Emergency care nurses’ self-reported clinical competence before and after postgraduate education - a cross-sectional study

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ABSTRACT
Changing prerequisites in healthcare leads to the increased complexity of nursing. Since there are no regulations on re-validation of competencies for emergency nurses in Sweden there is sparse knowledge on how nurses develop competencies after registration as nurses (RN). Aim: To describe self-reported professional competence after postgraduate education among RNs in emergency care settings. Method: A cross-sectional design and STROBE guidelines were used. The short version of the Nurse Professional Competence Scale was used for data collection and the data were collected before and after postgraduate education, descriptive and comparative statistic was used for analysis. Results: 62 (71%) students participated in the first data collection and an independent group of 31 (48%) students participated in the second data collection. The results showed generally good competencies before entering education and significantly improved competencies after education were found in areas of working independently and reviewing literature for evidence-based nursing. Conclusion: The competencies were assessed as very good after education. Evaluating nurses’ competencies supports educators in developing education to ensure the need for knowledge in emergency care. To ensure required competencies among emergency care nurses there is a need to regulate additional training and re-validation of emergency nurses’ competencies.

1. Background
Nurses are essential for providing safe and high-quality care, and play a crucial role in healthcare organisations, working on health promotion and disease prevention, and providing emergency, primary, and community care in diverse settings all over the world [1]. Technological advancements and precision nursing have changed the practice of nursing to a great extent [2,3]. In addition, patient care is changing with an increasingly elderly population with complex and chronic comorbidities [4], and there is also an increase in healthcare-associated infections [5] and other infectious diseases such as COVID-19 that affect the clinical work of nurses around the world [6,7]. The changing prerequisites of health care increase the complexity of nursing within different clinical contexts. It is also known that there is a shortage of nurses around the world [7], and particularly there is a lack of experienced nurses [8]. All together creates an inconsistency since the quality of care and patient safety are dependent on well-educated nurses and their clinical competence [9,11,12]. General clinical competence is described as “the ability to perform the task with desirable outcomes under the varied circumstances of the real world” [9] (p. 304).

For nurses who work in an emergency care setting further aspects of the care are added since emergency care often is the first healthcare contact for patients suffering from an acute illness or injury [10,11]. Emergency care is described to be complex with episodic, primary, and usually acute care needed [12,13], and the nurses care for “...individuals of all ages with perceived or actual physical or emotional alterations of health that are undiagnosed or that require further interventions.” [12] (p.1). In this study, emergency care includes care delivered by the emergency medical services at the scene of an acute injury or illness, during ambulance transport, care in the emergency department, and early critical care.
inpatient care. In the Swedish emergency care system, the most common professionals are Registered Nurses (RN) with a bachelor’s degree, nurse assistants, and physicians with or without specialization in emergency medicine [14,15]. There is no national regulation claiming that RNs working within emergency care should have additional training or continuing professional development (CPD) or conduct re-validation of their nursing knowledge and skills. In emergency care settings there is a challenge to determine how to develop and maintain clinical competence among nurses when the working environment is complex and constantly changing by its nature [16] and there is an increase in emergency nurse vacancies [17]. It is known that developing clinical competence is a process that requires knowledge, skills, values, and critical thinking [18,19]. CPD is considered important for nurses’ lifelong learning and vital to maintain and develop their knowledge and clinical skills [20,21]. CPD includes “… the process of ongoing education and development of healthcare professionals, from initial qualifying education and for the duration of professional life, in order to maintain competence to practice and increase professional proficiency and expertise” [22] (p.6).

The requirement for nurses to participate in CPD differs between countries [22,23] and is mandatory in countries such as Belgium, France, and the United Kingdom, or voluntary, for example in Sweden, the Netherlands, and Germany [21]. Without any regulations on CPD, and because professional competence in nursing develops differently depending on the context [24], there is a lack of knowledge on how RNs working within emergency care maintain and develop their clinical competence without regulated CPD. However, it is known that RNs without additional specialist training working in emergency care settings consider they have limited knowledge concerning patient safety and assessing and providing care for patients in complex situations [25]. In addition, RNs before entering postgraduate education in emergency care at the advanced level (second-cycle training-European education system) assessed their clinical competence as good but still desired clinical and theoretical knowledge to achieve competencies to feel secure, autonomous, and confident in their clinical setting [24]. To our knowledge, it is unclear how RNs assess their clinical competence before and after a postgraduate education in emergency care and there is sparse literature concerning competencies among students with a postgraduate education that includes both a professional and an academic degree. Therefore, the specific research question to be answered in this study was: What are the differences in self-reported professional competence before and after postgraduate education among two different groups of RNs in emergency care settings?

2. Aim

To describe self-reported clinical competence before and after postgraduate education among a group of RNs in an emergency care setting.

3. Method

A cross-sectional study design with a comparative approach was used. The study conforms to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) cross-sectional reporting guidelines [26].

3.1. Setting

The Swedish National Agency for Higher Education regulates nursing education conducted at universities to ensure the quality of education. Since 1993, nursing education in Sweden has been a three-year, full-time study program leading to both a registration as a nurse and a bachelor’s degree. On the nurse’s own volition and after their registration as nurses, they can apply for an additional one-year (full-time) study program at advanced level at university to achieve a one-year master’s and specialist degree in nursing [27]. A postgraduate specialist program leads to a specialist degree in nursing together with a one-year master’s degree in nursing. At present, there are 11 different healthcare areas (Anaesthesia care, Intensive Care, Medical Care, Oncology Care, Paediatric Care, Prehospital emergency care, Primary Health Care, Surgical Care, and Theatre Care) that RNs can become specialists in. In addition, universities have the possibility to decide on what specialist area to provide a postgraduate diploma in specialist nursing together with a one-year master’s degree. Common healthcare areas offered by the universities are acute care, infection care, and neonatal care [27]. According to the Swedish Higher Education Act, specific outcomes need to be fulfilled to achieve a postgraduate diploma in specialist nursing. An example of a common outcome for all study programs is: to demonstrate knowledge of the disciplinary foundation of the field and insight into current research and development work as well as the links between research and proven experience and the significance of these links for professional practice, and demonstrate specialised knowledge of the planning, management and coordination of health care measures [28] (p.131–132). For the 11 different healthcare areas to become a specialist in there are two or three outcomes specific to the healthcare area one has been educated in.

3.2. Sample

The students from one university were asked to participate in the study and sample I consisted of all eligible students (n = 87) admitted to postgraduate education at advanced level in emergency care (study programs acute and prehospital emergency care). The requirements for admittance to the postgraduate education program were certified as an RN and with a minimum of 12 months of work experience as an RN. The education was conducted at 50 percent full-time for two years (60 European Credit Transfer and Accumulation System [ECTS]). Sample II consisted of all eligible students (n = 64) in the emergency care programs and the students were asked to participate at the end of their 60 ECTS education. Eligible students were the students who were finalizing their studies two years after the first data collection leading to different eligible students in sample I and sample II, before and after education. The change of participants is caused by the fact that part-time education leads to an increased frequency of study breaks for various reasons, and resumption of studies (comparable in certain respects with hop-on-hop busses).

3.3. Data collection and variables

The first data collection (Sample I) was conducted during the students’ first two weeks after entering the study program in 2020, and one week before ending the studies in 2022 (Sample II). In the two samples, a web-based questionnaire was answered anonymously by the participants and two reminders were sent two weeks apart. Demographic variables such as gender, number of years in the profession and type of competence area in nursing, and year of certification as an RN were collected. The self-assessed competencies were collected through the short version of the Nurse Professional Competence Scale (NPC) which has shown good internal consistency (Cronbach α = 0.70) [29]. The NPC consists of 35 items and is based on competence determined by the Swedish Society of Nursing [2017], which correlates with the core competencies described by the quality and safety education for nurses [30]. The six competence areas (CA) covered by the NPC are: CA 1, Nursing care (five items); CA 2: Value-based nursing care (five items); CA 3: Medical/technical care (six items); CA 4: Care Pedagogics (five items); CA 5: Documentation and Administration of Nursing Care (eight items); and CA 6: Development. Leadership and Organisation of Nursing Care (six items) [28]. Due to technical issues in the web-survey, two items (in CA 4 & 6) were not included in the questionnaire, but Cronbach’s alpha values were still > 0.80 in all CAs as displayed in Table 1. A seven-point Likert scale was used to collect participants’ statements (according to Nilsson et al.’s 2018 recommendation), ranging from “very low degree” = 1 to “very high degree” = 7. The responses to each
item of the NPC scale were transformed into a score ranging from 1 to 100. The scores were divided into four levels; ≤25 (a low competence), >25–50 (quite good competence); >50–75 (good competence), and >75–100 (very good competence), a classification that was inspired by Benner’s concept “From novice to expert” [9].

3.4. Data analysis

The descriptive analyses using percent, range, mean, and standard deviation are presented. Internal consistency was evaluated by Cronbach Alpha Coefficient (Table 1). Cronbach’s alpha values of ≥ 0.70 were judged to be sufficient [31].

As the data were normally distributed, and the study design was cross-sectional, not longitudinal, the student’s t test was used to assess the statistical significance between two different samples means to compare the different data collections. Pearson’s chi-square test was used to examine person-related conditions (years since nursing education) between participants. The significance level was set at p < .05. Data were analysed using IBM SPSS version 26.

3.5. Ethical considerations

Ethical principles were followed in accordance with the Declaration of Helsinki 2013 [31]. Both oral and written information describing the aim of the study and stating that their participation was voluntary was presented to the participants. The survey was answered anonymously by the participants by using a public access (web-link) to the questionnaire. The decision to use an anonymous survey was based on that the researchers work in the university as teachers and examiners. The data collected were stored in the “KI-web survey” provided by Karolinska Institutet, Stockholm, Sweden. Informed consent was obtained from all participants when answering the questionnaire. The study was approved by the ethical committee at Sophiahemmet University (Dnr: 20200824/0433).

4. Results

A total of 93 students participated in this study. Of these, sample I consisted of 62 (71%) students entering postgraduate education, and sample II consisted of another group of 31 (48%) students about to complete their postgraduate education. Most participants were female with a working experience as RNs of more than six years (Table 2). There was no significant difference between the two independent groups and years of experience at the current workplace as RNs (Chi-2: 41.61, df = 45, p = .40).

Overall, the student’s self-assessment showed generally good competencies (group mean > 75) before entering their postgraduate education according to their scores on the short version NPC scale. All competence areas showed an increased competence (group mean > 79) which correlates to very good competencies in all areas after postgraduate education (Table 3).

Significant differences between the two independent groups, pre- and post-education, were found in 16 out of the total of 33 items of the NPC scale. The differences were mainly reported in nursing care and care pedagogics (Table 4).

5. Discussion

The overall findings show that the student’s self-assessment indicated good competencies before entering the emergency care postgraduate education, and after the education, the students assessed their competence as very good competence, as described in Benner’s theory [9]. The findings showing increased competencies after education can be considered as not surprising as the RNs had achieved 60 ECTS in advanced level studies at university where studies are regulated by the Swedish Higher Education Act. Nevertheless, the most significant findings were found in CAs that are essential for emergency care nurses as they should have the competence to apply disaster medicine and independently care for patients of all ages suffering from an acute illness or injury that may require care interventions [12]. A failure by emergency care nurses to recognize and/or respond to acute illness increases the risk of adverse events [11]. Despite the competencies needed to work as an emergency care nurse [11,12] and knowing that quality of care and patient safety are dependent on well-educated nurses and their clinical competence [9,11,12] there are no national mandatory demands in Sweden claiming that RNs in an emergency care setting should have additional training in emergency care.

As the specialist education in Sweden includes a one-year master’s in nursing it is not surprising that the basics for evidence-based practice (EBP) are reported as higher compared to before the education. This result also correlates well with the result from Rudman et al. [32] which showed a significant difference in EBP activities, where RNs with

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### Table 1

<table>
<thead>
<tr>
<th>Competence Area</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing care (5 items)</td>
<td>0.860</td>
</tr>
<tr>
<td>Value-based nursing care (5 items)</td>
<td>0.876</td>
</tr>
<tr>
<td>Medical/technical care (6 items)</td>
<td>0.848</td>
</tr>
<tr>
<td>Care pedagogics (4 items)</td>
<td>0.872</td>
</tr>
<tr>
<td>Documentation and administration of nursing care (8 items)</td>
<td>0.874</td>
</tr>
<tr>
<td>Development leadership and organisation of nursing care (5 items)</td>
<td>0.889</td>
</tr>
</tbody>
</table>

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### Table 2

<table>
<thead>
<tr>
<th>Description of Participants</th>
<th>Before Postgraduate Education (Sample 1)</th>
<th>After Postgraduate Education (Sample 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female/male</td>
<td>51(82)/11(18)</td>
<td>23(74)/7(23)</td>
</tr>
<tr>
<td>Years as RN* (mean/ range)</td>
<td>6.33 (1–27 years)</td>
<td>7.8 years (2–23 years)</td>
</tr>
<tr>
<td>Years at current workplace mean/ range</td>
<td>3.5 years/1–25</td>
<td>5.05 years/0–20</td>
</tr>
</tbody>
</table>

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* Registered Nurse.
Table 4
Results mean scores item Nurse professional Competence scale before and after advanced level postgraduate education in emergency care.

<table>
<thead>
<tr>
<th>Competence area (CA)</th>
<th>Item</th>
<th>Before postgraduate education (sample I) Mean (std) (range 1–7) n = 62</th>
<th>After Postgraduate education (sample II) Mean (std) (range 1–7) n = 31</th>
<th>Chi-2 (df) p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA 1. Nursing Care</td>
<td>Independently apply the nursing process</td>
<td>5.31 (0.879)</td>
<td>6.13 (0.957)</td>
<td>18.60 (4) p = .001</td>
</tr>
<tr>
<td></td>
<td>Meet patient’s basic physical needs</td>
<td>5.47 (0.783)</td>
<td>6.16 (0.898)</td>
<td>17.42 (3) p = .001</td>
</tr>
<tr>
<td></td>
<td>Meet patient’s specific physical needs</td>
<td>5.24 (0.803)</td>
<td>5.97 (0.836)</td>
<td>18.57 (3) p = .001</td>
</tr>
<tr>
<td></td>
<td>Document patient’s physical status</td>
<td>5.47 (0.900)</td>
<td>6.10 (0.746)</td>
<td>11.52 (3) p = .001</td>
</tr>
<tr>
<td></td>
<td>Document patient’s psychological status</td>
<td>4.84 (1.04)</td>
<td>5.52 (0.1.02)</td>
<td>10.40 (5) p = .054</td>
</tr>
<tr>
<td>CA 2. Value-based nursing care</td>
<td>Respectfully communicate with patients, relatives, and staff</td>
<td>6.16 (0.834)</td>
<td>6.39 (0.803)</td>
<td>6.62 (3) p = .08</td>
</tr>
<tr>
<td></td>
<td>Show respect for patient autonomy, integrity and dignity</td>
<td>6.02 (0.799)</td>
<td>6.42 (0.672)</td>
<td>8.69 (3) p = .03</td>
</tr>
<tr>
<td></td>
<td>Enhance patients’ and relatives’ knowledge and experiences</td>
<td>5.35 (0.889)</td>
<td>5.97 (0.795)</td>
<td>9.86 (4) p = .04</td>
</tr>
<tr>
<td></td>
<td>Show respect for different values and beliefs</td>
<td>5.89 (0.832)</td>
<td>6.16 (0.820)</td>
<td>2.53 (3) p = .47</td>
</tr>
<tr>
<td></td>
<td>Contribute to a holistic view of the patient</td>
<td>5.92 (0.836)</td>
<td>6.13 (0.846)</td>
<td>1.60 (3) p = .65</td>
</tr>
<tr>
<td>CA 3. Medical and technical care</td>
<td>Manage drugs, and clinical application of knowledge in pharmacology</td>
<td>5.10 (0.900)</td>
<td>5.97 (0.795)</td>
<td>19.62 (4) p = .001</td>
</tr>
<tr>
<td></td>
<td>Independently administer prescriptions</td>
<td>5.32 (1.09)</td>
<td>5.94 (0.929)</td>
<td>6.84 (3) p = .23</td>
</tr>
<tr>
<td></td>
<td>Pose questions about unclear instructions</td>
<td>5.95 (0.948)</td>
<td>6.10 (1.07)</td>
<td>3.15 (3) p = .36</td>
</tr>
<tr>
<td></td>
<td>Support patients during examinations and treatments</td>
<td>5.61 (0.776)</td>
<td>5.90 (0.790)</td>
<td>3.50 (3) p = .32</td>
</tr>
<tr>
<td></td>
<td>Follow up on patient’s conditions after examinations and treatments</td>
<td>5.15 (1.08)</td>
<td>5.74 (0.729)</td>
<td>9.90 (5) p = .07</td>
</tr>
<tr>
<td></td>
<td>Handle medical/technical equipment according to legislation and safety routines</td>
<td>5.37 (0.962)</td>
<td>6.00 (0.894)</td>
<td>9.81 (4) p = .04</td>
</tr>
<tr>
<td>CA 4. Care pedagogics</td>
<td>Provide patients and relatives with support to enhance participation of patient</td>
<td>5.35 (0.925)</td>
<td>5.81 (0.703)</td>
<td>8.05 (3) p = .04</td>
</tr>
<tr>
<td></td>
<td>Inform and educate individual patients and relatives</td>
<td>5.08 (0.874)</td>
<td>5.68 (0.791)</td>
<td>9.6 (4) p = .04</td>
</tr>
<tr>
<td></td>
<td>Make sure that information given to the patient is understood</td>
<td>5.47 (0.882)</td>
<td>6.03 (0.752)</td>
<td>9.6 (4) p = .04</td>
</tr>
<tr>
<td></td>
<td>Motivate the patient to adhere to treatments</td>
<td>5.16 (0.944)</td>
<td>5.55 (0.925)</td>
<td>3.5 (4) p = .47</td>
</tr>
<tr>
<td></td>
<td>Make use of relevant data in patient records</td>
<td>5.60 (1.15)</td>
<td>5.77 (1.33)</td>
<td>7.2 (4) p = .12</td>
</tr>
<tr>
<td>CA 5. Documentation and administration of nursing care</td>
<td>Use information technology as support in nursing care</td>
<td>5.23 (1.20)</td>
<td>5.94 (1.03)</td>
<td>9.9 (4) p = .04</td>
</tr>
<tr>
<td></td>
<td>Document according to current legislation</td>
<td>5.47 (0.987)</td>
<td>6.06 (0.854)</td>
<td>9.3 (4) p = .05</td>
</tr>
<tr>
<td></td>
<td>Comply with current legislation and routines</td>
<td>5.69 (0.898)</td>
<td>6.13 (0.806)</td>
<td>6.6 (3) p = .08</td>
</tr>
<tr>
<td></td>
<td>Handle sensitive personal data in a safe way</td>
<td>5.90 (0.863)</td>
<td>6.29 (0.824)</td>
<td>4.8 (3) p = .18</td>
</tr>
<tr>
<td></td>
<td>Monitor for work-related risks and prevent them</td>
<td>5.21 (0.926)</td>
<td>5.94 (0.814)</td>
<td>13.56 (5) p = .01</td>
</tr>
<tr>
<td></td>
<td>Continuously engage in professional development</td>
<td>5.56 (0.880)</td>
<td>6.00 (0.894)</td>
<td>5.79 (3) p = .12</td>
</tr>
<tr>
<td></td>
<td>Lead and develop health staff teams</td>
<td>5.29 (1.12)</td>
<td>6.03 (0.875)</td>
<td>10.28 (5) p = .06</td>
</tr>
<tr>
<td>CA 6. Development, leadership, and organisation of nursing</td>
<td>Act adequately in the event of unprofessional conduct among employees</td>
<td>5.06 (1.06)</td>
<td>5.48 (1.12)</td>
<td>6.06 (5) p = .30</td>
</tr>
<tr>
<td></td>
<td>Apply principles of disaster medicine</td>
<td>4.55 (1.09)</td>
<td>5.35 (0.985)</td>
<td>16.65 (6) p = .01</td>
</tr>
<tr>
<td></td>
<td>Search for and review relevant literature for evidence-based nursing</td>
<td>4.82 (1.03)</td>
<td>5.52 (1.06)</td>
<td>14.75 (5) p = .01</td>
</tr>
<tr>
<td></td>
<td>Interact with other professionals in care pathways</td>
<td>5.52 (0.936)</td>
<td>5.84 (0.779)</td>
<td>3.19 (4) p = .41</td>
</tr>
<tr>
<td></td>
<td>Supervise and educate staff</td>
<td>5.18 (1.18)</td>
<td>5.68 (1.07)</td>
<td>7.18 (5) p = .20</td>
</tr>
</tbody>
</table>
specialist education (one-year master) showed a higher extent of EBP activities. Postgraduate education at the master’s level in health care has been shown to improve leadership skills and lead to better job performance and improved skills that all require critical thinking [33], which correlates with our result regarding the ability to work more independently in several aspects of emergency care. As shown by Aiken et al., it is known that academic education has an impact on patient outcomes [34].

The knowledge of disaster medicine has been reported as poor among clinical RNs [35]. Emergency care nurses are in the front line when it comes to care for patients from disasters or major incidents and therefore the curriculum for emergency nurses has disaster medicine as one of the core competencies [27]. Therefore, it is not surprising that specialist education in emergency care improves this competence even though Sweden has a low frequency of disasters or major incidents compared to other countries [36].

The Quality and Safety Education for Nursing (QSEN) framework has been at the forefront of preparing nurses to lead the development of patient safety and quality in nursing [37]. The QSEN defined six competencies declared as essential for all health professions [37]: patient-centred care, teamwork, and collaboration, EBP, quality improvement, safety, and informatics. These core competencies have been integrated into the curriculum for RNs as well as in advanced level specialist education in Sweden and are also measured by the NPC scale. Our results show a significant difference concerning improvement in the items of patient-centred care, EBP, quality improvement, and in informatics after the postgraduate education. However, when looking at item by item, there are areas where there was no significant difference between before and after the postgraduate education. For example, our results showed no significant improvement in the CA of teamwork, which is remarkable in emergency nursing where teamwork is considered a key aspect of emergency situations [38]. Further research is therefore needed to explore how to support emergency care students’ learning on leadership in teamwork. In the item “Document patient’s psychological status” there was no significant difference in self-assessed competencies before and after the post graduated education. This raises questions about the emergency care context itself, is it possible that the RNs working and studying in the emergency care setting does not train to document psychological status instead the care including assessment, treatment, and documentation is focused on task-oriented and physical aspects of care [28,39]. It is known that RNs working in emergency care settings find it difficult to care for patients with psychiatric illnesses even though individuals with psychiatric illnesses often use the emergency department as a primary source of healthcare [40] and in addition, patients cared for in an emergency care setting such as the ambulance services find the RNs prejudiced [41]. Another explanation for the findings could be attitudes and the cultural context in emergency settings against patients with psychiatric illness [40,41]. Therefore, the care of patients with a psychiatric illness needs to be developed in the study programs curriculum and trained during the studies at the university. In addition, the authorities need to regulate CPD after registration as RNs to secure high-quality care of patients with psychiatric illnesses. At present, CPD or re-validation of nursing knowledge and skills is not regulated by the authorities in Sweden [21] instead, CPD occurs at the RNs’ and employers’ own volition. Despite limited evidence on the direct impact CPD in the patient care [20,42] it is reasonable to assume that not maintaining and developing new knowledge and clinical skills in a constantly changing practice environment can lead to an increased risk of adverse events and increased risk of extra suffering for patients cared for in an emergency care setting.

6. Limitations

One limitation is that our results are based on the perception of RNs in emergency care settings and therefore may not be generalised for the entire RN population in other health care settings. However, previous studies have shown that NPC can be relevant in different countries and working environments [43,44]. The RNs assessed their competencies as relatively high, both when entering and ending their education, suggesting that the variation expected by using an increased number of response alternatives, from four to seven [29], is still an issue that must be considered when using the short version of the NPC. Another limitation to be considered is that the participants may not have been representative of students in emergency care as data were collected from one university. An additional limitation is the cross-sectional design which means that the participants were not the same in the before and after education data collection, which makes it difficult to make a causal inference of our result. Without longitudinal data, it is not possible to establish the true causes and effects of shown differences before and after education. Furthermore, if we consider our response rate, there could be another result if our non-responders would have answered the questionnaire. Therefore, further studies including several universities and a longitudinal design are necessary.

7. Conclusion

The student’s self-assessed competencies were assessed as good before and very good after their postgraduate education in emergency care. The most significant improved competencies among the students were found in working independently and using evidence-based knowledge. By continuously evaluating nurses’ self-assessed competencies before the nurses enter postgraduate education, educators can focus and develop areas, e.g., psychiatric illness and teamwork, that need improvements to ensure that the education meets the needs of knowledge in a constantly changing practice in emergency care. The findings themselves indicate that CPD occurs at the RNs’ own volition, but without a postgraduate education, or other training the RNs risk a lack of professional development in a continuously developing health-care organisation. Therefore, there is necessary to regulate CPD and re-validation of nursing knowledge and skills to ensure the required knowledge and clinical skills among nurses to care for patients in emergency care settings.

Ethics approval and consent to participate

Ethical principles were followed in accordance with the Declaration of Helsinki 2013 [32]. Both oral and written information describing the aim of the study and stating that their participation was voluntary and that they could withdraw at any time without explanation, was presented to the participants. Informed consent was obtained from all participants when answering the questionnaire. The study was approved by the ethical committee at Sophiahemmet University (Dnr: 20200824/0433).

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Availability of data and material

The data analysed are available on reasonable request from the corresponding author.

CRediT authorship contribution statement

V. Lindström: Conceptualization, Investigation, Methodology, Writing – original draft. A-C. Falk: Conceptualization, Investigation, Methodology, Writing – original draft.
Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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