

Report

# Nursing Education in Crisis

**Exploring Norwegian Students' Competence and  
Learning Disruptions Amid the COVID-19 Pandemic**

## **Nursing Education in Crisis: Exploring Norwegian Students' Competence and Learning Disruptions Amid the COVID-19 Pandemic**

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## ABSTRACT

**Background:** The COVID-19 pandemic disrupted nursing education in Norway, transitioning theoretical education to digital platforms and adversely impacting clinical placements.

**Aims:** To investigate bachelor nursing students' self-reported competence at graduation, perceived impact of the COVID-19 pandemic on their educational situation regarding and perceived overall concern that the educational situation during the pandemic had not given sufficient competence to start working as a nurse. Additionally, the study aimed to investigate how these results were associated with students' demographic, educational background, and work experience data, and to examine whether self-reported competences were correlated with the overall concern that the educational situation had not given sufficient competence to start work as a nurse.

**Method:** The validated 35-item Nurse Professional Competence Scale Short Form, covering six competence areas (CAs), was used alongside demographic and background questions.

**Findings:** Students reported the highest competence in 'Value-based Nursing Care' (mean 84.3/100) and 'Nursing Care' (mean 81.4). The students reported the lowest competence in 'Development, Leadership, and Organization of Nursing Care' (mean 70.6) and 'Care Pedagogics' (mean 74.4). Over 30% of the students reported that their competence in managing drugs, handling technical equipment, and educating patients was negatively impacted by the pandemic. Additionally, 40.6% expressed high concern about being inadequately prepared to start working as nurses. Younger students reported significantly lower competence in the three CAs 'Value-based Nursing Care', 'Care Pedagogics' and 'Development, Leadership and Organization of Nursing Care'. They also expressed greater overall concern regarding their readiness to transition into professional nursing roles.

**Conclusion:** The findings of this study provide valuable insights into the self-reported competence at graduation of Norwegian nursing students during a global crisis, addressing an important gap in the literature. The results highlight both the resilience of nursing students and the importance of identifying vulnerable student groups, such as younger nursing students, early to provide targeted support and enhance their readiness to begin working as nurses. The study emphasizes the need for universities to re-evaluate and potentially redesign educational frameworks to ensure that nursing students continue gaining competence during crisis. This study serves as a foundation for future research and policy development aimed at fostering innovative approaches to education and preparing nursing students to meet clinical challenges in both ordinary and extraordinary circumstances.

**Key words:** COVID-19 pandemic, NPC Scale-SF, Nurse Professional Competence Scale, Nursing, Nursing education, Nursing students, Self-reported competence

## **INTRODUCTION**

The World Health Organization (WHO) emphasizes the importance of clinical practice as a cornerstone of nursing education, highlighting its role in preparing nursing students to meet the demands of modern healthcare systems. Clinical practice is critical for bridging the gap between classroom learning and professional practice, ensuring that graduates are competent and ready to deliver high-quality care (1). Clinical competence in nursing care refers to the integration of theoretical knowledge, practical skills, ethical reasoning, and reflective practice, all of which are essential to delivering safe, effective, and patient-centred care. Clinical competence encompasses a nurse's ability to apply evidence-based knowledge, perform medical and technical tasks, communicate effectively, and make sound ethical decisions in diverse and complex healthcare settings (1).

In Norway, nursing education is a three-year university bachelor's program that qualifies graduates as registered nurses. The curriculum is evenly divided between theoretical education and clinical practice with nurse educators from the university typically supervising students in clinical settings. Clinical placements are a fundamental part of the bachelor's degree program in nursing and are closely regulated to ensure that students are exposed to diverse patient populations and interprofessional collaboration. These placements are designed to ensure that nursing students develop the skills and experience necessary to meet the requirements of the Norwegian healthcare system (2). Research highlights that mentorship and supervision during clinical practice are pivotal to nursing students' learning outcomes. These elements enhance the integration of theoretical knowledge into practical skills, foster reflective learning, and ensure patient safety through guided experiences (3).

COVID-19 presented an unprecedented global health crisis. In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic, significantly impacting societies worldwide. The international pandemic-induced lockdowns necessitated a rapid transformation in higher education. For nursing students, traditional on-site theoretical instruction and bedside supervision were replaced with virtual teaching and remote supervision. Nursing students were required to adapt to digital learning environments, despite early reports indicating that both students and educators were unprepared for this sudden shift (4).

Research highlighted that many nursing students lacked the technological proficiency necessary for effective online education, resulting in feelings of helplessness and disappointment (5). The pandemic also created unpredictable study conditions (6), including reduced clinical placement time (7) and altered modes or locations for clinical training (7,8). Furthermore, the disruption of social interactions within student groups emerged as a significant concern, compounding the challenges faced by nursing students (9).

Early in the lockdown, research highlighted the adverse effects of the COVID-19 pandemic on nursing students' mental health (5,10-12), with increased anxiety reported during clinical placements (13). Final-year nursing students experienced higher levels of distress compared to their junior counterparts (11). The pandemic led to an increased demand for psychosocial

support and regular supervision among nursing students (8,10). However, the lack of adequate educator support posed significant risks to students' psychological well-being (14).

The Norwegian authorities' closure of all universities due to the COVID-19 pandemic in March 2020 demanded the educators and students to transition to remote work. Theoretical education and examinations were rapidly adapted to digital platforms. Clinical placements were significantly disrupted as educators were prohibited from visiting healthcare facilities due to the high risk of COVID-19 transmission and the clinical practice for nursing students was challenging to complete. On-campus simulation and practical training were also reduced, further limiting students' opportunities for hands-on learning. Healthcare institutions, overwhelmed by the ongoing clinical situation, communicated their inability to provide clinical supervision for students. To mitigate the negative impact on Norwegian nursing students' clinical experience, universities facilitated temporary voluntary individual employments opportunities for students as paid nurse assistants in elderly care during the spring of 2020. During their employment, the students received online support from nurse educators, although at a reduced frequency.

On a national level, the authorities decided in March 2020 that clinical practice could be shortened, and the nursing students could work as an assistant nurse as a substitute for clinical practice. Employers provided a written certificate confirming that a student had reached their learning outcomes (15). During the autumn of 2020 and spring of 2021, clinical placements resumed, however, limitations on the level of supervision and support provided by nurse educators persisted.

This study was initiated during the peak of the pandemic in Norway in early spring 2021. At that time, we were unable to identify any studies focusing on nursing students' self-reported competence at graduation. This study was motivated by concerns about the educational challenges faced by nursing students during the pandemic and a desire to understand how they managed these extraordinary circumstances.

### **Aims of the study**

The overall aims of the study were to investigate bachelor nursing students'

1. Self-reported competence at graduation,
2. Perceived impact of the COVID-19 pandemic on their educational situation regarding self-reported competence, and
3. Perceived overall concern that the educational situation during the pandemic had not given sufficient competence to start working as a nurse.

Additionally, the study aimed to investigate how these results were associated with students' demographic, educational background, and work experience data, and to examine whether self-reported competences were correlated with the overall concern that the educational situation had not given sufficient competence to start work as a nurse.

## **METHOD**

This study utilized a cross-sectional, descriptive research design. The reporting adhered to the ‘Strengthening the Reporting of Observational Studies in Epidemiology’ (STROBE) checklist. A convenience sampling approach was used to recruit participants. No formal institutional ethical review was needed as all data was collected anonymously.

### **Participants and recruitment**

In May 2021, all 197 students enrolled in the final semester of the bachelor’s nursing program at a university in south-eastern Norway were invited to participate in the study. These students began their nursing education in August 2018, thus completing their final three semesters during the COVID-19 pandemic.

Participants eligible for inclusion were required to be enrolled in the bachelor’s nursing program and expected to graduate in June 2021. Additional criteria included being reachable via email and having access to the password-protected e-learning platform used by the students. Information about the upcoming study was posted on the e-learning platform in May 2021 by a fully informed teacher who was not a part of the research team. This approach was chosen to avoid direct contact with the students, thereby minimizing potential conflicts of interest or perceived pressure to participate. One week later, the teacher sent an email to all students containing detailed information about the study. The email emphasized the voluntary nature of participation, assured anonymous data collection, and confirmed that the results would be presented only at the group level. The email also included a link to the online questionnaire and the deadline. Additionally, students were provided with the name and contact information of the project leader (A.G.) if they had any questions or needed clarification. However, no students reached out with inquiries or feedback.

At the initial deadline, only 11.5% of the students had responded to the online questionnaire. The deadline was subsequently extended, and a reminder email was sent to all students by the teacher. In collaboration with the university’s research unit, it was decided to introduce an incentive to improve participation. A raffle was announced, offering three gift cards, each valued at 500 NOK, to students who completed the questionnaire. Information about the raffle was communicated by the teacher, who also managed its implementation. The deadline for questionnaire submission was extended twice, with the final deadline set for the day before graduation. Data collection spanned a 25-day period in May and June 2021.

To summarize, during this time, two written reminders were sent to the student group, the deadline was extended twice, and the gift card raffle was implemented to encourage participation.

### **The online questionnaire and scoring**

The first section of the online questionnaire collected data on demographic, educational and work-related background variables. These questions included fixed answer alternatives, and responses are displayed in numbers and percentages. The variables included:

- gender with alternatives female, male or binary

- age groups with alternatives <25, 26-30, 31-35, 36-40, and >41 years
- highest educational qualification before joining the nursing program with alternatives upper secondary school or university degree
- experience of working in healthcare before joining the nursing program with alternatives experience or no experience
- paid work in healthcare during the nursing program (in addition to the 190 hours required for certification) with alternatives paid work in parallel (<10 hours, 10-20 hours, >20 hours) or no paid work in parallel.

The second section of the questionnaire included the validated, 35-item version of the Nurse Professional Competence Scale Short Form (NPC Scale-SF) (16) developed by a Swedish research group (<https://npcresearchgroup.com/>). The NPC Scale-SF is designed to assess self-reported nursing competence among nursing students and/or registered nurses (16). The NPC Scale-SF has been utilized in several international studies involving nursing students (17-25), is well-established, and has been translated into more than 20 languages. The Norwegian version of the scale has been tested and validated by Skaug, Ekman, and Kirchhoff (26). Psychometric testing of the NPC Scale-SF has demonstrated its reliability and validity (16). The 35 items form six competence areas (CAs):

- Nursing Care (CA1, 5 items),
- Value-based Nursing Care (CA2, 5 items)
- Medical and Technical Care (CA3, 6 items)
- Care Pedagogics (CA4, 5 items)
- Documentation and Administration of Nursing Care (CA5, 8 items)
- Development, Leadership, and Organization of Nursing Care (CA6, 6 items).

In the current study, Cronbach's alpha coefficients for the six CAs were 0.88, 0.85, 0.87, 0.87, 0.88 and 0.83, respectively.

Each item on the NPC Scale-SF begins with the prompt, '*Do you think you have the ability to...*' followed by a description of a clinically relevant nursing activity. Examples include:

- *Do you think you have the ability to meet the patient's basic physical needs?*
- *Do you think you have the ability to manage drugs adequately, applying knowledge in pharmacology?*

Responses are recorded on a seven-point scale, ranging from 1 ('*To a very low degree*') to 7 ('*To a very high degree*'). According to the NPC Scale-SF manual, the 1-7 scores are transformed to a 14.3-100 scale for each of the six CAs, with 100 indicating the highest self-reported competence. Unique to this study, each item on the NPC Scale-SF was supplemented with an additional question asking students whether they felt their nursing competence had been affected by the educational situation during the COVID-19 pandemic. Response options for this question were: '*Not at all*', '*Yes, for the better*', and '*Yes, for the worse*' (Figure 1).

| Do you think you have the ability to...    |  |   |  |   |   |  |   | Do you feel that your nursing competence has been affected by the educational situation during the pandemic? |   |  |
|--|--|---|--|---|---|--|---|--|---|--|
| ...independently apply the nursing process | <input type="checkbox"/><br>To a very low degree | <input type="checkbox"/><br>To a low degree | <input type="checkbox"/><br>To a fairly low degree | <input type="checkbox"/><br>Neither a high nor a low degree | <input type="checkbox"/><br>To a fairly high degree | <input type="checkbox"/><br>To a high degree | <input type="checkbox"/><br>To a very high degree | <input type="checkbox"/><br>Not at all   | <input type="checkbox"/><br>Yes, for the better | <input type="checkbox"/><br>Yes, for the worse |
| ...meet patient's basic physical needs     | <input type="checkbox"/><br>To a very low degree | <input type="checkbox"/><br>To a low degree | <input type="checkbox"/><br>To a fairly low degree | <input type="checkbox"/><br>Neither a high nor a low degree | <input type="checkbox"/><br>To a fairly high degree | <input type="checkbox"/><br>To a high degree | <input type="checkbox"/><br>To a very high degree | <input type="checkbox"/><br>Not at all   | <input type="checkbox"/><br>Yes, for the better | <input type="checkbox"/><br>Yes, for the worse |
| ...meet patient's specific physical needs  | <input type="checkbox"/><br>To a very low degree | <input type="checkbox"/><br>To a low degree | <input type="checkbox"/><br>To a fairly low degree | <input type="checkbox"/><br>Neither a high nor a low degree | <input type="checkbox"/><br>To a fairly high degree | <input type="checkbox"/><br>To a high degree | <input type="checkbox"/><br>To a very high degree | <input type="checkbox"/><br>Not at all   | <input type="checkbox"/><br>Yes, for the better | <input type="checkbox"/><br>Yes, for the worse |
| ...document patient's physical status      | <input type="checkbox"/><br>To a very low degree | <input type="checkbox"/><br>To a low degree | <input type="checkbox"/><br>To a fairly low degree | <input type="checkbox"/><br>Neither a high nor a low degree | <input type="checkbox"/><br>To a fairly high degree | <input type="checkbox"/><br>To a high degree | <input type="checkbox"/><br>To a very high degree | <input type="checkbox"/><br>Not at all   | <input type="checkbox"/><br>Yes, for the better | <input type="checkbox"/><br>Yes, for the worse |

**Figure 1.** Four questions from the competence area 'Nursing Care' in the Nurse Professional Competence Scale Short Form (NPC Scale-SF) are presented as examples. These questions have been abbreviated from their original form. The figure also illustrates how these questions were supplemented with additional queries regarding whether students felt their nursing competence had been affected by the educational situation during the COVID-19 pandemic.

The third section of the questionnaire asked the students about perceived degree of overall concern that the educational situation during the pandemic had not provided sufficient competence to begin working as a nurse. Responses were recorded on a five-point Likert-like scale ranging from 1 ('To a very low degree') to 5 ('To a very high degree').

The questionnaire concluded with an open-ended question inviting students to share their thoughts on the educational situation during the COVID-19 pandemic.

### Data handling and statistical analysis

The NPC Scale-SF had a very low rate of missing responses (0.003%). Missing data were imputed using the group mean (27). The percentage of students who did not respond to each of the 35 items regarding the impact of the educational situation on their self-reported competence is presented in Table 4. There were no missing responses to the question about overall concerns regarding competence to begin professional nursing practice. The Shapiro-Wilk test confirmed a normal distribution for all six CAs. Independent t-tests were used to compare between-group variables, e.g. gender, age groups, and highest previous

educational qualification. The question about overall concern regarding sufficient competence to begin working as a nurse was measured on an ordinal scale. Therefore, Spearman's rho correlation coefficient was used to assess the relationship between concern for overall sufficient competence to start working as a nurse and self-reported competence for each CA.

The significance level was set at  $p \leq 0.05$ . Data analysis was performed using the IBM Statistical Package for the Social Sciences, version 29.

### **Ethics**

Study information was posted on the students' secure login page on the university's digital learning platform. The written information to the students clarified the aims of the study, and emphasized that participation was voluntary, that the students had the right to decline to participate, that data were collected anonymously, and that all results would only be published only at group level. A link to the online questionnaire was provided on the platform. Informed consent was considered obtained from students who submitted the online questionnaire via the system. Those who did not wish to participate refrained from answering the questionnaire. Withdrawal from the study was not possible as all data were anonymized. Students were informed that the data would be stored on a server at the University of Oslo, in accordance with a formal agreement between Inland University Norway and the University of Oslo.

In accordance with Norwegian law - including the Act on Medical and Health Research (Health Research Act; ACT 2008-06-20 no. 44, also known as LOV-2008-06-20-44), the Act on Ethics and Integrity in Research (Research Ethics Act; ACT 2017-04-28 no. 23), and the Act relating to the Processing of Personal Data (The Personal Data Act; ACT 2018-06-15 no. 38) - ethical approval and approval from the Norwegian Agency for Shared Services in Education and Research were not required for the present study, as no personal data were collected. Nonetheless, to ensure full compliance with ethical standards, we contacted the Regional Ethics Committee by telephone to explain the study design and the type of data we intended to collect. The committee administrator confirmed that ethical approval was not required under the law. Similarly, consultation with the Norwegian Agency for Shared Services in Education and Research confirmed that their approval was unnecessary given the study's nature. Data collection at the university was authorized by the Head of the Research Department at the institution conducting the study.

## RESULTS

Of the 197 nursing students invited to participate, 59 responded to the questionnaire, resulting in a response rate of 30%. The majority of respondents were female (n=51, 86.4%) and approximately half of the respondents were 25 years of age or younger (n=32, 54.2%).

For most respondents (n=46, 81%), upper secondary school was the highest educational qualification prior to entering the nursing program. A large proportion of respondents (n=48, 81.4%) reported having prior experience working in healthcare before joining the nursing program. A large proportion of students worked in healthcare in parallel with their studies (n=51, 86.4%) (Table 1). Among the 51 students who worked additional paid hours, 20 (39.2%) worked fewer than 10 hours per week, 18 (35.3%) worked 10-20 hours per week, and 13 (25.5%) worked more than 20 hours per week.

**Table 1.** Demographic, educational and work-related background data of the nursing students

| Gender <sup>a)</sup>   | n  | %    |
|--|----|------|
| • Female   | 51 | 86.4 |
| • Male   | 7  | 11.9 |
| Age groups (years)   |    |      |
| • Up to and including 25 years of age  | 32 | 54.2 |
| • 26 years of age or older   | 27 | 45.8 |
| Highest educational qualification before joining the nursing program <sup>b)</sup> |    |      |
| • Upper secondary school   | 46 | 80.7 |
| • University degree  | 11 | 19.3 |
| Experience of working in healthcare before joining the nursing program             |    |      |
| • Had experience   | 48 | 81.4 |
| • Had no experience  | 11 | 18.6 |
| Paid work in healthcare in parallel with taking the nursing program                |    |      |
| • Paid work in parallel  | 51 | 86.4 |
| • No paid work in parallel   | 8  | 13.6 |

Legends:

<sup>a)</sup> One student reported 'Not binary'

<sup>b)</sup> Note that information about educational level was missing for two students, and the results are therefore calculated based on 57 respondents

### Self-reported competence at graduation

Students reported the highest levels of competence in 'Value-based Nursing Care' (mean 84.3, SD 10.3) and 'Nursing Care' (mean 81.4, SD 10.0). The lowest levels of competence were reported in 'Development, Leadership, and Organization of Nursing Care' (mean 70.6, SD 12.6) and 'Care Pedagogics' (mean 74.4, SD 11.9) (Table 2).

**Table 2.** The nursing students' self-reported competence measured by the NPC Scale-SF at graduation during the COVID-19 pandemic (100=highest competence)

| Competence areas               | Mean scores | Standard deviations (SD) | Minimum-maximum scores |
|--------------------------------|-------------|--------------------------|------------------------|
| CA1 Nursing Care               | 81.4        | 10.0                     | 60-100                 |
| CA2 Value-based Nursing Care   | 84.3        | 10.3                     | 63-100                 |
| CA3 Medical and Technical Care | 76.8        | 12.1                     | 52-100                 |

|  |      |      |        |
|--|------|------|--------|
| CA4 Care Pedagogics  | 74.4 | 11.9 | 51-100 |
| CA5 Documentation and Administration of Nursing Care         | 81.1 | 10.0 | 55-100 |
| CA6 Development, Leadership and Organization of Nursing Care | 70.6 | 12.6 | 43-100 |

Legend: CA=Competence area

### Group comparisons

Independent t-tests were conducted to compare the six CAs across all demographics, educational, and work-related background variables. It was found that students aged 25 years or younger reported significantly lower competence in three of the six CAs (Table 3). No statistically significant differences in CA scores were observed for any of the other variables (all  $p > 0.05$ ).

**Table 3.** Self-reported competence measured by the NPC Scale-SF at graduation among younger and older nursing students during the COVID-19 pandemic (100=highest competence)

|   | Mean scores | Standard deviations (SD) | P-values     |
|---|-------------|--------------------------|--------------|
| <b>CA1 Nursing Care</b>   |             |                          |              |
| - Students aged $\leq 25$ years                                     | 79.3        | 9.0                      |              |
| - Students aged 26 years or older                                   | 83.4        | 11.0                     | 0.165        |
| <b>CA2 Value-based Nursing Care</b>                                 |             |                          |              |
| - Students aged $\leq 25$ years                                     | 81.2        | 10.1                     |              |
| - Students aged 26 years or older                                   | 87.9        | 9.5                      | <b>0.012</b> |
| <b>CA3 Medical and Technical Care</b>                               |             |                          |              |
| - Students aged $\leq 25$ years                                     | 74.1        | 11.3                     |              |
| - Students aged 26 years or older                                   | 79.9        | 12.6                     | 0.068        |
| <b>CA4 Care Pedagogics</b>  |             |                          |              |
| - Students aged $\leq 25$ years                                     | 71.2        | 11.1                     |              |
| - Students aged 26 years or older                                   | 78.3        | 11.8                     | <b>0.020</b> |
| <b>CA5 Documentation and Administration of Nursing Care</b>         |             |                          |              |
| - Students aged $\leq 25$ years                                     | 79.2        | 8.3                      |              |
| - Students aged 26 years or older                                   | 83.3        | 11.5                     | 0.115        |
| <b>CA6 Development, Leadership and Organization of Nursing Care</b> |             |                          |              |
| - Students aged $\leq 25$ years                                     | 66.4        | 10.3                     |              |
| - Students aged 26 years or older                                   | 75.5        | 13.4                     | <b>0.005</b> |

Legends:

Students 25 years of age or younger, n=32; students 26 years of age or older, n=27.

Significant differences marked in bold.

CA=Competence area

### Perceived impact of the pandemic on the educational situation

The majority of students reported that their nursing competence had not been affected by the educational situation during the COVID-19 pandemic; for 24 out of the 35 items on the NPC Scale-SF, 50% or more of the students selected the response option 'Not at all' (Table 4).

**Table 4.** The 35 items of the NPC Scale SF and the students' opinion if their nursing competence had been affected by the study situation during the COVID-19 pandemic.

Data are presented in percentages.

| Competence items   | Not at all | Yes, for the better | Yes, for the worse | Missing |
|--|------------|---------------------|--------------------|---------|
| <b>Nursing Care, 5 items</b>   |            |                     |                    |         |
| Independently apply the nursing process  | 37.3       | 27.1                | 30.5               | 5.1     |
| Meet patient's basic physical needs  | 49.2       | 22.0                | 22.0               | 6.8     |
| Meet patient's specific physical needs   | 50.8       | 16.9                | 25.4               | 6.8     |
| Document patient's physical status   | 54.2       | 18.6                | 22.0               | 5.1     |
| Document patient's psychological status  | 44.1       | 27.1                | 25.4               | 3.4     |
| <b>Value-based Nursing Care, 5 items</b>   |            |                     |                    |         |
| Respectfully communicate with patients, relatives and staff                          | 49.2       | 25.4                | 20.3               | 5.1     |
| Show respect for patient autonomy, integrity and dignity                             | 61.0       | 22.0                | 13.6               | 3.4     |
| Enhance patients' and relatives' knowledge and experiences                           | 55.9       | 15.3                | 25.4               | 3.4     |
| Show respect for different values and beliefs  | 64.4       | 13.6                | 16.9               | 5.1     |
| Contribute to a holistic view of the patient   | 42.2       | 23.7                | 27.1               | 6.8     |
| <b>Medical and Technical Care, 6 items</b>   |            |                     |                    |         |
| Manage drugs and clinical application of knowledge in pharmacology                   | 42.4       | 11.9                | 39.0               | 6.8     |
| Independently administer prescriptions   | 32.2       | 22.0                | 39.0               | 6.8     |
| Pose questions about unclear prescriptions   | 61.0       | 18.6                | 13.6               | 6.8     |
| Support patients during examinations and treatments                                  | 50.8       | 23.7                | 20.3               | 5.1     |
| Follow up patient's condition after examinations and treatments                      | 55.9       | 15.3                | 23.7               | 5.1     |
| Handle medical/technical products according to legislation and safety routines       | 30.0       | 20.3                | 33.9               | 6.8     |
| <b>Care Pedagogics, 5 items</b>  |            |                     |                    |         |
| Provide patients and relatives with support to enhance participation in patient care | 52.5       | 10.2                | 28.8               | 8.5     |
| Inform and educate individual patients and relatives                                 | 45.8       | 8.5                 | 39.0               | 6.8     |
| Inform and educate groups of patients and relatives                                  | 42.4       | 6.8                 | 44.1               | 6.8     |
| Make sure that information given to the patient is understood                        | 54.2       | 13.6                | 25.4               | 6.8     |
| Motivate the patient to adhere to treatments   | 64.4       | 13.6                | 15.3               | 6.8     |
| <b>Documentation and Administration of Nursing Care, 8 items</b>                     |            |                     |                    |         |
| Make use of relevant data in patient records   | 61.0       | 18.6                | 13.6               | 6.8     |
| Use information technology as a support in nursing care                              | 61.0       | 16.9                | 16.9               | 5.1     |
| Document according to current legislation  | 69.5       | 15.3                | 10.2               | 5.1     |
| Comply with current legislation and routines   | 66.1       | 18.6                | 19.2               | 5.1     |
| Handle sensitive personal data in a safe way   | 74.6       | 13.6                | 6.8                | 5.1     |
| Observe work-related risks and prevent them  | 62.7       | 15.3                | 16.9               | 5.1     |
| Continuously engage in professional development                                      | 47.5       | 27.1                | 20.3               | 5.1     |
| Lead and develop health staff teams  | 55.9       | 10.2                | 28.8               | 5.1     |
| <b>Development, Leadership and Organization of Nursing Care, 6 items</b>             |            |                     |                    |         |
| Act adequately in the event of unprofessional conduct among employees                | 71.2       | 8.5                 | 15.3               | 5.1     |
| Apply principles of disaster medicine  | 50.8       | 16.9                | 27.1               | 5.1     |
| Search and review relevant literature for evidence-based nursing                     | 55.9       | 25.4                | 13.6               | 5.1     |
| Interact with other professionals in care pathways                                   | 57.6       | 10.2                | 25.4               | 6.8     |
| Teach, supervise and assess students   | 62.7       | 10.2                | 20.3               | 6.8     |
| Supervise and educate staff  | 69.5       | 6.8                 | 16.9               | 6.8     |

The 35 items have been shortened in relation to the text of the original NPC Scale SF. Response options marked by >50% of the students are shown in grey. Response options marked by ≥33% of the students are shown in light blue.

However, three items related to the CA 'Medical and Technical Care' – including 'Manage drugs and clinical applications of knowledge in pharmacology', 'Independently administer prescriptions', and 'Handle medical and technical equipment according to legislation and safety routines' – were reported as being negatively affected during the pandemic ('Yes, for the worse') by at least one-third of the students.

Similarly, two items related to the CA 'Care Pedagogics' - including '*Inform and educate individual patients and relatives*' and '*Inform and educate groups of patients and relatives*' were also reported as being negatively affected by at least one-third of the students (Table 4).

### **Concern about not having sufficient competence to begin work as a nurse**

Among the 59 respondents, 24 (40.6%) expressed high or very high concern that the educational situation during the pandemic had not provided them with sufficient competence to begin working as a nurse. In contrast, 17 respondents (28.8%) reported low or very low concern.

Students aged 25 years or younger reported significantly higher levels of concern compared to those aged 26 years or older (mean score 3.6, SD 0.9 vs. mean score 2.7, SD 1.4,  $p < 0.009$ ; 5='To a very high degree'). There was a moderate, negative relationship between self-reported competence and concern about insufficient competence to begin working as a nurse: CA1  $r = -0.475$ ,  $p < 0.001$ ; CA2  $r = -0.437$ ,  $p < 0.001$ ; CA3  $r = -0.518$ ,  $p < 0.001$ ; CA4  $r = -0.522$ ,  $p < 0.001$ ; CA5  $r = -0.535$ ,  $p < 0.001$ ; CA6  $r = -0.510$ ,  $p < 0.001$ . Thus, lower self-reported competence in each of the six CAs was associated with increased concern about not having sufficient competence to begin working as a nurse.

### **Student comments**

Seventeen students provided a total of 21 comments, with 13 specifically addressing the educational situation during the COVID-19 pandemic. Representative comments include:

*'I believe my knowledge gaps in nursing are primarily due to interrupted clinical placements and insufficient practical exercises on various procedures, including documentation, which has been inadequately covered.'*

*'I feel I missed out significantly by not having the opportunity to participate in hospital practice for two academic years during the COVID-19 outbreak.'*

*'The program should have placed greater emphasis on clinical procedures, pharmacology, and pathology throughout all three years. The final year's 10 weeks of home nursing practice were less beneficial compared to hospital practice, as it was very basic and similar to nursing home practice. A general hospital placement at the end would have provided more opportunities to practice various procedures before starting work.'*

Three further comments commended the nurse educators for their dedication and effective management of the educational challenges posed by COVID-19. Four comments pertained to the questionnaire itself. One comment highlighted anxiety about potentially transmitting the infectious agent SARS-CoV-2 from the clinic to home, particularly due to a family member being at high risk for severe COVID-19.

## DISCUSSION

The participating nursing students reported high levels of self-reported competence in nursing and value-based nursing. Most students indicated that the altered educational situation during the COVID-19 pandemic had not negatively affected their ability to learn most nursing skills. However, one-third or more of the students reported that five critical nursing activities related to drug management and patient education were adversely affected by the pandemic. Furthermore, 40.6% of the students expressed high or very high concern that the educational situation during the pandemic had not sufficiently prepared them to begin working as nurses. Notably, younger students aged 25 years or younger reported significantly lower competence in three of the six CAs and expressed greater overall concern regarding their readiness to transition into professional nursing roles.

Contrary to reports during the COVID-19 pandemic raising concerns about the adequacy of nursing students' competence at graduation (6,9,10,28,29), Norwegian students in our study reported high competences at graduation, particularly in 'Nursing Care' (CA1), 'Value-based Nursing Care' (CA2), and 'Documentation and Administration of Nursing Care' (CA5). Reduced support from nurse educators was identified as a factor negatively affecting students' learning and the development of perceived clinical competence (10). Interviews conducted during the pandemic highlighted that nursing students perceived their clinical competence, particularly in providing nursing care, as insufficient (6). Similarly, concerns were raised about the adequacy of nursing students' skills upon graduation during the pandemic (8). Senior nursing students specifically reported that COVID-19-related restrictions during clinical placements adversely impacted their clinical competence (29), heightening concerns about their readiness for professional practice (5). However, not all experiences during the pandemic were negative. Some students identified unique learning opportunities during the COVID-19 pandemic. The extraordinary circumstances motivated them to enhance their learning experiences (5), with some students feeling a sense of historical significance and pride in contributing to society and healthcare (24,30). Similarly, first-year nursing students in Norway reported that the new teaching methods introduced during the pandemic improved their learning ability, coherence in the nursing program, and clinical reasoning skills (9).

Interestingly, the NPC Scale-SF scores reported by the students in this study align with findings from previous studies involving pre-pandemic bachelor nursing studies cohorts in Australia (19), China (20,23), Norway (22,26), Poland (24), Sweden (17,18,21), and the Kingdom of Saudi Arabia (25), indicating no change in self-reported competence due to the pandemic in the Norwegian cohort. While the aim of this study was not to compare pre-pandemic and pandemic cohorts, these findings provide useful context for understanding the self-reported competence levels of nursing students at graduation.

The high self-reported competence reported by the students regarding the CA 'Nursing Care' suggests that, despite the loss of traditional clinical practice and supervision, the students were able to gain general nursing experience, most likely through their roles as nurse assistants and parallel paid work in healthcare settings. This aligns with findings from a

Swedish study, which reported that nursing students who worked paid hours in parallel to their education reported higher nursing competence than those who did not work (31). Paid work during the pandemic may have provided students with additional opportunities to practice foundational nursing skills in real-world settings, complementing their formal education and compensating for the disruptions to their clinical placements.

The CA ‘Value-based Nursing Care’ encompasses elements such as respecting the autonomy, integrity, dignity, knowledge, experiences, values, beliefs of patients and their relatives, as well as maintaining a holistic view of the patients (16). This CA embodies attitudes that could be cultivated and effectively integrated into discussions among students and nurse educators online, even amidst significant changes in the educational situation, which could explain the high self-reported competence of the students. Literature indicates that reflective discussions, facilitated virtually, can support the development of value-based nursing competencies by encouraging students to critically explore and integrate ethical and person-centered care principles into their practice. For example, a study by Papastavrou et al. (32) found that discussions and reflective exercises improved nursing students' understanding of patient dignity and holistic care. Additionally, ‘Value-based Nursing Care’ might be one of the CAs that students were able to explore independently from home, supported by their work as nurse assistants. Work experiences likely helped reinforce these attitudes by exposing students to real-life scenarios where respect for patients’ values, autonomy, and dignity played a critical role.

The third CA with high self-reported competence was ‘Documentation and Administration of Nursing Care.’ The subject of nursing documentation is amenable to online practice as theoretical subjects are more suitable for online learning compared to clinical practice (5). While online teaching cannot replace clinical practice (33), online teaching has been found to motivate students to develop their competence (5) and support their learning (34).

The low self-reported competence regarding drug handling and technical equipment is particularly concerning, as these skills are essential for ensuring patient safety and preventing harm. A high proportion of students in this study felt unprepared to handle drugs and technical equipment, highlighting a critical area for improvement in nursing education. Taylor et al. (35) reported that nursing students frequently express a need to enhance their pharmacological knowledge and skills to adequately administer medication to patients. Similarly, a systematic review concluded that even registered nurses often face challenges in handling medications safely, indicating a broader issue within nursing practice (36). These findings suggest that nursing educational institutions must prioritize pharmacology and the clinical competence required for medication administration within their curricula. This need becomes even more pressing during times of crisis. Greater emphasis on pharmacological education, alongside innovative teaching approaches, could help address these gaps and better prepare nursing students for safe and effective work.

Student feedback highlighted significant gaps in practical training and clinical experience caused by the COVID-19 pandemic. Despite these challenges, students praised nurse educators for their dedication and effective management during the pandemic, highlighting

the critical role of supportive educators in mitigating disruptions. Üzar-Özçetin & Öcalan (29) similarly emphasized the importance of maintaining contact with academics during clinical placements to support learning and development. Interestingly, some students also reflected on unique strengths gained during the pandemic, naming themselves as ‘the COVID nurses’. Training during this period fostered creative communication strategies, such as greater use of technology and verbal instructions to navigate social distancing (37). This underscores the need for flexible, resilient educational strategies to sustain nursing education and support student growth during crises.

The transition to professional nursing practice is inherently challenging, often marked by feelings of inadequate knowledge, high workloads, and insufficient support from colleagues and leaders (34). For students in this study, these challenges were likely compounded by the additional stress of entering a healthcare environment still grappling with the pandemic. Similar concerns were reported in an Iranian study, where nursing students felt that the diminished quality of clinical practice during the pandemic led to reduced clinical competence and feelings of inadequacy. These students attributed their lack of preparedness to fewer and less varied patient interactions during their training (6). Similarly, Molanida et al. (28) highlighted how the pandemic negatively affected nursing skills and core competencies.

The findings of this study contribute to the broader discourse on the readiness of newly graduated nurses for professional practice, not only during crises like the pandemic but also in more stable healthcare contexts. Younger students (aged 25 years or under) reported lower competency, a finding that aligns with Molanida et al. (28) who observed higher self-reported competence among older nursing students. Similarly, Dodd et al. (38) found that younger students in Australia reported that the educational situation during the pandemic had a significant negative impact on their studies. In this study, younger students also expressed significantly greater overall concern that the educational situation during the pandemic had not given them sufficient competence to begin working as a nurse. One implication of this result is the need for increased follow-up and supervision by nurse educators tailored specifically to younger students. Previous research has shown that reduced contact with educators negatively affects nursing students’ competence development (8,30). Providing additional academic and practical support to younger students may help bridge this gap and enhance their readiness for professional practice.

### **Methodological Considerations**

All nursing students graduating in June 2021 were invited during their last month of studies to participate in the study. Despite providing written information, detailed reminders twice, extended deadlines and the implementation of a gift card raffle to encourage participation, the response rate was 30%. This is a key limitation, which raises concerns about potential nonresponse bias. However, this response rate is consistent with other studies conducted during the COVID-19 pandemic, where survey fatigue, increased academic and clinical demands on nursing students, and the psychological toll of the pandemic contributed to lower participation rates (4,10-12,38). Online questionnaires are a widely used method for data

collection. A meta-analysis reported an average response rate of 44.1% for online questionnaires (39). Achieving high response rates remains an ongoing challenge, particularly in studies involving students (40). One strategy to improve the response rate could have been to offer the students the opportunity to complete the questionnaire during designated teaching sessions. Earlier studies using the NPC Scale report response rates exceeding 70% when students were given the option to complete a paper-based questionnaire in the classroom during scheduled teaching time (17,18,21).

A notable strength of this study is the use of the validated NPC Scale-SF, which encompasses a broad range of nursing activities critical for clinical practice (16). The reliability of this scale was confirmed in our study, with Cronbach's alpha coefficients exceeding 0.80 for all CAs. The application of the NPC Scale-SF during the COVID-19 pandemic addresses a unique dimension of this research, providing insights into nursing students' self-reported competence under crisis. To gain deeper insights, follow-up interviews or additional questionnaires after the student commenced independent practice in healthcare settings would have been valuable. Unfortunately, resource constraints precluded the inclusion of a longitudinal study.

## **CONCLUSION**

The findings of this study provide valuable insights into the self-reported competence at graduation of Norwegian nursing students during a global crisis, addressing an important gap in the literature. The results highlight both the resilience of nursing students and the importance of identifying vulnerable student groups, such as younger nursing students, early to provide targeted support and enhance their readiness to begin working as nurses. The study emphasizes the need for universities to re-evaluate and potentially redesign educational frameworks to ensure that nursing students continue gaining competence during crisis. This study serves as a foundation for future research and policy development aimed at fostering innovative approaches to education and preparing nursing students to meet clinical challenges in both ordinary and extraordinary circumstances.

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### **Authors' Contributions**

Conceptualization and design: R.M., M.B., S.N. and A.G. Acquisition of data: R.M., M.B. and A.G. Analysis: A.G and M.B. Drafting the report and revising it critically for important intellectual content: R.M., M.B., S.N. and A.G. All authors have read and approved the final version of the report.

Artificial Intelligence was not used in drafting any aspect of this report.