








ORIGINAL ARTICLE

# 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

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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, Wangenstein, 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).

Wangenstein 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 (Wangenstein 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 Finnakk 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 Wangenstein et al.'s (2018) study.

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 <sup>a</sup>	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 Wangenstein et al.'s (2018) study.

<sup>a</sup>Competency not covered in the programme: one student.

**TABLE 3** Top 10 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) <sup>a</sup>
1	<b>I am independently responsible for health assessment (systematic physical examination), examinations, and treatment of patients with complicated medical conditions</b>	<b>5.19 (1.87)</b>	<b>7.97 (1.98)</b>
8	<b>I interpret, analyse, and reach alternative conclusions about patients' health conditions after a detailed mapping of health history and health assessment (physical examination)</b>	<b>5.37 (2.01)</b>	<b>8.31 (1.66)</b>
45	I assess the patients' health needs by telephone, e-mail, or other electronic devices	5.54 (2.67)	6.89 (2.83)
7	<b>I exclude differential diagnoses when assessing patients' health conditions</b>	<b>5.51 (1.92)</b>	<b>8.14 (1.95)</b>
15	<b>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</b>	<b>5.63 (1.93)</b>	<b>8.43 (1.95)</b>
6	<b>I evaluate and modify patients' medical treatment</b>	<b>5.71 (1.82)</b>	<b>8.22 (1.82)</b>
16	<b>I generate a creative learning environment for staff at my workplace</b>	<b>5.87 (2.32)</b>	<b>7.54 (2.64)</b>
14	<b>I systematically gather information from each patient about her/his health resources</b>	<b>5.91 (1.90)</b>	<b>7.67 (2.03)</b>
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).

<sup>a</sup>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)



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 PROFNurse 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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