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The correlation between professional competencies and self-efficacy among nursing students and registered nurses. An observational cross-sectional study

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Abstract. *Background and aim of the work:* The assessment and application of professional skills in registered nurses and undergraduate nursing students during clinical practice are essential in nursing education. Self-efficacy positively affects the professional competence of nursing students and registered nurses, but studies have yet to focus on the relationship between professional competence and self-efficacy. This study examined professional competence and its association with self-efficacy among undergraduate nursing students and registered nurses. *Research and Methods:* A cross-sectional, observational, and correlational study was conducted through a two-questionnaire-based survey. Sampling was conventional. Data was collected through the Italian version of the Nurses' Professional Competence Scale Short Form (I-NPCS-SF), which investigates professional competencies, and Nursing Professional Self-Efficacy Scale (NPSES), which investigates self-efficacy and a socio-demographic questionnaire. The study was based on a convenience sample of 320 individuals: nursing students (n=116) in Albania and Italian nurses (n=204). *Results:* Factors associated with professional competence, particularly ethical values, of nursing students (M = 77.57) and registered nurses (M = 83.18) obtained the lowest average score, while other factors were almost the same for the two groups of nurses. Self-efficacy did not play an essential role in the development of professional competence of nursing students and registered nurses, as our investigation found no correlation between these two elements. *Conclusions:* The results of this study can be applied as a reference for improving nursing education programs by augmenting students' professional competence and, consequently, future nurses. (www.actabiomedica.it)

Key words: clinical practice, nursing competencies, nursing professional competence scale, observational study, professional competence, self-efficacy

Introduction

Professional nurses (RNs) and Nursing Students (NS) play an essential role in different international healthcare systems in different clinical settings to achieve optimal well-being for all patients (1). Because of this conceptualization, their professional competence must be adequate and dynamic to ensure a good quality of care and patient safety (2).

Unfortunately, the shortage of nurses and nursing students remains challenging for any health system, placing a greater demand on university nursing programs to train competent nurses (3-5). It is also vital that both (RNs) and (NSs) develop their ability to identify their knowledge gaps and their need for professional skills development (6, 7) and self-efficacy (8), two tenets strictly linked to clinical reasoning. Several tools are used to assess professional competence (9-11)

and self-efficacy (12, 13), but to our knowledge, according to Högstedt et al., no study describes dual-use tools to measure self-assessed competence and how they relate to each other (14).

Nurses in the future will face new challenges in the healthcare sector with more complex scenarios, where both technology and different contexts of care, residential, will outline new nursing competencies (15). To meet these future challenges, well-trained and motivated nurses are necessary because they can provide nursing care at all societal levels (16). Therefore, how nursing training programs are organized is imperative to optimize the development of NSs' competencies and their transition from student life to that of a professional nurse (17).

Nursing competencies concerning the safety and quality of care have been widely discussed internationally by several authors (18-20). In this regard, some authors have shown that the training level of nurses is fundamental, i.e., better nursing competence in clinical contexts is interpreted in a reduced incidence of mortality, morbidity, and adverse events for patients (21).

Several countries have developed university education outlining these specific competencies for future nurses to ensure that nurses provide safe and high-quality care in different hospital and ambulatory settings (22, 23).

Benner (24) defined nurses' clinical competence as the ability to elaborate on a task and obtain a desirable result in certain situations within a clinical context (25). Instead, according to Kajander-Unkuri et al. (26), competence in nursing refers to knowledge related to tasks and skills, a generic focus on problem-solving and critical thinking, and a holistic approach that brings together knowledge, skills, attitudes, and judgments. Notarnicola et al. (27) define clinical and nursing competencies as the set of skills, knowledge, attitudes, and abilities that every nurse must possess to perform acceptably those tasks directly related to patient care in a specific clinical context and certain circumstances to promote, maintain and restore the health of patients.

However, many aspects remain unclear within the concept of nursing competence, as it is a multidimensional and complex construct (28).

The definitions and relationships, with other components of the competencies, such as self-efficacy, are helpful to define and outline the possession of a highly qualified core competence; therefore, it is essential to evaluate the levels of competence of nurses both in training and work so that a tool for continuous competences assessment can be developed and can indicate the need for further competencies development (29).

According to Immonen et al., using valid and reliable assessment tools to measure the evolution of nursing competencies and the development of nursing practice is vital for NSs, educators and RNs (30).

For clinical nurses, these tools can assess their skills and help with clinical reasoning and self-efficacy to inform clinical decisions and, therefore, a process of knowledge of their cognitive capacities and attitudes to modify their learning. It could lead to actions concerning ethical values, professionalism, and leadership (24).

Agreeing with Zahavi et al., nurses thus gain new insights into their ability to make future action choices and take control of different clinical situations (31). Indeed, according to Halamek et al., the combination of similar instruments should contribute to a holistic assessment of the skills development of nursing students and RNs during theoretical or clinical learning (32).

According to Mann et al., in the educational field, these assessment instruments can also be essential for the student's self-assessment, which is indispensable for learning and professional development in the clinical environments where they will practice (33).

Therefore, the assessment of nursing competencies has to be a fundamental prerequisite to ensure qualified care to patients and identify those areas in which it is also necessary to develop nursing practice (34). One of these instruments is the Nurse Professional Competence-Short Form (I-NPCS-SF) (35) that was utilized in our investigation coupled with the Nursing Professional Self-Efficacy Scale (NPSES), the scale of self-efficacy of the nursing profession (36) to assess the professional competence of both (NSs) and (RNs) based on their self-assessment (37). This choice was made to compare the self-perceived professional competence and self-efficacy between these two groups and to gain insights into any potential differences or similarities.

In this study, we aimed to address the following research questions:

1. What is the level of professional competence among registered nurses (RNs) and nursing students (NSs) in clinical practice, with a focus on self-efficacy and clinical reasoning, to provide a more precise definition and delineation of these highly qualified core competencies?
2. How do the Nurse Professional Competence-Short Form (I-NPCS-SF) and the Nursing Professional Self-Efficacy Scale (NPSES), as innovative instruments for measuring professional skills, correlate?

Participants and methods

Study design

A cross-sectional observational design study was used to process data from the sample of RNs and NSs at a single time point. The manuscript was written following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) protocol (38).

Sample and participants

A convenience sample was acquired from a nursing degree programme at Our Lady of Good Counsel University (Albania) where teaching courses are held in Italian to recruit NSs, while RNs were recruited from a University Hospital in Rome (Italy), the choice of an Italian hospital was made as there is no hospital in the university.

To define an adequate sample size, the authors considered Hair et al. (39) element/participants ratio of 1:10. Sample recruitment was accomplished between September 2021 and March 2022. Variables collected from NSs, and RNs included sociodemographic data for both scales used.

Sample RNs

The participation of the RNs was carried out anonymously, the questionnaire was unidentified, and after reading a fact sheet explaining the purpose of the study, the risks and benefits of the investigation and the rights of the participants were clarified. RNs were asked to provide informed consent for participation in the study; the consent was provided in paper format and returned to the researchers before participating in the examination.

The RNs were contacted via corporate mail. In particular, the authors distributed an invitation to participate in the investigation using the mailing list of RNs, provided by the hospitals contacted for the study. As a criterion for inclusion, RNs providing direct patient care had to be employed full-time in clinical practice.

Sample NSs

For NSs they had to be regularly enrolled in courses, have provided for the full payment of university fees, be in good standing and have passed more than 80% of the overall university exams required by the University nursing curriculum.

Even for the NSs who joined the study, participation was done anonymously; the questionnaire was not identifiable and after reading an information sheet explaining the purpose of the study, the risks and benefits of the survey and the rights of the participants. SNs were also asked to provide informed consent for study participation; consent was provided in paper format and returned to the researchers before participating.

Instruments

Italian version of the Nurses' Professional Competence Scale Short Form (I-NPCS-SF)

The Italian short version of the NPC-SF scale was translated into Italian in line with the recommendations by Beaton et al. (40) from Prendi et al. (35).

The I-NPCS-SF is divided into four categories. The first category, *management of nursing documentation and pedagogical assistance* (Dimension 1), evaluates the perception with respect to their own management of nursing documentation and the pedagogical contribution nurses must develop and have in clinical practice. The second category, *acts/medical and technical*

*nursing assistanc*e (Dimension 2), evaluates the perception of the acts put into the care practice from a medical and technical perspective. The third category, *leadership, and coordination of nursing care* (Dimension 3), evaluate the perception of the development of good leadership in coordinating care; the construct of leadership has become increasingly crucial in nursing over the years. The fourth category, *ethics of nursing care* (Dimension 4), assesses perceptions of the impact of professional ethics on responsible behaviour and ethical professional practice on the quality of training procedures and how it can contribute to professional improvement.

Each dimension has a score that is calculated using a formula application and the results of each dimension for the areas of expertise.

The scale measures the abovementioned four areas of expertise on a 7-point Likert scale (To a very low degree = 1, To a low degree = 2, To a relatively low degree = 3, Neither high or low degree = 4, To a relatively high degree = 5, To a high degree = 6 and, To a very high degree = 7).

Nursing Professional Self-Efficacy Scale (NPSES)

The scale of self-efficacy of the nursing profession (NPSES) (36) is composed of 19 items, grouped into two subscales: *Attributes of care situations* (12 items) and *Professional situations* (7 items). Attributes of care situations consider nurses' ethical and moral issues, particularly those related to organizational and structural weaknesses. It includes items: 1, 3, 4, 5, 6, 7, 8, 9, 12, 15, 18, 19 (Dimension S1). Professional situations concern the skills that come into play in relationships with colleagues or professional activity.

They correspond to the following items: 2, 10, 11, 13, 14, 16, 17 (Dimension S2). Each item has a response mode with a 5-step Likert scale, ranging from 1 (not at all capable) to a maximum of 5 (fully capable). The two factors in the original scale of calculations are composed as follows, Caring = ((sum Items 1, 3, 4, 5, 6, 7, 8, 9, 12, 15, 18, and 19) - 12) * (100/48) and, Professionalism = ((sum Items 2, 10, 11, 13, 14, 16, and 17) - 7) * (100/28), until the total score = ((sum all items) – 19) * (100/76).

Ethical considerations

This study did not involve patients. The study was designed, conducted, registered and reported consistently with the international scientific and ethical quality standards indicated by good clinical practice (GCP) and standard operating procedures (SOP). Before using and starting our study, the authors of the original NPC-SF tool were contacted by email. The authors granted the use of the NPC-SF scale. Participants were also informed of the confidentiality and anonymity of their responses during the data collection and analysis processes. This study was ethically approved by the Centre of Excellence for Nursing Scholarship OPI Rome protocol number 2.22.25.

Data analysis

SPSS statistical software for Windows, version 24 (SPSS Inc., Chicago, USA) was used to analyze the data.

Following the user manual for the I-NPC-SF, the responses to each competence area were recalculated to a score between 1 and 100, with 100 being the highest competence and 1 being the lowest competence. The same goes for the NPSES scale; the responses to each self-efficacy area were recalculated to a score between 1 and 100, with 100 being the highest self-efficacy and 1 being the lowest self-efficacy.

Descriptive statistics, including means and Standard Deviations (SDs), frequency and percentage, were calculated. Regarding inferential statistics, the one-way analysis of variance (ANOVA) was used to analyse the means between the groups. Pearson's correlation coefficient was calculated to evaluate the relationships between the factor scores of the I-NPC-SF to assess whether the sample examined showed that they had appropriate professional competencies.

A p-value of less than 0.05 was considered statistically significant. The internal consistency of each area of expertise and the full scale were calculated using Cronbach's alpha.

Missing values were replaced with the obtained mean of the missing items. Cases with missing values greater than 50% of the responses were excluded from the study. The analyses were conducted independently by two authors.

Results

Demographics

In total, 320 of 443 participants completed the questionnaire (response rate: 72.23%). The ages of the participants ranged from 19–56 years (mean 25.99 years ± 6.371 SD). The majority were women (75%). Participants were divided into 204 (63.75%) RNs and 116 (36.25%) NSs. Although the sample was asymmetrical, data from almost the entire population of the two institutions involved was collected and this approach allowed us to identify similarities and differences in evaluating the level of professional competence of RNs and NSs in clinical practice. The detailed demographics are presented in Table 1.

Reliability

Cronbach's alpha values for the I-NPCS-SF factors ranged from 0.807 to 0.820 and was 0.800 for the total instrument, while for the two factors of the NPSES it was 0.868 and 0.886 for the total scale. (Table 2).

Professional competence and self-efficacy among participants (RNs and NSs) with different demographic and professional characteristics

The self-assessed proficiency scores of RNs and NSs are described in Table 3. Table 3 presents the comparison of professional competence and self-efficacy according to the characteristics of the study participants.

RNs had a higher average than NSs on professional competencies (M 86.02 ± 9.45317 SD) and self-efficacy (M 58.31± 9.96148 SD). The area of professional competence where RNs had the highest average score was both Management (M = 86.89 ± 8.98015 SD) and Leadership (M = 86.89 ± 10.29728 SD),

Table 1. Socio-demographic data (n=320).

	N	%
Professional Role		
RN	204	63,75
SN	116	36,25
Gender		
Female	240	75.00
Male	80	25.00
Classes of Age		
19 - 33	245	76.56
34 - 48	64	20.00
> 41	11	3.44
Basic Education		
Scientific High School	99	30.94
Gymnasium	94	29.38
Professional High School	52	16.25
Other	75	23.44

Table 2. The mean of the factors between the Italian version of Nurse Professional Competence Scale – Short Form (I-NPCS-SF) and the Nursing Profession Self-Efficacy Scale (NPSES) (n=320).

		Mean	SD	Cronbach's Alpha
	Age	25.99	6.371	
Factor I-NPCS-SF	1. Management	85.13	9.804	0.815
	2. Nursing	84.66	11.198	0.807
	3. Leadership	85.31	11.333	0.808
	4. Ethics	81.15	13.595	0.820
Factor NPSES	1. Attributes of caring	27.84	6.283	0.868
	2. Professional situations	4.90	4.529	0.868
	Total NPSES	57.74	10.440	0.886
	Total I-NPC-SF	84.36	10.334	0.800

Table 3. Correlation between the Professional Role, Gender, Classes of Age, and the Italian version of Nurse Professional Competence Scale – Short Form (I-NPCS-SF) and the Nursing Profession Self-Efficacy Scale (NPSES).

		Management	Nursing	Leadership	Ethics	Attributes of Caring	Professional Situations	Total NPSES	Total I-NPC-SF
Professional Role									
Registered Nurse (n=204)	Mean	86,89	85,97	86,89	83,18	28,25	5,06	58,31	86,02
	SD	8,98015	10,57699	10,29728	12,33469	5,92928	4,42412	9,96148	9,45317
Student Nurse (n=116)	Mean	82,03	82,35	82,53	77,57	27,10	4,62	56,72	81,43
	SD	10,44418	11,91172	12,52403	14,96043	6,82627	4,71382	11,20449	11,17756
F		19,219	7,909	11,301	13,098	2,495	0,691	1,718	15,216
p		**0,000**	**0,005**	**0,001**	**0,000**	0,115	0,406	0,191	**0,000**
Gender									
Female (n=240)	Mean	85,13	84,65	85,23	80,81	28,08	5,15	58,23	84,28
	SD	10,06064	11,39774	11,65508	14,04390	5,94236	4,40991	10,02588	10,63396
Male (n=80)	Mean	85,11	84,68	85,57	82,14	27,11	4,16	56,28	84,57
	SD	9,05096	10,64375	10,37033	12,17594	7,20231	4,82201	11,53747	9,43501
F		0,000	0,001	0,053	0,573	1,422	2,845	2,101	0,046
p		0,989	0,982	0,818	0,450	0,234	0,093	0,148	0,830
Classes of Age									
19 - 33 (n=245)	Mean	84,60	84,46	85,10	80,48	27,87	4,95	57,82	83,94
	SD	10,02878	11,34488	11,76025	13,98593	6,28525	4,44890	10,36693	10,58768
34 - 48 (n=64)	Mean	87,10	85,64	85,97	83,18	27,44	4,66	57,09	85,86
	SD	8,72570	10,16735	9,65627	11,70947	6,62337	4,87370	11,19200	9,05185
> 41 (n=11)	Mean	85,44	83,41	86,15	84,20	29,36	5,18	59,55	84,82
	SD	10,03006	14,11474	11,40962	14,53250	3,93123	4,60040	7,67286	11,66350
F		1,667	0,353	0,180	1,297	0,457	0,129	0,294	0,886
p		0,191	0,703	0,835	0,275	0,634	0,879	0,746	0,413
Total (n=320)	Mean	85,13	84,66	85,31	81,15	27,84	4,90	57,74	84,36

while the lowest mean score was Ethics (M = 83.18 ± 12.33469 SD). The area of self-efficacy where RNs had the highest average score was Attributes of caring (M = 28.25 ± 5.92928 SD).

Regarding NSs, the area of competence in which they had the highest average score was Leadership (M = 8 2.53 ± 12.52403), while the lowest average score was Ethics (M 77.57± 14.96043). The area of self-efficacy where NSs had the highest average score was Attributes of caring (M = 27.10 ± 6.82627 SD).

Correlations between professional competence and self-efficacy

No statistically significant correlations between professional competence and self-efficacy (r = -0.012, P = 0.827) of the study participants were found. Professional competence was related to Attributes of caring (r = 0.002, P = 0.978) and Professional situations (r = -0.030, p = 0.587). While self-efficacy correlated in the factors of I-NPC-SF as management (r = -0.008,

Table 4. Correlation between the Italian version of Nurse Professional Competence Scale – Short Form (I-NPCS-SF) and the Nursing Profession Self-Efficacy Scale (NPSES).

	Management	Nursing	Leadership	Ethics	Attributes of Caring	Professional Situations	Total NPSES	Total I-NPC-SF
Management	1							
Nursing	,837**	1						
Leadership	,815**	,883**	1					
Ethics	,786**	,811**	,825**	1				
Attributes of caring	0,003	0,019	0,021	-0,039	1			
Professional situations	-0,023	-0,011	-0,027	-0,061	,861**	1		
Total NPSES	-0,008	0,007	0,001	-0,050	,975**	,952**	1	
Total I-NPC-SF	,943**	,945**	,929**	,905**	0,002	-0,030	-0,012	1

**. Correlation is significant at the 0.01 level (two-tailed).

P = 0.883); Nursing (r = 0.007, P = 0.899); Leadership (r = 0.001, P = 0.988); Ethics (r = -0.050, P = 0.372). Table 4 presents the correlation matrix for these variables.

Differences between professional competence and self-efficacy

Regarding the differences between NSs to RNs scores obtained with the administration of both I-NPC-SF and NPSES, correlations showed significant differences between the I-NPC-SF scores of RNs (M = 86.02; SD = 9, 45317; p = 0.000) and NSs (M = 81.43; SD = 11.17756; p = 0.000; Table 3). RNs had the highest and significantly different scores from NSs for I-NCS-SF factors, particularly for Management (p = 0.000) and Leadership (p = 0.001).

Differences between both NPSES and I-NPC-SF correlations scores related to gender, in this case, showed no significant differences between female gender scores (M-NPSES = 58.23; SD = 10.02588; p = 0.148; M - I-NPC-SF = 84.28; SD = 10.63396; p = 0.830) and male sex (M - NPSES = 56.28; SD = 11.53747; p = 0.148) (M - I-NPC-SF = 84.57; SD = 9.43501; p = 0.830) (Table 3).

Concerning the scales used, it demonstrated no significant differences with age groups in the NPSES (age 19 - 33, mean = 57.82; SD = 10.36693; age 34 - 48; mean = 57.09; SD = 11.19200; age >41; mean = 59.55; DS = 7.67286; p = 0.746). and I-NPC-SF (ages 19 - 33, mean = 83.94; SD = 10.58768; age 34-48; mean = 85.86; SD = 9.05185; age >41; mean = 84.82; DS = 11.66350; p = 0.413) (Table 3).

Conclusion

This study explored the perceptions of RNs and NSs in the Italian context regarding their professional competence using the I-NPC-SF scale (35) and regarding self-efficacy with the use of the NPSES scale. Therefore, the results of this study reported that the average professional competence of RNs and NSs was at a very good level, and the average self-efficacy was at a good level.

This could indicate a good relationship between academic and clinical learning environments in developing professional competence and self-efficacy. Especially in the academic field, it is necessary to develop specific paths in teaching professional competencies since the latter are considered essential elements in ensuring quality in nursing care, also considering it as one of the professional standards necessary in the quality of it.

From the results of our study, it is clear that the professional competencies and self-efficacy of the

sample seemed to follow the process of competencies development supported by statistically significant correlations between the partial scores among the different variables analyzed (Table 3). If the analyzed sample demonstrated the ability to have both adequate professional competencies and self-efficacy, it also demonstrated the appropriate competencies and self-efficacy in the different stages of development from NSs to RNs.

Specifically, the factors for which RNs rated their competence as highest were Management and Leadership (M=86.89). At the same time, either with scores or lower were Ethics of nursing care (M = 8 3.18). The factor in which the NSs rated their highest competence was Leadership (M = 82.53), while the lowest-scoring factor was Ethics nursing care (M = 77.57).

These results highlight the deficiencies in the university paths of the NSs since it is evident that ethics in nursing care, being absent in the training path, is then lacking in the professional competencies of the RNs. Whilst both management and leadership remain and develop as long as acquiring professional competencies.

All this aligns with the analysis van de Mortel et al. (41) accomplished in their study. They indicated that it would be appropriate to explore the competencies of NS with those of RNs; this could be useful for analyzing the areas of expertise with the lowest score for academic nurses as components to be addressed in nursing curricula, highlighted in our study. In particular, concerning the professional competence of RNs and NSs, our results are in line with the results of several studies, which assessed the professional skills of nurses in Australia, China and Slovenia and showed that the professional skills of RNs and NSs were above average (41-43). This study suggests that ethical and managerial competencies are among nurses' most relevant professional skills in the current nursing and educational context, while ethics in nursing care is neglected in university curricula.

Concerning self-efficacy, our analyses showed that RNs obtained a good average in the Attributes of caring factor (M = 28.25) compared to students who had it lower (M = 27.10). This evidence shows that the awareness of self-efficacy is learned during the acquisition of professional skills in the workplace (44, 45). As nurses have to manage their skills, abilities, and control over events, having the technical competencies to successfully carry out a determined nursing activity can be felt as complex (46, 47).

Our study presented several limitations. First, this study was conducted only in one university and one hospital. Therefore, the results may not be generalized to NSs and RNs in other contexts. Secondly, we utilized a convenience sample, which is critical due to its practical use to generalise results. Since the sample does not represent the total reference population, the study's results cannot portray the entire population. In addition, it was a cross-sectional study with no longitudinal observations of the study participants. Therefore, future research should be geared towards improving these aspects. One strength of our study is that it is the first to research where there is a correlation between professional competencies and self-efficacy.

The results of this investigation highlighted that there is no direct correlation between self-efficacy and professional competence. Self-efficacy is not a link between NSs and RNs in developing professional competence.

However, the findings of our study highlight the importance of close collaboration between the university system and the workplace. This can improve not only the learning of both NSs and RNs but also training programs in acquiring both self-efficacy and professional competence and improving the quality of care for recipients of care.

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Conflict of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement, etc...) that might pose a conflict of interest in connection with the submitted article.

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