awareness of the learner's need to know. However, the more effective approach is for the learners themselves to identify the gap between where they are now and where they wish to be.

2. Self-concept of the learner – autonomous, self-directing: As adults arrive at a self-concept of being responsible for their own decisions and their own lives, they will develop a need to be acknowledged by others as capable of self-direction. An adult will, therefore, resent and resist situations in which they feel that others are imposing their will on them. A challenge in adult education is when adults have a mental model of a learner being dependent on the educator to teach them. This mental model contrasts with the need to be an autonomous adult and creates inner conflict. An educator should be aware of this conflict and create learning experiences that facilitate a transition for the learner from being dependent to being self-directed.

3. Prior experience of the learner – resource, mental models. Adults have a greater volume of experience than youth by simply having lived longer, but they have also had a different kind of experience, which makes adults a heterogeneous group. As the richest resources for learning reside in the adult learners themselves, the adult's experience can be used beneficially for learning. However, adults tend to develop

mental habits, biases and presuppositions as they accumulate experience that can close the mind to new ideas, fresh perceptions and alternative ways of thinking. A more subtle reason for emphasising experience in adult education is linked to how adults increasingly develop self-identity with the experience they had, compared to the experiences they see children having. The implication of ignoring an adult's experience is not only a rejection of their experience but also of that adult as a person.

4. Readiness to learn – life-related, developmental task: As adults discover what they need to know, they also discover a readiness to learn how to cope effectively with their real-life situations. The learner's transition from one developmental stage to the next can provide a rich source of learning. Timing is of the essence. For example, learners may need to master a certain skill before they are ready for a course in supervisory training and for the responsibility of supervising others in learning that same skill.

5. Orientation to learning – problem-centred, contextual: In an orientation to learning process, adults are life-centred. An interest to learn something new can come when learners perceive that learning will help them to either perform better or solve a problem relevant to their life situations. Thus, learning of new knowledge, skills, values and attitudes is most effective when educational content is aimed at how it can be applied to real-life situations.

6. Motivation to learn – intrinsic value, personal payoff: In general, adults are motivated to continue growing and developing throughout their lives. External motivators, such as higher salaries, provide some degree of the drive to learn. However, more powerful influences can be found within internal pressures, such as the desire for increased job satisfaction. This type of motivation can be blocked by barriers such as a negative self-concept, lack of opportunities or resources, time constraints and educational programmes that are not based on learning theories.

4 AIM

The overall aim of this PhD project was to investigate the development of the clinical competence of advanced practice nursing students who are pursuing a NP role. This goal was reached by achieving the objectives of three sub-studies as described next.

Sub-study I:

To identify the areas of professional development and educational needs that can improve patient care in sub-study I, the aim of the study was two-fold:

(a) to describe and analyse the self-assessment of clinical competence and the need for further training, and
(b) to analyse the possible predictive variables in self-assessments among advanced practice nursing students.

Sub-study II:

To retrieve the knowledge that can be used to improve the assessment of advanced clinical competence in NP education in sub-study II, the aim was:

to explore and describe NP students' and examiners' experiences with Objective Structured Clinical Examination (OSCE)

Sub-study III:

To contribute to a sustainable standard of advanced clinical competence for NPs that can lead to a credible role, the aim of sub-study III was:

to analyse the development of nurse practitioner students' self-assessed clinical competence from the beginning of their education to after the completion of their clinical studies.

5 METHOD

The overall aim of this PhD project was achieved through three sub-studies conducted using a mixed methods research design. The first sub-study involved a cross-sectional survey that described and analysed advanced practice nursing students' clinical competence and needs for further training and analysed the possible predictive variables in the self-assessment at the beginning of the student's education. The qualitative descriptive study that served as the second sub-study explored and described how NP students and examiners experienced the OSCE as an exam form for assessing the advanced level of clinical competence. The third sub-study, supported by a longitudinal survey, analysed NP students' development regarding clinical competence from the beginning of their education to after the completion of their clinical studies.

5.1 Mixed methods research design

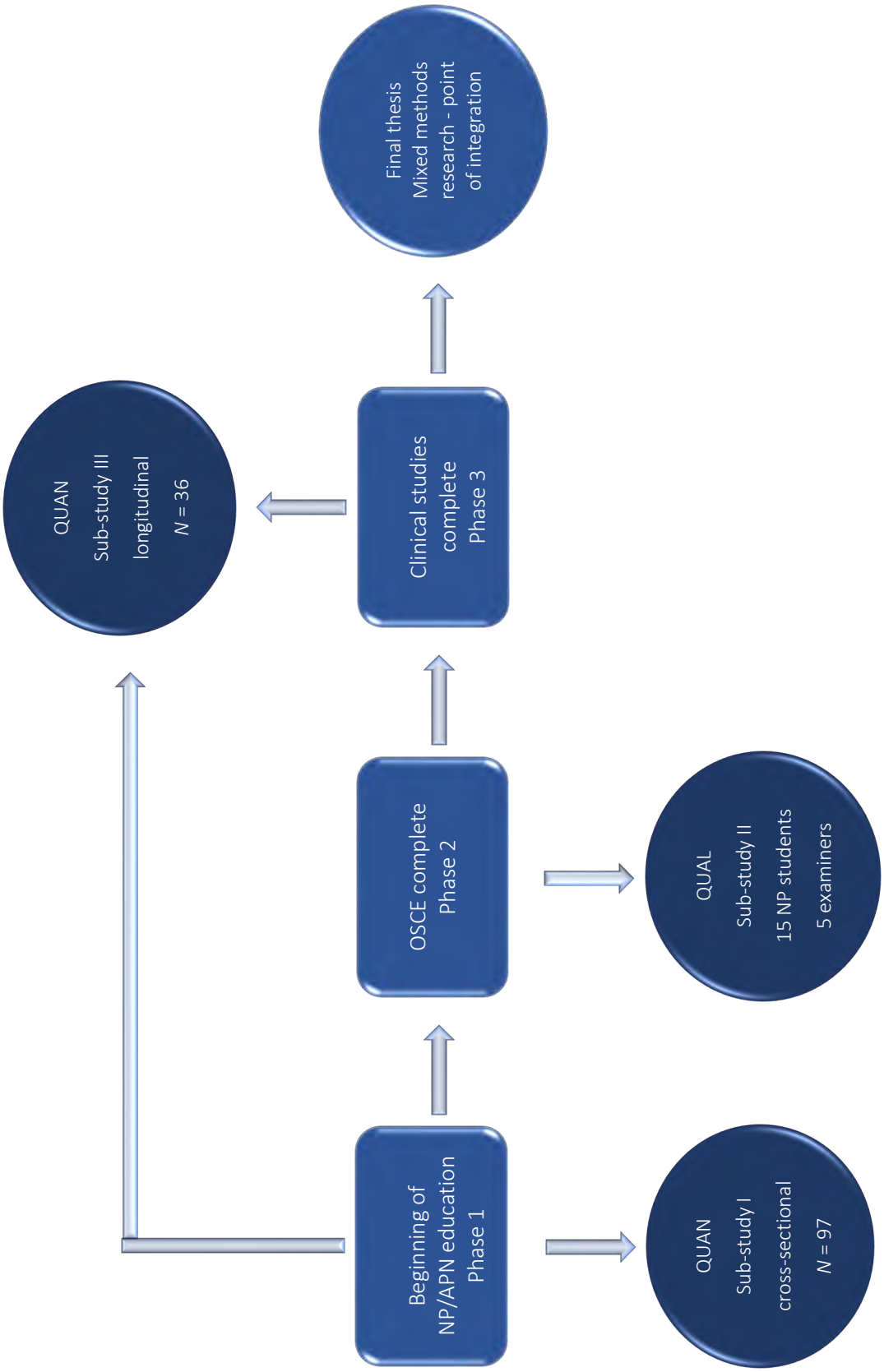
This PhD project is based on the understanding that the overall goal of mixed methods research is to contribute to the published literature by expanding and strengthening a study's conclusions through the combination of qualitative and quantitative research components (Schoonenboom & Johnson, 2017). Furthermore, this PhD project adheres to the following definition, presented by Johnson et al. (2007, p. 123):

Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.

Schoonenboom and Johnson's (2017) paper 'How to Construct a Mixed Methods Research Design' served as the basis for this PhD project design. The authors advocate for several design dimensions that are addressed here.

This PhD project was planned to follow a mixed methods research design when the research proposal was developed. The research phenomenon of this project is built upon a holistic definition of clinical competence (knowledge, performance, skills, values and attitudes) put forth by Cowan et al. (2005) and explores how the student's clinical competence develops in accordance with the ICN (2020) guidelines' description of the NP role. As the need for plurality in clinical competence assessment is generally agreed upon (Cowan et al., 2005; Miller, 1990), two approaches to clinical competence assessment were included in this PhD project. The purpose of the mixed methods design for this PhD project aligns with triangulation of the same phenomenon, development of clinical competence, with two different methods, self-assessment (quantitative data) and OSCE (qualitative data). The purpose of the mixed methods design for this PhD project is to use two different methods, self-assessment (quantitative data) and OSCE (qualitative data) to understand the same phenomenon, namely the development of clinical competence; this is known as triangulation. According to Greene et al. (1989, p. 259), triangulation intent is to "seeks convergence, corroboration, correspondence of results from different methods". The quantitative sub-studies involving self-assessments contribute to knowledge of NP students' starting point when they begin their education and of their development from this point to the completion of their clinical studies. The qualitative sub-study involves OSCE as an assessment of students' clinical competence at one point during their education. Together, the data provide information about the beginning and the end of the educational process, as well as between these two measuring points, thus creating a comprehensive picture of clinical competence development. Figure 3 illustrates these three phases of the PhD project.

Figure 3: Sampling phases in relation to the sub-studies



The figure illustrates that some of the collected data overlaps. Some of the data collected in sub-study I was also used as a baseline in sub-study III. However, these two studies are independent and were analysed sequentially. Thus, the overall design of this PhD project is sequential, and the different methods are implemented sequentially (Schoonenboom & Johnson, 2017) in this thesis. This results in the following notation: QUAN → QUAL → QUAN. The capital letters indicate equal status, and the arrows indicate sequential design.

While this PhD project contains two quantitative sub-studies and one qualitative sub-study, the theoretical drive behind the project was an equal-status design, where the approaches and thought processes from both the qualitative and quantitative components were equally valued and weighted (Schoonenboom & Johnson, 2017). The overall timeline for this PhD project is presented in appendix 2.

With any mixed methods research design, there is at least one point of integration where qualitative and quantitative components are brought together, and this might be the most important part of such designs (Schoonenboom & Johnson, 2017). When synthesizing the results from the three sub-studies, I made an integrated visual display in line with the recommendation to use joint display for mixed methods research (McCrudden, et al, 2021). These integrated results matrices show quantitative and qualitative findings side-by-side, which helps compare findings and generate meta-inferences. The display is presented in Chapter 6 and is discussed in Chapter 7 and represents the point of integration in this PhD project.

Table 3 presents an overview of the three sub-studies included in this PhD project.

Table 3: Overview of the sub-studies

	Design	**Method**	**Data Collection**	**Participants**	**Analysis**
Sub-study I	Cross-sectional survey	Quantitative	Questionnaire (PROFFNurse SAS II)	97 students in the NP/ master's or post-graduate programme from three universities/university colleges	Descriptive statistics, correlation coefficient, linear regression and Cronbach's alpha
Sub-study II	Qualitative descriptive study	Qualitative		15 students and 5 examiners from an NP master's programme from one university	Thematic analysis underpinned by pragmatic paradigm
Sub-study III	Longitudinal survey	Qualitative	Questionnaire (PROFFNurse SAS II)	36 students from an NP master's programme from one university	Descriptive statistics, inferential statistics and linear regression

5.2 Sub-study I: Cross-sectional survey

5.2.1 Research questions

Based on the two-fold aim of sub-study I – to describe and analyse the self-assessment of clinical competence and the need for further training and to analyse the possible predictive variables in self-assessments among advanced practice nursing students – the following research questions were developed:

• What were the students' highest self-assessed clinical competence and the greatest needs for further training?

• Was there cohesion between the students' lowest level of self-assessed clinical competence and their greatest need for further training?

• Are 'clinical work experience as an RN' and 'previous higher education level above a bachelor's degree in nursing' significant predictors for the self-assessment of clinical competence and the need for further training?

5.2.2 Design

To identify areas of professional development and educational need, I sought to develop knowledge about the students' point of departure regarding their development from bachelor's level RN to advanced level nurse. A cross-sectional sub-study was designed to gain insights into advanced practice nursing students' clinical competence and need for further training. A cross-sectional design involves collecting data at a fixed point in time and is appropriate for describing the status of phenomena, as well as the relationship among phenomena at a specific juncture (Polit & Beck, 2020). I was interested in describing the phenomena of both self-assessed clinical competence and the need for further training, as well as the relationship between the two. A cross-sectional design was found suitable because of the ability to gather a 'snapshot' description of what the students considered their clinical competence level to be and what they sought to develop, as well as whether experience and previous education were associated with self-assessments.

5.2.3 Participants

For this study, 105 RNs enrolled in either a postgraduate or master's programme related to NP/APN roles at one of three universities/university colleges in Norway were invited to participate. Of the 105 RNs, 99 responded by submitting a completed PROFFNURSE SAS II, for a response rate of 94%. A convenience sample strategy was used to select students to invite to participate. A convenience sample is a nonprobability sample in which the most easily available people are invited to participate (Polit & Beck, 2020). Inclusion criteria for participation included being enrolled in the first semester of the first year of an advanced practice nursing education course that met the ICN's APN definition as previously launched in 2002. In 2015,

four master's programmes that required 120 ECTS points in NP/advanced practice nursing were invited to participate in the study: two accepted. In 2017, a new postgraduate programme involving 60 ECTS units in advanced practice nursing was launched and subsequently was invited to participate in the study. This new postgraduate programme can be considered the equivalent of the first year in a master's programme. The programme was later developed into a 120 ECTS master's level programme and was formally recognised as in compliance with the formal regulations for advanced practice nursing master's education programmes (Norwegian Ministry of Education and Research, 2020b) by the Norwegian Agency for Quality Assurance in Education.

Following is participant information related to the sociodemographic and professional background variables for the NP/advanced practice nursing students (*N* = 99):

- Mean age: 39 (range: 24–59)
- 93 women and 6 men
- 98 part-time students, 1 full-time student
- Mean number of years of clinical work experience as an RN: 11.5 years (range: 1–33 years)
- Mean number of years of clinical work experience in PHC: 6.8 years (range: 0–27 years)
- Mean number of years of clinical work experience in specialised health care: 4.1 years (range: 0–20 years)
- All students considered, 46 of the participants had previous educational qualifications above the level of a bachelor's degree in nursing when they entered the master's programme. Of these, 36 participants had obtained more than 30 ECTS credits.

5.2.4 Data collection

Data on students' clinical competence self-assessments were collected using the PROFFNurse SAS II. Also collected were data on sociodemographic and professional background variables – age, gender, clinical work experience as an RN when entering the master's programme measured in years, the scope of practice and previous higher education before entering the

master's programme (above a bachelor's degree in nursing level) measured in ECTS credits, enrolment status (full-time vs. part-time).

Sub-study I reports on both the A-scale of the questionnaire (self-assessed clinical competence) and the B-scale (self-assessed need for further training), as the aim of the study relates to both scales. All data from participants were collected in the first semester of the first year of the educational programme. The students were invited to participate through a printed handout of the questionnaire. With permission from the programme leaders from each of the educational programmes, data collection was carried out during one of the lectures. I was the principal collector of the data for two of the educational programmes. However, due to practical considerations, one of the supervisors of this PhD project, who was also a programme leader at the time, collected some of the data. For these two programmes, the students were given printed questionnaires with a unique code, and only I had access to the scrambling key. The participants enrolled in the third educational programme answered the questions anonymously, and the programme leader collected the data. The data were collected between August 2015 and August 2018.

5.2.5 Analysis

The data were analysed using the IBM SPSS® Statistics 25.0 for Windows software. The analysis process was supervised by an experienced statistician who also co-authored the published article. A significance level of 0.05 was used in all statistical analyses.

I punched the data from the printed handout of the paper questionnaires into a data file. The data file was checked for errors according to the steps suggested by Pallant (2016) to correct any punching mistakes and non-valid scores. I uncovered less than a 1% punching error in the data file.

Of all the participants (*N* = 99), 64% (*n* = 63) responded to all the items on the questionnaire. The total response rate for the A-scale (clinical competence) was 79% (*n* = 78), and for the B-

scale (need for further training) it was 67% (*n* = 66). Surveys with missing items were only included if the number of missing items was fewer than 10 (18% of the items). Thus, 3 participants who returned questionnaires with 10 or more unanswered A-scale questions were excluded, and 2 were excluded for having returned questionnaires with 10 or more unanswered B-scale questions. Therefore, the analysis of the A-scale included 96 participants, and the analysis of the B-scale included 97 participants.

To replace missing data for participants who submitted questionnaires with some missing items but met the inclusion criteria (*n* = 33), the case mean substitution technique was used (Fox-Wasylyshyn & El-Masri, 2005). This technique has been reported to be appropriate for self-assessed data, as it assumes that the score on any data point is closely related to the scores on the remaining data points. Thus, the case mean substitution technique is especially applicable for self-reported measures in which all items are indicators of a specific construct (Fox-Wasylyshyn & El-Masri, 2005). In this PhD project, clinical competence is defined as a specific construct that is measured in the PROFFNurse SAS II. For each participant, I calculated the mean scores for the variables in the A-scale and B-scale. I then used the individual mean scores to replace missing values. The case mean substitution technique has shown to be robust when the participants were missing 20% of the items in a study by Roth et al. (1999), and when they were missing 30% of the items in a study by Downey and King (1998). As the data set included fewer than 18% of the missing items, the technique was deemed appropriate.

Descriptive statistics were used to assess the sample size, to describe characteristics of the sample and to check the assumptions underlying the statistical techniques that were chosen.

The 95% confidence interval for the total mean score for clinical competence was analysed to assess whether the sample size was sufficient in terms of answering the research questions. According to Julious et al. (2010), the short length of an confidence interval can indicate an appropriate sample size. The length of the confidence interval for the total mean of clinical competence (A-scale) was 0.37 and was deemed a short length, considering the total length of the A-scale was 10; hence, the sample size was considered sufficient.

Moreover, the frequency distributions of participants' demographic variables, including the student's age, gender, full-time versus part-time status, clinical work experience as an RN and previous higher education above a bachelor's degree, were obtained, in addition to the mean total score and individual items and standard deviations.

In accordance with Pallant (2016), the following assumptions were checked: normality (by inspecting histograms), linearity and homoscedasticity (by inspecting scatterplots) and outliers (by inspecting boxplots). No violations of the assumptions were found, and the data set was found fit for parametric analysis. A specific assumption for multiple regression is multicollinearity. The collinearity diagnostic on the background variables was checked by estimating variance inflation factors. No values were found to be above 10, which is the recommended cut-off point cited by Pallant (2016).

Pearson's *r* was used for a bivariate correlation between the total score of self-assessed clinical competence and the total score regarding the need for further training to address the research question that asked whether a relationship exists between the two phenomena. In addition, to select individual items related to clinical competence and the need for further training in a regression model, Pearson's *r* was used for a bivariate correlation between work experience as an RN measured in years (three items) and previous higher education (above a bachelor's degree in nursing level) measured in ECTS credits (five items). Then, the *r* values were interpreted according to the following guidelines: *r* = .10–.29 (small), *r* = .30–.49 (medium) and *r* = .50–1.00 (large; Pallant, 2016). Pearson's *r* is designed for interval level data but can also be used when one variable is continuous and the other is dichotomous (Pallant, 2016). This means that the variables of self-assessed clinical competence and the need for further training were treated as continuous variables on an interval level. While this issue has long been debated in the literature, empirical support has been provided; for instance, when a Likert scale has a range from 0–10, as the one used in the PROFFNurse SAS II does, it can make the distribution approximate normality on an interval scale (Wu & Leung, 2017).

Multiple linear regression analyses were conducted. The dependent variables were the total A-scale score for the self-assessment of clinical competence and the total B-scale score for the need for further training. Age, work experience as an RN measured in years and previous higher education level (above a bachelor's degree in nursing) measured in ECTS credits were chosen as independent variables. Age was used to adjust the regression model. The independent variables were chosen to check the hypothesis by determining whether they affected the dependent variable. Previous research did not find work experience to be a significant predictor for master's level students in advanced practice nursing or specialist RNs in postgraduate educational programmes (Wangensteen et al., 2018). However, in the context of NP education, an investigation into whether clinical competence and the need for further training are associated was expected to prove interesting, as an educational programme in NP usually has an entry requirement of relevant work experience in nursing (ICN, 2020). Previous research demonstrated that students in advanced practice nursing master's programmes self-assessed their clinical competence as higher than students in specialist programmes assessed theirs (Wangensteen et al., 2018). Previous education was chosen as an independent variable to explore whether it is associated with the NP student's competence level and need for further training. A linear regression was also conducted with the results from a bivariate correlation. Thus, three items that correlated significantly with the years of clinical work experience as an RN variable and five items that correlated with previous higher education were included in a regression analysis. I first entered all independent variables simultaneously in the regression analysis and removed the least significant variable and then re-estimated the model with the remaining independent variables. This backward variable selection method was repeated until the regression model only consisted of significant predictors.

As PROFFNurse SAS II has yet to be validated, Cronbach's alpha values was used to assess internal consistency, which is a component within the reliability domain and concerns the degree to which the items of a scale are interrelated and whether they all measure the same dimension (Polit & Beck, 2020). Cronbach's alpha values were .936 for the A-scale and .979 for the B-scale. A Cronbach's alpha coefficient above .8 has been suggested to be preferable (Pallant, 2016). However, Cronbach's alpha values are sensitive to both a high and low number

of items (Field, 2018); thus, I recommend further investigating internal consistency once the PROFFNurse SAS II has sufficiently developed sub-scales.

5.3 Sub-study II: Qualitative descriptive study

5.3.1 Design

A qualitative descriptive study was designed to uncover how NP students and examiners experienced the OSCE as a tool for assessing clinical competence. Descriptive qualitative studies have no specific disciplinary or methodological roots but consist of an analysis of the themes or patterns that emerge from the collected data (Polit & Beck, 2020). Sandelowski (2000) claimed that a study with a qualitative descriptive design is characterised by a surface analysis that stays close to the data, in contrast to phenomenological, ethnographic or narrative studies, in which the data are penetrated for a representation of data. This sub-study did not initially have a descriptive design; rather, the decision to use one emerged through the analysis, which is described in Section 5.2.4. Previous research has found the OSCE to be a valid and reliable tool for assessing clinical competence (Bagnasco et al., 2016; Barry et al., 2013; Najjar et al., 2016; Navas-Ferrer et al., 2017). For sub-study II, a qualitative design was used, given previous calls for additional research on students' experiences with the OSCE in nursing education (Johnston et al., 2017; Muldoon et al., 2014). One previously reported student-related challenge with the OSCE is the stress and nervousness experienced by some students (Johnston et al., 2017; Miller & Carr, 2016; Muldoon et al., 2014). Thus, the aim of the sub-study was to record the experiences of both examiners and students for use in identifying ways to improve clinical competence assessments in NP education.

5.3.2 Participants

Fifteen NP students and five examiners from an NP master's programme from one university participated in sub-study II. The study employed a purposeful sampling strategy, as participants were selected based on who would most benefit from the study (Polit & Beck, 2020). The students participated in focus groups, while the examiners were interviewed individually. Focus

groups were initially considered for the examiners; however, individual interviews were deemed more appropriate due to practical considerations. The simulated patients from the OSCE were initially regarded as potentially valuable participants for the study; however, they did not participate, also due to practical considerations. All the students and examiners who were invited participated in the study. Table 4 includes the demographic characteristics of the participants.

Table 4: Demographic characteristics of participants in sub-study II

Participants			Students (*N* = 15) Examiners (*N* = 5)
Students	Age	Range (mean)	26–60 years (mean age: 43 years)
	Gender	Female	14
		Male	1
	Work setting	Primary health services	10
		Specialist health services	5
Examiners	Gender	Female	3
		Male	2
	Profession	NP* (British)	2
		NP* (Norwegian)	1
		Physician (Norwegian)	2 (anaesthesiologist and geriatrician)

Note: *NP = Nurse Practitioner (Source: Taylor et al, 2019, p. 117).

The inclusion criteria for participation in sub-study II were enrolment as a student in the NP master's programme in the second semester of their first year or being an examiner for the OSCE. At the beginning of the course leading up to the OSCE, the students and examiners were informed about the sub-study in writing by e-mail. They received information about the sub-study's intention and about the participant's right to withdraw from the study without providing a reason and without incurring any negative consequences. This information was repeated orally before the focus groups and interviews began, as recommended by Malterud (2017), and written consent also was obtained before the sessions began.

5.3.3 Data collection

The plan was to collect data using focus groups; however, due to practical reasons, including the examiners' busy schedules, individual interviews were conducted with all the examiners. Thus, data collection for sub-study II involved five focus groups with students, with three

students participating in each group (*N* = 15), and five examiners participating in individual interviews (*N* = 5). These two methods draw on a similar technique for collecting data but differ in how they are structured. Some assert that the interactive nature of focus groups allows the researcher to gather information that might not be gathered from a single respondent. Others (Guest et al., 2017) claim that individual interviews result in more details than focus groups and give more insight into a respondent's personal thoughts, feelings, and world view. Guest et al. (2017) looked at 15 studies comparing focus groups and interview data and found that the strength of focus groups is the group dynamics that make it possible to stimulate discussion. Further, the researchers conducted a randomised controlled trial comparing the two types of data and found that focus groups and individual interviews are very similar in their ability to generate unique items, and that sensitive data was easier to retrieve from focus groups (Guest et al., 2017). In this study the choice to conduct both focus groups and interviews was highly practical. I illustrate the difference between the two types of data by quoting extracts from the conversations in the focus groups to demonstrate how meaning was constructed and using single quotes from the interviews.

When organising the data collection strategy, consideration for the participants was emphasised. Thus, the focus groups were organised into groups of three. Four of the five focus groups were arranged on the same day as the OSCE on the university campus. The fifth and final focus group was conducted at the workplace of one of the students approximately one week after the OSCE. The interviews with the examiners were scheduled to be held approximately one week after the OSCE was administered and were conducted on the university campus or at the examiner's workplace. The focus groups lasted from 65 to 98 minutes; the interviews lasted from 56 to 70 minutes. Both the focus groups and the interviews were audio recorded. I retrieved all the data and transcribed the focus group discussions, while an independent party transcribed the interviews. The data were collected between 13 and 24 June 2016.

Both the focus groups and interviews were conducted according to a semi-structured interview guide that adhered to the five-step framework of Kallio et al. (2016): (1) prerequisites, (2)

previous knowledge, (3) preliminary guide, (4) pilot testing and (5) complete the guide. The interview guide for the focus groups was pilot tested with a student who had previously completed an OSCE. The interview guide for the individual interviews was pilot tested with an assistant professor with considerable experience in undergraduate nursing student skill assessment. Both guides aimed to collect data about the participants' experiences with the OSCE as an examination; with history taking, physical assessments and clinical decision-making; with learning activities in the course; with OSCE cases; with simulated patients; and with person-centredness. See Appendices 4 and 5 for the interview guides.

5.3.4 Analysis

Braun and Clarke's (2013) thematic analysis was used to analyse the data. Thematic analysis entails a process of identifying, analysing and reporting repeated patterns of meaning within a data set to capture themes that are relevant to the research aim (Braun & Clarke, 2006, 2013). Thematic analysis consists of six steps: (1) becoming familiar with the data, (2) coding, (3) searching for themes, (4) reviewing themes, (5) naming themes and (6) the final report. The analytical process for sub-study II is further described in paper II (Taylor et al., 2019, pp. 117–118). Both the focus group data and the individual interview data were handled and analysed in a similar fashion, namely as a written text. First, I analysed the data from the focus groups with the students before analysing the examiners' individual interviews. Subsequently, I presented the analysis twice, to my supervisors and to the research team from PraksisVEL, for discussion before producing the final iteration of the analysis. See Table 5 for an example from the analysis.

Table 5: Example of the analysis process

Step 1	Step 2		Steps 3–5	Step 6
Example of transcribed material	**Example of coding**	**Iterative process**	**Preliminary theme**	**Final theme**
'And a clinical exam is needed in this course to demonstrate what you have learned and what you can execute'	Assessment of learning outcomes		Learning outcomes of the OSCE	The OSCE as a method for demonstrating and assessing clinical competence.
			Preliminary subthemes	**Final subthemes**
			• Ability to conduct physical assessments • Clinical competence on an NP level	• Students' ability to demonstrate advanced clinical competence • Assessing advanced clinical competence

Source: Taylor et al., 2019, p. 118.

Braun and Clarke (2006) present several choices for the analysis and recommend that researchers make their answers explicit to promote clarity about what has been done. These choices – which concern descriptions of themes, deductive versus inductive approaches, semantic or latent themes and paradigm – are elaborated on in the following paragraphs.

Braun and Clarke (2006) stated that a description of themes can represent either the data set as a whole or a particular narrowed-down aspect of the data set. The aim of the analysis for sub-study II was to provide a rich description of the data set, including the data collected from both the students and the examiners, rather than providing a detailed account of one aspect for some of the participants. Although Braun and Clarke (2006) warned that some depth and complexity may be lost, they recommended this approach when prior research on the topic is minimal, which is true of experiences with the OSCE.

Another choice presented by Braun and Clarke (2006) concerns the deductive versus inductive approach. For sub-study II, the themes were found using an inductive approach, as there is a strong link between the data and the identified themes. An inductive approach was deemed appropriate to allow for a flexible understanding of the participants' experiences with the OSCE

in connection to their contexts. This mean that when I coded the material, I used a data-driven approach rather than trying to make the codes fit in a pre-existing theoretical frame.

How the themes should be identified, whether via semantic themes (finding the explicit or surface meaning) or latent themes (finding underlying ideas, assumptions and conceptualisations), is another choice presented by Braun and Clarke (2006). As previously mentioned, sub-study II was not initially planned to have a descriptive design. I started the analysis by searching for latent themes that could explain participants' experiences with the OSCE. This manner of search for themes is characteristic of an explanatory design in which the underlying cause of the phenomenon is investigated by asking 'what is really going on here?' (Polit & Beck, 2020). However, when I analysed the transcripts from the focus groups and individual interviews, I discovered that the students and examiners reported a lack of training during the preparation for the OSCE and that few students had trained at their workplace, even though this was a course obligation (Taylor et al., 2019). This finding could have been investigated using an explorative approach to search for latent themes and questions, such as 'Why did the students not train in their workplace?'. However, previous research has already shown that newly educated NPs in Finland experience several barriers in the clinical field (Fagerström & Glasberg, 2011). I concluded that an explorative approach would not be beneficial for developing new knowledge relevant to the research aim, so instead I chose a descriptive approach guided by the following question: 'What is important about the phenomenon?' (Polit & Beck, 2020). The analysis led to the discovery of the theme of alignment between the course and the OSCE, which, in turn, led to the discovery of the theoretical concept of constructive alignment (alignment between assessment task and intended learning outcome) by Biggs (2011). I found that a descriptive design, in which I searched for semantic themes, was more appropriate to developing knowledge that could be used to improve the assessment of clinical competence in NP education.

The last choice presented by Braun and Clarke (2006) relates to the paradigm. Sub-study II was placed within a pragmatic paradigm, which entailed taking the participants at face value (Taylor et al., 2019). From the outset, the plan for the sub-study was to triangulate sources and, thus,

compare different viewpoints to establish credibility, which is one aspect of trustworthiness as described by Lincoln and Guba (1985). While the students had lived experience of how to perform and demonstrate clinical competence during the OSCE, the examiners had lived experience of assessing clinical competence based on their expertise in their clinical field. Hence, the students and examiners represented two different viewpoints that could potentially represent multiple ways in which the OSCE could be improved. For instance, the students spoke most often about the stress and nervousness associated with completing the OSCE, while the examiners mostly focused on the checklist, both of which are important aspects of the OSCE. Johnson and Onwuegbuzie (2004) argued that the aim of a pragmatically inclined enquiry is to reach an agreement about what is of importance to the many and that 'knowledge is viewed as being both constructed and based on the reality of the world we experience and live in' (p. 18). I take this to mean that pragmatism can be perceived as an apparent incompatibility but, rather, focuses on finding a workable middle ground. Moreover, for the analysis, I chose to take the participants' viewpoints at face value and organised the themes chronologically such that they collectively represented all the participants' experiences: *pre* (main theme 1: insufficient preparation for the OSCE), *per* (main theme 2: the OSCE as a challenging examination process) and *post* (main theme 3: the OSCE as a method for demonstrating and assessing advanced clinical competence).

5.4 Sub-study III: Longitudinal survey

5.4.1 Research questions

Based on the aim of sub-study III, which was to analyse the development of NP students' self-assessed clinical competence from the beginning of their education to after the completion of their clinical studies, the following research questions were developed:

• What were the most and least developed items from baseline to follow-up?

• How did the lowest self-assessed items at baseline develop for students with high and low clinical competence?

• Are clinical work experience and previous higher education predictors of the development of clinical competence?

5.4.2 Design

To contribute to a sustainable standard of advanced clinical competence for NPs that can lead to establishing it as a credible role, I sought to understand the students' development from being RNs in a bachelor's programme to nurses on an advanced level. Thus, a longitudinal sub-study was designed to gain insight into the development of NP students' self-assessed clinical competence from the beginning of their education to after the completion of their clinical studies. The longitudinal design involves the collection of data at more than one point in time and is appropriate for assessing whether a change occurs over time (Polit & Beck, 2020). Although I was interested in whether the development of clinical competence occurred, it was not possible to conduct a longitudinal study encompassing the students' entire educations due to the time constraints that come with completing a PhD project. The period from the beginning of their education in the NP master's programme to the end of clinical studies was chosen. During this data collection period, the students had completed core courses at the advanced nursing level on assessing a patient. However, the students had not completed their master's theses and, thus, had not completed their NP education. In addition, to explore whether the students developed their clinical competence as one group, I was also interested in investigating whether any differences existed between the students. I, therefore, chose to examine whether the students whose self-assessments were the lowest at the beginning of their education developed their clinical competence differently compared to the students whose self-assessments were the highest. A longitudinal design was deemed appropriate because of the possibility of following up with the students on an individual level to determine whether their self-assessed clinical competence had developed over the course of their education.

5.4.3 Participants

Forty-six students enrolled in an NP master's programme from one university in Norway were invited to participate in sub-study III. Thirty-nine participants responded to the survey using the

PROFFNurse SAS II, representing an 80% response rate. Convenience sampling was used to select the students who were invited to participate. While sub-study I sought to contribute a 'snapshot' description, sub-study III sought to assess whether development happened over time. Therefore, the participants for sub-study III were invited from one university, where the participants underwent the same teaching, to facilitate data retrieval. The participants were invited to participate twice, at baseline and at follow-up. The inclusion criterion at the baseline point was enrolment in the first semester as a first-year student in an NP master's programme. The inclusion criterion for the follow-up segment was completion of clinical studies (450 h) and having passed the OSCA.

Following are the details for the sociodemographic and professional background variables for the NP students:

- Mean age: 41 (range: 26–59)
- 33 women and 3 men
- All students were part-time
- Mean number of years of clinical work experience as an RN: 13.0 (range: 4–33)
- Mean number of years of clinical work experience in PHC: 7.3 (range: 0–27)
- Mean number of years of clinical work experience in specialised health care: 4.7 (range: 0–17)
- 23 students (64%) had previous educational qualifications above the level of a bachelor's degree in nursing; among them, 18 students (50%) had obtained more than 30 ECTS credits

5.4.4 Data collection

The data for sub-study III were collected using the PROFFNurse SAS II. Sociodemographic and professional information, see section 5.4.4., were also collected. Sub-study III reports only on the A-scale of the questionnaire (self-assessed clinical competence), as the aim of the study relates to clinical competence development. All the baseline data were collected during the participants' first semester of their first year in the educational programme and after having passed their OSCA for follow-up. There was an approximately two-year interval between the

two measuring points. Data collected in sub-study I were used for the baseline. The data for follow-up were collected using an online version of the PROFFNurse SAS II. I collected all the data for the follow-up. The data were retrieved between August 2015 and May 2020.

5.4.5 Analysis

The data were analysed using IBM SPSS® Statistics 25.0 for Windows. The analysis was supervised by an experienced statistician who also co-authored the published article. A significance level of 0.05 was used in all statistical analyses.

The baseline data were retrieved from sub-study I. Data were also exported from the online survey (Questback) for the follow-up. The same steps were taken as in sub-study I (Section 3.3.4) to check the data for errors, as suggested by Pallant (2016), and to correct any punching mistakes and non-valid scores. I uncovered less than a 1% punching error in the data file.

Of all the participants considered (N = 39), 79% (n = 31) responded to all the items on the questionnaire. The total response rates for baseline and follow-up investigations were 85% (n = 33) and 87% (n = 34), respectively. For a participant to be included in the study, a limit of no more than nine missing items (18% of the items) was chosen; three participants were excluded for having returned questionnaires with 10 or more unanswered A-scale questions. Thus, the analysis of the sub-study included 36 participants.

To replace missing data for participants who submitted questionnaires with some missing items but met the inclusion criteria (n = 5), the case mean substitution technique was used (Fox-Wasylyshyn & El-Masri, 2005), as it was in sub-study I (Section 3.3.4).

Descriptive statistics were used to describe the characteristics of the sample and to check the assumptions underlying the statistical techniques that were chosen. Frequency distributions of demographic variables, such as the students' age, gender, full-time versus part-time enrolment, clinical work experience as an RN and previous higher education level above a bachelor's degree, were obtained, in addition to the mean of the total score of the A-scale of clinical

competence and individual items in the A-scale. The same steps were taken as in sub-study I to check for any violation of the assumptions of parametric tests, as suggested by Pallant (2016), and the data set was found to be fit for parametric analysis.

Paired sample *t*-tests (two-tailed) were used to analyse baseline and follow-up scores for the individual items to gain knowledge about the students' development of clinical competence. A potential ceiling effect – participants choosing the highest value at baseline – could lead to a misleading conclusion that no development can be detected (Cramer & Howitt, 2004). A ceiling effect was considered to be present if more than 15% of the participants self-assessed themselves with the highest possible score at the baseline.

An independent *t*-test was used to determine whether any differences existed in the development of clinical competence between the following two groups, which were extracted from the total sample: the third of the students with the highest total mean of clinical competence at baseline (n = 12) and the third of the students with the lowest total mean of clinical competence at baseline (n = 12).

Multiple linear regression analyses were conducted. The dependent variables were the total A-scale score for the self-assessment of clinical competence. The total mean score for the students' self-assessed clinical competence at baseline, age, work experience as an RN (measured in years) and previous higher education level (above a bachelor's degree in nursing and measured in ECTS credits) were chosen as independent variables. Age was used to adjust the regression model, in addition to the total A-scale score at baseline, as recommended by Vickers and Altman (2001). The independent variables were chosen to be tested to determine whether they affected the dependent variable for the same reasons as in sub-study I, and the independent variables were entered in the same steps as described for sub-study I (Section 3.3.4).

To evaluate the sample size of the sub-study, a power analysis was performed. The total scores for the A-scale of the baseline and follow-up investigations were 0.90 and 0.74, respectively.

An estimation of a development greater than 0.50 was assumed between the baseline and follow-up investigations. As the results showed a larger development than was estimated, a sample size of 36 participants was found to be appropriate.

5.5 Ethical considerations

The PhD project adhered to the ethical principal of medical research involving human subjects as presented in the Declaration of Helsinki (World Medical Association, 2013). All three sub-studies were reported to the Norwegian Centre for Research Data (approval nos. 44140, 48269 and 52648). All students who participated gave their consent. Written consent was retrieved for sub-study II. For sub-studies I and III, the students were informed in advanced that filling out the form was considered their consent to participate. All participants were given information about the study in writing, either through a handout or e-mail, and orally. The participants were informed about participant anonymity and their right to withdraw from the study at any time, without giving a reason.

Ethical challenges for all three sub-studies were related to students feeling pressured to participate and fearing impaired progress or learning experiences in the educational programme due to non-participation (Ferguson et al., 2006), especially for the students whose programme leader collected the data. A high response rate was experienced for data collection, which may indicate that the students were eager to participate; however, it may also indicate that they felt obliged to participate. The students were, therefore, ensured that non-participation or withdrawal from participation did not affect their grading in any of the courses or for any other type of academic performance.

For sub-study I, the programme leaders of the educational programmes collected the formal consent forms. In sub-study I, one of the educational programmes collected the data anonymously. The benefit of this was that the student leader did not have access to the participants' answers. At the same time, that meant that the students did not have the

possibility to withdraw from the sub-study once they had first participated. Thus, I was careful to choose an analysis approach that did not reveal the identification of the participants.

See Appendices 6 to 12 for information and consent forms and research approvals from Norwegian Social Science Data Services for all three sub-studies.

6 RESULTS

6.1 Sub-study I

Taylor, I., Bing-Jonsson, P., Wangensteen, S., Finnbakk, E., Sandvik, L., McCormack, B., & Fagerström, L. (2020). The self-assessment of clinical competence and the need for further training: A cross-sectional survey of advanced practice nursing students. Journal of Clinical Nursing, 29(3-4), 545–555. https://doi.org/10.1111/jocn.15095

Sub-study I was a cross-sectional study for which data were collected with PROFFNurse SAS II at the beginning of advanced practice nursing students' education. The aims of the study were (a) to describe and analyse advanced practice nursing students' self-assessment of their clinical competence and need for further training and (b) to analyse the possible predictive variables in their self-assessment. The research questions were as follows: What were the students' highest self-assessed clinical competence and the greatest needs for further training? Was there a cohesion between the students' lowest self-assessed clinical competence and their greatest need for further training? Are 'clinical work experience as an RN' and 'previous higher education level above a bachelor's degree in nursing' significant predictors for the self-assessment of clinical competence and the need for further training?

Students gave themselves the highest rating for clinical competence on Item 32: 'I take full responsibility for my own actions' (*M*: 8.89; *SD*: 1.20). The top 10 items of the self-assessed clinical competence (A-scale) mainly pertained to responsibility and cooperation. Students gave the highest rating on their need for further training for Item 15: 'I have knowledge of the interactions of various types of medication and what side effects they may cause for the patients I am responsible for' (*M*: 8.43; *SD*: 1.97). Among the top 10 items for need for further training (B-scale), the first 8 items related to direct clinical practice, and the last 2 items addressed having a vision for developing nursing and generating a creative learning environment. The total mean score of self-assessed clinical competence was 6.95 (*SD*: 0.92; 95% CI: 6.77–7.14). The total mean score for the need for further training (B-scale) was 6.80 (*SD*: 1.79).

The higher the advanced practice nursing students assessed their clinical competence, the less they saw a need for further training, as the two scales were negatively correlated ($r = -.34$, $p = .001$). When I compared the 10 lowest self-assessed items for clinical competence (A-scale) with the top 10 items for the need for further training (B-scale), a relationship was observed. Eight items were found on both scales regarding direct clinical practice. This means that a relationship was observed between the students' lowest self-assessed clinical competence levels and their reported greatest need for further training. However, the remaining two items regarding the use of electronic devices when assessing the patient differed from this pattern, as the students assessed their clinical competence as low on these items but assessed their need for further training as average.

Clinical work experience as an RN and previous higher education level were not found to be significant predictors of self-assessed levels of clinical competence or the need for further training. One item (16) was a significant predictor of clinical competence when adjusted for age: 'I generate a creative learning environment for staff at my workplace' ($B = 0.147$; adjusted $R^2 = .075$; Sig = 0.012). Two items were significant predictors of the need for further training when adjusted for age: Item 19 'I improve routines/systems that fail to meet the needs of patients at my workplace' ($B = 1.280$; adjusted $R^2 = .050$; Sig = 0.014) and Item 46, 'I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices' ($B = 1.391$; adjusted $R^2 = .064$; Sig = 0.016). For all these individual items, the amount of variation described by these models was very low, indicating that the predictor variables and age had a minor influence on the dependent variables.

6.2 Sub-study II

Taylor, I., Bing-Jonsson, P. C., Johansen, E., Levy-Malmberg, R., & Fagerström, L. (2019). The Objective Structured Clinical Examination in evolving nurse practitioner education: A study of students' and examiners' experiences. Nurse Education in Practice, 37, 115–123. https://doi.org/10.1016/j.nepr.2019.04.001

Sub-study II was a qualitative descriptive study for which data were collected through focus groups and individual interviews after the NP students had completed their OSCE. The study aimed to explore and describe NP students' and examiners' experiences with the OSCE to improve the assessment of clinical competence in NP education.

The analysis revealed that the participants experienced the OSCE as an appropriate form of assessment for advanced clinical competence; however, both the students and the examiners experienced some challenges. Three main themes and six subthemes emerged through the analysis process (see Table 6).

Table 6: Themes and subthemes in sub-study II

Theme	Subthemes	Summary of findings
Insufficient preparation for the OSCE	Alignment between the course and the OSCE	A lack of alignment between the learning activities of the course and the OSCE impaired the students' preparation for the exam.
	Skill training and the OSCE	Students need to have access to sufficient skills training to prepare them for the exam.
The OSCE as a challenging examination process	Student stress and the impairment of student performance	Stress can impair students' performance and threaten the validity of the advanced clinical competence assessment.
	The unnatural setting of the simulation	The unnatural setting of the simulation can make the students overly attentive to being in an exam setting and not in a real-life clinical setting.
The OSCE as a method for demonstrating and assessing clinical competence	Students' ability to demonstrate advanced clinical competence	After completing the OSCE, the students could demonstrate some structured history taking and physical assessment techniques but still struggled with decision-making.
	Assessing advanced clinical competence	The students and examiners experienced the OSCE as an appropriate assessment of advanced clinical competence.

Source: Taylor et al., 2019, p. 119.

The first main theme was 'insufficient preparation for the OSCE', which highlighted the importance of preparing students for their exam through two subthemes. The subtheme 'alignment between the course and the OSCE' relates to the participants' perceptions that their preparation for the exam was impaired by a lack of alignment between the OSCE and the learning activities of the course leading up to the OSCE. The subtheme 'skill training and the OSCE' identified the importance of giving students access to sufficient skills training to prepare them for the OSCE.

The second main theme was 'the OSCE as a challenging examination process'; this theme highlighted the challenges that occur during the OSCE when assessing clinical competence. The subtheme 'student stress and the impairment of student performance' identified how students' performance and the validity of the clinical competence assessment can be threatened by student stress before and during the exam. The subtheme 'the unnatural setting of the simulation' pointed to the challenge experienced by students when they perceive the simulation as unnatural and, thus, become overly attentive to being in an exam setting and not in a real-life clinical setting.

The third main theme was 'the OSCE as a method for demonstrating and assessing clinical competence', and it highlighted the students' learning outcomes after the OSCE and the challenges of assessing advanced clinical competence. The subtheme 'the students' ability to demonstrate advanced clinical competence' indicates that the students had gained clinical competence in some structured history taking and physical assessment techniques; however, they struggled to make clinical decisions. The subtheme 'assessing advanced clinical competence' relates to the participants' experiencing the OSCE as an appropriate assessment of advanced clinical competence, though they experienced some challenges regarding ensuring that essential skills were weighted in the checklist and person-centredness compatibility to the OSCE.

6.3 Sub-study III

Taylor, I., Bing-Jonsson, P. C., Finnbakk, E., Wangensteen, S., Sandvik, L., & Fagerström, L. (2021). Development of clinical competence—a longitudinal survey of nurse practitioner students. BMC Nursing, 20(1), 130. https://doi.org/10.1186/s12912-021-00627-x

Sub-study III was a longitudinal study for which data were collected through the PROFFNurse SAS II at the beginning of NP students' education and after completion of their clinical studies. The study aimed to analyse NP students' development of clinical competence from the beginning of their education (baseline) to after completion of the clinical studies (follow-up).

The research questions were as follows: What were the most and least developed items from baseline to follow-up? How did the lowest self-assessed items at baseline develop for students with high and low clinical competence? Are clinical work experience and previous higher education predictors of the development of clinical competence?

Overall, 45 out of 50 items in the PROFFNurse SAS II questionnaire increased significantly. The total mean score for clinical competence increased significantly between baseline and follow-up, from 6.83 (*SD*: 0.90; range: 4.94–8.64) to 8.22 (*SD*: 0.74; range: 6.68–9.77). The mean difference between baseline and follow-up was 1.39 (*SD* = 0.80; range: − 0.68–2.84; 95% CI: − 1.58–1.04; $p < .001$).

The item that increased the most was number 14: 'I systematically gather information from each patient about her/his health resources' (*M* baseline: 5.49; *M* follow-up: 8.29; *M* difference: 2.80, $p < .001$). Of the 10 items that increased the most, 8 pertained to direct clinical practice, such as history taking, physical examination, differential diagnosing and medications. The remaining two items concerned health promotion and illness prevention and supporting and guiding the patient. Considering all 10 items that developed the most, the items increased significantly from 1.66 (baseline) to 2.80 (follow-up).

The item that increased the least was number 35: 'I experience a division of responsibility between the physician and me as a nurse' (*M* baseline: 7.44; *M* follow-up: 7.56; *M* difference: 0.12). The difference was not significant, and a ceiling effect was observed. The 10 items that increased the least represent fragmented elements of clinical competence, such as items of responsibility, cooperation with the physician, decision-making, improvements in the workplace and use of electronic devices (i.e. telephone and e-mail) when assessing the patient. Considering all 10 items that developed the least, items increased from 0.12 (baseline) to 0.75 (follow-up); 5 of the items increased significantly.

The 10 lowest self-assessed items at baseline concerned direct clinical practice, improvement of the workplace, health promotion and illness prevention and the use of electronic devices

(i.e., telephone and e-mail) when assessing the patient. Among the 10 lowest self-assessed items at baseline, the students increased their clinical competence from 0.36 (baseline) to 2.8 (follow-up). Eight of these items increased significantly.

From the total sample, two groups were extracted. The first group (one-third of the total sample: *n* = 12; total *M*: 7.93; *SD*: 0.49; range: 7.31–8.75) included the students with the highest self-assessed clinical competence at baseline (total *M*: 7.93). The second group (one-third of the total sample: n = 12; total *M*: 5.91; *SD*: 0.46; range: 4.98–6.42) included the students with the lowest self-assessed clinical competence at baseline. The two groups were cohesive in that they both rated eight of the same items as lowest at baseline. Five of these mutual items related to direct clinical practice. Out of all 50 items on the questionnaire, the students in the group with the lowest levels of clinical competence increased the level at which they self-assessed their clinical competence significantly more for 22 items than did the students in the group with the highest clinical competence. A ceiling effect was observed for 14 of the 22 items, but not for the items regarding direct clinical practice. This means that the differences between students with high and low clinical competence levelled out during education; thus, the students became a more homogenous group after completion of their clinical studies.

In a regression analysis with a total mean score of clinical competence at follow-up as the dependent variable, adjusting for clinical competence at baseline, previous clinical work experience as an RN in PHC was a significant predictor. Students with 10 years of work experience within PHC had a 0.35 point higher score for total clinical competence than students without. Further, this variable explained 36.9% of the variance. Working experience as an RN overall (or within specialised areas of health care) and previous education were not significant predictors for total score of self-assessed clinical competence. Thus, the impact of work experience on clinical competence at follow-up was relatively low and appears to be of minor clinical importance.

6.4 Integration of findings

The findings from sub-studies I and III are presented in Table 7. For sub-study I, the mean scores for items on the A and B scales are presented. For the A-scale, the table is organised by whether the students self-assessed their clinical competence as low (*n* = 10), medium (*n* = 30) or high (*n* = 10). For the B-scale, only the mean scores for the highest self-assessed items regarding the need for further training are presented (*n* = 10). For sub-study III, only the A-scale at follow-up is presented with the mean score at follow-up and the mean difference between baseline and follow-up. The A-scale is organised as to whether the students self-assessed their clinical competence as low (*n* = 10), medium (*n* = 30) or high (*n* = 10) at follow-up.

Finally, to integrate the qualitative and quantitative findings of all three sub-studies in this PhD project, I developed a joint display, as described and recommended by McCrudden et al. (2021), shown in Table 8. A joint display is a table or figure that can be used to organise mixed methods analysis and can have an important role in integration and inferential transparency in a mixed methods research study (McCrudden, et al., 2021). In Table 8 I summarise the findings regarding direct clinical practice from sub-studies I, II and III. This joint display communicates the analytic integration of findings from the three sub-studies framed by the Caring APN model (Fagerström, 2021), specifically the core which entails the nurse-patient relationship and direct clinical practice, and different elements of direct clinical practice (i.e. history taking, physical assessment, clinical decision-making, differential diagnosis, medication and medical treatment). Thus, the table 8 is a synthesis of the findings and elements of the Caring APN model. The purpose of the joint display is to convey how the integration maps onto existing theory and how the findings might serve the purpose of extending the theory, as recommended by McCrudden et al. (2021).

Table 7: Sub-study I and III results

PROFFNurse SAS II Items	Sub-study I				Sub-study III		
	Clinical competence (*M*)			Need for further training (*M*)	Clinical competence (*M*: Follow-up and difference)		
	Low	Medium	High	High	Low	Medium	High
1. I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with complicated medical conditions	5.19			7.97			7.31 (+ 1.95*)
2. I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with uncomplicated medical conditions		6.30					8.28 (+1.92)
3. I plan and prioritise nursing and medical interventions		6.96				8.22 (1.33)*	
4. I identify patients' health problems		7.07				8.44 (1.27)*	
5. I assess patients' symptoms		7.40				8.72 (1.36)*	
6. I evaluate and modify patients' medical treatment	5.71			8.21		7.06 (+ 1.32)*	
7. I exclude differential diagnoses when assessing patients' health conditions	5.51			8.14			7.72 (+ 2.11)*
8. I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)	5.37			8.31			7.75 (+ 2.44)*
9. I apply both subjective and objective methods when examining, treating and caring for patients		6.06		7.76			8.33 (+ 2.19)*
10. I utilise medical equipment in an appropriate and accurate manner		7.82				8.81 (0.78)*	
11. I have knowledge of the effects of medication and		6.28		8.14		8.11 (1.55)*	

treatment for the patients I am responsible for							
12. I identify changes in patients' health and medical conditions		7.22				8.56 (1.53)*	
13. I develop and administer health-promoting and illness-preventive actions for patients		5.94					8.11 (2.22)*
14. I systematically gather information from each patient about her/his health resources	5.91			7.67			8.29 (+2.80)*
15. I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for	5.63			8.43			8.25 (2.28)*
16. I generate a creative learning environment for staff at my workplace	5.87			7.54		7.17 (1.31)*	
17. I participate in quality development at my workplace		6.00				6.41 (0.85)*	
18. I take responsibility for competence development at my workplace	5.88					7.06 (1.57)*	
19. I improve routines/systems that fail to meet the needs of patients at my workplace		6.45			6.89 (0.29)		
20. I am actively responsible for my own professional development			8.15		9.03 (0.75)*		
21. I take patients' mental health needs (mood swings, feelings of hopelessness, depression, etc.) into account when assessing and planning for the health and life situation of patients		7.43				8.28 (1.22)*	
22. I take patients' spiritual health needs (feelings of meaninglessness, existential needs, beliefs, fear of death, etc.) into account when assessing and planning for the health and life situation of patients		7.05				7.89 (1.03)*	
23. I take patients' physical health needs (illness, pain, disabilities, etc.) into account when assessing and planning for the health and life situation of patients		7.87				8.58 (0.94)*	
24. I act ethically when caring for patients		7.73				8.83 (1.16)*	
25. I identify and assume responsibility for patients' own		7.01				8.31 (1.25)*	

health resources in planning nursing care							
26. I take patients' social health needs (leisure activities, friends, financial situation, etc.) into account when assessing and planning for the health and life situation of patients		6.02				7.53 (1.62)*	
27. I support and guide patients in mastering their illnesses and health problems		6.96					8.17 (1.64)*
28. I maintain an ethical approach towards my colleagues		7.30				8.14 (1.08)*	
29. I take active responsibility for creating a good working environment			8.16		8.53 (0.47)		
30. I put emphasis on patients' own wishes when assessing and planning for nursing care and medical treatment		7.48				8.50 (1.31)*	
31. I make my own decisions in my work			7.96		8.36 (0.47)*		
32. I take full responsibility for my own actions			8.89		9.33 (0.66)*		
33. I am correct and accurate in speech and writing		7.11				8.39 (1.61)*	
34. I understand the consequences my decisions may have for patients			8.18			9.14 (1.17)*	
35. I experience a division of responsibility between the physician and me as a nurse		7.29			7.56 (0.12)		
36. I cooperate well with the physician			8.23		9.03 (0.50)*		
37. I consult other professional experts when required			8.35			9.08 (0.91)*	
38. I cooperate actively with other health professionals when coordinating patients' nursing, care and treatment			8.08			8.97 (0.97)*	
39. I am cognisant of when my medical knowledge is insufficient when assessing patients' health conditions			8.79		9.11 (0.50)*		
40. I document the steps taken in assessing patients' needs for nursing, care and treatment		7.35				8.56 (1.20)*	
41. I reflect on my actions			8.19			9.00 (1.06)*	
42. I analyse and evaluate my work continuously		7.12				8.69 (1.50)*	

43. I perceive opportunities and have visions for how nursing and clinical paths for patients can be developed		6.98				8.14 (1.36)*	
44. I have a vision of how nursing should be developed at my workplace		7,48		7,55		8.69 (1.55)*	
45. I assess patients' health needs by telephone, e-mail or other electronic devices	5.54					5.96 (1.26)*	
46. I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices	4.58				5.07 (0.36)		
47. I give health promotion and illness preventive recommendations in accordance with national guidelines to patients		6.28					7.49 (1.66)*
48. I have a supportive ongoing dialogue with patients about their needs and wishes		6.87				8.03 (1.43)*	
49. I focus on relatives' need for support and guidance		7.14				8.00 (1.08)*	
50. I report all incidents in accordance with the actual patient safety system		6.71			7.58 (0.44)		

Notes:
The 'medium' columns for sub-studies I and II contain previously unpublished data; the grey-shading indicates an item for which a ceiling effect was observed; $*p < .05$.

Table 8: Direct clinical practice — findings from all three studies

Direct clinical practice	Sub-study	Development identified	Findings
History taking	**I**	Low clinical competence—high need for further training	Item number 14—'I systematically gather information from each patient about her/his health resources'—was one of the 10 lowest-rated clinical competences (A-scale; *M*: 5.91) and one of the top 10 highest-rated items related to need for further training (B-scale; *M*: 7.67).
	II	Partial development found	*Students:* Several students expressed that they could demonstrate the structured history taking of a patient. *Examiners:* The examiners expressed that some students exhibited a strong performance regarding history taking, while others exhibited a weaker performance.
	III	The overall item that increased the most	Item number 14—'I systematically gather information from each patient about her/his health resources'—was the overall item that increased the most between the start of the students' education to completion of their clinical studies (*M* at follow-up: 8.29; *M* increase: 2.80).
Physical assessment	**I**	Low clinical competence—high need for further training	Item number 1—'I am independently responsible for health assessment (systematic physical examination), examinations, and treatment of patients with complicated medical conditions'—(*M*: 5.19) was one of the 10 lowest-rated clinical competences (A-scale) and one of the top 10 items with the highest need for further training indicated (B-scale; *M*: 7.97).
	II	Partial development found	*Students:* Several students expressed that they could demonstrate some physical assessment techniques. However, the students questioned whether they had acquired an advanced level of clinical competence when they had the knowledge behind a technique (e.g., checking reflexes) but had not developed the actual skill to execute the technique. *Examiners:* The examiners expressed that some students showed strong performance in physical assessment, while others exhibited a weaker performance. However, the examiners questioned the students' level of pathophysiology, as they observed that the students did not place the stethoscope in the correct places when assessing the abdomen of the simulated patient.

	III	The 7th most increased item	Item number 1—'I am independently responsible for health assessment (systematic physical examination), examinations, and treatment of patients with complicated medical conditions' (*M* at follow-up: 7.31; *M* increase: 1.95) was among the top 10 items that increased the most.
Clinical decision-making	**I**	Low clinical competence—high need for further training	Item number 8—'I interpret, analyse, and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)'—(*M*: 5.37) was one of the 10 lowest-rated clinical competences (A-scale) and one of the top 10 items with the highest need for further training indicated (B-scale; *M*: 8.31).
	II	Little development found	*Students:* Making decisions was experienced by the students as the most difficult task to demonstrate during the OSCE. *Examiners:* The examiners expressed that only a few students were able to combine knowledge of pathology and findings from the physical assessment to demonstrate clinical decision-making during the OSCE.
	II	The 2nd most increased item	Item number 8—'I interpret, analyse, and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)'—(*M* at follow-up: 7.75; *M* increase: 2.44) was among top 10 items for which students' ratings increased the most.
Differential diagnoses	**I**	Low clinical competence—high need for further training	Item number 7—'I exclude differential diagnoses when assessing patients' health conditions'—(*M*: 5.51) was found to be among the 10 lowest-rated clinical competences (A-scale) and among the top 10 items with the highest need for further training indicated (B-scale).
	II	No data identified	The students were expected to compile a differential diagnosis according to the OSCE checklist, but no relevant data pertaining to the students' and examiners' experiences was published in the study.
	III	The 6th most increased item	Item number 7—'I exclude differential diagnoses when assessing patients' health conditions'—(*M* at follow-up: 7.72; *M* increase: 2.11) was among the top 10 items for which students' ratings increased the most.
	I	Low clinical competence—the highest need for	Item number 15—'I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for'—was one of the 10 lowest-rated clinical competences (A-scale; *M*: 5.37) and was at the top of the

Medication		further training	list of the top 10 items for which the students indicated the highest need for further training (B-scale; *M*: 8.43).
	II	No data identified	The students were expected to assess the patient's medical history (drugs, medications and prescriptions) according to the OSCE checklist, but no relevant data on the students' and examiners' experiences was published in the study.
	III	The 3rd most increased item	Item number 15—'I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for'—(*M* at follow-up: 8.25; *M* increase: 2.28) was among the top 10 items for which the students' ratings increased the most.
Medical treatment	**I**	Low clinical competence—high need for further training	Item number 6—'I evaluate and modify patients' medical treatment'—was one of the 10 lowest-rated clinical competences (A-scale, *M*: 5.71) and was at the top of the list of the top 10 items for which the students indicated the highest need for further training (B-scale; *M*: 8.21).
	II	No data identified	Medical treatment was beyond the scope of the OSCE.
	III	Not found among the students' most developed clinical competence areas	Item number 6—'I evaluate and modify patients' medical treatment'—(*M* at follow-up: 7.06; *M* increase: 1.32) was not among the top 10 items for which students' ratings most increased.

7 DISCUSSION

The overall aim of this PhD project was to investigate the development of clinical competence in advanced practice nursing students following an NP model. The aim of sub-study I was to (a) describe and analyse the self-assessment of clinical competence and the need for further training and (b) analyse possible predictive variables in self-assessments among advanced practice nursing students, at the beginning of their education. The aim of sub-study II was to explore and describe NP students' and examiners' experiences with the OSCE, at the end of their first year of education, in order to further improve assessments for clinical competence in NP education. The aim of sub-study III was to analyse the development of NP students' self-assessed clinical competence from the beginning of their education (baseline) to after completing their clinical studies (follow-up).

The findings of sub-study I show that at the beginning of their education, the students self-assessed their clinical competence regarding responsibility and cooperation as high but assessed their direct clinical practice competence at lower levels. The findings indicate a cohesion between the areas in which the students self-assessed their clinical competence at the lowest levels and the areas in which their self-assessed need for further training was greatest. Work experience and previous higher education were found not to be significant predictors of the total self-assessment score for either clinical competence or the need for further training. The findings in sub-study II reflect that the students and examiners experienced the OSCE as an appropriate method of assessment for advanced practice clinical competence but that they also experienced some challenges regarding the exam in terms of preparing for the OSCE, the process of the OSCE and assessment and demonstrating clinical competence at an advanced level. The findings in sub-study III indicate that the students developed their self-assessed clinical competence most in the area of direct clinical practice. However, the findings are inconclusive as to whether the students developed their self-assessed clinical competence regarding consultation, coaching and guidance and collaboration. Further, the results point to a lack of development regarding clinical leadership in the student's workplace. Previous higher education was not proven to be a significant predictor of clinical

competence development, while previous work experience in PHC was a significant, but minor, predictor.

This chapter presents a discussion that addresses the following considerations: Based on the Caring APN model (Fagerström, 2021) and relevant previous research findings and literature, what self-assessed clinical competence did the advanced practice nursing students develop? Based on andragogical assumptions and relevant previous research findings and literature, why did the advanced practice nursing students develop their self-assessed clinical competence, or, conversely, why did they not develop it? How did the methodological choices in the study impact the research findings related to the advanced practice nursing students' development of self-assessed clinical competence? Lastly, following the discussion, this final thesis concludes with the implications of this research for education and recommendations for further research.

The following discussion is based on the results presented in Chapter 6, Tables 7 and 8. In addition, the discussion is also based on my review of the connection between the PROFFNurse SAS II and the Caring APN model (Fagerström, 2021) (Appendix 12). The review can be considered an operationalisation of the instrument based on the Caring APN model by reviewing the items in the instrument and placing them within the core and one of the eight core competency domains of the Caring APN model. This review is not to be understood as a validation of the instrument, but rather as what Polit and Beck (2020, p. 737) describe as the operationalisation process of "translating research concepts into measurable phenomena". The reason behind this choice is, first, that PROFFNurse SAS II has not yet been psychometrically tested, and underlying dimensions (sub-scales) from the first factor analysis have therefore not been reconfirmed. Second, Chapter 6 presents the item-level results, and it is challenging to get an overall understanding of the results on an aggregated clinical competence domain level. Thus, I review the connection between the PROFFNurse SAS II and the Caring APN model to aggregate item-level results and known theoretical terms as described in the Caring APN model. In the discussion, the results are related to the core of the Caring APN model and all eight domains from all three sub-studies.

While PROFFNurse SAS II does not include underlying dimensions (sub-scales), its predecessor, PROFFNurse SAS I, was validated with factor analysis that resulted in six dimensions which were found to be supported by the theoretical framework of both the Nordic and Caring APN models (Fagerström, 2011; 2021; Finnbakk, et al., 2015). I did consider using the sub-scales from the validated instrument PROFFNurse SAS I, as in the study by Willman et al. (2020). However, I found that some of the sub-scales would be represented with few items; in addition, PROFFNurse SAS II include six new items which I was unsure how to place within the original subscales from PROFFNurse SAS I. I found that doing my own review would give me the freedom to explore and reflect on how the PROFFNurse SAS II was supported by the theoretical framework of the Caring APN model and thus contribute to highlighting the results from sub-studies I and III on the clinical competence domain level.

7.1 Caring APN model and clinical competence development

This chapter discusses the findings of the current research project based on the Caring APN model (Fagerström, 2021) and in relation to previous research and literature to explore what areas of clinical competence the advanced practice nursing students developed during their education. I first address findings that relate to the core of the Caring APN model and then discuss their development in relation to the eight core competency domains.

7.1.1 The core of the Caring APN model

The Caring APN model is illustrated using the analogy of a boat engine, where the nurse–patient relationship is the core of the model and can be understood as its 'motor', and the core competencies are the model's 'propeller blades' (Fagerström, 2021). The illustration represents how theoretical perspectives of the nurse–patient relationship determines the quality and outcomes of nursing. The placement of the nurse–patient relationship is in line with recommendations that followed previous research on NP education that suggested students be taught medical content while maintaining the caring foundation of nursing to become autonomous practitioners (Ljungbeck et al., 2021). *Ethos*, a person-centred fundamental ethical attitude, is one of the four theoretical perspectives of the nurse–patient relationship,

where *virtue as a force* is a central concept (Fagerström, 2021). *Virtue as a force* refers to the APN's desire to take greater independent responsibility for a patient's care and treatment, which is a character trait that indicates moral goodness based on a clear value base (Fagerström, 2021).

In sub-study I, at the beginning of their education, the students top 10 items of self-assessed clinical competence included their ability to take responsibility and cooperate with other healthcare professionals (table 7). This finding agrees with those gleaned from analysing self-assessments of RNs in master's and postgraduate programmes from Iceland, the Netherlands, Sweden, Norway and the United Kingdom at the end of their education (Wangensteen et al., 2018). The mean age of the students who participated in this PhD project was approximately 40 years old, and the majority had considerable working experience as RNs. I expected the students to be more knowledgeable and experienced compared to nursing students in a bachelor's programme whom I had taught before becoming a PhD candidate. Nevertheless, I was surprised by a clear character trait that was evident in the students: the bravery to seek out greater responsibility by pursuing a role as a nurse on an advanced practice level. In their study with Swedish APN students, Bergström and Lindh (2018) found that the desire to have greater responsibility was one of their reasons for enrolling in the programme. The ICN (2020) guidelines portray NPs as able to take full clinical responsibility and management of their patient population; thus, it is essential that NP students have personal characteristics that reflect a willingness to accept responsibility by being accountable for their actions. Personal characteristics have been shown to be the most important prerequisites to pursuing an advanced practice nursing education among NP students in the United States (Crosby et al., 2003) and were deemed important factors in the degree to which an APN can promote or prohibit the development of the role in Finland (Wisur-Hokkanen et al., 2015). In the context of the concept of *virtue as a force,* the findings of this research indicate that the students fulfilled the necessary prerequisites to develop clinical competence in their future advanced practice nursing roles.

Fagerström's Caring APN model (2021) includes person-centredness as a fundamental ethical attitude towards the patient. The OSCE checklist used in sub-study II included the criterion "ascertains patient's belief/concerns". While the checklist is relevant for assessing compassion in a nurse–patient relationship, it did not include criteria for involving the simulated patients in a shared decision-making process in line with a person-centred approach (McCormack et al., 2021). In an editorial, Dewing and McCormack (2017) warn against oversimplifying the concept of person-centredness by asking the patient "What matters to you?" without addressing how to respond meaningfully and authentically to their answers. This oversimplification ignores how nurses can facilitate choices and preferences, and develop, maintain, and sustain compassionate relationships in practice contexts. Thus, the results from sub-study II indicate that it was unclear if OSCE as an examination strategy could assess the person-centredness of the NP students' approach to the patient.

This PhD thesis builds on a holistic definition of clinical competence by Cowan et al. (2005) that includes a complex combination of knowledge, performance, skills, values and attitudes. An interesting question is whether OSCE is suitable to assess clinical competence from a holistic perspective. The findings in sub-study II show that there is a strong focus on knowledge, performance, and skills and less focus on values and attitudes. In medical and nursing education, there have been calls to develop OSCE to assess person-centredness (Moore et al. 2021; Tullo et al. 2018). Attempts have been made to do so in medical education, including by involving standardised patients in assessment based on their personal experience and their reflections on societal expectations of doctors (Johnston et al. 2013). To my knowledge, there is a lack of research on how to develop OSCE in line with person-centredness, which is an essential perspective in holistic clinical competence in nursing education.

7.1.2 Advanced practice nursing students' development of direct clinical practice

The Caring APN model comprises eight core competencies: direct clinical practice, ethical decision-making, coaching and guidance, consultation, cooperation, case management, research and development and leadership (Fagerström, 2021). Direct clinical practice is the most important of all the core competencies in the Caring APN model (Fagerström, 2021).

Hamric and Tracy (2019) described direct clinical practice as a central competency that informs all other core competencies. The ICN (2020) guidelines and the APN model refer to direct clinical practice as the central competency of an APN. The following discussion is based on the findings shown in Table 8.

History taking

At the beginning of their education, as discovered in sub-study I, the students self-assessed history taking as one of their lowest areas of clinical competence, but it was revealed to be their most developed self-assessed clinical competence in sub-study III (Table 8). History taking involves collecting the patient's chief complaint and current general condition and situation and then using that information as a foundation for the physical assessment (Bickley et al., 2020). Previous research has shown that the information collected from the patient's history taking is highly relevant for making medical diagnoses. Hampton et al. (1975) found that for 66 patients (82.5%), history taking led to the final diagnosis. Their research was groundbreaking in highlighting the importance of history taking and has since been broadly cited. Though their study was criticised because physicians were allowed to read referral letters before performing the history taking process, similar findings were reported – more specifically, that the information gathered from a physician's history taking led to a relevant diagnosis for 56%–78.58% of the patients assessed (Peterson et al., 1992; Roshan & Rao, 2000; Sandler, 1980). Keifenheim et al. (2015) found that the best teaching method for developing history taking skills for medical students was small group workshops, including role-play and interviews with real patients, followed by feedback and discussion focused on students' interviewing skills rather than on a differential diagnosis. These research findings are similar to the findings of sub-study II, in which the students found role-playing beneficial to preparing for the OSCE.

Physical assessment

At the beginning of their education, the students also self-assessed physical assessments as one of their lowest areas of clinical competence, according to the findings of sub-study I, but it became one of the top 10 areas in which students' self-assessed clinical competence developed, according to the results of sub-study III (Table 8). Physical assessment involves

evaluating anatomic findings through observation, palpation, percussion and auscultation (Bickley et al., 2020). Physicians and RNs have traditionally different but overlapping focuses related to physically assessing patients (Wallström & Ekman, 2018). While physicians are trained to assess various objective disease markers, RNs often focus on the patient's subjective experiences with their illness and how it affects their well-being and daily life (Wallström & Ekman, 2018). A good example of how NPs can become complementary in the provision of health care can be found in a narrative study of NP students' holistic approach to history taking and physical assessment (Brykczynski, 2012). An NP student discovered a tumour in a patient that a physician had not discovered, not because the student was more proficient but because the student asked for information in a different way than the physician did, which led the patient to reveal information that was relevant to discovering the tumour (Brykczynski, 2012).

Clinical decision-making

Clinical decision-making was another clinical competence that the advanced practice nursing students self-assessed as being at the lowest level at the beginning of their education in sub-study I that also became one of the top 10 areas of self-assessed clinical competence that the students developed in sub-study III (Table 8). Clinical decision-making, which begins at the outset of the patient encounter, involves determining factors that may explain the patient's concerns and identifying the findings, problems and diagnoses (Bickley et al., 2020). Tiffen et al. (2014, p. 400) developed the following definition of clinical decision-making for the NP role: 'Clinical decision-making is a contextual, continuous, and evolving process, where data are gathered, interpreted and evaluated to select an evidence-based choice of action'. Though care that is not evidence-based is likely both unethical and incompetent (Vincent et al., 2015), clinical decision-making is not based on explicit, robust evidence alone (Bucknall, 2012). NPs are expected to integrate research on evidence-informed guidelines into their practice (Vincent et al., 2015); however, the findings from sub-study II indicate that few NP students could demonstrate clinical decision-making, most likely because of the complexity of the reasoning skill. According to Miller's (1990) framework for clinical assessment, clinical decision-making is a process that takes place in the mind and is, therefore, challenging to measure at an action or performance level. Nevertheless, clinical decision-making skills are important for utilising the

findings from the history taking and physical assessment to establish a diagnosis and determine medication and further treatment (Bickley et al., 2020).

Differential diagnosis

Differential diagnosis was another clinical competence that the students self-assessed at the lowest level at the beginning of their education, as reported in sub-study I (Table 8). Sub-study II did not include findings related to developing differential diagnoses. However, the differential diagnosis was included in the OSCE checklist, thus, the absence of data can indicate a lack of student development. Nevertheless, the ability to compile a differential diagnosis became one of the most developed areas of competence uncovered in sub-study III, according to students' self-assessments. Completing a differential diagnosis involves developing a list of potential causes of the patient's problems (Bickley et al., 2020). While the authority to diagnose is included in the definition of an NP in the ICN (2020) guidelines, it is also a component governed by regulations in each country that supports the NP role. Even though a body of research exists that has confirmed NPs'/APNs' contributions for a broad range of patient conditions (Allsop et al., 2021; Chavez et al., 2018; Landsperger et al., 2016; Laurant et al., 2018; Martinez-Gonzalez et al., 2014; Swan et al., 2015), a diagnostic error can threaten patient safety. In the United States, the NP education has been criticised for a lack of consensus regarding advanced diagnostic and procedural skills to those used in clinical practice (Schallmo et al., 2019). Also in the United States, Rugen et al. (2018) found that NP students or newly graduated NPs in residents' programmes viewed themselves as having good basic skills in history taking and physical assessment, but they wanted to improve their skills related to completing differential diagnoses. The regulation of NPs in Norway does not give them the authority to make a diagnosis. However, if the NP role in Norway in the future evolves to include diagnostic authority, it would be advisable to include the Norwegian Medical Association and the Norwegian Nursing Association subject groups to be involved in establishing guidelines related to the APN's diagnostic authority, in collaboration with the regulations of the APN's scope of practice (Norwegian Ministry of Education and Research, 2020a).

Medication

As sub-study I demonstrated, at the beginning of their education, the students self-assessed improved knowledge about medication interactions and side effects as one of their lowest areas of clinical competence, but evidence from sub-study III (see Table 8) revealed this competence to be highly developed after the students concluded their clinical studies, according to their self-assessments. Prescribing medication is included in Fagerström's (2021) vision of the APN role in developing clinical autonomy. Previous research has uncovered evidence supporting the assignment of prescription authority to NPs and has documented NPs with similar prescriptive practices as physicians in the treatment of urinary tract infections in an emergency department setting in the United Arab Emirates (O'Neill et al., 2020). Additionally, data from the New Zealand Ministry of Health pharmaceutical collection indicate that NPs in New Zealand prescribe potentially inappropriate medicines at lower rates than other prescribers (Poot et al., 2020). However, as with diagnostic authority, the prescribing authority is another component of the NP's role that is governed by national regulations (ICN, 2020). Moreover, a discussion on methods for ensuring safe practices is paramount to the broader discussion on granting NPs the authority to prescribe medication, as the World Health Organization (2017) has reported that the leading cause of avoidable harm in healthcare systems across the world is unsafe medication practices and medication errors. In the guidelines on prescriptive authority for nurses, the ICN calls upon governments to ensure appropriate levels of education and regulations to safeguard the healthcare system (ICN, 2021). If the future NP role in Norway evolves to include prescriptive authority, it would again be advisable to include the Norwegian Medical Association and the Norwegian Nursing Association subject groups to be involved in establishing guidelines related to APNs' prescriptive authority, in collaboration with the regulations of the APN's scope of practice (Norwegian Ministry of Education and Research, 2020a). Aside from the discussion pertaining to NPs' prescriptive authority, the finding that, according to their self-assessments, the students' competence related to knowledge about medications improved is encouraging, as previous research has highlighted that RNs in hospitals and nursing homes lack the necessary pharmacological knowledge, which poses a significant risk for medication errors (Andersson et al., 2018; Simonsen et al., 2011).

Medical treatment

Evaluating and modifying medical treatment was another clinical competence for which the advanced practice nursing students assessed themselves at the lowest level at the beginning of their education and was also the area in which they acknowledged their greatest need for further training, as revealed in sub-study I. However, this was not among the clinical competences that showed the most development in sub-study III, according to the students' self-assessments (Table 8). The lack of development can be understood as a reflection of where we are in the process of evolving the NP role in Norway. With reference to Fagerström's (2021) definition of APNs and the ICN's (2020) definition of NPs, for an NP to be able to independently evaluate and modify patients' medical treatment, regulations of the scope of practice is essential to APNs' ability to develop as autonomous practitioners. Barnes et al. (2017), who found varying levels of scope for practice regulations in the United States, indicated that practice restrictions reduce NPs' participation in primary care. Though both the APN role and a master's education are regulated by law in Norway, advanced practice nursing students are on a path characterised by a double-edged sword: on one hand, they have entered a credentialed master's education programme, but on the other hand, they graduate as APNs without the authority for an expanded scope of practice. The ICN (2020) guidelines acknowledge that many countries are in different stages of developing advanced nursing roles and that the potential for the role is shaped within the specific country. Norway is in the early stages of advanced practice nursing development, and further policy changes can be discussed as the APN role matures. Examples of potential collaborations with the Norwegian Medical Association and the Norwegian Nursing Association subject groups for advanced practice nursing have been given to ensure safe practices as part of the future development of the APN role. In addition, several established protocols for ensuring safe practices are described in published international research that can be adopted, such as the requirement for renewed advanced practice nursing licenses that encompasses practice requirements, continuing education, portfolios and/or examinations (Pulcini et al., 2010).

7.1.3 Ethical decision-making

The ICN (2020) guidelines state in their assumptions that an APN should be able to explain and apply ethics in the context of advanced practice nursing. The national guidelines for the master's education in advanced practice nursing do not explicitly mention ethical decision-making but emphasise APNs' competence to protect the co-determination and autonomy of patients, relatives and other healthcare consumers, which is relevant to ethics in practise (Norwegian Ministry of Education and Research, 2020b). To return to Aristotle's view of practical wisdom as the highest intellectual virtue, I find the ICN (2020) guidelines to be scarce in their integration of ethical decision-making in the overall clinical competence requirements for APNs. The lack of the explicit integration of ethical decision-making in the ICN (2020) guidelines and in the national guidelines for a master's education may indicate the lack of a holistic view of clinical competence as defined by Cowan et al. (2005) or that ethical decision-making is not addressed explicitly because it is assumed to be integrated in ethical practice standards in line with the ICN (2012) code of ethics for nurses.

According to Fagerström (2021), previous research on ethics in nursing typically explored ethical approaches but paid little attention to ethical decision-making. A review of the items in the PROFFNurse SAS II with respect to the Caring APN model did not reveal items explicitly concerning ethical decision-making (Appendix 12). Two items explicitly referring to taking an ethical approach were found: Item 24, 'I act ethically when caring for patients', and Item 28, 'I maintain an ethical approach towards my colleagues'. Other items were found to be in line with the ICN (2012) code of ethics for nurses, including Item 33, 'I am correct and accurate in speech and writing', and Item 42, 'I analyse and evaluate my work continuously'. The items are related in that they are all associated with the element of ethical decision-making pertaining to *knowledge development* but not *knowledge application*, which is described in the Caring APN model and Hamric's APN model (Fagerström, 2021; Wocial, 2019). Knowledge development pertains to gaining knowledge of ethical principles and represents the foundation of ethical decision-making, whereas the next element in ethical decision-making – knowledge application – involves moral actions when faced with clinical challenges (Fagerström, 2021; Wocial, 2019).

Allmark (2017) criticised nursing education schemes when they adopt what he calls quasi-virtues (such as compassion, care and courage) without a related goal and, thus, end up with an ethic that is conceptually adrift. He argued that this modern take on Aristotle's virtue ethic will only lead to a circularity where 'ethically correct action is said to be that which would be chosen by the virtuous person, but the virtuous person is one who would choose to do what is ethically correct' (Allmark, 2017, p. 2). The author argued for an approach to ethics in practice, education and research according that calls for asking whether decisions are situated within a framework of human flourishing (good health and good function) (Allmark, 2017). I, therefore, contend that Item 34, 'I understand the consequences my decisions may have for patients,' is highly relevant to implications for ethical decision-making. Two other items regarding patient wishes and safety can also be viewed as including components of ethical decision-making; Item 30, 'I put emphasis on patients' own wishes when assessing and planning for nursing care and medical treatment', and Item 50, 'I report all incidents in accordance with the actual patient safety system'. However, the items were all found in the medium- to high level range of clinical competence for sub-studies I with a medium development with an observed ceiling effect for all of the items in sub-study III (table 7).

7.1.4 Coaching and guidance

Coaching and guidance are not explicitly mentioned in the ICN (2020) guidelines. However, both aspects describe disease prevention and health promotion, which are concepts associated with the competency domain of coaching and guidance in the Caring APN model (Fagerström, 2021). The national guidelines for the advanced practice nursing master's education underscore the APN's knowledge and skills pertinent to disease prevention and health promotion interventions (Norwegian Ministry of Education and Research, 2020). The coaching and guidance domain can be understood as having two distinct applications: coaching is focused on the patient's goals and how to reach them, whereas guidance is focused on the APN as the expert in the competency domain of direct clinical practice who, thus, advises or educates the patient (Fagerström, 2021).

My understanding is that Item 27, 'I support and guide patients in mastering their illnesses and health problems', is mainly an aspect of coaching, while Item 47, 'I give health promotion and illness preventive recommendations in accordance with national guidelines to patients', mainly links to guidance (Appendix 12). The students self-assessed their clinical competence relative to each item at a medium level, and these items were notably among those related to the areas of self-assessed clinical competence that were found to be most developed in sub-study III (table 7). However, the results from sub-study III for Item 48, 'I have a supportive ongoing dialogue with patients about their needs and wishes', and Item 49, 'I focus on relatives' need for support and guidance', indicate that students had self-assessed their clinical competence in the area to be medium developed, where a ceiling effect was observed.

Results from prior research showed that in a randomised controlled trial involving 92 patients with chronic hepatitis C who smoked, the intervention group who had telephone counselling with NPs smoked almost six fewer cigarettes peer day than the control group after twelve weeks (Reid et al., 2020). According to the World Health Organization (2018), noncommunicable diseases (where cardiovascular diseases are the major diagnosis) lead to 71% of all deaths globally. This international public health agency claimed that these diseases result from a combination of genetic, physiological, environmental and behavioural factors, where tobacco use, physical inactivity, harmful use of alcohol and unhealthy diets are the four major risk factors. Therefore, APNs must improve their clinical competence by developing their guidance and counselling skills to meet the global population's need for health care services.

7.1.5 Consultation

The ability to provide consultant services to other healthcare professionals is recognised by the ICN (2020) guidelines as within the NP's scope of practice. Furthermore, consultation is described in the literature as an independent, autonomous function of NPs/APNs (Chan et al., 2020; Kutzleb et al., 2015; Sastre-Fullana et al., 2014). However, national and state regulations can impact APNs' consultation activities (Pearson, 2019). The Norwegian national guidelines for the advanced practice nursing master's education encompass an element of independence in the APN's scope of practice but also emphasise that an APN shall practice in close collaboration

with physicians and other healthcare personnel (Norwegian Ministry of Education and Research, 2020b).

In the Caring APN model, consultation is centred around either the client, the consultee or the programme (Fagerström, 2021). In the review of the PROFFNurse SAS II in connection with the Caring APN model, items concerning client- and consultee-centred consulting, but not programme-centred consulting, were identified (Appendix 12). The findings on the items related to the direct clinical practice of assessing the patient concern client-centred consulting and are covered in Section 7.1.2. Items 21, 22, 23 and 26 pertain to the indirect care of considering the patient's mental, spiritual, physical and social health needs when assessing and planning for the patient's health and life situation. These items can be viewed as representing a holistic assessment of the patient that is in line with the core of the Caring APN model of the nurse–patient relationship (Fagerström, 2021). The students self-assessed their performance on all these items at the medium-level range in sub-study I, while the results for sub-study III show they self-assessed their competence in this area to have a medium development, with a ceiling effect observed for items 21, 22 and 23 (table 7).

According to Fagerström (2021), a consultee-centred consultation is necessary during the phase of APN role development when the APN role is initially introduced to establish trust. In addition, consultation with a physician or with other healthcare team experts is an integral part of an APN's development, as it enables them to validate their assessment of their patient (Kutzleb et al., 2015; Pearson, 2019). Item 37, 'I consult other professional experts when required', was among the items for which the students self-assessed their clinical competence at the highest levels in sub-study I. However, results for this item reflected medium developed of this clinical competence in sub-study III, with an observed ceiling effect. Item 39, 'I am cognisant of when my medical knowledge is insufficient when assessing patients' health conditions', is important in the context of consultee-centred consultation, as it indicates APNs' attentiveness to their own weaknesses, which is an important characteristic because it is vitally important that APNs know when to ask for help. The students self-assessed their clinical competence related to this item within their highest level of competence in sub-study I, but it

was among the least developed self-assessed clinical competences according to the findings in sub-study III; however, a ceiling effect was observed (table 7).

7.1.6 Cooperation

APNs' ability to provide support to other healthcare professionals and to engage in professional collaborative activities is recognised in the 'Advanced Practice Nursing Characteristics' section on the *nature of practice* in the ICN (2020) guidelines. In addition, the ICN (2020) guidelines' position on the NP's scope of practice includes that NP practices encompass a broad level of autonomy, critical decision-making and cooperation with other healthcare professionals, which also can be found in the Norwegian national guidelines for the master's education in advanced practice nursing (Norwegian Ministry of Education and Research, 2020b). The Caring APN model highlights the importance of the APN's ability to effectively collaborate with other healthcare personnel and with patients to realise better treatment outcomes and greater patient satisfaction with treatment (Fagerström, 2021).

In the review of the PROFFNurse SAS II in relation to the Caring APN model, three items concerning the aspects of the collaboration domain were identified (Appendix 12). Item 36, 'I cooperate well with the physician', was found to be among the highest of students' self-assessed clinical competence areas in sub-study I and among their least developed in sub-study III (table 7). However, a ceiling effect was also observed. Item 35, 'I experience a division of responsibility between the physician and me as a nurse', was found to be an aspect of clinical competence that students self-assessed at the medium-level in sub-study I and, like Item 36, was among the least developed clinical competence in sub-study III, but without an observed ceiling effect. Item 38, 'I cooperate actively with other health professionals when coordinating patients' nursing, care and treatment', was among the students' highest level of clinical competence in sub-study I but moved to being medium develop in sub-study III. It is interesting that the results for Item 38, which includes the term 'other health professionals', show a medium-level development, whereas items concerning the physician were lower developed (table 7).

As stated in Section 7.1.5, physicians are vital to consultee-centred consultations for the validation of health assessments. Thus, cooperation and division of responsibility between physicians and nurses represent important aspects of sharing power to achieve the common objective of patient care, as described in the Caring APN model (Fagerström, 2021) and Hamric's APN model (Carter et al., 2019). However, the results from this PhD project indicate a lack of clear boundaries between the nurse and physician in their collaboration. The Norwegian Medical Association supported the establishment of a master's educational programme but expressed concerns about role ambiguities (The Norwegian Medical Association, 2019). In addition, lack of role clarity for APNs has been reported as a barrier to role implementation (Donald et al., 2010). Moving forward, advanced practice nursing students must have role models in the clinical field to support an awareness of what to expect of the APN's scope of practice in Norway, which is a recommendation in line with those that resulted from previous research on the NP education in the United States (Roberts et al., 2017) and Canada (Staples & Sangster-Gormley, 2018).

7.1.7 Case management

Case management is described as 'managing one's own caseload at an advanced level' (ICN, 2020, p. 6) and is recognised in the 'Advanced Practice Nursing Characteristics' section on the *nature of practice* in the ICN (2020) guidelines. While case management is not explicitly mentioned in the ICN (2020) guidelines regarding the NP's scope of practice, it is described in the context of the CNS role. The Norwegian national guidelines for the master's education in advanced practice nursing state that an APN shall contribute to clinical pathways, where the patient and their relatives are taken care of and transitioned to safe, effective and coordinated services (Norwegian Ministry of Education and Research, 2020b).

Of the eight core competency domains, I found case management to be the most challenging to identify when reviewing the PROFFNurse SAS II with respect to the Caring APN model (Appendix 12). Fagerström (2021) asserted that case management is an ambiguous term because it overlaps with the core competency domains of collaboration, consultation and research for managing patient pathways. Case management in nursing has been shown to

bridge health systems in PHC (Putra & Sandhi, 2021) and to contribute to reductions in hospital use (Joo & Liu, 2017). A randomised controlled trial with 281 patients under nurse-led case management demonstrated significant decreases in hospital readmission rates within 84 days of the patient's discharge (Chow & Wong, 2014).

Based on my review of the PROFFNurse SAS II in relation to the Caring APN model (Appendix 12), I deemed Item 43, 'I perceive opportunities and have visions for how nursing and clinical paths for patients can be developed', to be the item that most closely aligned with the case management competency. The students initially self-assessed their clinical competence in these areas at the medium-level, as the results of sub-study I indicate, and as medium developed according to the sub-study III findings (table 7). Students also self-assessed their clinical competence to be at the medium-level in relation to Item 25, 'I identify and assume responsibility for patients' own health resources in planning nursing care', and to Item 40, 'I document the steps taken in assessing patients' needs for nursing, care and treatment'; sub-study III showed they were medium developed with an observed ceiling effect for Item 25. Though these two items have been deemed relevant to case management, they do not reflect the full scale of the clinical competence to coordinate health care services between institutions and authorities.

All competency domains in the Caring APN model involve some form of direct clinical practice and indirect nursing; the case management is among the domains that include the most indirect nursing. In addition, the possibility for NP/advanced practice nursing students to develop the case management competence can depend upon a certain level of integration of the role. Henni's (2020) doctoral dissertation revealed the need for a consensus at the workplace regarding the advanced geriatric nurse's (AGN's) role and scope of practice as part of external factors to promote the integration of AGNs. Thus, collaboration between research, education and the clinical field on the integration of the role is important to finding new APN models that are case management specific to the Norwegian health care context.

7.1.8 Research and development

APNs' ability to integrate research findings, here defined as evidence-based practice, is recognised in the 'Advanced Practice Nursing Characteristics' section on the *nature of practice* in the ICN (2020) guidelines. The position of the ICN (2020) guidelines on the NP's scope of practice includes an integration of education, research and leadership that focuses on direct clinical practice at an advanced level. The national guidelines for the master's education in Norway documents that an APN shall contribute to carrying out development and improvement efforts based on relevant professional knowledge and research, user knowledge and experiential knowledge (Norwegian Ministry of Education and Research, 2020b).

The review of the PROFFNurse SAS II in connection with the Caring APN model showed that the items related to research and development represented, first and foremost, professional development and quality development rather than explicit evidence-based practice (Appendix 12). Thus, I conclude that the PROFFNurse SAS II contains too few items explicitly related to the evidence-based practise of the skills needed to understand research, unitise data and participate in research.

Three items covered the students' involvement in competence development at their workplace, which is an important element of the development of APN practices (Fagerström, 2021; Gray, 2019). Item 16, 'I generate a creative learning environment for staff at my workplace', was among the students' least advanced areas of clinical competence and areas of greatest need for further training in sub-study I, with a medium development reflected in sub-study III (table 7). Students self-assessed their clinical competence related to Item 17, 'I participate in quality development at my workplace', at a medium-level point in sub-study I, and it was shown to be medium developed in sub-study III. Item 18, 'I take responsibility for competence development at my workplace', was among the students' lowest self-assessed clinical competence in sub-study I, with a medium development exhibited in sub-study III. The items can be viewed as associated with the autonomy to lead a change through competence development in the student's workplace. Though none of the items was highly developed, the finding that they were medium developed was encouraging, considering that students' self-

assessed their clinical competence relative to two of the items to be among their lowest at the beginning of the student's education (table 7).

In the Caring APN model, an organisation's structure and culture are critical contextual factors in the development of the APN role (Fagerström, 2021). Gerrish et al. (2012) conducted a study of 23 APNs from hospitals and primary care in the United Kingdom. Their findings pertain to both individual factors related to APNs and critical contextual factors. They found that the personal attributes of APNs; the support provided by managers and medical colleagues; APN role specifications; and the organisational context, including the organisational culture, influenced the APN's ability to promote evidence-based practice. The research paper concluded that educational preparation for APNs should enable them to develop interpersonal and leadership skills (Gerrish et al., 2012). The findings by Gerrish et al. (2012) illustrate the overlapping competences of the research and development domain and the leadership domain in the Caring APN model (Fagerström, 2021) and how the development processes for the two domains are intertwined.

7.1.9 Leadership

APNs' ability in leadership and clinical management is recognised in the 'Advanced Practice Nursing Characteristics' section of the ICN (2020) guidelines that focuses on the *nature of practice*. In addition, the ICN (2020) guidelines standpoint on the NP's scope of practice adopts a view of NPs as clinical leaders who can influence health service delivery and the wider profession. The leadership dimension of the role is embedded in the national guidelines for a master's education in advanced practice nursing in Norway (Norwegian Ministry of Education and Research, 2020b), following the national policy and competency standards regarding NP/advanced practice nursing education in, for example, Australia, England, the United States and South Africa (Health Education England, 2017; National Organization of Nurse Practitioner Faculties, 2017; Nursing and Midwifery Board of Australia, 2018; South African Nursing Council, 2005).

The review of the PROFFNurse SAS II with respect to the Caring APN identified four items regarding the students' development of leadership skills in their workplace (Appendix 12). One item illustrated that the students found leadership as a need for further training. Item 44, 'I have a vision of how nursing should be developed at my workplace', was self-assessed by the students as a medium-level clinical competence and an area of greatest need for further training in sub-study I, with a medium development demonstrated in sub-study III (table 7). However, three items illustrated a possible lack of development. Neither the results for Item 19, 'I improve routines/systems that fail to meet the needs of patients at my workplace', nor those for Item 29, 'I take active responsibility for creating a good working environment', demonstrated a significant increase in sub-study III. The students' self-assessed competence levels related to Item 31, 'I make my own decisions in my work', increased significantly; however, results indicated the level of development was minor (table 7). As no ceiling effect was observed, the findings indicate that the students perceived themselves to lack autonomy as a practitioner in their APN role and to lack the ability to lead change at the workplace.

Leadership at a system level includes the indirect nursing practice of recognising systems that can be improved (Carter & Reed, 2019; Fagerström, 2021). The national guidelines for a master's education in advanced practice nursing declare that an APN shall contribute to innovation, change, improvements and user participation at the individual and system level (Norwegian Ministry of Education and Research, 2020b). The findings in this PhD project that the students' lack leadership development relates to two aspects of leadership. First, as leadership has been found to be one of the lowest self-assessed competences among graduating nursing students (Forsman et al., 2020; Lachmann & Nilsson, 2021), educational programmes in advanced practice nursing need to address students' interpersonal skill development that fall under the scope of leadership (Gerrish et al., 2012). Second, the contexts in which the students work can facilitate the development of leadership possibilities leading to new APN models. For example a Norwegian study that is part of the overreaching PraksisVEL research project evaluated APNs' ability to diagnose and treat patients with minor orthopaedic injuries in an emergency department (Boman et al., 2021). According to the findings, the diagnosis was found to be correct in 97.3% (*n* = 326) of the patient cases, and the treatment

was deemed correct in 91.3% (*n* = 306) of the patient cases (Boman et al., 2021). The research paper illustrates how new APN models can be developed and successfully integrated on the basis of a collaboration between research, education and the clinical field.

7.2 Andragogy and clinical competence development

In this part of the discussion, I focus on why the students developed, or did not develop, their clinical competences. To answer these questions, I explore my findings from the three sub-studies related to the core assumptions of andragogy proposed by Knowles (2020) to reflect on the students' learning progress during their education.

The APN's extended and broader range of autonomy is recognised in the 'Advanced Practice Nursing Characteristics' section on *the nature of practice* in the ICN (2020) guidelines. The assumptions are relevant to understanding how to facilitate students' autonomy development in education to prepare them for their future roles. Learning theory is useful for promoting insights into the ways that people gain knowledge and skills, as well as how emotions, attitudes and behaviours are acquired and can be changed (Braungart & Braungart, 2018). To investigate clinical competence development, I consider my research findings, together with my experiences interacting with the advanced practice nursing students during lectures, pre-clinical skills training and informal conversations, through the lens of Knowles' (2020) six core assumptions.

Knowles (2020) presented core assumptions about students related to the following six areas that inform the development of strategies to facilitate self-directed learning by building the personal autonomy of the student:

(1) Learners' need to know
(2) Self-concept of the learner
(3) Prior experience of the learner
(4) Readiness to learn

(5) Orientation to learning

(6) Motivation to learn

Assumption 1 – *learner's need to know* – pertains to learners' need to understand why something needs to be learned before they start the learning process (Knowles, 2020). The first course the students undertook as part of their advanced practice nursing education was 'Introduction to Advanced Practice Nursing'. In this introductory course, the teacher introduces the students to advanced practice nursing in both an international and Norwegian context. The students are expected to present their views on their possible role development as a future APN. Several of the students expressed that they experienced a change in both their work and life after the coordination reform (Norwegian Ministry of Health and Care Services, 2009) and that they wanted to develop their competence in direct clinical practice – their *need to know* – to provide a safeguard for patients. In sub-study I, the students self-assessed direct clinical practice as their weakest area of clinical competence and the area in which they had the greatest need for further training at the beginning of their education. This outcome is in line with the findings of the study by Wangensteen et al. (2018) and with the observation that newly educated NPs who specialised in the care of older adults or in surgical nursing perceived this as the most important area of clinical competence (Henni et al., 2018; Jangland et al., 2016). Thus, these research findings point to a current trend in Northern European countries for advanced practice nursing students to perceive clinical competence in direct clinical practice as the most important aspect of their practice.

Assumption 2 – *self-concept of the learner* – addresses the transition from being a learner who is dependent on an educator to being a self-directed learner (Knowles, 2020). As RNs, many of the students in this study had been in a traditional nursing role that was dependent on a leader or physician to assign suitable day-to-day clinical tasks. I experienced that the students would look to their educators and leaders for answers as to how to evolve new APN models specific to their clinical contexts. As described in Section 2.3, in the United States, advanced practice nursing first gained recognition in the clinical field before the associated educational requirements were established (Lusk et al., 2019), which can be understood as a bottom-up

process. In Norway, a more top-down process has taken place, as the education came first (Hauge et al., 2011), followed by regulation of the role and of the master's education in advanced practice nursing (Norwegian Ministry of Education and Research, 2020a, 2020b). With the status of the national evolvement of the role considered, the students' tendency to lean towards a dependent position relative to the development of advanced nursing roles is understandable.

According to Knowles (2020), students who have a mental model of being dependent on educators can create an inner conflict and a challenge to their sense of self – that is, of being an adult who is responsible for their own life. Dependency can likewise be a challenge in advanced practice nursing education: it is expected, as the ICN (2020) guidelines denote, that the NP model can work autonomously for clinical leaders across healthcare settings. Jangland et al. (2016) explored how the first NPs in the surgical ward experienced their transition into a new role and which competency domain from the Nordic APN model (Fagerstrom, 2011) that the NPs utilized in an interprofessional team. They found that though the NPs integrated several of the competencies from the Nordic APN model, the NPs focused on direct clinical praxis, consultation, cooperation, case management, and coaching in their new role. The competency domains of leadership, research and development, and ethical decision-making were not mentioned (Jangland et al., 2016). The findings can be understood as the NPs self-concept in an advanced nursing role was mainly focused to develop as a practitioner in terms of direct clinical care and less on indirect nursing. In the Caring APN model (Fagerström, 2021), it is emphasised that both developments of direct clinical practice and indirect nursing are necessary for the development of the independence and responsibility they need for the role. Indirect care such as the competency domain of leadership includes how APNs drive for change and seek new, effective ways to practice (Fagerström, 2021).

The findings in sub-study III indicate that the advanced practice nursing students showed lower than desirable improvement in elements around clinical leadership in the workplace – a systemic level. Leadership has been reported to be a key factor in advancing practitioners' ability to influence innovation, improve clinical practice and health care delivery and advance

the nursing/midwifery professions (Delamaire & Lafortune, 2010). As previously mentioned, the NP/APN leadership domain is included in the national and international policy competency standards regarding the advanced practice nursing education (Health Education England, 2017; Norwegian Ministry of Education and Research, 2020b; National Organization of Nurse Practitioner Faculties, 2017; Nursing and Midwifery Board of Australia, 2018; South African Nursing Council, 2005). However, the leadership aspect of being an APN can sometimes come as a surprise for newly educated APNs, as they have been focused on developing their role in terms of direct clinical practice (Carter & Reed, 2019). Thus, to support development in line with the self-concept of the students of being self-directed and the ICN (2020) guidelines position regarding autonomy, advanced practice nursing education must communicate clearly that being an APN is more than being an experienced RN with medical skills – it is a role in which they are expected to act as a pioneer who leads change in health care. This argument aligns with the critical contextual factor of marketing in the Caring APN model relative to releasing information on what advanced practice nursing is (Fagerström, 2021). According to the findings in this PhD project, this applies especially to the indirect nursing practice of clinical leadership on a systemic level. Making the learning outcomes clear will, in turn, make clear to students what is reasonably expected of them regarding clinical competence development for their intended future role.

Assumption 3 – *prior experience of the learner* – concerns utilising experience as a resource for learning and challenging existing mental models (Knowles, 2020). In sub-study I, clinical work experience was not found to be a significant predictor of total scores on students' self-assessed clinical competence, but in sub-study III, work experience was a significant, but minor, predictor in PHC. These findings are supported by previous research findings that also did not indicate that clinical competence was associated with the work experience of RNs in PHC (Bing-Jonsson et al., 2016) or with the work experience of RNs and critical care nurses in intensive care units (Leonardsen et al., 2020). Internationally, entry requirements for NP programmes regarding work experience differ markedly across countries, ranging from zero to five years, and the ICN (2020) guidelines report that no evidence was found to support this requirement. In Norway, the two-year entry requirement was removed when the educational program in anaesthesia

nursing progressed from post-graduate to master's level by the Ministry of Education and Research (Regulations on national guidelines for nurse anaesthetist education, 2022). Though the quantitative research of this PhD project did not find support for an association between work experience and clinical competence, more research is needed regarding the context of advanced practice nursing education. I recommend examining how students utilise their previous experience as a rich resource for new learning during the skill training for the OSCE. For example, in the current study, the students seemed to quickly acquire the ability to conduct structured history taking based on previous patient experiences. I, therefore, recommend further research to investigate whether entry requirements regarding work experience are appropriate in advanced practice nursing education, as it can be an appropriate measure to ensure that students have the prerequisite knowledge and skills for their future role, as well as to prevent the exclusion of qualified and newly graduated RNs.

Assumption 4 – *readiness to learn* – concerns how developmental tasks associated with moving from one developmental stage to the next are a rich source of learning (Knowles, 2020). The findings of sub-study II reveal that while the students could demonstrate some structured history taking and physical assessment techniques, they struggled to demonstrate decision-making in their OSCE (first clinical exam) for a pre-clinical course they were required to pass before entering their clinical studies. However, in sub-study III, all students had completed their clinical studies and also passed their OSCA (a second clinical exam), in which they were asked to conduct an assessment of a patient (who gave their consent) chosen by their clinical preceptors. The findings of sub-study III demonstrated that the second most developed clinical competence in the follow-up part of the study related to clinical decision-making. Taking the OSCE before going on a clinical placement might ensure that students experience learning, practice and assessment of core skills before clinical placement (Nulty et al., 2011). Though the findings of sub-study II indicate that students and examiners found the OSCE to be an appropriate assessment of clinical competence on an advanced nursing level, the developmental stages the students go through during their education set the parameters for the assessment. To return to Miller's (1990) framework for clinical assessment of the level *shows how*, to include an OSCA after the students have completed their clinical studies and

with the use of real patient's ca be advised in NP programs. A second OSCE or OSCA would contribute with a plurality in clinical competence assessment appropriate to the advanced practice nursing student's developmental stage.

Assumption 5 – *orientation to learning* – concerns how adults are life-centred in their orientation to learning and learn the most effective when new knowledge is presented in the context of application to real-life situations (Knowles, 2020). During skill training for the OSCE, I found the students to be oriented to developing new knowledge and skills that would help them to solve problems related to in-patient encounters in their everyday clinical work life.
My understanding of the students was that presenting them with educational content that was not connected to their real-life contexts could create confusion. The findings of sub-study II indicate that the students and examiners agreed that the students found immersing themselves in the role-playing and simulated settings difficult. This may indicate that the students did not experience adequate levels of psychological fidelity; that is, the contextual elements were not adequate for promoting the students' emotional involvement in the scenario and their ability to believe it was real (Brackney & Priode, 2017). The psychological fidelity of the simulation has a strong link to cognitive skill transfer, such as decision-making (Jones, 2021). The consequences of reduced psychological fidelity of the simulation can be student stress, which can impact the validity of the OSCE (Miller & Carr, 2016). Assessment in education can be formative, in the form of feedback on students' progression, or summative, in the form of, for example, a final exam (Engström et al., 2017). The OSCE has wide potential for use as a formative and summative assessment; previous research on the examination tool in advanced practice nursing education recommends the use of formative assessments to prepare students for their final OSCE (Aronowitz et al., 2017).

Assumption 6 – *motivation to learn* – focuses on adults' ongoing motivation to continue growing and developing in their lives, most often facilitated by internal pressures, such as increased job satisfaction, rather than external motivators, such as higher salaries (Knowles, 2020). In sub-study II, the students expressed that they felt motivated to further train and develop their clinical competence after completion of the OSCE, as it indicated their existing

levels. Thus, the students were motivated by internal drives, such as the desire to succeed as a practitioner.

The findings in sub-study III indicated that the students who had the lowest clinical competence scores at the beginning of their education showed significantly greater improvement in their clinical competence in direct clinical practice than the students with the highest clinical competence scores. Thus, the different levels of ability among the students relative to direct clinical practice levelled out during the course of the programme, leading to greater homogeneity in their level of clinical competence in direct clinical practice after the completion of their clinical studies. This finding can be viewed through two learning concepts. The first concept, noted by Knowles (2020), proposes that motivated than the students with initially high self-assessed clinical competence in that they identified the gap between where they were and where they wanted to be and motivated themselves accordingly to get there. The other concept concerns the process of scaffolding, as noted by Bruner (1990), which is a process through which support is given so that learners can focus only on those elements that are within their range of competence. Thus, learners can achieve competence development goals that go beyond their unassisted efforts (Bruner, 1990). The students with high self-assessed clinical competence levels may not have received the same support through the scaffolding process as the students with low self-assessed clinical competence. Stensaker and Prøitz (2015) have suggested the existence of a conflict pertaining to quality in education: on one hand, programmes endeavour to include everyone by being broad and general, while on the other hand, they are narrow and elitist to promote excellence. In NP education, this poses a challenge. NP education seeks to educate practitioners who are safe for practice with an extended scope of practice (Starkweather et al., 2017), while at the same time preparing students to assume the role of pioneer with a high level of autonomy capable of improving patient care (Brown & Draye, 2003). Although the pioneer role of the NP can be viewed as an important aspect of leading change in line with the ICN (2020) guidelines, education should prioritise levelling out clinical competence differences in students for safe practice for sustainable and credible role evolvement.

I now share some closing reflections on Knowles' (2020) assumptions. Overall, I found the assumptions beneficial for reflecting on and understanding the learning process the students went through during their advanced practice nursing education. APN students are adults, and we can thus apply Knowles' andragogical assumptions about adult learners to understand their needs and personal development trajectories throughout the learning process: they need to know, they are self-directed, they bring prior experience to the learning process, they are ready to learn, they have a problem-based orientation to learning, and they are internally motivated to learn. Using these assumptions to guide the development of a master's programme can help tailor a programme that fosters students' personal autonomy with a focus on self-direction as a central aspect of learning. Knowles's aim in outlining his assumptions of andragogy was to focus on the learner and to provide an alternative perspective to method-centred instructional design, which he found to be dominant in teaching at the time (Knowles et al., 2020). My impression is that the master's programme under scrutiny in this study is definitely focused on the student and self-directed learning, but I hope that my discussions through the lens of Knowles' theory has further highlighted the usefulness of analysing a programme based on a person-centred perceptive on learning and not only on the method of teaching.

7.3 Comprehensive understanding of clinical competence development

This PhD project has employed a mixed method design to investigate the development of the clinical competence of advanced practice nursing students pursuing an NP role using PROFFNurse SAS II and OSCE. First, I will summarise which competency domain from the Caring APN model the students developed and second, I will summarise what makes OSCE an appropriate assessment strategy for APNs and the challenges with the exam format. Third, I will reflect on clinical competence development from the theoretical perspective of the Caring APN model and andragogical assumptions.

The students were found to have suitable prerequisites for a future advanced nursing role in

being experienced RNs with a high self-assessed ability to take responsibility and cooperate with other healthcare professionals which are in line with Bergströma and Lindh's (2018) findings regarding Swedish APN students. APN's scope of practice is characterised by responsibility combined with expanded clinical competence in making autonomous judgments (Nieminen et al., 2011).

At the beginning of their education, the students' self-assessments of their clinical competence were lowest for the items related to direct clinical practice, history taking, physical assessment, clinical decision-making, compiling a differential diagnosis and knowledge of medication. Furthermore, they self-assessed these same functions as their areas of greatest need for further training, and these also reflected the areas in which the students developed the most after the students completed their clinical studies. However, medical treatment differed as it was moderately developed.

Coaching and guidance were found to be medium developed clinical competence, whereas a high level of development was found in clinical competence related to health promotion and disease prevention. Cooperation was found to be the highest self-assessed clinical competence at the beginning of the student' education, with a medium development after the students completed their clinical studies, with the exception of having clear boundaries between the nurse and physician in their collaboration which was found to be lower developed. The students' clinical competence in ethical decision-making was self-assessed at a medium to high level at the beginning of their education, with medium development after the students completed their clinical studies. Nevertheless, a ceiling effect was observed for the competency domains of coaching and guidance, cooperation, and ethical decision-making.

Consultation and case management were deemed to have an inconclusive level of development after the students completed their clinical studies because the PROFFNurse SAS II contained too few relevant items. Research and development were found to be medium developed after the students completed their clinical studies, and no ceiling effect was

observed. Lastly, a lack of clinical leadership development was discovered, indicating a lack of development of indirect nursing on a systemic level.

This PhD project uses Cowan et al.'s (2005) holistic definition of clinical competence as something that requires a complex combination of knowledge, performance, skills, values and attitudes. The instruments PROFFNurse SAS I and II were developed based on Takase and Teraoka's (2011) holistic understanding of clinical competence, which I understand to be in line with the three-dimensional view of knowledge (episteme, techne and phronesis), i.e. the epistemological view of the Caring APN model (Fagerström, 2021). *Phronesis* (practical wisdom) (Gustavsson, 2000) , in particular, or *general competence* (the ability to utilise knowledge and skills in an independent manner in different situations) (Norwegian Ministry of Education and Research, 2020b) is suitable for assessment by OSCE that includes simulated patients in simulated clinical scenarios in an educational setting but also by OSCA with real patients as a part of students' clinical studies. While the OSCE included in this PhD project emphasised knowledge, performance, and skills, OSCE, as an assessment strategy, has the potential to incorporate values and attitudes for a person-centred approach, which is needed to further improve medical and nursing education (Johnston et al., 2013; Moore et al., 2021; Tullo et al., 2018). While the PhD project found the OSCE to be an appropriate method for assessment in advanced practice nursing education, findings from sub-study II indicate some challenges with the exam format. First, the students experienced the simulation setting as a stressful situation, which may have affected the validity of the assessment. Second, clinical decision-making and the person-centred perspective were difficult to assess in an OSCE prior to clinical studies. These challenges need to be addressed in advanced practice nursing education and further research is needed to better understand how to utilise OSCE to assess clinical competence from a holistic perspective that incorporates not just knowledge, performance, and skills but also values and attitudes. The OSCE is best used as an assessment strategy to facilitate clinical competence development when it includes both formative and summative assessments.

The theoretical framework in this PhD was inspired by the Caring APN model (Fagerström,

2021) and Knowles' andragogical assumptions (2020). These theoretical perspectives have served as two distinct lenses through which to understand the findings of this PhD.

First, the Caring APN model (Fagerström, 2021) has been central to determining how to systematically organise the findings and investigate whether clinical competence development is in line with the conceptual understanding of the rationale for APNs in the PhD project. In addition, previous research and literature, specifically the ICN (2020) guidelines, have been used to support arguments throughout the discussion chapter. A challenge with the Caring APN model (Fagerström, 2021) is that some of the central domains overlap, which has made organising the findings a complex process. A conceptual framework builds on abstraction from observations of behaviours, situations, or characteristics of some aspects of reality (Polit & Beck 2020). Thus, it is not in the nature of a conceptual model to mirror the complexity of observation made in the real world, in this case observations related to nursing, education, or research. Nevertheless, connecting the findings from this PhD project with the Caring APN model highlighted strengths and weaknesses in the development of students' clinical competence. While overall the students' developed their clinical competence in line with international standards, a lack of development of clinical leadership skills was noted.

Second, applying the theoretical perspective of Knowles et al.'s (2020) andragogical assumptions contributed to reflections on the humanistic values of autonomy which I have found to be highly relevant for the student's future NP/APN role. Bergström and Lindh (2018) found that Swedish students expanded their knowledge vertically and horizontally during their master's programme in APN, which resulted in a more advanced professional voice in their new role. Advanced practice nursing is evolving role in Norway, and students have a unique perspective on how new APN models can fit within the national context. Fagerström (2021) argued for a person-centred perspective in career development and contended that RNs should choose which level of nursing – bachelor's, master's or doctoral – is right for them when they are considering their life situations and interests, as well as which level feels most meaningful and relevant, and then ask themselves: 'Who am I as a person and what constitutes a meaningful contribution to patient care for me?' (Fagerström, 2021, p. 3). I find these

contemplations highly relevant for developing new APN models that can meet patient's needs. As a point of emphasis, clinical competence development should not be viewed as a solely personal matter of individual growth. Context must also be taken into consideration. For instance, Unsworth et al. (2022) emphasise the importance of including the APN's clinical leader when implementing the role. Their study showed that when the clinical leader was not included, an APN would often return to their role as an RN, in which they were unable to use the full scope of practice (Unsworth et al., 2022). A Norwegian report described how APNs' clinical leaders in home care services were attentive to how the nurses could utilise their clinical competence (Melby et al., 2022), which is a promising finding. The Caring APN model (Fagerström, 2021) addresses several critical contextual factors; however, an additional factor should be a focus on collaborative efforts between education, research, and the clinical field to develop new APN models that complement existing healthcare services. Such collaborations will be essential in the future to support the evolvement of the NP/APN role and to facilitate clinical competence development according to international standards.

International studies have documented APNs' contribution to patient health outcomes (Allsop et al., 2021; Chavez et al., 2018; Laurant et al., 2018; Landsperger et al., 2016; Martinez-Gonzalez et al., 2014; Stewart et al., 2021; Swan et al., 2015; Yang et al., 2021). These studies are important because patient outcome research in APN care is essential to providing a rationale for APN roles (Kapu et al., 2021). Several studies have been conducted in the Nordic countries on how APNs can be a resource in healthcare settings (Altersved et al., 2011; Boman et al., 2019; Eriksson et al., 2018; Fagerström & Glasberg, 2011; Henni et al., 2018; Hansen et al., 2020; Kvarnström et al., 2018; Lindblad et al., 2010; Wisur-Hokkanen, et al., 2015). To my knowledge, the study by Boman et al. (2021) is currently the only study that measures practice-specific quality metrics in Norway in line with the outcome research design recommended by Kapu et al. (2021). Many European countries lack legislation regarding the APN role and credentialing for APNs, and there is a need for outcome research to support the further evolvement of APN roles (Kaldan et al., 2021). Clinical competence development and role evolvement can be viewed as two sides of the same coin. By that, I mean that clinical competence can only develop as far as APNs' extended scope of practice has developed. In

Scandinavia, the APN role lacks a formal credentialling process and a recognised extended scope of practise with extended rights, including the right to prescribe medication and admit patients to hospital admission (Altersved et al., 2011; Boman et al., 2022; Lindblad et al., 2010; Jokiniemi et al., 2015; Piil et al., 2012), which are described in the ICN (2020) guidelines (see Table 1, "Assumptions and characteristics of advanced practice nursing"). If educated APNs cannot practice as APNs, they cannot develop their clinical competence either.

7.4 Methodological considerations

Considering methodological choices in research is regarded as crucial to understanding how conclusions are drawn from the data (Polit & Beck, 2020). In this section, I reflect on my choice of methodology, in particular my decision to use mixed methods. Although there are strong traditions in both quantitative and qualitative scientific research, this does not imply that there is only one correct way to conduct a study. On the contrary, throughout the research process – from coming up with an idea for a research project, to developing a project plan, conducting the research, and finally integrating the whole process in a thesis – I have had to make countless choices as a researcher. In the following, I will discuss important decisions I have taken in the process of conducting my PhD research and reflect on how these may have influenced the findings and the validity of the inferences that can be drawn from them. In terms of methodological considerations, I found addressing the following issues to be particularly important: trustworthiness; self-assessment; the validity and reliability of the PROFFNurse SAS II; the overall research focus, sample size and contextual factors; and the mixed methods design.

Trustworthiness

According to Polit and Beck (2020), Lincoln and Guba's (1985) framework of trustworthiness parallels the standard of reliability and validity in quantitative research and, thus, was deemed appropriate for this mixed methods doctoral research project. Lincoln and Guba (1985) suggested four criteria of trustworthiness: credibility, dependability, confirmability and transferability. Table 9 shows the criteria with selected strategies employed and how they were

adapted in sub-study II. For example, for credibility, prolonged engagement was one strategy that was employed. Lincoln and Guba (1985) described this strategy as investing sufficient time in the field to learn or understand the culture, social setting or phenomenon of interest. I adapted the strategy by being involved in most of the content in the course leading up to the OSCE (i.e. lectures and skill training).

Table 9 Criteria of trustworthiness

Criterion	Strategy employed	Description	My adaptations
Credibility	Prolonged engagement	Investing sufficient time in the field to learn or understand the culture, social setting, or phenomenon of interest	I attended most of the content in the course leading up to the OSCE (i.e. lectures and skill training).
	Triangulation	Using multiple sources when people have different viewpoints as a strategy to produce rich, robust, comprehensive and well-developed findings	I combined findings from focus groups with students and individual interviews with examiners to develop themes.
	Peer debriefing	A debriefing process that involves an impartial peer asking questions regarding important methodological steps to challenge what is implicit in the inquirer's mind	I conducted a debriefing session in a qualitative PhD course to investigate choices of analytical strategies.
	Member-checking	Formally and informally checking the data analytical categories and conclusions with members of the group from whom data was originally collected	During data analysis, I presented and asked the participants whether preliminary themes corresponded with their perceptions.
Transferability	Thick description	Providing enough information about a context for an inquirer to convey what has been studied and facilitate an understanding for others such that the conclusions drawn are transferable to other contexts	I collected information about the context of the OSCE by being involved in planning for the OSCE in teacher meetings and engaging in students' activities. I provided information regarding the learning outcomes of the OSCE and master's programme in NP in the final paper for sub-study II.
Dependability	Inquiry audit	Having an external audit to examine the research process and product to evaluate if the analysis and conclusions are supported by the data	I presented the data analysis process and preliminary findings to impartial participants of the research group for feedback.
Confirmability	Reflexivity	Keeping a reflexive journal in which the inquirer makes entries regarding methodological decisions and the reasons for them	I took notes throughout the process to uncover implicit epistemological assumptions when conducting the analysis.

Note: The table includes the criteria, strategy employed, and description as explained by Lincoln and Guba (1985), in addition to my adaptations.

Several methodological issues are described in paper II, including the decision to conduct focus groups with students and individual interviews with examiners, focus group size, issues

concerning data collection (such as not collecting data on the students' experiences with the examiners' written feedback) and the presentation of the findings that included quotations of group interactions in the focus groups (Taylor et al., 2019). However, an issue that was not addressed was how the analysis emphasised the students' experiences more than the examiners'. Although both the students and examiners were engaged and invested in both the course leading up to the OSCE and the OSCE itself, I found that the students' experiences with the OSCE were not only professional, but also personal, whereas for the examiners, the experiences involved a job-related task. Thus, the students' experiences had a deeper meaning and dimension than the examiners', which resulted in the analysis emphasising the students' experiences. While this can be viewed as a study bias that distorted the results of the research (Polit & Beck, 2020), it can also be viewed as a result of conducting a naturalistic inquiry – of being committed to studying something in its natural state (Lincoln & Guba, 1985).

Self-assessment

The choice of self-assessment as a methodology has implications for validity. Polit and Beck (2020) raise the issue of validity in self-assessment by asking how we can be sure whether people feel or act the way they say they do in a self-assessment. When we measure clinical competence development, we are measuring a construct and are thus concerned with psychometrics, where the main concern is measurement error (Polit & Beck, 2020). Concerns about measurement error are related to the validity and reliability of the measure, which is discussed in relation to both sub-studies I and III below.

Another concern regarding self-assessment is whether it is a good choice for measurement in this study. Clinical competence can be measured quantitatively through self-assessment, patient evaluations, or structured observation by a supervisor (Meretoja & Leino-Kilpi, 2001). Self-assessment is a common method for measuring nurses' competence as it allows nurses to consider their own practice within their own environment and may identify their strengths and areas needing further development (Meretoja et al., 2004). It is also a cost-effective way of performing a quantitative measurement and has been shown to encourage continued education and increase work satisfaction (Adams & Bond, 2000). Thus, there is solid support

for self-assessment being a relevant methodological choice. However, more recent research has questioned the appropriateness of self-assessment in nursing education at the bachelor's level, as it has been found to be insufficient when compared with the OSCE for measuring performance in responding to emergencies (Baxter & Norman, 2011). Similar findings were reported by Siles-González and Solano-Ruiz (2016) for a course on cultural care, leading to the conclusion that nursing students at the bachelor's level have an insufficient ability to self-reflect about their actions, which may be due to a lack of critical thinking skills. Although these studies do not cover the measurement of clinical competence as a holistic concept, they raise questions as to the level of education for which this methodology is most appropriate. When discussing self-assessment's appropriateness as a methodology, many researchers have pointed to the Dunning–Kruger effect, which has shown that poor performers overestimate their performance, an effect caused by their lack of insight into their shortcomings, while top performers slightly underestimate their performance and have a higher degree of accuracy in their estimates (Schlösser et al., 2013). One example of the Dunning–Kruger effect in nursing research can be seen Bahreini et al. (2011). The researchers found that Iranian RNs overestimated their self-assessed clinical competence compared to the assessment made by their head nurses, with the greatest difference observed in the "managing situations" and "teaching–coaching" categories and the least difference in the categories of "helping roles" and "diagnostic functions" (Bahreini et al., 2011). One interpretation of this finding could be that bachelor's students are less well-suited to self-assessment than master's students, although it is inaccurate to label bachelor's students as poor performers. Another interpretation is that one should take this effect into consideration when interpreting results from self-assessments on bachelor's and master's students, respectively. The question of whether self-assessment is appropriate for bachelor's students is not pertinent to this thesis; however, I argue that self-assessment is appropriate for advanced practice nursing students. In sub-study I, the students self-assessed their highest level of clinical competence and need for further training in addition to the reliability between the scales, which was in line with the findings of Wangensteen et al. (2018). In addition, in sub-study I, the students' self-assessments revealed that the interactions and side effects of medications were the areas in which they had the greatest need for further training. This is in line with previous findings that indicate a significant risk of medication errors

exists due to a lack of pharmacological knowledge among RNs in hospitals and nursing homes (Andersson et al., 2018; Simonsen et al., 2011). The usefulness for self-assessment for master students in nursing is further supported by the findings by Flynn et al. (2020) who found in a nurse anaesthesia master's programme that the students underscored their performance in non-technical skills (i.e. communication and situation awareness, task management, leadership and teamwork) compared to their clinical supervisors.

Validity and reliability of the PROFFNurse SAS II

In sub-study III, a ceiling effect was observed for several items, which can be interpreted in two ways. First, it may indicate that the PROFFNurse SA II has some limitations in relation to assessing an advanced level of clinical competence, as the ceiling effect has been described as an indicator of an incomplete scale (Cramer & Howitt, 2004). A second interpretation concerns statistical issues. The students may have assigned a maximum score for their experiences as they pertained to the RN role, not considering the advanced practice nursing level. As APN roles are evolving in Norway, many of the students who participated in this project did not have role models in their clinical work context who could represent the qualities of advanced practice nursing. Thus, this research project has some limitations in the measurement on clinical competence development.

The PROFFNurse SAS II was evaluated for content validity by Wangensteen et al. (2018). In sub-study I, Cronbach's alpha values were 0.936 for the A-scale and 0.979 for the B-scale, indicating internal consistency. However, further reliability testing of the questionnaire is needed, as a large number of items on a scale can influence the results (Field, 2018). As a researcher, not having sub-scales gave me the freedom to explore the items in connection to the Caring APN model (Fagerström, 2021); however, working with data on the item level is a detailed approach that I found challenging when trying to produce a comprehensible report of the findings. Thus, a recommendation for further research is to conduct a factor analysis to develop sub-scales for the PROFFNurse SAS II and to explore the construct's validity.

The overall research focus

In the introductory chapter, the aim of this PhD project is clarified as focused on clinical competence development rather than on evaluating the educational programme as a whole, as initially planned in the umbrella research project PraksisVEL. A driving factor behind the decision to focus on clinical competence development was that the data did not include longitudinal measurements from the start to the end of the students' educations. Conducting longitudinal measurements with analysis on an individual level was a challenge while ensuring a sufficient sample size. Thus, the decision was made not to gather follow-up data after the master's programme had been completed but, rather, after the students had completed their clinical studies. At this point, the students had completed clinical courses in physical assessment, pathophysiology and pharmacology, but they had not completed their master's theses. Though the broad portion of the students' clinical learning outcomes had been covered, the omission of the learning that took place while developing the master's thesis may have left out the totality of the clinical competence the students developed during their education.

Sample size and contextual factors

Given the relatively small sample size of this PhD project, caution should be taken when generalising the findings. The recruitment process for advanced practice nursing programmes in Norway is further described in paper I (Taylor et al., 2020). The data for this project were collected between 2015 and 2019, and during that period, advanced practice nursing educational programmes in Norway were both established and discontinued. In addition, regulation of the role and master's programme in advanced practice nursing (Norwegian Ministry of Education and Research, 2020a, 2020b) was brought into effect after the data had been collected. Thus, the value of the findings of this research project must be considered within the context of evaluating whether educational programmes support the development of the clinical competence desired in APNs in Norway.

Mixed methods design

Mixed methods designs can be understood to have different levels of design complexity, and the recommendation has been made to address whether the design of the study is simple or

complex (Schoonenboom & Johnson, 2017). Complexity in the design refers to how many qualitative and quantitative components are involved and the number of points of integration that have been made (Schoonenboom & Johnson, 2017). For this doctoral study project, the mixed methods design had a sequential design with one point of integration, which was the integration of the results to answer the overall research aim. Thus, the design of this PhD project can be considered simple compared to a fully integrated mixed design that includes multiple points of integration (Schoonenboom & Johnson, 2017). Table 8 represents the point of integration where the findings from the three sub-studies are integrated. The table illustrates how the findings relate to direct clinical practice, which is the most important core competency domain in the Caring APN model (Fagertsröm, 2021). It also shows that sub-study II has fewer findings regarding the other seven core competency domain than sub-study I and II have. To strengthen the integration of the qualitative and quantitative findings and the mixed methods design, I could have made a connection to the theoretical framework of this PhD, i.e. using the APN Caring Model (Fagerström (2021) in a framework analysis (Gale et al., 2013) in sub-study II. Nevertheless, novice researchers have been cautioned to simultaneously analyse qualitative and quantitative data into a coherent set of findings (Teddlie, 2006). In addition, Schoonenboom and Johnson (2017) clearly stated that the research question determines the need for complexity in a design. In conclusion, although reflecting on how to improve the research design was beneficial to me as a researcher, I found that the current research design was sufficient to address the overall research aim of this PhD project.

8 CONCLUSION

The overall aim of this PhD project was to investigate the development of the clinical competence of advanced practice nursing students who are pursuing an NP role. This was accomplished through three sub-studies, two quantitative and one qualitative, in an overall mixed methods design. This is the first Nordic doctoral research project that investigates advanced practice nursing education.

The results of this PhD project demonstrate that the students developed their clinical competence in line with international standards for NP/APN. In particular, students developed their skills related to direct clinical practice, including history taking, physical assessment, clinical decision-making, differential diagnosis and knowledge of medication. Evaluating and modifying medical treatment were the only elements of direct clinical practice that were not satisfactorily developed, along with clinical leadership, which is a component of indirect nursing. These aspects of clinical competence should be strengthened in future advanced practice nursing programmes to contribute to the development of the NP role in the clinical field.

The NP role includes an extended scope of practice; thus, it is necessary to ensure that students are ready for the greater responsibility of their future role upon completion of the advanced practice nursing master's programme. The findings in this PhD project have provided evidence of achieved learning outcomes in advanced practice nursing master's programmes that are important to ensuring patient safety in the clinical field. The differences in clinical competence among the students levelled out through students' progression in the master's programme, with all students reaching a certain level of clinical competence by the end, which is a positive finding in terms of building a sustainable and safe workforce of NPs/APNs. Having effective strategies to assess clinical competence in advanced practice nursing education is crucial to ensuring quality in education that responds to the imperative to safeguard patient safety, and OSCE has proven to be an appropriate method. OSCE provides the possibility to assess clinical competence from a holistic perspective that includes a complex combination of knowledge,

performance, skills, values, and attitudes. The OSCE that was included in this PhD project emphasised knowledge, performance, and skills, and it is recommended to further strengthen it to include values and attitudes from a person-centred perspective. The findings of this PhD project did not show work experience to be a significant predictor of clinical competence. This raises the question of whether a work experience requirement for entry into advanced practice nursing programmes is necessary or redundant in terms of learning outcomes.

The theoretical perspectives included in this PhD project were regarded as appropriate to discuss the findings of the PhD. The Caring APN model served as a measure to systematically organise the findings and highlighted strengths and weaknesses in clinical competence development. PROFFNurse SAS II is supported by the competency domains found in the Caring APN model. While the PhD project found the instrument to be appropriate for assessing clinical competence development in both a cross-sectional and longitudinal design, some weaknesses were found regarding an observed ceiling effect for the competency domains of coaching and guidance, cooperation, and ethical decision-making. To further improve the instrument, a factor analysis should be conducted to develop sub-scales for the PROFFNurse SAS II and to explore the construct's validity. Assumptions of andragogy have facilitated reflection on students' development of the clinical competence necessary for a future role as an autonomous practitioner with an extended scope of practice. A lesson learned from an andragogical perspective is that education, research, and the clinical field can support individual students and their unique perspectives in the development of new roles that can meet patient needs. This approach builds on a person-centred approach to facilitate students' personal development and to help them develop clinical competence in line with personal growth and contextual factors.

In conclusion, this PhD project supports advanced practice nursing education as an initiative to develop clinical competence at an advanced level to improve current healthcare services and meet the challenges of the future. It points out both strengths and weaknesses in the clinical competence development of students that can be used to further improve advanced practice

nursing master's programmes and facilitate collaboration between education, research, and clinical practice to further develop APN models in line with the NP role.

8.1 Implications and further research

Below is a list of implications for education and recommendations for further research based on this PhD project's findings.

The following are recommendations for advanced practice nursing master's programmes:

- Strengthen education to achieve better learning outcomes for students regarding the direct clinical practice of evaluating and modifying medical treatment and indirect nursing involving clinical leadership.
- Implement OSCE with standardised simulated patients and simulated clinical scenarios prior to clinical studies. Implement OSCA with real patients in the presence of an educational supervisor and the student's clinical preceptor upon completion of clinical study.
- Recruit former students from advanced practice nursing master's programmes as clinical preceptors. Today, advanced practice nursing students are commonly supervised by physicians in their clinical studies. However, as these students graduate, they will be able to serve as preceptors on collaborative teams with physicians to ensure that the scope of practice includes an advanced nursing perspective.
- Continue the discussion of whether working experience is a necessary requirement for entry in advanced practice nursing master's programmes.

The following are recommendations for further research regarding advanced practice nursing:

- Provide evidence for significant correlation between clinical competence development and clinical work experience as an RN to determine the relevance of work experience as an entry requirement for advanced nursing education.

- Perform explorative factor analysis to test the psychometric properties of PROFFNurse SAS II as well as confirmative factor analysis to explore the connections between PROFFNurse SAS II and the Caring APN model.
- Continue research on OSCE/OSCA in terms of the validity and reliability of the use of standardised patients in educational and clinical settings in addition to how a person-centred approach can be incorporated in the assessment.
- Longitudinal research of clinical competence development that includes former students that have graduated in advanced practice nursing master programs with working experience as an NP/APN.
- Examine the need for further training for NPs/APNs in different roles and contexts.
- Patient outcome research that includes practice-specific quality metrics to evaluate different advanced practice nursing models in various clinical contexts for safe practice and quality of care.

The following are recommendations for the clinical field regarding advanced practice nursing:

- Employ newly graduated NPs/APNs in positions that are specifically created for the role with clear work descriptions and that allow for continuing development of clinical competence.
- Ensure that leaders in the clinical field familiarise themselves with the possibilities of the role and take initiative to find suitable work tasks for NPs/APNs. At the same time, leaders need to be attentive to NP's/APN's own perspectives on what work tasks are suitable so that newly graduated and employed NPs/APNs can put their clinical competence to use in practice.

Collaborative recommendations for education, research and the clinical field are:

The Norwegian government has contributed greatly to advanced practice nursing by accrediting the role and master's education. Today, many Norwegian universities and university colleges have developed their existing programmes and adopted the national guidelines to create a full master's programme in line with the NP/APN role that fulfils the requirements for

credentialed specialist approval. To further develop the role, it is now crucial that newly educated NPs/APNs be employed in the clinical field in designated positions. Education, research, and the clinical field must come together to further collaborate on the development of NP/APN models.

Current regulations in Norway do not include a full scope of practice for the nurse practitioner role, as they exclude such elements as the authority to diagnose, prescribe medications and treat patients, which limits the possibilities for clinical competence development for students in line with international standards. Advanced practice nursing in Norway has been gradually and carefully developed. Now is the time to discuss how to extend the rights, such as rights to refer patient for laboratory tests and radiography, refer from primary health care to hospitals, prescription of medications, of NPs/APNs to evolve their role as practitioners with an extended scope of practice in line with international standards.

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Appendix 1: Sample OSCE checklist

Neurological

OSCE STATION

MARKING CRITERIA

STUDENT NAME: _____

0 = Not done
1 = Demonstrates, not confident
2 = Demonstrates confidence

MARKING CRITERIA	0	1	2
COMMON CRITERIA			
1. Introduces self to patient			
2. Washes hands			
3. Ascertains patient's belief/concerns			
4. Closure of consultation/evidence of safety netting			
PART ONE – HISTORY			
5. Determines chief presenting complaint			
6. Structured approach to determine history of presenting complaint e.g. OLDCART/PQRST			
7. Past medical history			
8. Drug history/Medication—prescription/OTC			
9. Smoking amount			
10. Alcohol consumption/recreational drugs			
11. Family history			
12. Social history—occupation/home			
13. Review of systems			
14. Allergies			
PART TWO – EXAMINATION			
15. Assesses general appearance—e.g. FAST positive			
16. Vital signs: Temp, BP, RR, HR, SPO2			
CRANIAL NERVES			
17. I Olfactory (smell, nasal patency)			
18. II Optic (visual acuity, visual fields, says funduscopy would be performed)			
19. III, IV, VI (oculomotor, trochlear, abducent)			
20. V (sensory, motor, says would check corneal reflex)			
21. VII Facial (symmetry, motor function)			
22. VIII Vestibulocochlear (whisper test, Weber or Rinnes test)			
23. IX, X Glossopharyngeal, vagus (uvula, voice, pronation)			
24. XI Accessory (trapezius, sternocleidomastoid)			
25. XII Hypoglossal (tongue movements, tongue power)			
PERIPHERAL NERVOUS SYSTEM			
26. Checks upper and lower limb tone bilaterally			
27. Checks upper and lower limb sensation bilaterally			

28. Checks upper and lower limb power bilaterally			
CEREBELLUM			
29. Checks gait			
30. Checks balance—e.g. Romberg test			
31. Checks for evidence of one of the following: • Dysdiadochokinesis • Ataxia • Nystagmus • Intention tremor • Slurred speech • Heel to shin test			
CORTICAL FUNCTION			
32. Checks patient alertness and orientation, e.g. GCS 15/15, ability to perform arithmetic			
REFLEXES			
33. Identifies/discusses bilateral upper reflexes: triceps, biceps, supinator			
34. Identifies/discusses bilateral lower reflexes: patella, Achilles, plantar: Babinski reflexes			
35. DIFFERENTIALS – any ONE of these			
TIA CVA: INFARCTION/ HAEMORRHAGE, HEMIPLEGIC MIGRAINE BELLS PALSY			
36. RED FLAG SIGNS – any ONE of these			
FAST positive Reduced level of consciousness Signs of meningitis Altered behaviour or function following head injury Seizures in the absence of a PMH of epilepsy Considers high force mechanism of injury On anticoagulants			

TOTAL POSSIBLE SCORE: 72

TOTAL SCORE: ___

PASS MARK above 40 % (29 points): Y / N

COMMENTS

EXAMINER'S SIGNATURE: _____ DATE: _____

NAME: _____

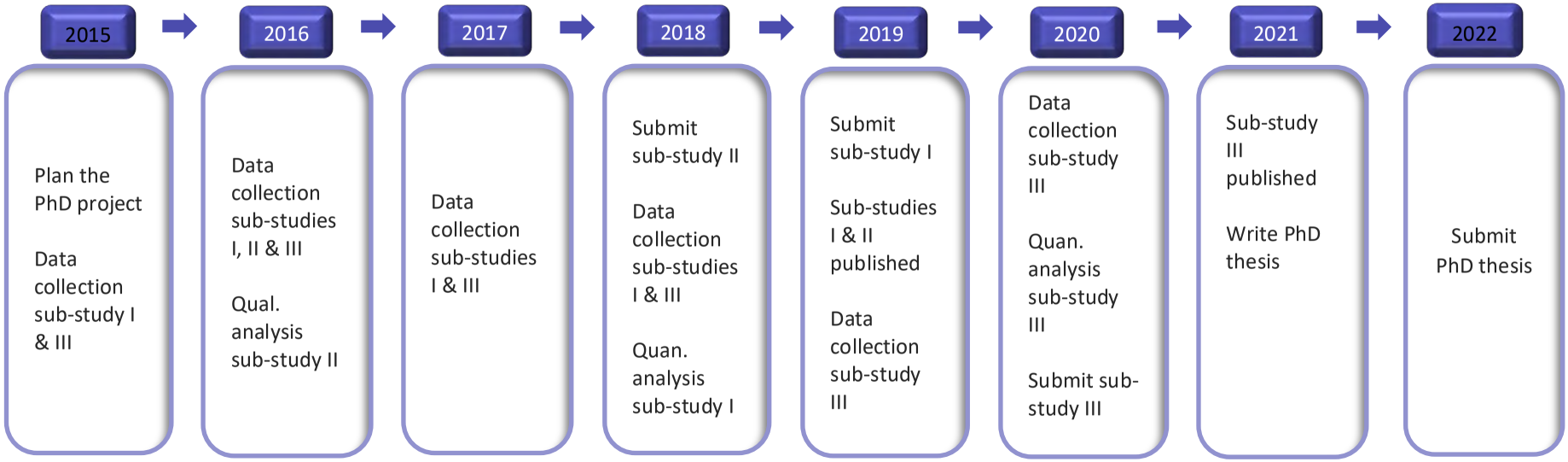
Source: Taylor et al. (2019, p. 121).

Appendix 2: Timeline of the research process

Paper I: The self-assessment of clinical competence and the need for further training: A cross-sectional survey of advanced practice nursing students

Paper II: The Objective Structured Clinical Examination in evolving nurse practitioner education: A study of students' and examiners' experiences

Paper III: Development of clinical competence – A longitudinal survey of nurse practitioner students



Appendix 3: Interview guide focus groups with students
sub-study II

Intervjuguide studenter

1. Erfaringer med OSCE

Hvordan har dagen i dag vært for dere?

Runde rundt bordet så alle får delt sin opplevelse **-** debrifing

Hoveddel

2. OSCE som eksamensform

Kan dere fortelle meg hva dere synes om å ha OSCE som eksamensform til AKS-masterprogrammet?

Hva synes dere om OSCE med tanke på objektivitet?

Hva tenker dere om at OSCE ikke bare kan være en eksamensform men også en læringsarena?

Med tanke på språk; Hvordan oppleve du å bli vurdert av ikke norsk-språklige sensorer?

Hva synes dere om casene dere ble gitt?

Hva synes du om casene – relevant for arbeidslivet, realistiske eller «praksisnære» – nokk tid for studenten for å gjøre en systematisk klinisk vurdering?

Hvordan opplevde dere å få vist/ikke vist den kompetansen dere har?

Hvor forberedt var dere til OSCE?

Brukte dere arbeidsplassen til å forberede dere til OSCE?

Når dere gjennomførte OSCE – var det noen av undersøkelsene dere gjorde som dere følte dere tryggere på enn andre?

Hva lærte dere mest av? (Forelesning, ferdighetstrening (pre-klinikk/arbeid)?)

Hva var spesielt verdifullt for læring/utvikling og hva var mindre verdifullt?

I hvilken grad bidro OSCE til at du utviklet egen evne til å jobbe systematisk (og utvikle egen beslutningsevne)?

Har kurset gitt dere den kompetansen til å gjennomføre en systematisk klinisk undersøkelse (og foreslå en helseproblem /tentativ diagnose i din arbeidshverdag)? (Evt. - hva mangler?)

Har dere utviklet egen kompetanse som påvirket hvordan dere arbeider på jobben? (Ev. – på hvilken måte?)

Hva tenker du at en AKS-student sammenlignet med en bachelorstudent skal kunne vise til av kompetanse/klinisk beslutningstagning?

Det finnes mange ulike eksamensformer: hvilke andre eksamensformer kunne vært relevante for å vurdere kompetanse/klinisk beslutningstaking på avansert nivå?

Hvordan var det å gjennomgå OSCE sammenlignet med tidligere eksamensformer dere har hatt?

Hvilke vurderinger er det en annen eksamensform kan gjøre som ikke blir gjort med OSCE?

Har du noen tanker om hvordan avansert kliniske beslutningstagning/kompetanse kan best mulig bli vurdert i en eksamensform?

Hvis vi valgte å arrangere OSCE neste år; hva kunne bli gjort for å forbedre eksamen?

Og hva kunne bli gjort for å forbedre kurset til studentene?

3. Simulering/person-orienter

Kan dere fortell meg erfaringer med simulerte pasientene?

Hvordan opplevde dere å undersøke «pasienten»?

Hva er fordeler og ulemper med å ha en simulert pasient vs en sim-man eller en virkelig pasient?

Hvor godt syntes dere de simulerte pasientene var realistiske til å spille sine roller?

Hva tenker du om at simulerte pasienter er med i sensureringsprosessen av studenten?

Til sist vil jeg spørre noen spørsmål om person-orientering siden mastergradene på HSN skal være person-orientert:

I relasjon til OSCE – I hvilken grad kan denne eksamensformen være egnet til å evaluere person-orientert tilnærming (omsorg vs kunstig/teknisk)?

Hva tenker dere om at de simulerte pasientene skal ha mulighet til å være delaktig i avgjørelser som studenten tar om deres helsesituasjon/behandling?

Hvordan gikk du frem for å pasientens ønsker/behov/utfordring ved undersøkelsen?

Avsluttende spørsmål

5. Avslutning

Før vi avslutter har jeg noen siste spørsmål?

Har du noe du vil tilføye om OSCE og avansert klinisk kompetanse/beslutningstagning?

Appendix 4: Interview guide interviews with examiners
sub-study II

Intervjuguide sensorer

Åpning

1. Erfaringer som sensor med OSCE/bakgrunns spørsmål

Hva er din erfaring med å være sensor?

(sykepleierutdannelsen på masternivå evt bachelor eller medisin)
Sammenlignet med tidligere erfaringer; Kan du fortell meg om hvordan du opplevde å vurder AKS-studentene under OSCE?

Hoveddel

2. OSCE som eksamensform

Kan du fortelle meg hva du synes om å ha OSCE som eksamensform (til AKS-studenter og eventuelt medisin studenter)? (sammenligne med din erfaring sammenlignet med annen erfaring?)

Hva synes du om OSCE med tanke på objektivitet?
Hva tenker dere om at OSCE ikke bare kan være en eksamensform men også en læringsarena?
Med tanke på språk; Hvordan oppleve du å samarbeide med ikke norsk-språklige sensorer?

Hva synes du om casene som ble gitt til studentene?

Hva synes du om casene – relevant for arbeidslivet, realistiske eller «praksisnære» – nokk tid for studenten for å gjøre en systematisk klinisk vurdering?

Hva synes du om vurderingsskjemaene i OSCE?

Hva synes du om avkrysningspunktene: Var det noe punkter som opplevdes som mer relevant enn andre? Hva tenker du om avkrysningspunktene med tanke på objektivitet?

Hva var ditt inntrykk av studentene under OSCE? (forberedthet, stress/rolig)

På hvilken måte merket du at studentene var trygg eller utrygg på sine avgjørelser/ kliniske beslutningstagning?
Hvordan synes du at studentene fikk vist den kompetansen de hadde?

Hva er din formening om at OSCE kan bidra til at studentene kan jobbe systematisk og utvikler egen beslutningsevne?

Som OSCE sensor; hva tenker du at en AKS-student sammenlignet med en bachelorstudent skal kunne vise til av kompetanse/klinisk beslutningstagning?
Opplever du at studentene har den kompetansen til å gjennomføre en systematisk

klinisk undersøkelse og foreslå en helseproblem /tentativ diagnose i din arbeidshverdag? (Evt. - hva mangler?)

Det finnes mange ulike eksamensformer: hvilke andre eksamensformer kunne vært relevante for å vurdere kompetanse/klinisk beslutningstaking på avansert nivå?

Hvilke vurderinger er det en annen eksamensform kan gjøre som ikke blir gjort med OSCE?
Har du noen tanker om hvordan avansert kliniske beslutningstagning/kompetanse kan best mulig bli vurdert i en eksamensform?
Hvis vi valgte å arrangere OSCE neste år; hva kunne bli gjort for å forbedre eksamen?
Og hva kunne bli gjort for å forbedre kurset til studentene?

3. Simulering/person-orientering

Hvordan opplevde du casene med de simulerte pasienter?

Hva er fordeler og ulemper med å ha en simulert pasient vs en sim-man eller en virkelig pasient?
Hvor godt syntes du de simulerte pasientene var realistiske til å spille sine roller?
Hva tenker du om at simulerte pasienter er med i sensureringsprosessen av studenten?

Til sist vil jeg spørre deg noen spørsmål om personorientering siden mastergradene på HSN skal være person-orientert:

I relasjon til OSCE – I hvilken grad er denne eksamensformen egnet til å evaluere studentenes person-orienterte tilnærming? (Omsorgs vs kunstig/teknisk?)
Hva tenker du om at de simulerte pasientene skal ha mulighet til å være delaktig i avgjørelser som studenten tar om deres helsesituasjon/behandling
Hvordan gikk studenten frem for å pasientens ønsker/behov/utfordring ved undersøkelsen?

Avsluttende spørsmål

5. Avslutning

Før vi avslutter har jeg noen siste spørsmål

Har du noe du vil tilføye om OSCE og avansert klinisk kompetanse/beslutningstagning?

Appendix 5: Information and consent form sub-study I

Forespørsel om deltakelse i forskningsprosjektet

PraksisVEL

”Kartlegging av egen kompetanse”

Bakgrunn og formål
Et doktorgradsprosjekt ved Institutt for sykepleievitenskap, Høgskolen i Buskerud og Vestfold, har til hensikt å kartlegge kompetansen til sykepleiere som er tatt opp på ulike masterprogram. Verktøyet for å kartlegge kompetansen er et spørreskjema for selvevaluering av sykepleieres kliniske kompetanse. Datainnsamling i dette prosjektet vil gjøres ved hjelp av PROFFNurse SAS (The Professional Self-Assessment Scale of core competencies); et spørreskjema utviklet med tanke på egenvurdering av kompetanse.

Som sykepleier og student ved en masterutdanning på en høgskole/universitet i Norge, forespørres du med dette om deltakelse i dette prosjektet.

Hva innebærer deltakelse i studien?
Deltagelse i studien innebærer at du fyller ut et spørreskjema om din kompetanse. Det vil ta ca. 30 minutter å fylle ut skjemaet. På spørreskjemaet spørres det også om alder, erfaringsområder som sykepleier og hvilket studieprogram du tilhører. Dine opplysninger vil bli registrert elektronisk i et dataregister. Prosjektet skal etter planen avsluttes 01.07.2018. Da vil alle koblinger mellom personidentifiserende opplysninger og dine svar makuleres.

Hva skjer med informasjonen om deg?
Alle personopplysninger vil bli behandlet konfidensielt. Det er frivillig å delta i studien, og du kan når som helst trekke deg uten å oppgi noen grunn. Hvis du fyller ut spørreskjemaet, regnes dette som et samtykke. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du ønsker å delta, har spørsmål til studien eller senere ønsker å trekke deg ta kontakt med Ingrid Eilertsen på epost ingrid.eilertsen@hbv.no, eller med mine veiledere professor Lisbeth Fagerström (lisbeth.fagerstrom@hbv.no) eller førsteamanuensis Pia Cecilie Bing-Jonsson (pia.bing-jonsson@hbv.no).

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Vennlig hilsen

Ingrid Eilertsen
Stipendiat, Institutt for sykepleievitenskap
Høgskolen i Buskerud og Vestfold
ingrid.eilertsen@hbv.no

Appendix 6: Research approval from Norwegian Social Science Data Services sub-study I

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Harald Hårfagres gate 2
N-5007 Bergen
Norway
Tel. +47-55 58 21 17
Fax +47 55 58 96 50
nsd@nsd.uib.no
www.nsd.uib.no
Org.nr. 985 321 884

Ingrid Eilertsen
Institutt for sykepleievitenskap (Drammen)
Høgskolen i Buskerud og Vestfold
Postboks 7053
3007 DRAMMEN

Vår dato: 10.08.2015 Vår ref:44140 / 3 / MHM Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 05.08.2015. Meldingen gjelder prosjektet:

44140	*Providing person-centred healthcare - by new models of advanced nursing practice in cooperation with patients, clinical field and education (Researcher project - PRAKSISVEL)*
Behandlingsansvarlig	*Høgskolen i Buskerud og Vestfold, ved institusjonens øverste leder*
Daglig ansvarlig	*Ingrid Eilertsen*

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, ombudets 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, 01.07.2018, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Bjørn Henrichsen

Marianne Høgetveit Myhren

Marianne Høgetveit Myhren tlf: 55 58 25 29
Vedlegg: Prosjektvurdering

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 44140

Utvalget informeres skriftlig om prosjektet og samtykker til deltakelse. Informasjonsskrivet er godt utformet.

Personvernombudet legger til grunn at forsker etterfølger Høgskolen i Buskerud og Vestfold sine interne rutiner for datasikkerhet.

Questback er databehandler for prosjektet. Høgskolen i Buskerud og Vestfold skal inngå skriftlig avtale med Questback om hvordan personopplysninger skal behandles, jf. personopplysningsloven § 15. For råd om hva databehandleravtalen bør inneholde, se Datatilsynets veileder: http://www.datatilsynet.no/Sikkerhet-internkontroll/Databehandleravtale/.

Forventet prosjektslutt er 01.07.2018. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)

Vi gjør oppmerksom på at også databehandler (Questback) må slette personopplysninger tilknyttet prosjektet i sine systemer. Dette inkluderer eventuelle logger og koblinger mellom IP-/epostadresser og besvarelser.

Høgskolen i Sørøst-Norge

Forespørsel om deltakelse i forskningsprosjektet

PraksisVEL

OSCE for avansert klinisk sykepleie
Fokusgruppeintervju med studenter, sensorer og simulerte pasienter

Bakgrunn og formål
Et doktorgradsprosjekt ved Institutt for sykepleievitenskap, Høgskolen i Sørøst-Norge, har til hensikt å undersøke om OSCE (Objective structured clinical examination) er et egnet eksamensverktøy for masterprogram i avansert klinisk sykepleie. Datainnsamling i dette prosjektet vil gjøres ved fokusgrupper med studenter, sensorer og simulerte pasienter.

Som sykepleier og student ved masterutdanningen i avansert klinisk sykepleie på Høgskolen i Sørøst-Norge, forespørres du med dette om deltakelse i dette prosjektet.

Hva innebærer deltakelse i studien?
Deltagelse i studien innebærer at du deltar på et fokusgruppeintervju. Fokusgruppeintervjuet vil finne sted samme dagen som du har gjennomført OSCE og vare ca 1-1,5 time. Under fokusgruppeintervjuet vil ikke sensorene være til stedet. Fokusgruppeintervjuet vil bli tatt opp på lyd, for deretter å bli transkribert. Dine opplysninger vil bli registrert elektronisk i et dataregister. Prosjektet skal etter planen avsluttes 01.07.2018. Da vil alle koblinger mellom personidentifiserende opplysninger og dine svar makuleres.

Ved siden av fokusgruppe, er det ønskelig at undertegnede kan observere både deg, sensorene og simulerte pasienter under eksamen. Du kan velge å ikke å bli observert under eksamen og samtidig delta på fokusgruppe.

Hva skjer med informasjonen om deg?
Alle personopplysninger vil bli behandlet konfidensielt. Det er frivillig å delta i studien, og du kan når som helst trekke deg uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du har spørsmål til studien eller senere ønsker å trekke deg ta kontakt med Ingrid Eilertsen på epost ingrid.eilertsen@hbv.no, eller med mine veiledere professor Lisbeth Fagerström (lisbeth.fagerstrom@hbv.no) eller førsteamanuensis Pia Cecilie Bing- Jonsson (pia.bing-jonsson@hbv.no) eller førsteamanuensis Edda Johansen (Edda.Johansen@hbv.no).

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Vennlig hilsen
Ingrid Eilertsen Stipendiat,
Institutt for sykepleievitenskap Høgskolen i Sørøst-Norge
ingrid.eilertsen@hbv.no

Samtykke til deltakelse i studien

Jeg samtykker til fokusgruppeintervju etter gjennomført OSCE.

Jeg har mottatt informasjon om studien, og er villig til å delta

---

(Signert av prosjektdeltaker, dato)

Appendix 8: Information and consent form to examiners sub-study II

Høgskolen i Sørøst-Norge

Forespørsel om deltakelse i forskningsprosjektet

PraksisVEL

OSCE for avansert klinisk sykepleie
Fokusgruppeintervju med studenter, sensorer og simulerte pasienter

Bakgrunn og formål
Et doktorgradsprosjekt ved Institutt for sykepleievitenskap, Høgskolen i Sørøst-Norge, har til hensikt å undersøke om OSCE (Objective structured clinical examination) er et egnet eksamensverktøy for masterprogram i avansert klinisk sykepleie. Datainnsamling i dette prosjektet vil gjøres ved fokusgrupper med studenter, sensorer og simulerte pasienter.

Som sensor i emnet MAKS400 *Systematiske kliniske undersøkelser og helsevurdering*, ved Høgskolen i Sørøst-Norge, forespørres du med dette om deltakelse i dette prosjektet.

Hva innebærer deltakelse i studien?
Deltagelse i studien innebærer at du deltar på et fokusgruppeintervju med de andre sensorene eller et individuelt intervju. Fokusgruppeintervjuet vil bli tatt opp på lyd, for deretter å bli transkribert. Dine opplysninger vil bli registrert elektronisk i et dataregister. Prosjektet skal etter planen avsluttes 01.07.2018. Da vil alle koblinger mellom personidentifiserende opplysninger og dine svar makuleres.

Hva skjer med informasjonen om deg?
Alle personopplysninger vil bli behandlet konfidensielt. Det er frivillig å delta i studien, og du kan når som helst trekke deg uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du har spørsmål til studien eller senere ønsker å trekke deg ta kontakt med Ingrid Eilertsen på epost ingrid.eilertsen@hbv.no, eller med mine veiledere professor Lisbeth Fagerström (lisbeth.fagerstrom@hbv.no) eller førsteamanuensis Pia Cecilie Bing- Jonsson (pia.bing-jonsson@hbv.no) eller førsteamanuensis Edda Johansen (Edda.Johansen@hbv.no).

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Vennlig hilsen
Ingrid Eilertsen Stipendiat,
Institutt for sykepleievitenskap Høgskolen i Sørøst-Norge
ingrid.eilertsen@hbv.no

Samtykke til deltakelse i studien

Jeg samtykker til fokusgruppeintervju etter gjennomført OSCE.

Jeg har mottatt informasjon om studien, og er villig til å delta.

(Signert av prosjektdeltaker, dato)

Appendix 9: Research approval from Norwegian Social Science Data Services sub-study II

Ingrid Eilertsen
Institutt for sykepleievitenskap (Drammen) Høgskolen i Buskerud og Vestfold
Postboks 7053
3007 DRAMMEN

Vår dato: 06.05.2016 Vår ref: 48269 / 3 / HIT Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 07.04.2016. Meldingen gjelder prosjektet:

48269	*OSCE for avansert klinisk sykepleie - Fokusgruppeintervju med studenter, sensorer og simulerte pasienter*
Behandlingsansvarlig	*Høgskolen i Sørøst-Norge, ved institusjonens øverste leder*
Daglig ansvarlig	*Ingrid Eilertsen*

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, ombudets 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, 31.08.2019, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Kjersti Haugstvedt

Hildur Thorarensen

Kontaktperson: Hildur Thorarensen tlf: 55 58 26 54
Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 48269

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivet er godt utformet, men det må tilføyes under "Hva innebærer deltakelse i studien?" at deltakelse også innebærer å bli observert under OSCE, og at videoopptak vil bli benyttet.

Personvernombudet legger til grunn at forsker etterfølger Høgskolen i Sørøst-Norge sine interne rutiner for datasikkerhet.

Forventet prosjektslutt er 31.08.2019. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)
- slette digitale lyd-/bilde- og videoopptak

Appendix 10: Information and consent form sub-study III

Universitetet i Sørøst-Norge

Forespørsel om deltakelse i forskningsprosjektet

PraksisVEL

”Kartlegging av egen kompetanse”

Bakgrunn og formål
Et doktorgradsprosjekt ved Institutt for sykepleie- og helsevitenskap, Universitetet i Sørøst-Norge (USN), har til hensikt å kartlegge kompetansen til sykepleiere som er tatt opp på ulike masterprogram. Verktøyet for å kartlegge kompetansen er et spørreskjema for selvevaluering av kliniske kompetanse. Datainnsamling i dette prosjektet vil gjøres ved hjelp av PROFFNurse SAS (The Professional Self-Assessment Scale of core competencies); et spørreskjema utviklet med tanke på egenvurdering av kompetanse.

Som sykepleier og student ved masterutdanningen avanser klinisk sykepleie ved USN, forespørres du med dette om deltakelse i dette prosjektet.

Hva innebærer deltakelse i studien?
Deltagelse i studien innebærer at du fyller ut et spørreskjema om din kompetanse. Det vil ta ca. 5-10 minutter å fylle ut skjemaet. På spørreskjemaet spørres det også om ditt navn, navn på din veileder i praksis og antall år arbeidserfaring som sykepleier. Ditt navn blir byttet ut med en kode og dine opplysninger vil bli registrert elektronisk i et dataregister. Prosjektet skal etter planen avsluttes 01.05.2020. Da vil alle koblinger mellom personidentifiserende opplysninger og dine svar makuleres.

Hva skjer med informasjonen om deg?
Alle personopplysninger vil bli behandlet konfidensielt. Det er frivillig å delta i studien, og du kan når som helst trekke deg uten å oppgi noen grunn. Hvis du fyller ut spørreskjemaet, regnes dette som et samtykke. Dersom du trekker deg, vil alle opplysninger om deg bli slettet.

Dersom du har spørsmål til studien eller senere ønsker å trekke deg ta kontakt med Ingrid Taylor på epost ingrid.taylor@usn.no, eller med mine veiledere professor Lisbeth Fagerström (lisbeth.fagerstrom@usn.no) eller førsteamanuensis Pia Cecilie Bing-Jonsson (pia.bing-jonsson@usn.no).

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Vennlig hilsen

Ingrid Taylor, stipendiat
Institutt for sykepleie- og helsevitenskap
Universitetet i Sørøst-Norge
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Appendix 11: Research approval from Norwegian Social Science Data Services sub-study III

Ingrid Eilertsen
Institutt for sykepleie- og helsevitenskap Høgskolen i Sørøst-Norge

3603 KONGSBERG

Vår dato: 16.03.2017 Vår ref: 52648 / 3 / AMS Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 31.01.2017. Meldingen gjelder prosjektet:

52648	*Nurse practitioner students' development of competence after clinical studies*
Behandlingsansvarlig	*Høgskolen i Sørøst-Norge, ved institusjonens øverste leder*
Daglig ansvarlig	*Ingrid Eilertsen*

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, ombudets 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, 01.05.2020, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Kjersti Haugstvedt

Anne-Mette Somby

Kontaktperson: Anne-Mette Somby tlf: 55 58 24 10
Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 52648

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivet er godt utformet.

Personvernombudet legger til grunn at forsker følger Høgskolen i Sørøst-Norge sine rutiner for datasikkerhet. Dersom personopplysninger skal sendes elektronisk, bør opplysningene krypteres.

Forventet prosjektslutt er 01.05.2020. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)

Appendix 12: Review of PROFFNurse SAS II in connection to the Caring APN model

The core of the Caring APN model	32. I take full responsibility for my own actions
	41. I reflect on my actions
Direct clinical practice	1. I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with complicated medical conditions
	2. I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with uncomplicated medical conditions
	3. I plan and prioritise nursing and medical interventions
	4. I identify patients' health problems
	5. I assess patients' symptoms
	6. I evaluate and modify patients' medical treatment
	7. I exclude differential diagnoses when assessing patients' health conditions
	8. I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)
	9. I apply both subjective and objective methods when examining, treating and caring for patients
	10. I utilise medical equipment in an appropriate and accurate manner
	11. I have knowledge of the effects of medication and treatment for the patients I am responsible for
	12. I identify changes in patients' health and medical conditions
	13. I develop and administer health-promoting and illness-preventive actions for patients
	14. I systematically gather information from each patient about her/his health resources
	15. I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for
Ethical decision-making	24. I act ethically when caring for patients
	28. I maintain an ethical approach towards my colleagues
	30. I put emphasis on patients' own wishes when assessing and planning for nursing care and medical treatment
	33. I am correct and accurate in speech and writing
	34. I understand the consequences my decisions may have for patients
	42. I analyse and evaluate my work continuously
	50. I report all incidents in accordance with the actual patient safety system
Coaching and guidance	27. I support and guide patients in mastering their illnesses and health problems
	47. I give health promotion and illness preventive recommendations in accordance with national guidelines to patients
	48. I have a supportive ongoing dialogue with patients about their needs and wishes
	49. I focus on relatives' need for support and guidance
Consultation	21. I take patients' mental health needs (mood swings, feelings of hopelessness, depression, etc.) into account when assessing and planning for the health and life situation of patients

	22. I take patients' spiritual health needs (feelings of meaninglessness, existential needs, beliefs, fear of death, etc.) into account when assessing and planning for the health and life situation of patients
	23. I take patients' physical health needs (illness, pain, disabilities, etc.) into account when assessing and planning for the health and life situation of patients
	26. I take patients' social health needs (leisure activities, friends, financial situation, etc.) into account when assessing and planning for the health and life situation of patients
	37. I consult other professional experts when required
	45. I assess patients' health needs by telephone, e-mail or other electronic devices
	46. I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices
Collaboration	35. I experience a division of responsibility between the physician and me as a nurse
	36. I cooperate well with the physician
	38. I cooperate actively with other health professionals when coordinating patients' nursing, care and treatment
Case management	25. I identify and assume responsibility for patients' own health resources in planning nursing care
	40. I document the steps taken in assessing patients' needs for nursing, care and treatment
	43. I perceive opportunities and have visions for how nursing and clinical paths for patients can be developed
Research and development	17. I participate in quality development at my workplace
	18. I take responsibility for competence development at my workplace
	20. I am actively responsible for my own professional development
Leadership	19. I improve routines/systems that fail to meet the needs of patients at my workplace
	31. I make my own decisions in my work
	44. I have a vision of how nursing should be developed at my workplace

Paper I

Taylor, I., Bing-Jonsson, P., Wangensteen, S., Finnbakk, E., Sandvik, L., McCormack, B., & Fagerström, L. (2020). The self-assessment of clinical competence and the need for further training: A cross-sectional survey of advanced practice nursing students. *Journal of Clinical Nursing, 29*(3–4), 545–555. https://doi.org/10.1111/jocn.15095

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ORIGINAL ARTICLE

Journal of Clinical Nursing WILEY

The self-assessment of clinical competence and the need for further training: A cross-sectional survey of advanced practice nursing students

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Abstract

Aims and objectives: (a) To describe and analyse advanced practice nursing students' self-assessment of their clinical competence and need for further training and (b) to analyse the possible predictive variables in their self-assessment.

Background: The self-assessment of clinical competence in nursing education is important for identifying professional development and educational needs to improve patient care.

Design: A cross-sectional survey following STROBE guidelines was used.

Methods: Ninety-nine students from three universities/university colleges in Norway participated in the study, and data were collected using a revised version of the Professional Nurse Self-Assessment Scale II. Descriptive, correlation and regression analyses were performed.

Results: The students gave the highest self-assessment ratings for their clinical competence in taking full responsibility and for their need for further training in medication effects and interactions. Although the students gave themselves low ratings for the use of electronic devices, they assessed their need for further training in this area as average. Clinical work experience as a registered nurse and previous higher education level were not significant predictors of clinical competence nor the need for further training.

Conclusion: The findings indicate that self-assessment is appropriate for students in advanced practice nursing programmes. This study implies that programmes in advanced practice nursing need to familiarise students with the possibilities of information technology. It questions the entry requirement that stipulates that prospective students must have several years of clinical work experience as registered nurses before entering advanced practice nursing programmes. These programmes need to

communicate that competencies other than direct clinical practice are also needed for students' future roles.

Relevance to clinical practice: The study contributes to the exploration of how students self-assess own clinical competence and need for further training in advanced practice nursing programmes. Further research should evaluate the development of clinical competence.

KEYWORDS

advanced practice nursing, clinical competence, nurse education, patient safety, self-assessment

1 | INTRODUCTION

The emergence of the role of advanced practice nurses (APNs) has been a reflection of the needs within population and health services for improved diagnostic and treatment services (Fealy et al., 2018). In numerous Organisation for Economic Cooperation and Development (OECD) countries, APNs contribute to the creation of new complementary roles in clinical settings, where nurses have expanded their practice profiles and where task-shifting between nurses and physicians has begun to take place (Maier, Aiken, & Busse, 2017). Studies have reported positive health outcomes in primary care in association with nurse substitution of physicians, which has also been shown to reduce the risk of patient mortality in acute care areas (Coster, Watkins, & Norman, 2018; Laurant et al., 2018).

According to the definition by the International Council of Nurses (ICN, 2019), an APN has an expert knowledge base, complex decision-making skills and clinical competencies for expanded practice. Furthermore, the characteristics of the role should be shaped by the context or country in which it is conducted, and a master's degree is recommended for entry level. Sheer and Wong (2008) emphasised that the definition of an APN must be interpreted and realised within each country's specific healthcare environment context. Worldwide, APN roles were first introduced in the USA, while in Europe, the UK has the longest history of APN development (Sheer & Wong, 2008). More recently, APN roles have also emerged in the Nordic countries: Sweden, Finland, Iceland and Norway (Eriksson, Lindblad, Möller, & Gillsjö, 2018; Fagerström & Glasberg, 2011; Henni, Kirkevold, Antypas, & Foss, 2018; Oddsdottir & Sveinsdottir, 2011).

In nursing research, the definition of clinical competence has been widely discussed; however, a consensus on a holistic view of the concept is emerging, and this definition includes the practitioner's knowledge, skills, values and attitudes (Yanhua & Watson, 2011). To measure clinical competence, a self-assessment of nursing competence has been used in research both to identify the professional development and educational needs areas, and to ensure that clinical competence is being put to use in the best possible way for patients (Meretoja, Isoaho, & Leino-Kilpi, 2004). Therefore, the present article analyses how APN students self-assess their own clinical competence levels and need for further training, with the purpose to provide additional knowledge that is beneficial when planning and improving APN education.

What does this paper contribute to the wider global clinical community?

- The paper argues that the use of self-assessment is an appropriate method for evaluating students' clinical competence and need for further training in advanced practice nursing programmes.
- The study questions the entry requirement that stipulates that prospective students must have several years of clinical work experience as registered nurses before entering advanced practice nursing programmes.
- Advanced practice nursing programmes could benefit from a clearer educational profile that involves more than direct clinical practice at an advanced level.

2 | BACKGROUND

To assess clinical competence, we need valid and reliable instruments. Several generic self-assessment instruments exist for registered nurses (RNs) at the bachelor's level (Cowan, Wilson-Barnett, Norman, & Murrells, 2008; Meretoja et al., 2004; Nilsson et al., 2014; Wu, Enskar, Pua, Heng, & Wang, 2016). The Advanced Practice Nursing Competency Assessment Instrument (APNCAI) was published for competency assessment in healthcare policy programmes for APNs in Spain (Sastre-Fullana et al., 2017); this instrument was published after the data collection for the present study began. The Nurse Competence Scale (NCS) is the most widely used generic instrument to measure the competence of RNs (Flinkman et al., 2017; Meretoja et al., 2004). The NCS contains 73 items and is based on Benner's domains of clinical expertise (Meretoja et al., 2004).

Inspired by the NCS, the Nurse Clinical Competence Scale (NCCS) instrument, with its 67 items, was developed to assess advanced clinical competence, including additional variables such as history taking, physical assessment and clinical decision-making (Nieminen & Fagerström, 2006). Seven new items were added to the NCCS in preparation for a Norwegian study, and then, the instrument was subjected to an exploratory factor analysis, resulting in a 51-item questionnaire called the Professional Nurse

Self-Assessment Scale (PROFFNurse SAS; Finnbakk, Wangensteen, Skovdahl, & Fagerström, 2015). The factor analysis revealed six components: direct clinical practice, professional development, ethical decision-making, clinical leadership, cooperation and consultation, and critical thinking (Finnbakk et al., 2015). The epistemological foundation of the PROFFNurse SAS is based on a life-learning perspective and the Aristotelian dimensions of knowledge: epistêmê, technê and phronesis (Fagerström, 2011a; Finnbakk et al., 2015). The theoretical framework of the PROFFNurse SAS is based on the Nordic APN model (Fagerström, 2011b), which is, in turn, based on the ICN's (2019) definition and Hamric's APN framework (Hamric & Tracy, 2018). Furthermore, the PROFFNurse SAS is underpinned by values that are closely linked to "knowing the patient," which is a notion found in person-centredness (McCormack & McCance, 2016), providing a holistic and moral commitment in relation to the nurses' clinical competence in taking care of patients' physical, social, mental and spiritual needs (Fagerström, 2011a; Finnbakk et al., 2015).

Wangensteen et al. (2018) sought to further develop the PROFFNurse SAS instrument and consequently developed a modified version of this questionnaire that contains 50 items on two scales—the self-assessment of clinical competence scale and the need for further training scale (PROFFNurse SAS II). A total of 97 RNs in specialist postgraduate or master's programmes from the Netherlands, UK, Iceland, Norway and Sweden responded to the PROFFNurse SAS II. The mean age of the students was 39 years, and the mean clinical work experience as a RN was 12 years. The students gave the highest self-assessment rating to their own clinical competence in taking full responsibility for patients and identified the most prominent need being further training in the effects and interactions of medications. In addition, the students in the master's programmes rated their clinical competence higher than the students in the specialist programmes, while the students in the specialist programmes rated their need for more training higher than the students in the master's programmes. There was a significant negative correlation between the responses on the students' self-assessed clinical competence and need for further training (r = .455), meaning that the higher the students assessed their clinical competence, the less need for further training they had. For the students' self-assessment of clinical competence, the need for further training and age were found to be significant predictors. For the students' need for further training, the students self-assessed clinical competence and master's versus specialist programmes were found to be significant predictors (Wangensteen et al., 2018).

Leonardsen, Bjerkenes, and Rutherford (2018) collected data using the PROFFNurse SAS II from 104 primary care RNs and 26 tertiary care ward RNs in Norway. Significant differences were found at the item level for five items regarding taking the patients' mental, spiritual, physical and social health needs into account when assessing the patients and focusing on their relatives' need for support and guidance. The study did not find any associations between clinical work experience as a RN and their clinical competence, nor between their previous higher education level above a bachelor's degree in nursing and the need for further training.

To the best of the authors' knowledge, the PROFFNurse SAS II is the only published questionnaire that measures clinical competence at all levels of nursing. In the present study, we collected data from students in APN programmes using the PROFFNurse SAS II. The purpose of the present study was to identify the professional development and educational needs areas that could improve patient care. This knowledge can be beneficial when planning and improving APN education. The aims of the present study were the following: (a) to describe and analyse the self-assessment of clinical competence and the need for further training and (b) to analyse the possible predictive variables in self-assessment among APN students. The research questions were the following:

- What were the students' highest self-assessed clinical competence and the greatest needs for further training?
- Was there a cohesion between the students' lowest self-assessed clinical competence and their greatest need for further training?
- Are clinical work experience as a RN and previous higher education level above a bachelor's degree in nursing significant predictors for the self-assessment of clinical competence and the need for further training?

3 | METHOD

3.1 | Design

A cross-sectional survey design was applied and conducted with APN students in Norway. STROBE guidelines for observational research were followed in reporting this study (Appendix S1).

3.2 | Data collection

A total of 99 nurses in APN programmes from three different universities and/or university colleges in Norway responded to the survey. Data were collected using the instrument PROFFNurse SAS II. A convenience sample of RNs in postgraduate or master programmes in Norway was recruited. Students in five APN education programmes who met the ICN's (2019) definition of APN were invited to participate in the present study, and students in three APN programmes participated. Thus, the invitation to participate was extended to 105 APN students from three different universities and/or university colleges in Norway, and 99 responded (a response rate of 94%). The inclusion criteria were enrolment as a student in one of the three above-mentioned APN programmes and being in the first semester of their APN programme's first year. APN education in Norway is not yet regulated in terms of education, licence or credentialing requirements; thus, two of the three APN programmes were master's degree programmes of 120 European Credit Transfer System (ECTS), and one was a postgraduate programme consisting of 60 ECTS, which can be thought of as equivalent to the first year of a master's degree programme (see Table 1 for more detailed descriptions of the programmes).

TABLE 1 Description of the APN programmes

	ECTS	APN role	Entry requirements	Clinical studies during the education
APN programme # 1	60 credits	Nurse practitioner	Bachelor as RN. Minimum two years of relevant clinical work experience as a RN over the past five years	Five weeks of clinical studies, with 30 hr of study per week and a self-study day for work with work requirements related to direct clinical practice. This amounts to about 200 hr (9.5 credits)
APN programme # 2	120 credits	Not specified	Bachelor as RN. Minimum two years of relevant clinical work experience as a RN	Duration of 400 hr, with clinical studies
APN programme # 3	120 credits	Nurse practitioner	Bachelor as RN. Minimum three years of relevant clinical work experience as a RN	Fifteen weeks of 30 hr of compulsory guided clinical studies placed in the third and fourth semester. This amounts to 450 hr (15 credits)

Note: Though the programmes varied in their credits, all three programmes had learning outcomes of clinical competence focused on direct clinical practice at an advanced level above a bachelor's degree in nursing to meet present and future healthcare needs.

Data were collected using the PROFFNurse SAS II questionnaire. This 50-item questionnaire included one A-scale—for the self-assessment of clinical competence—and one B-scale—for the self-assessment of the need for further training. The response options on the scales ranged from 1–10, where 1 indicates a poor level of clinical competence or minor need for further training, and 10 indicates an excellent level of clinical competence or great need for further training. The questionnaire also included an option for "entirely missing competence" on the A-scale (clinical competence) and the "no need" and "competency not covered in the programme" options on the B-scale (need for further training). "Entirely missing competence" and "no need" options were treated as zero and included in the analysis. The "competency not covered in the programme" option was treated as an invalid value and was not included in the analysis. Tables 3 and 4 report the number of participating students who used this option.

The students were invited to participate through a printed handout of the questionnaire. The questionnaires were distributed at each of the included universities or university colleges during a lecture for its APN programme and with permission from the programme leader. Data collection was carried out from August 2015–August 2018. Two of the authors collected the data for two of the APN programmes (I. T. and L. F.), while the APN education programme leader collected the data from the third APN programme. Written information was provided to the participants about both the questionnaire and the self-assessment.

3.3 | Data analysis

Of all the participants (n = 99) in the present study, 64% (n = 63) responded to all of the items on the questionnaire. The A-scale (clinical competence) and the B-scale (need for further training) had a total response rate of 79% (n = 78) and 67% (n = 66), respectively. Participants who had less than 10 missing items (18% of the items) were included in the study. As a result, three participants were excluded from the A-scale analysis and two participants from the B-scale analysis. For those participants with less than 10 missing items who met the inclusion criteria (n = 33), the case mean substitution technique was used to replace missing data because this technique is recommended in self-assessment studies (Fox-Wasylyshyn & El-Masri, 2005).

Multiple linear regression analyses were conducted, with the total A-scale score for the self-assessment of clinical competence and the total B-scale score for the need for further training being used as the dependent variables. The independent variables were age, years of clinical work experience as a RN and previous higher education level (above a bachelor's degree in nursing level) measured in ECTS credits. We assessed the dependent variables as normally distributed and fit for parametric analysis. Forced entry, also known as the *Enter* method in Statistical Package for the Social Sciences (SPSS), was chosen for the regression analysis, in which all the predicting variables were simultaneously entered (Field, 2018). A backward variable selection method was then used, and the predictors that were not statistically significant were removed one at a time. The model was subsequently re-estimated for the remaining predictors to build a model that would contain only statistically significant predictors (Field, 2018). A regression analysis was also performed on the single items that correlated significantly with the years of clinical work experience as a RN (three items) and with previous higher education in ECTS credits (above a bachelor's degree in nursing level; five items). The confidence interval for the total A-scale was calculated to provide a justification of the sample size based on precision (Julious, Tan, & Machin, 2010).

The PROFFNurse SAS II questionnaire is built on the previously validated PROFFNurse SAS questionnaire by Finnbakk et al. (2015). In the present study, the PROFFNurse SAS II was assessed for internal consistency, and the obtained Cronbach's alpha values were .936 for the A-scale and .979 for the B-scale. In each statistical analysis, a significant level of .05 was used. IBM® SPSS v25 was used for data analysis.

3.4 | Ethical considerations

The project was reported to the Norwegian Social Science Data Services (NSD, approval number 44140). In conjunction with the Declaration of Helsinki (World Medical Association, 2013), the

participants were advised in writing that their participation in the study was voluntary; they were informed of the aims of the project beforehand and advised of their right to withdraw from the project without having to provide a reason why and without any consequences for withdrawal. This information was also repeated orally when the questionnaires were distributed. The APN programme leader granted us access to the students. An ethical issue, in the form of students feeling obliged to participate, is inherent when their faculty is engaged (Ferguson, Myrick, & Yonge, 2006). To address this concern, the first author of the present study—a PhD student without a teaching affiliation—collected the data whenever possible. In addition, the APN education programme leader collected data from the third APN programme, and participation was anonymous. Because the data were anonymous, there was no opportunity for the APN students to withdraw from the study after participation.

4 | RESULTS

The mean age of the APN students in the present study (n = 97) was 39 (range: 24–59). The participant group was mainly female, consisting of 93 women and six men. With the exception of one student, all of the APN students were part-time students. The mean number of years of clinical work experience as a RN for all participants was 11.5 (range: 1–33 years). Furthermore, their mean number of years of clinical work experience as a RN was 6.8 for primary health care (range: 0–27 years) and 4.1 years for specialist health care (range: 0–20). Before entering their postgraduate programmes, 46 of the participants (n = 46%) had previous higher education level (ECTS). Among these, 36 participants (n = 36%) had obtained more than 30 ECTS.

The 10 items for which the APN students rated their clinical competence to be the highest (A-scale) were mainly related to responsibility and cooperation (Table 2).

Of the 10 items for which the APN students rated their need for further training to be the greatest (B-scale), the first seven items were related to direct clinical practice, whereas the last three items were related to improving routines or systems, having a vision for developing nursing and generating a creative learning environment (Table 3).

The 10 items for which the APN students rated their clinical competence to be the lowest (A-scale) mainly concerned direct clinical practice; these are presented in Table 4. The 10 lowest-rated items of clinical competence were compared with the top 10 items identified as the most prominent needs for further training—seven items were found to be identical. Item no. 18 "take responsibility for competence development" was tenth on the list of the lowest clinical competences but was not among the list of the top 10 greatest needs for further training. However, item no. 18 follows this pattern of cohesion because it has a high mean score for the need for further training (item score: 7.50 vs. the total mean score of the scale: 6.80); this indicates a cohesion between what the APN students assessed having the lowest clinical competence in and what they assessed to be their greatest need for further training. Only two items strayed from this pattern. These items were regarding the use of electronic devices when giving health promotion advice and recommendations and assessing the patients' health needs.

The total mean score for clinical competence (A-scale) was 6.95 (*SD* 0.92, 95% CI: 6.77–7.14), and the total mean score for the need for further training (B-scale) was 6.80 (*SD* 1.79). One important question in research studies is whether the sample size is sufficient to answer

TABLE 2 Top 10 self-assessment of clinical competence items (A-scale)

Item no.	Item	Mean	*SD*
32	I take full responsibility for my own actions	8.89	1.20
39	I am cognisant of when my medical knowledge is insufficient when assessing patients' health conditions	8.79	1.28
37	I consult other professional experts when required	8.35	1.83
36	I cooperate well with the physician	8.23	1.70
41	I reflect on my actions	8.19	1.50
34	I understand the consequences my decisions may have for patients	8.18	1.25
29	I take active responsibility for creating a good working environment	8.16	1.53
20	I am actively responsible for my own professional development	8.15	1.79
38	I cooperate actively with other health professionals when coordinating patients' nursing, care and treatment	8.08	1.58
31	I make my own decisions in my work	7.96	1.46

Note: Items in grey were also among the top 10 items (A-scale) in Wangensteen et al.'s (2018) study.

TABLE 3 Top 10 need for more training items (B-scale)

Item no.	Item	Mean	*SD*
15	I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for	8.43	1.97
8	I interpret, analyse, and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)	8.31	1.68
6	I evaluate and modify patients' medical treatment	8.21	1.84
7	I exclude differential diagnoses when assessing patients' health conditions	8.14	1.94
11	I have knowledge of the effects of medication and treatment for the patients I am responsible for	8.14	1.95
1	I am independently responsible for health assessment (systematic physical examination), examinations, and treatment of patients with complicated medical conditions	7.97[a]	1.93
9	I apply both subjective and objective methods when examining, treating, and caring for patients	7.76	1.93
14	I systematically gather information from each patient about her/his health resources	7.67	2.05
44	I have a vision of how nursing should be developed at my workplace	7.55	2.49
16	I generate a creative learning environment for staff at my workplace	7.54	2.64

Note: Items in grey were among the top 10 items (B-scale) in Wangensteen et al.'s (2018) study.
[a]Competency not covered in the programme: one student.

TABLE 4 The 10 lowest clinical competence items (A-scale) versus the need for more training items (B-scale)

Item no.	Item	A-scale Mean (*SD*)	B-scale Mean (*SD*)
46	I give health promotion advice and recommendations to patients by telephone, e-mail, or other electronic devices	4.58 (2.82)	6.83 (2.84)[a]
1	**I am independently responsible for health assessment (systematic physical examination), examinations, and treatment of patients with complicated medical conditions**	**5.19 (1.87)**	**7.97 (1.98)**
8	**I interpret, analyse, and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)**	**5.37 (2.01)**	**8.31 (1.66)**
45	I assess the patients' health needs by telephone, e-mail, or other electronic devices	5.54 (2.67)	6.89 (2.83)
7	**I exclude differential diagnoses when assessing patients' health conditions**	**5.51 (1.92)**	**8.14 (1.95)**
15	**I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for**	**5.63 (1.93)**	**8.43 (1.95)**
6	**I evaluate and modify patients' medical treatment**	**5.71 (1.82)**	**8.22 (1.82)**
16	**I generate a creative learning environment for staff at my workplace**	**5.87 (2.32)**	**7.54 (2.64)**
14	**I systematically gather information from each patient about her/his health resources**	**5.91 (1.90)**	**7.67 (2.03)**
18	I take responsibility for competence development at my workplace	5.88 (2.62)	7.50 (2.39)

Note: Items in **bold** were found among both the 10 lowest clinical competence items (A-scale) and the top 10 need for further training items (B-scale).
[a]Competency not covered in the programme: one student.

the research question posed. The length of the confidence interval for total A-score was 0.37 in the present study. Considering that the total length of the A-scale is 10, this length is short, indicating that the sample size in the present study is appropriate (Julious et al., 2010).

There was a significant negative correlation between the responses on the A- and B-scales (r = −.34, p = .001), meaning that the higher the APN student assessed their clinical competence, the less need for further training did they assess.

The linear regression analysis, when adjusted for age, demonstrated that clinical work experience as a RN (in years) and previous higher education level (in ECTS) were not significant predictors for increasing the total mean score of clinical competence (A-scale) or for decreasing the total mean score of the need for further training (B-scale). However, when adjusted for age, the linear regression analysis on single items showed that clinical work experience as a RN (in years) was a significant predictor for one particular item of clinical competence (A-scale) on generating a creative learning environment (Table 5). Respectively, previous higher education level (in ECTS), when adjusted for age, was a significant predictor for two items on the need for further training (B-scale). These two items were relating to improving routines or systems and giving health promotion advice and recommendations to patients by electronic devices (Table 6). Though clinical work experience and previous higher education level were associated with individual outcome variables, the amount of variation described by these models was very low (R^2 = 5%–7.5%) (Tables 5 and 6), thus suggesting that the predictor variables clinical work experience and previous higher education level, in conjunction with age, are minor possible influences.

5 | DISCUSSION

The findings indicate that a self-assessment of clinical competence has validity and reliability for APN students. First, we found that most of our top 10 highest-rated clinical competence items and the top 10 greatest needs for further training were the same items as those found by Wangensteen et al. (2018), thus indicating content validity of the PROFFNurse SAS II questionnaire. Second, the APN students' greatest need for further training—interactions and side-effects of medications—is in line with previous research findings. Researchers have reported that there is a significant risk for medication errors among RNs in hospitals and nursing homes because of a lack of pharmacological knowledge (Andersson, Frank, Willman, Sandman, & Hansebo, 2018; Simonsen, Johansson, Daehlin, Osvik, & Farup, 2011). Our findings indicate that the APN students are attentive to this knowledge gap and self-assess their own clinical competence to be insufficient. Third, the APN students reported that they have a high clinical competence in being cognisant of their insufficient medical knowledge; this is supported by the clear cohesion between the self-assessed clinical competence and the need for further training. In addition, we found that the higher the APN students assessed their clinical competence, the less need they saw for further training (r = −.34), indicating a relatively strong correlation (Pallant, 2016), which was also found by Wangensteen et al. (2018). This shows that for areas in which the APN students lack clinical competence, they tend to report a need for further training and vice versa, indicating a reliability between the scales.

Although self-assessment has been criticised in previous research on bachelor nursing education as an ineffective method for determining an individual's strengths in a clinical setting (Baxter & Norman, 2011), the findings from the present study support the use of self-assessment for APN students. Previous work on the Dunning–Kruger effect has shown that poor performers overestimated their performance, while top performers underestimated it (Kruger & Dunning, 1999). However, the Dunning–Kruger effect may have undersold the top performers' accurate judgements of self- and peer performance because of statistical artefacts rather than intellectual shortcomings (Schlösser, Dunning, Johnson, & Kruger, 2013).

TABLE 5 Regression: Self-assessment (A-scale) mean score at item level versus years of experience as an RN, adjusted for age

Item	Regression: Years of experience as an RN
16 A-scale: I generate a creative learning environment for staff at my workplace	B = 0.147 adjusted R^2 = .075 Sig = 0.012

TABLE 6 Regression: Need for further training (B-scale) mean score at the item level versus previous higher education level above a bachelor's degree in nursing, adjusted for age

Item	Regression: Previous higher education level above a bachelor's degree in nursing
19 B-scale: I improve routines/systems that fail to meet the needs of patients at my workplace	B = 1.280 adjusted R^2 = .050 Sig = 0.014
46 B-scale: I give health promotion advice and recommendations to patients by telephone, e-mail, or other electronic devices	B = 1.391 adjusted R^2 = .064 Sig = 0.016

Thus, while the usefulness of self-assessment for bachelor students is debated, this study argues for the use of self-assessment for APN students.

The findings of the present study show a strong connection between what the APN students assessed that they have the least clinical competence in and what they assessed to be their greatest need for further training, except for the two items of using telephone, e-mail or other electronic devices when "giving advice and recommendations to the patient" and "assessing the patient." The APN students self-assessed their clinical competence for these two items to be among the lowest 10 items, but they self-assessed their need for training as close to the total mean. This indicates that even though the APN students self-assessed themselves at lower levels when using electronic devices when communicating and assessing the patient, they were neutral as to whether this was important for further training. One explanation for this can be that the APN students did not have experience with using electronic devices when communicating with the patient or access to such devices in their workplace. In both primary and specialist health care, there is a lack of information and communication technology (ICT) use that could contribute to an effective exchange of patient information, management, service development, high-quality work and research (Norwegian Official Report [NOU], 2016; Øyen, Sunde, Solheim, Moricz, & Ytrehus, 2018). Undergraduate and graduate nurses may have limited skills related to ICT and patient safety; however, with proper education, they would be more likely to use ICT (Abdrbo, 2015). Thus, APN programmes need to implement ICT into their education curricula to familiarise the students with technology.

Experience in nursing is often presented as favourable for developing clinical competence, such as in Benner's (1984) domain of clinical expertise in which a nurse can develop five possible expertise levels that range from novice to expert. The predecessor instrument of the PROFFNurse SAS II is the NCS by Meretoja et al. (2004), which is based on Benner's domains. Meretoja et al. (2004) found a positive, although not strong, correlation between the age and length of clinical work experience as a RN and the level of competence. This finding was confirmed by O'Leary (2012), who also used the NCS instrument. In the study by Meretoja et al. (2004), the mean age of the RNs was 11.1 years, 15 years in O'Leary's (2012) study and 11.5 years in the present study. Therefore, the finding that clinical work experience as a RN of APN students is not a significant predictor for the total mean score of clinical competence is surprising in both Leonardsen et al.'s (2018) study and the present study. Because the RNs in the study by Leonardsen et al. (2018) had shorter clinical work experience as a RN (1.5–2.4 years) than those participating in the studies by Meretoja et al. (2004), O'Leary (2012), and in the present study, this could indicate that neither short- nor long-term experience is associated with self-assessed competence. This could further indicate that the present study found a lack of connection between the experience and the development of clinical competence.

The clinical work experience as a RN (in years) of the APN students was longer for those in primary care than in specialist care. The lack of connection between clinical work experience as a RN and the development of clinical competence could be because of the increased complexity and scope of the tasks and the need for increased clinical competence in primary health care (Norwegian Ministry of Health & Care Services, 2015). Bing-Jonsson, Hofoss, Kirkevold, Bjork, and Foss (2016) found that for RNs, assistant nurses and assistants, the years spent at their current workplace and in community care (i.e., years of clinical work experience) were not significant predictors for competence, but they found a negative association with age, indicating that competence actually decreased as age increased. Furthermore, Ravik, Havnes, and Bjørk (2017) found that experience alone was not sufficient for developing a nursing skill in bachelor education, especially when the nursing student was more attentive to skill performance and less on gaining scientific knowledge related to safeguarding the patient. In Knowles' (2015) andragogic assumptions, the prior experience of the learner can have both a positive and negative effect on learning. Although experience can be a rich resource for learning, it can also lead to closing off the mind to new ideas, fresh perceptions and alternative ways of thinking as a result of the mental habits, biases and presuppositions that tend to develop as experience is accumulated. For a nurse to move beyond habit-based practice and develop expertise, critical thinking must be used to link theoretical knowledge with the knowledge obtained from experience to inform their ongoing practice (Christensen & Hewitt-Taylor, 2006).

The lack of a connection between experience and the development of clinical competence needs to be further explored in the context of APN education. For instance, in all APN programmes included in the present study, there is an entry requirement that stipulates that prospective students must have two to three years of clinical work experience as a RN. However, the findings from the present study do not necessarily support this entry requirement, and more research is needed to further explore suitable and necessary prerequisites for entry into an APN programme. Because neither clinical work experience as a RN nor previous higher education level predicted self-assessed clinical competence and the need for further training, there is a chance that the above-mentioned entry requirement is not sufficient to ensure the acceptance of qualified students. On the contrary, it might actually exclude students who are qualified to be APNs and who, without such a requirement, could move straight from a bachelor's programme into an APN programme.

The findings of the present study and those of Wangensteen et al. (2018) indicate that the students primarily self-assessed their greatest needs for training with respect to direct clinical practice. Of the APN students' top 10 needs for further training, seven of the items were related to direct clinical practice, including physical examination, differential diagnoses, decision-making skills and diagnostic reasoning. Because the study by Wangensteen et al. (2018) had similar findings, this could indicate a trend in Northern Europe in which the RNs in postgraduate and master education view direct clinical practice as the most important clinical competence for their future. The ICN's definition of the APN (ICN, 2019), Hamric's framework of the APN (Hamric & Tracy, 2018) and the Nordic APN

model (Fagerström, 2011b) all characterise direct clinical practice as the core of the ANP role. However, they also emphasise that other competencies are important, such as case management and leadership. Thus, APN programmes need to prepare students for a range of learning outcomes that are relevant and to communicate how different competencies together contribute to clinical competence at an advanced level.

5.1 | Limitations

The present study is a cross-sectional survey using a convenience sample. Not all APN programmes in Norway participated in the study. However, the APN students came from three different universities or university colleges. As of 2015, two of these programmes represented 50% of all APN programmes in Norway. The third programme was added to the present study in 2017. In future research, it would be beneficial to include a larger sample from various programmes at several universities to obtain more rigorous findings of clinical competence and need for further training. Although the programmes had different lengths and credits, the learning outcomes of the programmes mainly focused on clinical competence, which is what is measured in the PROFFNurse SAS II. Also, the measurement took place at the beginning of the education programmes; therefore, the students would not have had significantly different experiences that would have influenced their responses. Further, the authors acknowledge that the data were collected over a longer period of time. The APN programmes were all relatively new in Norway (Henni et al., 2018), and usually, these programmes have small cohorts; thus, it took time to recruit participants. The authors are familiar with the fact that programme content has been stable over the past four years. The present study also found high Cronbach's alpha values. Because the PROFFNurse SAS II includes many items, internal consistency could be influenced by this, and the analysis could therefore be questioned (Field, 2018). Thus, further validation testing of the instrument is needed.

6 | CONCLUSION

When exploring the APN students' self-assessment of clinical competence and the need for further training, our findings provide a clear indication of how the students perceived their level of clinical competence and learning needs, which can be beneficial when planning and improving the future of APN education.

The students self-assessed their clinical competence to be the highest, primarily regarding responsibility and cooperation, and taking responsibility for one's actions was the highest self-assessed item. In addition, the students' most prominent self-assessed need for further training mainly concerned direct clinical practice, and the interactions and side-effects of medications were rated to be their greatest need for further training. Finally, both clinical work experience as a RN and previous higher education level above a bachelor's degree in nursing were the only significant predictors for one item of clinical competence and two items of need for further training.

The students' self-assessment was found to be valid and reliable; thus, our findings advocate for the use of APN students' self-assessment to identify areas for their future professional development and educational needs. Furthermore, the present study advises APN programmes to educate their students in the possibilities presented by ICT to increase the use of this technology in a clinical setting. The findings also lead us to question the entry requirement that stipulates that prospective students must have prior clinical work experience as a RN before entering an APN programme because neither clinical work experience as a RN nor previous higher education level above a bachelor's degree in nursing predicted self-assessed clinical competence and the need for further training. Our findings further indicate that there is a current trend in Northern European countries for APN students to perceive competencies regarding direct clinical practice as the most important.

7 | RELEVANCE TO CLINICAL PRACTICE

Self-assessments for APN students can be used to identify the level of clinical competence and educational needs for their future role. Further research is needed to address the entry requirement of clinical work experience as a RN for APN programmes to secure a sustainable recruitment profile of qualified future students. In addition, APN programmes also need to emphasise that competences other than direct clinical practice, such as case management and leadership, are important for the overall advanced clinical competence of an APN.

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CONFLICT OF INTEREST

No conflict of interest is declared by the authors.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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Original research

The Objective Structured Clinical Examination in evolving nurse practitioner education: A study of students' and examiners' experiences

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ABSTRACT

Assessment of advanced clinical competence is essential for safe practice and achieving international standards for nurse practitioners. It is of particular interest for countries that have recently been introduced to advanced nursing roles to investigate examination forms that ensure quality in nurse practitioner education. The aim of this study was to explore and describe the nurse practitioner students' and examiners' experiences with Objective Structured Clinical Examination, which is an exam form for assessing clinical competence. Five focus groups, consisting of 15 nurse practitioner students (n = 15) and five individual interviews with examiners (n = 5), were conducted in June 2016 and analysed using thematic analysis. The nurse practitioner students and examiners experienced the exam as an appropriate method of assessment for advanced clinical competence, although they experienced some challenges with its form. Consequently, the results of this study advocate for a course design that includes: constructive alignment between the course and the exam, more training with real patients, use of formative and summative assessment and a second exam with a real patient after the student's clinical placement. The lack of a clear nurse practitioner role in countries with evolving advanced nursing roles can challenge the expected level of advanced clinical competence in an educational context.

1. Introduction

Advanced Practice Nurses (APNs) were introduced into health care systems worldwide to meet health care demands and improve quality of care and treatment (Laurant et al., 2018; Martínez-González et al., 2014; Newhouse et al., 2011). The Nurse Practitioner/Advanced Practice Nurses Network (NP/APNN) of the International Council of Nurses (ICN, 2019) provides the following definition: 'A Nurse Practitioner/Advanced Practice Nurse is a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A master's degree is recommended for entry level'. The Nordic APN model by Fagerström (2011) has eight central competency domains: direct clinical praxis, ethical decision-making, coaching and guidance, consultation, cooperation, case management, research and development and leadership. A premise for the coaching role of an NP/APN is a person-centred approach to the patient (Fagerström, 2011), which can be understood as holding the person's values central during decision-making (McCormack et al., 2017). Thus, it can be argued that the NP/APN role contributes to more person-centred health care since NPs/APNs have been reported to provide the same high level of quality care as general practitioners with greater patient satisfaction (Laurant et al., 2018).

Nordic nursing leaders suggest that there is a need for APN roles in primary health care (Christiansen and Fagerström, 2016). In Norway, research indicates that the NP role can make a valuable contribution for non-urgent patients with extensive care needs in the emergency care context (Boman et al., 2018). The Norwegian government has recommended to establish NP master programmes, aiming at new tasks that follow a reorganisation in the municipal health and care services, such as consultations of patients with chronic disease (Ministry of Health and Care Services, 2015). To this end, Norway has recently introduced NP master programmes that carry the core elements of developing and assessing advanced clinical competence. The Objective Structured Clinical Examination (OSCE) has been introduced as a solution to the complexity of assessing advanced clinical competence within Norwegian NP master programmes.

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1.1. Background

The OSCE was originally designed for medical students as an examination that could objectively assess a range of competencies expected of a student in different stations using checklists and rating scales to be completed by the examiner (Harden, 2016). However, the use of OSCE in nursing education has been criticized for fragmenting holistic patient care by designating different stations (Rushforth, 2007). Thus, nursing education tends to focus on the integrated assessment tasks approach—or a total patient consultation that conforms to real-life clinical settings—which is referred to as the Objective Structured Clinical Assessment (OSCA) (Ward and Willis, 2006). This approach is in line with the holistic view of clinical competence that includes knowledge, skills, values and attitudes (Yanhua and Watson, 2011). On the other hand, the OSCE comprises of simulated clinical situations for NPs that include assessments of advanced skills, such as history taking and physical assessments (Ward and Barratt, 2009). Some authors, such as East et al. (2014), do not distinguish between the OSCE and the OSCA, which could indicate the inconsistent use of these terminologies and the existence of confusion regarding clinical competence assessment procedures for both approaches.

In nursing education, assessment plays a major role in certifying competent practitioners who can adequately take care of patients (Muthamilselvi and Ramanadin, 2014). According to Walsh et al. (2009), objectively assessing and evaluating nursing students' clinical competence is one of the most challenging tasks in nursing education due to health care system complexity and to the dynamic, revolutionary nature of nursing itself. While some concerns have been reported about the OSCE, such as cost and labour intensity (Palese et al., 2012), the validity of simulation (Rushforth, 2007) and student stress (Miller and Carr, 2016), a consensus about the OSCE as a valid and reliable assessment of clinical competence has emerged (Bagnasco et al., 2016; Barry et al., 2013; Najjar et al., 2016; Navas-Ferrer et al., 2017).

There is, however, a lack of research on the perspectives of students about the OSCE in nursing education (Johnston et al., 2017; Muldoon et al., 2014), which is surprising since students are integral to the overall OSCE performance (Johnston et al., 2017). While Johnston et al. (2017) showed that bachelor level nursing students found value in the OSCE, despite the stress and anxiety provoked by the assessment, Muldoon et al. (2014) showed that midwifery students were either neutral or unsure towards the OSCE as an assessment for clinical competence. Little is known about the NP experiences with the OSCE. Thus, further exploring student experiences together with examiner experiences can contribute to a broader perspective, which can facilitate a deeper understanding of the assessment of advanced clinical competence. In addition, research is also lacking on the OSCE for European countries outside the United Kingdom, indicating a need to determine whether the assessment is culturally sensitive, valid and reliable (Bagnasco et al., 2016). For countries with evolving NP/APN education, the assessment of advanced clinical competence must be investigated as a means of achieving the international NP/APN standards described by the ICN (2019): an expert knowledge base, complex decision-making skills and clinical competencies for expanded practice.

This study explores and describes the experiences of both NP students and examiners with the OSCE in a newly developed master programme at an eastern Norway university (Table 1). These experiences were collected to enhance the existing and evolving NP educational programmes. Thus, the purpose of the study is to retrieve knowledge that can be used to improve the assessment of advanced clinical competence in NP education. To the authors' knowledge, this is the first study on NPs and the OSCE in Scandinavia.

2. Method

2.1. Aim

The aim of this study was to explore and describe NP students' and examiners' experiences with the OSCE in order to further improve the assessment of clinical competence in NP education.

2.2. Design

A qualitative descriptive study was designed to produce findings that present 'the facts of the case in an everyday language' (Sandelowski, 2000, p. 336). By 'facts', Sandelowski (2000) does not refer to an objective reality when describing what is being observed, as a human is neither able nor likely to do so. Instead, she refers to the choices made by the observer when describing what exists that have descriptive and interpretive validity (Sandelowski, 2000).

With the NP students, focus groups were chosen to explore and clarify individual and shared perspectives through group discussions (Polit and Beck, 2017). Individual semi-structured interviews were conducted with the examiners to obtain information on their experiences, allowing the participants to talk freely and use their own words (Polit and Beck, 2017). While the use of examiner focus groups was considered, individual interviews were chosen due to practical considerations, such as geographical distances and scheduling, for the participants.

2.3. Participants

The participants were 15 NP students and five examiners. Purposeful sampling was used to recruit the participating students and examiners from a course in Systematic Clinical Assessment and Health Assessment as part of an NP master programme (Table 1). Purposeful sampling was employed to identify and select information-rich cases that would illuminate the aim of the study (Patton, 2015). An inclusion criterion was that the participants be either students or examiners in a course utilising the OSCE as an examination. The participants were informed of the study in writing through email at the beginning of the course and were recruited during the course. All students and examiners that met the inclusion criteria participated in the study, except for one examiner who is a co-author.

The students were at the end of the first year of their master programme and had at least five years of work experience as an RN in either specialist health or primary health services. The examiners were a Norwegian NP, two British NPs and two Norwegian physicians. The British examiners had extensive experience at another university with the OSCE as an examination form. The Norwegian examiners had no prior experience with the OSCE. All examiners taught during the course or during previous courses in the master programme. Additional participant characteristics are presented in Table 2.

2.4. Data collection

For practical reasons and out of consideration for the participants, five focus groups with three participant students in each group (n = 15) and five individual interviews with examiners (n = 5) were conducted from 13 to 24 June 2016. Four of the focus groups were conducted at the university campus on the same day that the students completed their OSCEs. The fifth focus group was conducted approximately one week after the OSCEs in one of the students' workplaces. The interviews with the examiners were conducted within a week after all the students had completed their OSCEs at either their workplace or the university campus. The focus groups lasted from 65 to 98 min and the individual interviews lasted from 56 to 70 min. All focus groups and interviews were conducted by the first author and were audiotaped. The focus groups were transcribed by the first author, while the individual

Table 1
Objective Structured Clinical Examination (OSCE) in a nurse practitioner (NP) master programme.

Learning outcomes in the NP master programme

The overall learning outcome for the master programme is to educate NPs with advanced clinical competence according to the International Council of Nurses (ICN) definition of an NP/APN to take on an expanded and independent role with considerable direct patient care that promotes person-centred health care. The master programme is part-time (three to four years) and has 120 European Credit Transfer and Accumulation System (ECTS).

The learning outcome of the Systematic Clinical Assessment and Health Evaluation course was to enable students to acquire a health history, conduct a structured physical assessment and make independent clinical decisions based on the information gleaned. The course is 10 ECTS. The course exam was an OSCE.

The Course:

The course was preclinical and aimed to prepare the NP students for a 15-week clinical placement supervised by a physician. Each block consisted of lectures, group- and casework, video-based e-learning and guided exercises in the clinical skills lab. The students were advised to practice physical assessments in their places of work. The course examination was an OSCE, which was arranged right after the last block week of the course.

Before the course in Systematic Clinical Assessment and Evaluation, the students had completed the following courses: Introduction to APN (5 ECTS), Pathology (10 ECTS) and Pharmacology (10 ECTS).

This was the second time the course was arranged, but it was the first time the course was carried out as a part of the NP master programme.

The OSCE:

The OSCE was set up with three stations: abdominal, respiratory and neurology. However, the NP students only went through two of the three stations. The students needed to obtain an exam mark of 40% or higher to pass the course. All students passed the OSCE. The OSCE assessed how the students used the knowledge they acquired on pathology, history-taking and physical assessment techniques to suggest medical and differential diagnoses and to make clinical decisions.

During the OSCE, the students went through the stations with a simulated patient and two examiners possessing a checklist. Before entering each station, they were presented with generic history information about the patient (e.g. 'the patient is feeling unwell'). Each station lasted 30 min: 10 min for history taking, 15–20 min for physical assessment and approximately five minutes for the examiners to ask the student about 'red flags' (i.e. any suspicious symptoms of any serious medical condition, differential diagnosis or further check-ups, such as x-rays or further treatment for a condition).

The checklist was developed by experienced OSCE nurse educators and included three columns of performance ratings.

Approximately one to two weeks after the exam, the students were given written feedback.

Table 2
Demographic characteristics.

Participants			Student (N = 15) Examiner (N = 5)
Student	Age	Range	26–60 years (mean age: 43 years)
	Sex	Female	14
		Male	1
	Work setting	Primary health service	10
		Specialist health services	5
Examiner	Sex	Female	3
		Male	2
	Profession	NP (British)	2
		NP (Norwegian)	1
		Physician (Norwegian)	2 (anaesthesiologist and geriatrician)

interviews were transcribed by an independent party.

A semi-structured interview guide was used for both the focus groups and the individual interviews, following the framework of Kallio et al. (2016): (1) identifying prerequisites, (2) retrieving and using previous knowledge, (3) creating a preliminary guide, (4) pilot testing and (5) presenting the complete semi-structured interview guide. The guides were pilot tested using a former student with OSCE experience and an assistant professor who had thorough experience with assessments of undergraduate nursing students' skills. Data were collected on the following participants' experiences: the OSCE as an examination form and assessment of advanced clinical competence; their ability to conduct history taking, physical assessments and clinical decision-making; their learning activities in the course prior to the OSCE; the cases used during the OSCE; and the simulated patient- and person-centredness relevance to the OSCE.

2.5. Ethical considerations

Ethical approval to conduct the study was granted by the Norwegian Social Science Data Services (approval number 48269). With reference to the Helsinki Declaration (World Medical Association, 2013), the informants were advised in writing via email about the project's intentions beforehand and their right to withdraw from the project without having to provide a reason and without consequences for themselves. In keeping with Malterud (2017), this information was also repeated orally before interviews began to ensure that the informants were adequately apprised. After the study was described to the participants, their written informed consent was obtained.

An ethical issue that arose was the dilemma of the position of the authors and the students. The first author is a PhD student without any teaching affiliation. However, the other authors were a programme leader of the NP education master programme from which the participants of our study were selected, a course coordinator for the OSCE, a teacher and examiner of the OSCE and a teacher of a previous course in pathology. Since all the students who participated in the study also participated in the OSCE, it should be noted that the possibility of an ethical issue of the students feeling an obligation to participate (Ferguson et al., 2006) cannot be excluded. In addition, the students had not yet received their OSCE feedback, which may have limited the perceived voluntary consent (Ferguson et al., 2006). Thus, as a preventative measure, the first author informed all the participants about the details of the study, conducted the sampling of participants as well as arranged and conducted both the focus groups and interviews. The first author did not share this data with the other authors until after the students had received their exam marks and feedback. It should be noted that both positive and negative experiences were shared in the focus groups and interviews, suggesting that the participants felt free to share some of their critical thoughts.

2.6. Data analysis

The data material was analysed using Braun and Clarke (2013) thematic analysis, which consists of six steps (Table 3). First, the audiotapes were listened to several times (step 1). Second, the transcribed material was coded to identify features of the data set, creating the basis for the themes (step 2). A back-and-forth approach was then applied by suggesting themes, writing them up and then going back to the coded material (steps 3–5). This iterative process was repeated until the themes and the final write-up represented the data material as a whole (step 6). The authors each analysed one interview individually before discussing them all as a group. The aim of the discussion was to analyse the authors' understanding of the data but also to illuminate possible blind spots when searching for patterns. The first author analysed all the data material, but all authors contributed to the discussion

Table 3
Example of the analysis process.

Step 1	Step 2		Step 3-5	Step 6
Example of transcribed material	**Example of coding**	**Iterative process**	**Preliminary theme**	**Final theme**
'And a clinical exam is needed in this course to demonstrate what you have learned and what you can execute'.	Assessment of learning outcomes.	⇔	Learning outcomes of the OSCE.	The OSCE as a method for demonstrating and assessing clinical competence.
			Preliminary sub-themes	**Final sub-themes**
			• Ability to do physical assessment. • Clinical competence on an NP level.	• Students' ability to demonstrate advanced clinical competence. • Assessing advanced clinical competence.

during the analysing process until an agreement was reached.

This study adhered to the following pragmatic paradigm: 'Truth is what works at the time. It is not based in a duality between reality independent of the mind or within the mind' (Creswell and Poth, 2018, p. 27). This approach means that the participants' answers on how to assess advanced clinical competence were taken at face value and their experiences were acknowledged within their contexts, both on campus and in work life.

2.7. Rigour

This study followed Lincoln and Guba (1985) four criteria for trustworthiness: credibility, transferability, dependability and confirmability. The strategies that were applied to ensure the rigour of this study are listed in Table 4.

Focus groups explicitly use group interaction as part of the method. Researchers have been heavily criticized when only single quotations from single participants were reported as this does not reflect the essence of group interaction that is unique to the focus group data collection method. (Kitzinger, 1994; Webb and Kevern, 2000). Therefore, to support the methodological rigour of the focus group approach, the presentation of this study's findings focuses on quotations from students who represented the groups' interactions. The quotations are marked using the number of the focus group and student, as well as the interviews with the examiner.

3. Findings

The analysis of the data material suggests that, even though both the students and the examiners experienced some challenges regarding the OSCE, they also experienced the OSCE as an appropriate form of assessment for advanced clinical competence. Three main themes emerged from the data: (1) that there was insufficient preparation for the OSCE; (2) that the OSCE was a challenging examination process; and (3) that the OSCE was a method for demonstrating and assessing advanced clinical competence. Each theme is presented along with two sub-themes and summarized in Table 5.

Table 4
Trustworthiness strategies.

Criterion	Strategy employed
Credibility	• Prolonged engagement • Analyst triangulation • Peer debriefing • Member-checking
Transferability	• Providing thick descriptions
Dependability	• Inquiry audit
Confirmability	• Reflexivity

3.1. Theme 1: Insufficient preparation for the OSCE

3.1.1. Sub-theme: Alignment between the course and the OSCE

The students experienced the course as highly relevant for their work life and motivating for the development of their NP roles. However, several students felt that some of the lectures did not prepare them for the OSCE. In general, the students agreed that most, but not all, learning activities aligned with the OSCE.

Focus group 5:

Student 13: Much of it [in block week two out of three] was a good pathological rehearsal, but not in relation to the OSCE.

Student 15: No, it wasn't connected.

The examiners acknowledged that the students had gained skills and developed their clinical competence during the course. Nevertheless, several examiners were concerned that not all students had acquired the necessary level of pathology knowledge and, thus, were not sufficiently prepared for the OSCE.

Examiner 5: It was clearly a differences in their [the students] level of knowledge … some of them [the students] understood or had much greater understanding of what they did than others.

3.1.2. Sub-theme: Skill training and the OSCE

The students found the training on history-taking and physical assessment techniques at the clinical skills lab to be most beneficial when they were guided by a teacher and trained in groups of three, using the OSCE checklists as 'student', 'patient' and 'examiner'. Several students expressed that it would also be highly beneficial to train with real patients who presented real symptoms. Several students did not feel prepared for the exam and agreed that the main reason for this was a lack of skill training with feedback during the course. Only 2 of the 15 students had trained with a physician at their workplace, which was a

Table 5
Themes and sub-themes.

Theme	Sub-themes	Findings summarized
Insufficient preparation for the OSCE.	Alignment between the course and the OSCE.	A lack of alignment between the learning activities of the course and the OSCE impaired the students' preparation for the exam.
	Skill training and the OSCE.	Students need to have access to sufficient skills training to prepare them for the exam.
The OSCE as a challenging examination process.	Student stress and the impairment of student performance.	Stress can impair the students' performance and threaten the validity of the advanced clinical competence assessment.
	The unnatural setting of the simulation.	The unnatural setting of the simulation can make the students overly attentive to being in an exam setting and not in a real-life clinical setting.
The OSCE as a method for demonstrating and assessing clinical competence.	The students' ability to demonstrate advanced clinical competence.	After completing the OSCE, the students could demonstrate some structured history-taking and physical assessment techniques but still struggled to demonstrate decision-making.
	Assessing advanced clinical competence.	The students and examiners experienced the OSCE as an appropriate assessment of advanced clinical competence.

course requirement.

Focus group 1:

Student 1: For me, in my job, I have not been able to practice at work to any degree because I am too busy at work.

Student 2: … as soon as I have started, then a medical physician student comes in to take over.

The examiners thought some of the students did not to have enough experience in some of the physical assessment techniques. They believed that the majority of students needed more training before being ready to perform physical assessments to ensure safe practice but thought they were ready for their clinical placement.

Examiner 4: I would be uncertain of some of them [the students], if it's reasonable to say. The same way you are uncertain when someone just got their driver licence, if it's safe to go for a ride the same day … I think some of them [the students] should have some more guided training before working on their own.

3.2. Theme 2: The OSCE as a challenging examination process

3.2.1. Sub-theme: Student stress and the impairment of student performance

Most students agreed that the OSCE process was well organized and felt that the examiners and simulated patients were friendly. Nevertheless, all students reported stress during the OSCE process. Stress caused many of them to forget both basic knowledge from their everyday work life, such as washing hands, as well as elements from different physical assessment techniques, such as checking visual fields during a neurological assessment. Consequently, some students were unsure whether they were able to show their actual level of clinical competence during the exam. Although the students' stress levels varied, most felt that the stress hindered their ability to focus, thereby impairing their exam performance.

Focus group 1:

Student 2: When you have your exam, there is always a bit of stress that you, well, the brain doesn't work a hundred percent. Because then, what did I forget?

Student 3: For me, it feels like I'm going to be executed. I feel it's absolutely horrible. When I'm told to open the door [to the examination room], I just want to run the other way. I don't understand how to put one leg in front of the other. And it's a bit like that, I think it has to do with the exam form.

Student 1: … I get nervous, but I don't have those problems [as student 3 describes] when I get so nervous.

The examiners agreed that some students were significantly more stressed than others. The students who were the least stressed were also those who succeeded the best during the OSCE process. Furthermore, the examiners thought that it was somewhat difficult to distinguish between poor performance caused by stress-related factors and that caused by actual lower levels of clinical competence. The examiners noted that since the students' performance was the foundation for this exam assessment, consequently both types of behaviour were graded in the same manner.

Examiner 1: I wasn't sure at first, not that I was judgmental. You can't do that, but she seemed very nervous.

3.2.2. Sub-theme: The unnatural setting of the simulation

The students felt positively about the use of simulated patients. Nevertheless, the students perceived the simulations as unnatural when the patients did not have the real symptoms of a disease relevant for the station or did not realistically portray the symptoms of, for example, pain. This made the students aware that they were in an exam setting and not in a real clinical setting. While some students did not mind the role-playing during the OSCE, other students either grew embarrassed or struggled to interact. There was substantial confusion about how the simulated patient was not a real patient although they were a real person. As a result, the students perceived the simulated patient in two ways—first, as a simulation of a patient (through the provision of fabricated information) and, second, as a real person (the actual man or woman who provided the fabricated information for the simulation).

Focus group 3:

Student 7: It is a filter because I do not relate to her [simulated female patient].

Student 9: Didn't you relate to her?

Student 7: Yes … The [simulated] patient, I related to, but not to the real lady who sat there [simulating the patient].

The examiners agreed that those students who succeeded in the role-playing were also the most successful candidates. Several of the examiners thought that some students interrupted the patient too much during the history taking or made the patient uncomfortable during the physical assessment (e.g. as a result of neglecting the patient's personal boundaries). While some examiners questioned whether this was due to the students' low level of clinical competence, others thought it was due to the students being too immersed in the role-playing.

Examiner 3: They [the students' that performed the best] immersed themselves more and also did so with palpating all four quadrants [of the abdomen] lightly first, then more deeply.…Those who did not do this [light and deep palpating], maybe did not do so because they thought it was uncomfortable for the [simulated] patient or because the nervousness in the [simulated] setting hindered them from immersing themselves to feel something that wasn't there.

3.3. Theme 3: The OSCE as a method for demonstrating and assessing advanced clinical competence

3.3.1. Sub-theme: The students' ability to demonstrate advanced clinical competence

Several students felt that the OSCE indicated their current level of clinical competence and were motivated to train and develop their clinical competence further during the clinical placement. Several

students felt that they could demonstrate some structured history-taking and physical assessment techniques after completing their OSCE. However, they questioned whether they had acquired the learning outcome of advanced clinical competence. For example, some felt that they had knowledge of a technique (e.g. checking reflexes) but not the ability to execute the technique. The students also found decision-making to be the most difficult to demonstrate during the OSCE.

Focus group 4:

Student 3: The cases were realistic, but the questions that came with the red flags fazed me [see Table 1 for the definition of red flags].

Student 2: I think he just tried to challenge us, just asked to hear if we knew a little more.

The examiners felt that while some students had strong performances, other students exhibited weaker performance regarding history-taking and physical assessment techniques. Some examiners found that some students lacked sufficient knowledge to demonstrate a skill. This was evident, for example, when students assessed the abdomen but did not place the stethoscope in the correct places. Only a few students demonstrated an ability to combine the knowledge and findings from their physical assessment to conduct independent decision-making when asked about the red flags in the OSCE.

Examiner 4: Also, I think some of them [the students] should have more, …systematising of the clinical aspect of the job or the clinical part of assessing [the patients] and drawing conclusions.

3.3.2. Sub-theme: Assessing advanced clinical competence

The students agreed that the OSCE was an appropriate exam for a course with clinical learning outcome aims, as they were given the opportunity to display their clinical competence level in action. Unlike a written exam, the OSCE gave the students the opportunity to receive feedback on their performance and on how to improve their clinical competence. Several focus groups discussed how they were usually given a grade from A-F for an exam and questioned whether a 40% mark was a sufficient minimum level with which to pass the OSCE while simultaneously holding an advanced level for an NP. Furthermore, some students found the OSCE and the person-centredness approach compatible, while others were unsure.

Focus group 2:

Student 6: The person-centred approach is to see the individual person.…The OSCE is only check, check, check.

Student 5: I don't think it's that bad, as you say … I asked about civil status. Oh, you're a widow. I'm sorry. How do you manage?

During the OSCE, an experienced English-speaking examiner was paired with a less experienced Norwegian examiner and all the examiners were satisfied with their collaboration. All examiners agreed that the OSCE was an appropriate assessment of advanced clinical competence. Several examiners thought that the 40% pass rate was not enough to ensure that all students were at an advanced level of clinical competence, particularly with points given for basic skills, such as washing hands prior to conducting the physical assessment. Instead, one examiner suggested that a pass should only be given when a student performed the skills relevant to an essential section of the examiners' checklist.

Examiner 2: Hmm, you have to weight what is essential, but everybody finds it difficult to know what do you leave out that's not essential.…we've put equal weighting for things like washing the hands to examining a cranial nerve.

Most of the examiners thought that a person-centred approach was relevant to assessment during the OSCE, but were unsure how to incorporate it into the OSCE checklist. One examiner expressed that it was a challenge to assess clinical competence in line with both safe practice and a person-centred approach:

Examiner 2: What it [the OSCE] doesn't take into account was all the circumstances, and even though we asked about family and home [of the simulated patient] we don't weight that as high because what we were rating high is their [the students'] ability to be safe in their [physical] assessment.

4. Discussion

The findings reveal that there were challenges regarding the alignment of the course and the OSCE that affected the students' preparation for the exam. Aronowitz et al. (2017) confirmed this by highlighting that the students must possess fundamental knowledge prior to performing an OSCE. Raleigh and Allan (2017) also found that biomedical and specialist knowledge deficits in NPs created a barrier to the transition of physical assessment skills from the university to the workplace context. Both the students and the examiners in this study questioned whether the students had gained this necessary level of fundamental knowledge. Thus, the course and the OSCE struggled to achieve a constructive alignment where the assessment tasks were aligned with the intended learning outcomes (Biggs and Tang, 2011). Because of the findings in this study, the NP master programme has implemented changes. The course leading up to the OSCE now includes more case-based (instead of organ-specific) lectures to be more in line with the procedures of conducting history-taking and physical assessments, clinical decision-making and the examination form of the OSCE.

The students and the examiners in this study both felt there was a lack of training on physical assessment skills. Taking the OSCE before the clinical placement might ensure that students experience learning, practice and assessment of core skills prior to clinical placement (Nulty et al., 2011). However, this strategy may also limit the students' access to training possibilities, as the students in this study did not find time to train at their workplaces. A challenge for every country with evolving NP education is that its students do not have NP role models in their clinical fields or workplaces. According to Schober and Affara (2016), the successful development of the NP/APN role requires well-functioning teamwork with physicians, as confirmed in those countries that have implemented the NP/APN role (Fagerström and Glasberg, 2011; Gould et al., 2007). Therefore, it may be more important that education in countries with an evolving NP/APN role ensures that students receive sufficient training experience with real patients than in countries with a more developed NP role. For this reason, the NP master programme analysed here has implemented a course learning activity to provide guided training with teachers and volunteers acting as simulated patients in the clinical skills lab prior to the OSCE.

The findings also revealed that the students and examiners experienced the OSCE as a challenging examination process involving student stress and an unnatural simulation setting. The findings concerning student stress during the OSCE are in line with results from previous research (Johnston et al., 2017; Miller and Carr, 2016; Muldoon et al., 2014). Rushforth (2007) argued that student stress could increase the validity of the OSCE in line with the stress that naturally occurs in the 'real world' of clinical practice. However, in this study, the students experienced stress, which consequently made them more attentive to the exam setting and less attentive to their own performance. Furthermore, the examiners felt that poor performance resulting from student stress was difficult to separate from poor performance that is due to a lack of clinical competence, thus challenging the exam's validity for assessing advanced clinical competence. Nulty et al. (2011) found that most students experience stress to be the worst aspect of the OSCE, even when the students perceived the examiners as friendly and there was a focus on practice rather than perfect demonstration. Hence, preparing students for the exam with the aim of reducing student stress might be beneficial for optimising student performance and validating the exam—as described in more detail below.

An advantage of the OSCE lies in its use as both an educational strategy as well as an assessment. The OSCE, in comparison to other exam forms, can be used as both a formative and summative evaluation method to identify and assess various components of clinical competence (Walsh et al., 2009). A summative assessment is usually a final exam utilised to summarise students' achievements, which requires

students to demonstrate knowledge, skills and professional judgements, while a formative assessment provides students with feedback on their performance throughout the learning process under conditions that are non-judgmental and non-threatening in order to promote learning (Engström et al., 2017). Through formative assessment, cases can be developed with increased complexity as students progress in their preparation for the summative assessment (Aronowitz et al., 2017). This utilisation of the OSCE as an educational strategy in addition to an assessment tool can be viewed as in line with an andragogical perspective, focusing on the building of personal student autonomy and facilitating self-directedness in learning (Knowles et al., 2015). Therefore, changes have been implemented in the NP master programme to integrate more formative assessments during the course with the aim of reducing student stress and preparing the students for their exam.

A quantitative study conducted by Bikker et al. (2015) with 774 patients concluded that experiences of care, patient enablement and health outcomes could be improved through an emphatic person-centred approach. A core competence of guidance and coaching for an NP/APN is to have a person-centred approach (Fagerström, 2011). Nevertheless, the students were divided on whether they considered a person-centred approach suitable for assessment in an OSCE format, and some examiners were unsure how to incorporate person-centredness into the OSCE checklist. Although the OSCE checklist used in this study had such criteria as 'ascertains patient's belief/concerns' (Table 6), it did not incorporate criteria relating to the simulated patients being included in the decision-making process, in line with McCormack et al. (2017) person-centred approach. Thus, there is a need for more research on how to implement a person-centred approach in the OSCE checklists.

As an assessment strategy, the OSCE has some challenges regarding the assessment of clinical competence. First, the validity of the checklist content can be questioned, as research on the medical OSCE shows that important items from the evidence literature (e.g. checking for tachycardia in a pulmonary embolism case) were overlooked when the checklists were developed (Hettinga et al., 2010). The current study also found that examiners were divided as to the best way to give credits when using the checklists. Second, this study found that the students experienced some challenges regarding the realism of the simulated setting. This might indicate that the students did not experience sufficient psychological fidelity, a perception that the simulated scenario is real (Miller and Carr, 2016). However, the assessment of clinical competence is complex and it is debatable whether one single assessment strategy can provide all the information required for an accurate assessment (Smith et al., 2012). Thus, it might be advisable to arrange for OSCEs both before and after clinical placement to ensure that students have gained advanced clinical competence in line with the ICN (2019) definition of an NP/APN. As a result of this study, along with the OSCE, the NP master programme has also implemented the OSCA at the end of the students' clinical placement (total of 15 weeks/450 h), in which a student is assessed by a teacher from the university faculty and the supervisor from their clinical placement. The student goes through the OSCA focusing on conducting a total patient consultation with a patient they have not previously met. Even though including real patients involves some ethical concerns, the OSCA with a real patient maximises the assessment validity, as using simulated patients can lead to poor patient consistency (Rushforth, 2007).

Muldoon et al. (2014) found that student midwives were neutral or unsure as to whether the OSCE was a meaningful assessment strategy for clinical competence. Though the students and examiners in this study did experience some challenges regarding the OSCE, they also felt that the OSCE was appropriate for assessing advanced clinical competence. Barry et al. (2012) found that students reacted positively to the OSCE, as it gave them confidence and prepared them for their clinical placement. The students participating in this study concurred with this. Nevertheless, the students and examiners were also unsure whether the OSCE checklists measured clinical competence at an advanced level.

Table 6
Sample OSCE checklist.

STUDENT NAME:_____

0 = Not done
1 = Demonstrates, not confident
2 = Demonstrates confidence

MARKING CRITERIA	0	1	2
COMMON CRITERIA			
1. Introduces self to patient			
2. Washes hands			
3. Ascertains patient's belief/ concerns			
4. Closure of consultation / evidence of safety netting			
PART ONE – HISTORY			
5. Determines chief presenting complaint			
6. Structured approach to determine history of presenting complaint e.g. OLDCART / PQRST			
7. Past medical history			
8. Drug history / Medication – Prescription/OTC			
9. Smoking amount			
10. Alcohol consumption / recreational drugs			
11. Family history			
12. Social history – occupation / home			
13. Review of systems			
14. Allergies			
PART TWO- EXAMINATION			
15. Assesses general appearance – eg FAST positive			
16. Vital signs: Temp, BP, RR, HR, SPO2			
CRANIAL NERVES			
17. I Olfactory (smell, nasal patency)			
18. II Optic (visual acuity, visual fields, says fundoscopy would be performed)			
19. III, IV, VI (Occulomotor, trochlear, abducent)			
20. V (sensory, motor, says would check corneal reflex)			
21. VII Facial (symmetry, motor function)			
22. VIII Vestibulocochlear (whisper test, Weber or Rinnes test)			
23. IX, X Glossopharyngeal, vagus (uvula, voice, pronation)			
24. XI Accessory (trapezius, sternocleidomastoid)			
25. XII Hypoglossal (tongue movements, tongue power)			
PERIPHERAL NERVOUS SYSTEM			
26. Checks upper and lower limb tone bilaterally			
27. Checks upper and lower limb sensation bilaterally			
28. Checks upper and lower limb power bilaterally			
CEREBELLUM			
29. Checks gait			
30. Checks balance e.g. Romberg test			
31. Checks for evidence of one of the following: • Dysdiadochokinesis • Ataxia • Nystagmus • Intention tremor • Slurred speech • Heel to shin test			
CORTICAL FUNCTION			
32. Checks patient alert and orientated e.g. GCS 15/15, ability to perform arithmetic			
REFLEXES			
33. Identifies/ discusses bilateral upper reflexes: triceps, biceps, supinator			
34. Identifies/ discusses bilateral lower reflexes: patella, achilles, plantar: Babinski reflexes			
35. DIFFERENTIALS- any ONE of these			
TIA, CVA: INFARCTION/ HAEMORRHAGE, HEMIPLEGIC MIGRAINE BELLS PALSY			
36. RED FLAG SIGNS- any ONE of these			
FAST positive Reduced level of consciousness Signs of meningitis Altered behaviour or function following head injury Seizures in the absence of a pmh of epilepsy Consider high force mechanism of injury On anticoagulants			

TOTAL POSSIBLE SCORE: 72

TOTAL SCORE : ___

PASS MARK above 40 % (29 points) Y / N

COMMENTS:

EXAMINER'S SIGNATURE:_____ **DATE:**_____

NAME:_____

Though the ICN (2019) has presented a definition for NP/APN that can be applied internationally, the definition also states that the characteristics of the role should be shaped by its context or country. In countries with evolving NP roles, the scope or expectations of the role have not yet been clearly established, which challenges the validity of an educational assessment of advanced clinical competence. Thus, there is a need for national credentialing of NP/APNs to create an understanding of the scope and practice for practitioners, consumers and policymakers (Loversidge, 2016).

5. Limitations

According to Tong et al. (2007), an ideal focus group should include at least four participants. However, since four of the five focus groups were conducted on the same day as the students' completed their OSCE, it was of particular interest to arrange the focus groups by prioritising the students' wishes rather than methodological issues. It was most convenient for the students to participate in a focus group as they finished their OSCE. Thus, the focus groups had three participants as the students finished their OSCE in groups of three. The author conducting the focus groups did not find this to be a considerable disadvantage, as the small groups contributed to a safe setting in which the students could voice their opinions in turn. This study did not collect data on the students' experiences with their feedback after the OSCE, since four out of the five focus groups had not received their exam results or feedback.

6. Conclusion

This study contributes to the understanding of the use of the OSCE to assess advanced clinical competence of NP students. The findings indicate that, although the participating NP students and examiners experienced challenges with the OSCE, they found it to be an appropriate form of assessment for an advanced level of competence. Challenges concerning the exam included a misalignment between the course and the exam, insufficient training, student stress, the unnatural setting of the simulation and the demonstration and assessment of the expected level of advanced clinical competence. This study advocates for the following course design changes to address these challenges: a constructive alignment between the course and the exam, more training with real patients, a use of both formative and summative assessment as well as a second exam with a real patient after the student's clinical placement. On a more general note, countries with evolving advanced nursing roles and a lack of a clearly defined NP role will challenge the OSCE's criteria for the expected level of advanced clinical competence in an educational context. National credentialing must be created for both NP education and the NP role to ensure clinical competence that is in line with the needs of health care services and that promotes patient safety.

Declarations of interest

None.

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Appendix A. Supplementary data

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Paper III

Taylor, I., Bing-Jonsson, P. C., Finnbakk, E., Wangensteen, S., Sandvik, L., & Fagerström, L. (2021). Development of clinical competence—a longitudinal survey of nurse practitioner students. *BMC Nursing*, *20*(1), 130. https://doi.org/10.1186/s12912-021-00627-x

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RESEARCH Open Access

Development of clinical competence – a longitudinal survey of nurse practitioner students

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Abstract

Background: In order to achieve a sustainable standard of advanced clinical competence for nurse practitioners leading to a credible role, it is important to investigate the development of clinical competence among nurse practitioner students.

Aim: The aim of the present study is to analyse the development of nurse practitioner students' self-assessed clinical competence from the beginning of their education to after completion of their clinical studies.

Design: The study involved the application of a longitudinal survey design adhering to STROBE guidelines.

Methods: The participants consisted of 36 registered nurses from a nurse practitioner programme at a Norwegian university. The Professional Nurse Self-Assessment Scale II was used for data collection during the period August 2015 to May 2020.

Results: The students developed their clinical competence the most for direct clinical practice. Our findings are inconclusive in terms of whether the students developed clinical competence regarding consultation, coaching and guidance, and collaboration. However, they do indicate a lack of development in some aspects of clinical leadership. The students with the lowest level of clinical competence developed their clinical competence regarding direct clinical practice significantly more than the students with the highest level of clinical competence. The differences between students with high and low levels of clinical competence were levelled out during their education. Thus, the students as a whole became a more homogenous group after completion of their clinical studies. Previous work experience in primary healthcare was a statistically significant, yet minor, predictor of the development of clinical competence.

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Conclusion: Our findings indicate that the students developed their clinical competence for direct clinical practice in accordance with the intended learning outcomes of the university's Master's programme and international standards for nurse practitioners. It is imperative that the clinical field supports nurse practitioners by facilitating extended work-task fits that are appropriate to their newly developed clinical competence. We refrain from concluding with a recommendation that prior clinical work experience should be an entry requirement for nurse practitioner programmes. However, we recommend an evaluation of the nurse practitioner education programme with the aim of investigating whether the curriculum meets the academic standards of clinical leadership expected in advanced level of nursing.

Keywords: Advanced practice nursing, Nurse practitioner, Clinical competence, Development, Self-assessment, Nurse education

Background

Advanced practice nursing (APN) has been introduced as a means of delivering high quality, safe and affordable healthcare [1]. At least one-third of all OECD (Organisation for Economic Cooperation and Development) countries reported in 2012–2013 that during the previous 5 years, they had expanded their scopes of practice of non-physicians, including advanced roles for nurses [2]. Research indicates that APN is beneficial in terms of achieving health outcomes for patients and patient satisfaction [3–5]. On 1 February 2020, Norway introduced regulations for registered nurses (RNs) with a Master's degree in APN [6] as part of an effort to meet the challenges facing the primary health care sector [7].

According to International Council of Nurses (ICN) guidelines [1], an APN is an RN: 'with the expert knowledge base, complex decision-making skills and clinical competencies for Advanced Nursing Practice' ([1] p. 4) who holds a minimum of a Master's degree. Clinical nurse specialist (CNS) and nurse practitioner (NP) are usually the two most recognised APN roles [1]. The ICN [1] provides the following definition of an NP: 'A Nurse Practitioner is an Advanced Practice Nurse who integrates clinical skills associated with nursing and medicine in order to assess, diagnose and manage patients in primary healthcare (PHC) settings and acute care populations as well as ongoing care for populations with chronic illness' ([1] p. 4).

An NP is an autonomous clinician with a clinical expertise that combines the diagnosis and treatment of health conditions and the prescription of medication based on evidence-informed guidelines and nursing principles. Moreover, NPs emphasise disease prevention and health management in their practice [1]. Research demonstrates that patients receiving care from NPs experience fewer unnecessary emergency room visits, reduced waiting times, and fewer hospital admissions and readmissions [8–10]. National contexts and the regulatory policies within which NPs practice determine their levels of autonomy and accountability [1]. Norway is presently in its first phase of implementing the NP role, and NPs do not currently have prescribing rights in Norway.

In order to meet the growing need for clinical competence in the care of an increasingly ageing population, as well as patients with complex health conditions, one university in Norway is currently offering a part-time (three- to- four-year) Master's degree programme for NPs with a 120 European Credit Transfer System (ECTS). The programme was launched in 2015 and includes courses in advanced health and physical assessment, advanced pathophysiology and advanced pharmacology. It also offers three courses focusing on elective specialization in geriatric assessment, acute medical assessment and specialization in wound care and acute pain treatment. All NP students in the programme are expected to submit a Master's thesis. The programme is consistent with both the ICN [1] definition of an NP and Fagerström's [11] Nordic APN model, which incorporates the nurse-patient relationship, eight core competencies and critical contextual factors.

The definition of clinical competence within nursing has been the subject of much debate, but there seems to be an international consensus that the concept must be viewed from a holistic perspective [12] that includes the application of complex combinations of knowledge, performance, skills, values and attitudes [13]. This holistic view appears to be in line with the complementary view of knowledge that underpins the Nordic APN model, representing a synthesis of the three Aristotelian dimensions of knowledge: scientific knowledge (*episteme*), expertise (*technê*), and practical wisdom (*phronêsis*) [14]. An APN nurse's clinical competence can be described as the result of a process in which these three dimensions of knowledge are synthesized to become 'knowledge in action' [11].

In order to investigate the clinical competence and the need for further training of NP/APN students, two studies have been carried out using a questionnaire called the Professional Nurse Self-Assessment Scale of clinical core competencies II (PROFFNurseSAS II), which is

grounded in the Nordic APN model [15]. The sample included in the first study involved specialist and APN students from Iceland, the Netherlands, Sweden, Norway and the United Kingdom, surveyed on completion of their education [15]. The sample included in the second study involved students from three different NP/APN education programmes in Norway, surveyed at the beginning of their education [16]. Both studies found that the students self-assessed their clinical competence to be highest in aspects related to taking responsibility and their need for further training with regard to knowledge of medication [15, 16].

The ICN [1] emphasises that the educational preparation that enables students to meet the qualifications for NP practice is crucial to the credibility and sustainability of the NP concept. Since continuous evaluation is a critical contextual factor in the Nordic APN model [11], it is important to investigate the development NP students' clinical competence in a Norwegian context. Moreover, it is especially important for countries like Norway, in which the NP/APN role is at an early stage of its development, to evaluate whether it is evolving according to international standards. Previous empirical research on clinical competence within nursing has been dominated by cross-sectional design studies, so we recognise a need for research employing a longitudinal design that track changes in clinical competence throughout a nurse's education [17]. Thus, with the aim of exploring the development of nursing students' clinical competence during an NP Master's programme, the present work describes and analyses their self-assessed clinical competence using a longitudinal design study facilitated by the aforementioned PROFFNurse SAS II questionnaire.

Methods

Aim

The aim of the present study is to analyse the development of NP students' self-assessed clinical competence from the beginning of their education (baseline) to after completion of their clinical studies (follow-up).

The following research questions regarding the students' education were addressed:

- What were the most and least developed items from baseline to follow-up?
- How did the lowest self-assessed items at baseline develop for students with high and low clinical competence?
- Are *clinical work experience* and *previous higher education* predictors for the development of clinical competence?

Design

A longitudinal survey design is applied in this study, and the ProffNurseSAS II questionnaire employed for the NP students' to self-assess their clinical competence at baseline and follow up.

Questionnaire

The PROFFNurseSAS II questionnaire used in this study aims to measure the clinical competence of nurses at different educational levels from a holistic and lifelong learning perspective [15]. The questionnaire builds on the validated questionnaire PROFFNurseSAS I [18], which consisted of six components: direct clinical practice, professional development, ethical decision-making, clinical leadership, cooperation and consultation, and critical thinking. Wangensteen [15] sought to improve the questionnaire and developed a modified version containing 50 items subdivided along two scales: the *A-scale* for self-assessed clinical competence, and the *B-scale* for self-assessed need for further training [15].

The PROFFNurseSAS II questionnaire has been evaluated for content validity [15] and reliability (the Cronbach's alpha value for the A-scale was 0.936) [16]. Since the aim of the present study addresses the development of clinical competence, it reports findings on the A-scale.

Participants

The survey involved the recruitment of a sample of RNs attending an NP programme at a Norwegian university. The first inclusion criterion was enrolment as a first-year student in the programme during their first semester. The second criterion centred on the students' completion of their clinical studies (450 h) and the passing of their Objective Structured Clinical Assessment (OSCA). A total of 46 NP students from four cohorts that met the inclusion criteria were invited to participate. Among these, 36 were included in the present study, a response rate of 78%.

A power analysis was performed to evaluate sample size. The standard deviations of the total A-score from the first and second investigations were 0.90 and 0.74, respectively. It is possible, given that there were 36 APN students in the follow-up investigation, that the test power will be at least 90% if the mean difference in the total A-score between the first and second estimations is at least 0.50. Thus, we are satisfied that 36 students appears to be an appropriate sample size for the present study.

Data collection

The students completed the questionnaire twice: initially at the beginning of their NP education (baseline), and then later after they had completed their clinical studies

(follow-up). The interval between surveys was approximately 2 years. The NP education is a part-time programme, in which all the students are assigned an individual study plan stating when and where their clinical studies are conducted, according to their needs and wishes. This provides the students with some flexibility, enabling some to spend more time completing their clinical studies than others. For this reason, there are slight differences between the two measuring points, although an approximate 2-year period applied to all students.

Data were collected using the questionnaire PROFF-NurseSAS II, which includes 50 items with responses ranged on a scale from 1 to 10, where 1 indicates a poor, and 10 an excellent, level of clinical competence. The questionnaire also includes an option for scoring 'entirely missing competence', which is quantified as zero. The questionnaire also includes the option 'competency not covered in the programme', which was treated as an invalid value and not included in the analysis. The number of students who selected this option is set out in the Tables. A number of sociodemographic variables were also collected, including gender, age, years of clinical work experience as an RN, area of work experience (i.e., as a specialist or in primary health care), and previous higher education qualifications above a Bachelor's degree in nursing, as recognised by the ECTS.

The students were first invited to participate in the baseline investigation by means of a printed handout of the questionnaire distributed during an NP programme lecture. As part of the second invitation, to the follow-up investigation, the students were given the opportunity to respond to the questionnaire online. Data collection was carried out between August 2015 and May 2020 by two of the present authors (IT and LF).

Ethical considerations

The project was approved by the Norwegian Centre for Research Data (NSD: approval no. 52648). Information was provided to the informants both at baseline (orally and on a written handout) and follow-up (via e-mail). The students were also informed about participant anonymity and their right to withdraw from the study at any time, without giving any reason. An ethical issue arises in situations where the nurse educators are also researchers conducting the study, and their students are participants. Such students may feel under some duress for fear that non-participation will impact on their progress or learning experience within the programme [19]. In order to address this concern, a PhD student with no teaching affiliation to the faculty (IT) assumed responsibility for collecting all the data, except in the case of one of the cohorts for which a former education programme leader (LF) collected data at baseline. It was emphasised to all the students that their responses would not affect their teachers' evaluations or their examination grades. A scrambling key was created that enabled directly identifiable information to be stored separately from the data. Only the first author (IT) had access to the scrambling key.

Data analysis

The software IBM SPSS® Statistics 26.0 for Windows was used for data analysis. Of the total number of participants, 79% ($n = 31$) responded to all 50 items in the questionnaire. The baseline and follow-up investigations had total response rates of 85% ($n = 33$) and 87% ($n = 34$), respectively. Only participants with fewer than 10 missing items (18% of the total number of items) were included in the study. This criterion resulted in the exclusion of three participants. Thus, among the 39 NP students who responded to the questionnaire (a response rate of 80%), 36 were included in the data analysis. The case mean substitution technique is recommended in self-assessment studies [20] and it was thus used to replace missing data for participants who met the inclusion criteria ($n = 5$).

The data were expressed as frequencies, percentages and means to summarize the students' demographical variables, items and total mean. Paired sample t-tests (two tailed) were conducted on participants' total mean scores and individual items during comparisons of baseline and follow-up scores. An independent sample t-test was used when comparing NP students with high and low self-assessed clinical competencies.

Multiple linear regression analyses were conducted in situations where the total mean score for self-assessed clinical competence at follow-up was used as a dependent variable. The independent variables were as follows; (a) total mean score for the students' self-assessed clinical competence at baseline, (b) age, (c) years of clinical work experience as an RN (overall, in primary health care and specialist health care, respectively) and (d) previous level of higher education above a Bachelor's degree in nursing (measured in ECTS credits). Forced entry was used for all the predicting variables [21], which means that all independent variables were entered simultaneously. A backward variable selection method was subsequently applied by which predictors were removed one by one when they were not statistically significant, until all the remaining predictors were recognised as significant. The aim of this process was to build a model containing only statistically significant predictors [21]. Follow-up scores were adjusted for the baseline when linear regressions were performed, as recommended by Vickers and Altman [22],

The assumptions underlying the t-tests and linear analyses were checked and found to be adequately met, and

p values below 0.05 were considered statistically significant.

It is important in this study to recognize a potential ceiling effect resulting from selection of the highest value at baseline, which may lead to an erroneous conclusion of no improvement [23]. In the present study, a ceiling effect was considered to be present at baseline if more than 15% of the participants self-assessed themselves with the highest possible score.

Results

The participating students ($n = 36$) consisted of 33 females and three males, with a mean age of 41 (range: 26–59). The mean number of years with clinical work experience as an RN was 13.0 (range: 4–33). All the participants were part-time students. Their mean number of years of clinical work experience in primary health care was 7.3 (range: 0–27), and 4.7 (range: 0–17) in specialist health care. Before entering their NP programmes, 23 students (64%) had previous educational qualifications above the level of a Bachelor's degree in nursing. Among these, 18 students (50%) had obtained more than 30 ECTS credits.

The total mean score of clinical competence at baseline was 6.83 (SD = 0.90, range: 4.94–8.64), and 8.22 (SD = 0.74, range: 6.68–9.77) at follow-up. The mean difference between baseline and follow-up was 1.39 (SD = 0.80; range: − 0.68–2.84; 95% CI: − 1.58–1.04; $p < 0.001$). Among the 50 items in the questionnaire, 44 increased significantly (not shown in table).

The ten items that increased most between baseline and follow-up are presented in Table 1. Eight of these related to direct clinical practice, such as history-taking, physical examination, differential diagnosing and medication, while two were related to health promotion and illness prevention, and support and guidance provided to the patient. These items increased from 1.66–2.80 between baseline and follow-up, and all items increased significantly.

The ten items that increased least between baseline and follow-up are presented in Table 2. These related to fragmented aspects of clinical competence such as responsibility, cooperation with the physician, decision-making, improvements in the workplace, and the use of electronic devices such as telephones and e-mail when assessing the patient. These items increased from 0.12–0.75 between baseline and follow-up, and five items increased significantly. A ceiling effect was observed for seven items.

The 10 items ranked lowest at baseline are presented in Table 3. These related to direct clinical practice, improvement in the workplace, health promotion and illness prevention, and the use of electronic devices such as telephones and e-mail when assessing the patient.

Table 1 Top 10 developed self-assessed items between baseline and follow-up (paired sample t-test)

Item no.	Item	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean
14	**I systematically gather information from each patient about her/his health resources**	**5.49 (1.93)**	**8.29 (1.05)** [a]	**2.80****
8	**I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)**	**5.31 (1.86)**	**7.75 (1.27)**	**2.44****
15	**I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for**	**5.97 (2.09)**	**8.25 (1.03)**	**2.28****
13	**I develop and administer health-promoting and illness-preventive actions for patients**	**5.89 (2.00)**	**8.11 (1.02)** [a]	**2.22****
9	**I apply both subjective and objective methods when examining, treating and caring for patients**	**6.14 (1.79)**	**8.33 (1.22)**	**2.19****
7	**I exclude differential diagnoses when assessing patients' health conditions**	**5.61 (1.93)**	**7.72 (1.56)**	**2.11****
1	**I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with complicated medical conditions**	**5.36 (1.71)**	**7.31 (1.77)**	**1.95****
2	**I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with uncomplicated medical conditions**	**6.36 (1.82)**	**8.28 (1.06)**	**1.92****
47	**I give health promotion and illness preventive recommendations in accordance with national guidelines to patients**	**5.83 (2.33)**	**7.49 (2.05)** [a]	**1.66****
27	**I support and guide patients in mastering their illnesses and health problems**	**5.83 (2.33)**	**7.49 (2.05)**	**1.66****

Note: Bold font indicates statistically significant differences

[a]Competency not covered in the programme: item no. 13—1 student; item no. 14—1 student; and item no. 47—1 student

**$p < 0.001$

Table 2 Lowest 10 developed self-assessed items between baseline and follow-up (paired sample t-test)

Item no.	Item	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean	Ceiling effect observed
35	I experience a division of responsibility between the physician and me as a nurse	7.44 (1.80)	7.56 (1.99)	0.12	Yes
19	I improve routines/systems that fail to meet the needs of patients at my workplace	6.60 (2.15)	6.89 (2.06) [a]	0.29	No
46	I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices	4.71 (2.46)	5.07 (3.42) [a]	0.36	No
50	I report all incidents in accordance with the actual patient safety system	7.14 (2.14)	7.58 (2.03)	0.44	Yes
29	I take active responsibility for creating a good working environment	8.06 (1.49)	8.53 (1.11)	0.47	Yes
31	**I make my own decisions in my work**	**7.89 (1.60)**	**8.36 (1.76)**	**0.47***	No
36	**I cooperate well with the physician**	**8.53 (1.23)**	**9.03 (1.13)**	**0.50***	Yes
39	**I am cognisant of when my medical knowledge is insufficient when assessing patients' health conditions**	**8.61 (1.32)**	**9.11 (0.89)**	**0.50***	Yes
32	**I take full responsibility for my own actions**	**8.67 (1.33)**	**9.33 (0.96)**	**0.66***	Yes
20	**I am actively responsible for my own professional development**	**8.28 (1.70)**	**9.03 (0.88)**	**0.75***	Yes

Note: Bold font indicates statistically significant differences
[a]Competency not covered in the programme: item no. 19—1 student; and item no. 46—8 students
*$p < 0.05$

Table 3 10 lowest self-assessed items at baseline with follow-up scores and difference (paired sample t-test)

Item no.	Item	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean
45	I assess patients' health needs by telephone, e-mail or other electronic devices	4.70 (2.32)	5.96 (2.91)[a]	1.26
46	I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices	4.71 (2.46)	5.07 (3.42) [a]	0.36
8	**I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)**	**5.31 (1.86)**	**7.75 (1.27**	**2.44***
1	**I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with complicated medical conditions**	**5.36 (1.71)**	**7.31 (1.77)**	**1.95****
18	**I take responsibility for competence development at my workplace**	**5.49 (2.55)**	**7.06 (2.51)**	**1.57****
14	**I systematically gather information from each patient about her/his health resources**	**5.49 (1.93)**	**8.29 (1.05)**	**2.80****
17	**I participate in quality development at my workplace**	**5.56 (2.55)**	**6.41 (2.69)**	**0.85***
7	**I exclude differential diagnoses when assessing patients' health conditions**	**5.61 (1.93)**	**7.72 (1.56)**	**2.11****
6	**I evaluate and modify patients' medical treatment**	**5.74 (1.74)**	**7.06 (1.47)** [a]	**1.32****
47	**I give health promotion and illness preventive recommendations in accordance with national guidelines to patients**	**5.83 (2.33)**	**7.49 (2.05)**	**1.66****

Note: Bold font indicates statistically significant differences
[a]Competency not covered in the programme: item no. 6—1 student; item no. 18—1 student; item no. 45—9 students; and item no. 46—8 students
*$p < 0.05$
**$p < 0.001$

The items increased from 0.36–2.8 between baseline and follow-up, and eight items increased significantly.

We extracted two groups from the total sample. One group represents the third of the students with the highest total mean for clinical competence ($n = 12$; total mean: 7.93; SD: 0.49; range: 7.31–8.75), and the other group represents the third of the students with the lowest total mean for clinical competence (n = 12; total mean: 5.91; SD: 0.46; range: 4.98–6.42). In the group with high clinical competence, the 10 lowest self-assessed items at baseline are presented in Table 4. In this group, eight items increased significantly. In the group with low clinical competence, the 10 lowest self-assessed items at baseline are presented in Table 5. In this group, eight items increased significantly. When the 10 lowest self-assessed items at baseline for students with high and low clinical competence (Tables 4 and 5) were compared, 8 items were found in both groups (items in grey in Tables 4 and 5). Among these eight items, five concerned direct clinical practice, two concerned assessing the patient with electronic devices and one concerned competence development at the workplace. Among the 50 items, 22 items increased significantly more for students with low clinical competence than for students with high clinical competence (Table 6). The ceiling effect was observed for 14 items, but this did not include the items concerning direct clinical practice.

Previous clinical work experience as an RN within primary health care was found to be a statistically significant, yet minor, predictor for total mean clinical competence scores at follow-up, when adjusted for clinical competence at baseline (Table 7). This predictor variable explained 36.9% of the variance. Students with 10 years of previous clinical work experience in primary health care had a 0.35-point higher score for total clinical competence than students without. Neither work experience as an RN overall, work experience within specialist health care or previous education, were significant predictors.

Discussion

Clinical competence that developed the most

The aim of the present study is to analyse the development of NP students' self-assessed clinical competence from the beginning of their education (baseline) to after completion of their clinical studies (follow-up). Among the 50 items in the PROFFNurseSAS II questionnaire, 45 increased significantly. The total clinical competence score increased by 1.39 points, resulting in a total score of 8.22 (of a maximum of 10) after the students had completed their clinical studies. This finding is consistent with that of Wangensteen [15], who found that APN

Table 4 Students with higher clinical competence and the 10 lowest self-assessed items at baseline (paired sample t-test)

Item no.	Item	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean
45	I assess patients' health needs by telephone, e-mail or other electronic devices	4.50 (2.39)	5.75 (3.06)[a]	1.25
46	I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices	5.56 (2.79)	5.78 (3.87 [a]	0.22
8	**I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)**	**5.75 (1.91)**	**8.25 (1.36)**	**2.50****
1	**I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with complicated medical conditions**	**5.92 (1.88)**	**7.67 (2.23)**	**1.75***
18	**I take responsibility for competence development at my workplace**	**6.17 (2.37)**	**7.92 (1.62)**	**1.75***
7	**I exclude differential diagnoses when assessing patients' health conditions**	**6.58 (1.68)**	**8.42 (1.00)**	**1.84***
14	**I systematically gather information from each patient about her/his health resources**	**6.73 (1.85)**	**8.64 (1.29)** [a]	**1.91***
6	I evaluate and modify patients' medical treatment	6.67 (1.56)	7.42 (1.68)	0.75
15	**I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for**	**6.67 (1.83)**	**8.75 (0.97)**	**2.08***
13	**I develop and administer health-promoting and illness-preventive actions for patients**	**7.00 (1.35)**	**8.67 (0.89)**	**1.67***

Notes: Bold font indicates statistically significant differences

[a] Competency not covered in the programme: item no. 14—1 student; item no. 45—4 students; and item no. 46—3 students

* $p < 0.05$

Table 5 Students with lower clinical competence and the 10 lowest self-assessed items at baseline (paired sample t-test)

Item no.	Item	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean
17	I participate in quality development at my workplace	3.45 (2.21)	4.82 (3.28)[a]	1.37
16	I generate a creative learning environment for staff at my workplace	3.58 (1.83)	5.92 (1.88)	2.34
18	**I take responsibility for competence development at my workplace**	**3.82 (1.94)**	**5.55 (3.01)[a]**	**1.73***
13	**I develop and administer health-promoting and illness-preventive actions for patients**	**4.09 (2.12)**	**7.73 (1.27)[a]**	**3.64****
46	I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices	4.20 (2.20)	4.50 (3.54)[a]	0.30
15	**I have knowledge of the interactions of various types of medication and what side-effects they may cause for the patients I am responsible for**	**4.25 (2.14)**	**7.75 (0.97)**	**3.50****
14	**I systematically gather information from each patient about her/his health resources**	**4.25 (1.55)**	**8.08 (1.00)**	**3.83****
45	I assess patients' health needs by telephone, e-mail or other electronic devices	4.44 (2.01)	5.44 (3.43)[a]	1.00
8	**I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)**	**4.42 (1.51)**	**7.50 (1.24)**	**3.08****
7	**I exclude differential diagnoses when assessing patients' health conditions**	**4.42 (1.83)**	**7.50 (1.17)**	**3.08****

Notes: Bold font indicates statistically significant differences
[a]Competency not covered in the programme: item no. 13—1 student; item no. 17—1 student; item no. 45—3 student, and item no. 46—2 students
**$p < 0.001$

students self-assessed their clinical competence at 8.08 on completing their education.

We found that, among the 10 items that increased the most between the beginning of the students' NP education and following the completion of their clinical studies, 8 items concerned the direct clinical practice of history-taking, physical examination, differential diagnosis and medication. These items refer to medically-related clinical skills that highly proficient RNs must acquire in order to become NPs [1, 24]. This finding is in line with previous research, which has shown that direct clinical practice was what NP/APN students most desired to learn [15, 16], and what NP students perceived as the most important aspect of their clinical competence [25].

Clinical decision-making is an important aspect of an NP's clinical competence. Tiffen et al. ([26] p.400) developed the following definition: 'Clinical decision-making is a contextual, continuous, and evolving process, where data are gathered, interpreted, and evaluated in order to select an evidence-based choice of action'. Taylor, Bing-Jonsson, Johansen, Levy-Malmberg, and Fagerström [27] found that while NP students demonstrated some structured history-taking and physical assessment techniques, they struggled to demonstrate decision-making in their OSCE (first clinical exam) for a pre-clinical course that they were required to pass prior to starting their clinical studies. In the present study, all the participating students had completed their clinical studies. They had also passed their OSCA (a second clinical exam), during which they were asked to assess clinical preceptor-selected patients who had given their consent. Item no. 8 in the questionnaire – 'I interpret, analyse and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)' – is consistent with the aforementioned definition of clinical decision-making, and was ranked second among the items that increased its scores the most in the follow-up part of the present study. This skill is specific and essential to NPs, as is clearly stated in the APN Nordic model [11].

Previous research has shown that medication (interactions and side-effects) represented the item about which NP/APN students most wanted to learn [15, 16]. The present study found that this item was ranked third among the items in the questionnaire that increased its scores the most. A study has shown that RNs working in nursing homes are in need of a deeper understanding of the inter-complexity of age-specific diseases and medication in order to ensure that their clinical judgments and actions are appropriate and safe [28]. Another study revealed that among 243 graduating nursing students and 203 RNs who took a multiple choice test, 25% of the answers to questions related to medicines management

Table 6 Students with high clinical competence vs low clinical competence (independent sample t-test)

Item no.	Item	Group	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean	Ceiling effect
2	I am independently responsible for health assessment (systematic physical examination), examinations and treatment of patients with uncomplicated medical conditions	High clinical competence	7.75 (1.71)	8.50 (1.09)	0.75*	No
		Low clinical competence	5.42 (1.68)	8.17 (0.94)	2.75*	
3	I plan and prioritise nursing and medical interventions	High clinical competence	7.75 (0.75)	8.58 (1.08)	0.83*	No
		Low clinical competence	5.58 (1.51)	8.00 (1.35)	2.42*	
4	I identify patients' health problems	High clinical competence	7.92 (1.17)	8.67 (1.16)	0.75*	No
		Low clinical competence	6.42 (1.51)	8.33 (0.99)	1.91*	
9	I apply both subjective and objective methods when examining, treating and caring for patients	High clinical competence	7.75 (0.87)	8.92 (1.17)	1.17*	No
		Low clinical competence	5.25 (1.36)	8.08 (1.08)	2.83*	
12	I identify changes in patients' health and medical conditions	High clinical competence	7.92 (1.17)	8.75 (0.87)	0.83*	No
		Low clinical competence	5.58 (2.35)	8.67 (0.65)	3.09*	
13	I develop and administer health-promoting and illness-preventive actions for patients	High clinical competence	7.00 (1.35)	8.67 (0.89)	1.67*	No
		Low clinical competence	4.09 (2.12)	7.73 (1.27) [a]	3.64*	
14	I systematically gather information from each patient about her/his health resources	High clinical competence	6.73 (1.85)	8.64 (1.29) [a]	1.91*	No
		Low clinical competence	4.25 (1.55)	8.08 (1.00)	3.83*	
20	I am actively responsible for my own professional development	High clinical competence	9.33 (0.89)	9.50 (0.80)	0.17*	Yes
		Low clinical competence	7.17 (2.04)	8.92 (0.90)	1.75*	
21	I take patients' mental health needs (mood swings, feelings of hopelessness, depression, etc.) into account when assessing and planning for the health and life situation of patients	High clinical competence	8.33 (1.07)	8.75 (1.01)	0.42*	Yes
		Low clinical competence	6.42 (1.62)	8.25 (1.06)	1.83*	
22	I take patients' spiritual health needs (feelings of meaninglessness, existential needs, beliefs, fear of death, etc.) into account when assessing and planning for the health and life situation of patients	High clinical competence	8.08 (1.56)	8.00 (1.54)	−0.08*	Yes
		Low clinical competence	5.67 (1.83)	7.83 (1.03)	2.16*	
23	I take patients' physical health needs (illness, pain, disabilities, etc.) into account when assessing and planning for the health and life situation of patients	High clinical competence	8.92 (0.90)	9.08 (0.79)	0.16**	Yes
		Low clinical competence	6.75 (1.14)	8.58 (0.79)	1.83**	
24	I act ethically when caring for patients	High clinical competence	8.83 (0.84)	9.17 (0.84)	0.33*	Yes
		Low clinical competence	6.83 (1.80)	8.83 (0.72)	2.00*	
25	I identify and assume responsibility for patients' own health resources in planning nursing care	High clinical competence	8.08 (1.44)	8.33 (1.07)	0.25**	Yes
		Low clinical competence	5.33 (1.72)	8.42 (1.00)	3.08**	

Table 6 Students with high clinical competence vs low clinical competence (independent sample t-test) *(Continued)*

Item no.	Item	Group	Baseline Mean (SD)	Follow-up Mean (SD)	Difference Mean	Ceiling effect
26	I take patients' social health needs (leisure activities, friends, financial situation, etc.) into account when assessing and planning for the health and life situation of patients	High clinical competence	7.55 (1.44)	8.18 (1.33) [a]	0.63*	No
		Low clinical competence	4.58 (1.93)	7.42 (1.17)	2.83*	
27	I support and guide patients in mastering their illnesses and health problems	High clinical competence	8.50 (1.09)	8.42 (1.08)	−0.08**2.67**	Yes
		Low clinical competence	5.50 (1.83)	8.17 (0.72)		
30	I put emphasis on patients' own wishes when assessing and planning for nursing care and medical treatment	High clinical competence	8.50 (1.73)	9.00 (0.85)	0.50*	Yes
		Low clinical competence	6.08 (2.11)	8.50 (1.00)	2.42*	
32	I take full responsibility for my own actions	High clinical competence	9.17 (0.94)	9.25 (1.14)	0.08*	Yes
		Low clinical competence	8.00 (1.71)	9.25 (1.06)	1.25*	
34	I understand the consequences my decisions may have for patients	High clinical competence	8.67 (1.16)	9.17 (0.94)	0.5*	Yes
		Low clinical competence	7.17 (1.47)	9.00 (0.95)	1.83*	
37	I consult other professional experts when required	High clinical competence	9.42 (0.79)	9.25 (0.97)	−0.17*	Yes
		Low clinical competence	7.17 (2.25)	9.00 (0.96)	1.83*	
38	I cooperate actively with other health professionals when coordinating patients' nursing, care and treatment	High clinical competence	9.25 (0.87)	9.08 (0.90)	−0.17*	Yes
		Low clinical competence	7.33 (2.02)	9.00 (1.04)	1.67*	
39	I am cognisant of when my medical knowledge is insufficient when assessing patients' health conditions	High clinical competence	9.58 (0.67)	9.25 (0.75)	−0.33*	Yes
		Low clinical competence	8.17 (1.47)	9.17 (0.58)	1.00*	
41	I reflect on my actions	High clinical competence	9.00 (0.74)	9.08 (1.08)	0.08*	Yes
		Low clinical competence	7.25 (2.09)	9.00 (0.74)	1.75*	

Notes: [a]Competency not covered in the programme: item no. 13—1 student; item no. 14—1 student; item no. 26—1 student
*$p < 0.05$
**$p < 0.001$

Table 7 Regression: Self-assessment total mean at follow-up versus years of clinical work experience as an RN in primary health care, adjusted for total mean at baseline

Item	*B*	adjusted R^2	*p*
Total mean baseline	= 0.401	= 0.369	= 0.003
Clinical work experience as an RN: Primary health care	= 0.035		= 0.038

indicated a high risk of error [29]. We thus regard it as a promising finding of the present study that the item related to medication was ranked third among those that increased its scores the most. Despite the fact that NPs in Norway have yet to be granted prescription rights, our NP programme course in pharmacology is extensive and compares well with those offered in countries where NPs are granted such rights. The findings in this study indicate that the students had developed their clinical competence for direct clinical practice in line with the ICN's [1] NP definition and the intended learning outcomes of the NP Master's programme, specifically in

relation to advanced health and physical assessment, advanced pathophysiology and advanced pharmacology.

Clinical competence that developed the least development

We found that the 10 items that increased the least between the start of students' NP education and after the completion of their clinical studies concerned fragmented aspects of clinical competence such as responsibility, cooperation with the physician, decision-making, improvements in the workplace, and the use of electronic devices such as telephones and e-mail when assessing the patient. All of these items coincided with similarly fragmented aspects of clinical competencies set out in the Nordic APN-model, i.e., consultation, coaching and guidance, collaboration and leadership [11].

In the case of item 19 in the questionnaire ('I improve routines/systems that fail to meet the needs of patients at my workplace'), the students reported average scores at the beginning of their education, and scores for this item did not increase significantly on completion of their clinical studies. This item is considered to be important as a measure of a student's clinical competence in relation clinical leadership in the workplace. According to the ICN [1], NPs are clinical leaders who can influence health service delivery and the profession at large. Thus, an assessment of the development of students' clinical competence at advanced nursing level must include an evaluation of their ability as clinical leaders. Indeed, leadership has been reported to be a key factor in an advanced practitioner's ability to influence innovation, improve clinical practice and health care delivery, and advance the nursing/midwifery professions [30]. Moreover, the leadership aspect of the APN role is embedded in the statutory regulations governing APN Master's programmes offered in Norway [31], which conform in most respects to national policy and competency standards relating to NP education in countries such as Australia, England, the United States and South Africa [32–35]. However, the finding in the present study may indicate that the NP students did not develop sufficiently with regard to clinical competence in some aspects of clinical leadership.

The students' self-assessment of item no. 46—'I give health promotion advice and recommendations to patients by telephone, e-mail or other electronic devices'—was the second-lowest at the beginning of their education. This item did not increase significantly on completion of their clinical studies. This outcome is in line with previous findings showing that NP/APN students consistently reported the lowest scores for this item [15], and were neutral in their attitudes as to whether this was an important factor in the further training [16]. We note in passing that experience from the Covid-19 pandemic has demonstrated that digital health care is more relevant today than it has ever been.

A ceiling effect was observed for seven of the ten items that increased their scores the least. Since a ceiling effect can be indicative of an incomplete scale [23], it may be argued that some of the items in the PROFFNurseSAS II questionnaire have limitations regarding their value as measures of clinical competence at an advanced level. However, a ceiling effect may reflect other than purely statistical issues [23] and NP students may have been reporting a maximum score for items relevant to their experiences as an RN. There are distinct differences between the levels of clinical competence among RNs and NPs. NPs have a broader degree of autonomy due to their advanced in-depth critical decision-making skills [1]. Due to the recent introduction of the NP role in Norway, many of the students in the present study did not associate with other NPs who could act as role models and indicators of what might be expected in terms of clinical competence at advanced NP level. Thus, in this respect, the present study has some limitations with regard to its measurement of some aspects of clinical competence at NP level.

Students with high and low clinical competence

When selecting the ten items with the lowest mean scores at the beginning of the students' education, the high- and low-clinical competence groups revealed surprising similarity. With the exception of two items, those selected were identical in both groups. Even more surprisingly, in the case of 22 items, students with a low clinical competence at baseline increased their scores significantly more than those starting with a high clinical competence. A ceiling effect was observed for 14 of the 22 items, but not for those relating to direct clinical practice, which represent the central competencies set out in the Nordic APN model [11]. This means that the students with low clinical competence increased their clinical competence of direct clinical practice more that the students with higher clinical competence. In short, the differences between students with high and low levels of clinical competence at baseline were levelled out during their education. As a consequence, the students evolved into a more homogenous group with similar levels of clinical competence in relation to direct clinical practice after the completion of their clinical studies.

It is important to implement set standards in NP education as a means of achieving consistency in the educational preparation and authorization of NPs [36]. However, there are both positive and negative aspects in having all students develop their clinical competence to the same level. Stensaker and Prøitz [37] have expressed the concern that our perception of quality in education

is conflicted. On the one hand, educational programmes are broad-based and generalised in an attempt to promote inclusivity. Others, on the other hand, education policy evolve as narrow and elitist in pursuit of promoting excellence. A challenge currently facing NP education is the fact that programmes seek simultaneously to educate students to be safe practitioners at an advanced level [38] while also encouraging them to be highly autonomous pioneers with the ability to make a difference to the quality of patient care [39]. We argue that NP education should aim to level up differences in clinical competence in order to ensure that the NP role represents a sustainable standard that contributes to improvements in patient safety.

Work experience and the development of clinical competence

Previous research has not found an association between the clinical competence and work experience of RNs in primary health care [40], or among RNs and critical care nurses working in intensive care units [41]. This is in line with the present authors' previous research [16], during which we also did not establish work experience in primary health care as a significant predictor of clinical competence among APN/NP students at the beginning of their education. This finding is also supported by that of Wangensteen [15]. However, in the present study, we found that work experience in primary health care was a statistically significant, yet minor, predictor of the total mean score reported by students after they had completed their clinical studies, following adjustment for the total mean score reported at baseline. This could mean that, even though previous work experience was not associated with clinical competence at the beginning of their education, the students who had worked within primary health care utilized their work experience in a way that enabled them to develop clinical competence. Knowles, Holton, Swanson, and Robinson [42] emphasise that the richest resources for learning reside in the adult learners themselves, and recommend teaching techniques that tap in to the learners' own experiences. Offering students the opportunity to draw on their prior work experience during their Master's education has been shown to promote learning, especially when educators facilitate the students' critical reflections on their experiences and provided feedback on their performance [43]. Students who participated in the present study were specifically encouraged to apply their previous work experience during the programme's coursework and lectures. Our findings may therefore indicate that the NP Master's programme is well suited to students who have prior work experience in primary health care.

The finding that prior work experience in primary health care is associated with clinical competence development is interesting with regard to NP programmes that include clinical work experience as an entry requirement. According to the ICN [1], entry requirements for NP programmes in terms of work experience differ markedly between countries. For example, Gardner, Dunn, Carryer and Gardner [44] found that entry requirements across the 14 programmes they studied varied from zero to 5 years of experience. In the present authors' previous study [16], we did not find evidence to recommend having work experience as an entry requirement. Due to the findings in the present study, that are significant yet minor, we remain inconclusive to a recommendation for having working experience as an entry requirement.

Limitations

The PROFFNurseSAS II questionnaire has been evaluated for content validity [15] and reliability [16]. However, findings indicate that it may have issues related to its ability as a tool to assess the development of some aspects related to consultation, coaching and guidance, as well as collaboration at an advanced nursing level. This may be due to the fact that there are relatively few items in the questionnaire that pertain to these aspects, combined with a ceiling effect.

The value of self-assessment in nursing education is currently disputed, since it has been argued that nursing students at Bachelor's level do not possess either sufficient faculty of self-reflection in relation to their actions, or the critical thinking skills necessary to carry out self-assessment [45]. The Dunning–Kruger effect has shown that poor performers overestimate their performance [46], thus raising doubts as to the construct validity of self-assessment approaches. However, Flynn, Valeberg, Tønnessen and Bing-Jonsson [47] found that Master's students in nurse anaesthesia education significantly underestimated their clinical performance in relation to non-technical skills when compared with the assessments of their clinical supervisors. This finding supports the argument made in our previous study [16] that self-assessment is a valid and reliable approach to evaluations of APN education.

The present study does not attempt to evaluate the development of NPs' clinical competence from the start to the end of their education, but from the start to the completion of their clinical courses in physical assessment, pathophysiology and advanced pharmacology, and their clinical studies. Before completing the NP Master's programme, the students still have to complete their Master's theses, which each offer 30 ECTS credits. Students are encouraged to choose topics with a clinical focus, or a project centred on professional development or quality improvement. Thus, since the students in this study had not yet fully completed their Master's

programme at the follow-up point, we suggest that more research is needed in order to investigate the students' level of clinical competence as certified NPs.

We acknowledge that in general terms our sample size of 36 participants is limited in the context of a quantitative research project. However, the population of 46 students is also small. The study has achieved a high response rate and from the power analysis we have concluded that the sample size is appropriate. However, we recognise the problems associated with generalising our results on the basis of such a small sample size, and recommend further research using a larger sample.

Conclusion

The greatest development in the NPs' clinical competence observed in this study was in relation to direct clinical practice. This is in line with international standards and the intended learning outcomes of the NP Master's programme. However, the results of the present study are inconclusive regarding the students' development in the fields of consultation, coaching and guidance, and collaboration. Furthermore, we observed a lack of development in aspects concerning clinical leadership in the workplace. The students entered the NP programme with different levels of clinical competence in terms of direct clinical practice, but these differences were largely equalised during their education. Students with low clinical competence of direct clinical practice at baseline achieved significantly greater advances in their clinical competence during their education than those with high clinical competence at baseline. Clinical work experience in primary health care was a statistically significant, yet minor, predictor of the development of clinical competence among the students during the programme. The authors thus refrain from recommending that prior clinical experience should be an entry requirement for the NP programme. We believe that the results of the present study may be used to improve nurse practitioner education, and recommend that an evaluation of the current NP programme be carried out in order to determine whether the curriculum meets the academic standards of clinical leadership that are expected for advanced level nursing practitioners.

The Norwegian government has contributed by introducing an APN certification and regulations governing APN Master's education in Norway. It is now imperative that the clinical sector works together with the NP students to integrate the NP role in the workplace. NP students must be given the opportunity to display and further advance their newly acquired clinical competence at advanced level so that potential health outcomes for patients can be measured. Further research into the development of NP students' clinical competence should include studies of future NPs with clinical work experience in relevant and advanced fields of nursing practice in clinical settings. The objective here will be to evaluate the transfer of learning outcomes from education to clinical practice. With regard to the methodological dilemmas associated with self-assessment, we believe that it would be interesting to include NP students or NPs clinical preceptors in such studies in order to strengthen the validity of any findings.

Abbreviations

APN: Advanced Practice Nursing; ICN: International Council of Nurses; OECD: Organisation for Economic Cooperation and Development; RNs: Registered Nurses; CNS: Clinical Nurse Specialist; NP: Nurse Practitioner; PHC: Primary Health Care; ECTS: European Credit Transfer System; PROFFNurseSAS II : The Professional Nurse Self-Assessment Scale of clinical core competencies II (survey questionnaire); OSCA: Objective Structured Clinical Assessment; OSCE: Objective Structured Clinical Examination

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Authors' contributions

All those entitled to authorship are listed as authors. All authors have agreed on the final version and have made substantial contributions to all of the following: (1) The conception and design of the study, as well as the acquisition or analysis and interpretation of data. (2) The drafting or critical revision of the article for important intellectual content. (3) The final approval of the version to be submitted.

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Availability of data and materials

Due to the express wishes of the informants, the datasets used and analysed in the present study are not available. The corresponding author can be contacted.

Ethics approval and consent to participate

The present project was approved by the Norwegian Centre for Research Data (NSD: approval no. 52648). The Norwegian Centre for Research Data ensures that data about people can be collected, stored and shared, both safely and legally, today and in the future. The Ethical Committee of South East Norway provides advance approval for medical and health research projects involving humans. As this project is not a medical nor health research project, approval from The Ethical Committee of South East Norway was not required. Informed consent was obtained from all participants. Information was provided to the informants on both occasions when they participated in the study. At baseline they received information both orally and on a written handout, and at the follow-up point via e-mail. The students were also informed about participant anonymity and their right to withdraw from the study at any time, without giving any reason. All methods were implemented in accordance with the EU's General Data Protection Regulation (Regulation 2016/679), and the study adhered consistently to STROBE guidelines.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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