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Nurse Competence Scale: A Multicenter Observational Study on Nursing Competencies in Northern Italy

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Abstract

Introduction. Nursing competence—encompassing knowledge, skills, and experience—is key to delivering safe, high-quality care. Self-assessment supports professional growth, enhances satisfaction, and may lower turnover. This study aimed to assess nurses' self-declared competencies across four domains (management, nursing care, leadership, and ethics) using the validated Italian Nurse Professional Competence Scale–Short Form (I-NPCS-SF).

Methods. A multicenter cross-sectional study was conducted on 161 nurses from two hospitals in Northern Italy (Oct–Dec 2024). Data were analyzed with ANOVA using Jamovi.

Results. Higher scores were found in all areas. Postgraduate education and 6–10 years' experience correlated with better scores.

Discussion. Assessing nursing competencies is essential to maintain care quality and guide professional development. Promoting regular self-assessment helps identify areas for growth, supports career progression, and contributes to nurse retention.

Keywords: Leadership, Nursing Competence, Professional Development, Quality of Care, Self-Assessment

Introduction

Today's healthcare is rapidly evolving due to emerging diseases, an aging population, low birth rates, diverse patient needs, and technological advancements (Karami et al., 2017). These complex dynamics challenge all healthcare professionals, including nurses, who must continuously develop their competencies to ensure patient safety, high-quality care, and improved outcomes (Fukada, 2018). Despite being widely discussed, the concept of competence remains ambiguous (Garside & Nhemachena, 2013; Smith, 2012). A standardized definition is essential to strengthen the nursing profession's identity (Yanhua & Watson, 2011). Benner defines competence as performance described through intent, function, and meaning—not merely task execution (Benner, 1982). Others define it as a combination of knowledge, skills, attitudes, and abilities aimed at achieving organizational goals (Audenaert et al., 2014; Dellai et al., 2009; Gunawan & Aungsuroch, 2017). Competence is acquired and maintained over time as part of a broader effort to ensure quality (Mayo et al., 2018).

Research links higher patient satisfaction to nurses' competencies, especially technical and relational skills (Kozka et al., 2019; Tomaszewska et al., 2023). Competence is now recognized as fundamental to care outcomes (Bing-Jonsson et al., 2016; Maheu et al., 2020), though factors influencing it—such as experience, age, work environment, employment status, self-esteem, satisfaction, and critical thinking—show inconsistent associations (Kim & Choi, 2019; Kim & Kim, 2015; Liu & Aungsuroch, 2018; Meretoja et al., 2004; Numminen et al., 2016).

Nurses must develop professional competencies to meet growing and complex care demands (AllahBakhshian et al., 2017; Helminen et al., 2016). Competence can be measured through outcomes sensitive to nursing care, including medication errors, patient falls, infections, complaints, pressure ulcers, cardiac arrests, and deaths, standardized per patient-days or medication doses (Twigg et al., 2019). Its assessment is complex, involving various dimensions observed during both training and daily practice (Cai, 2016; Halcomb et al., 2016; Lin et al., 2017). Increased competence is expected to reduce adverse events, but reliable, valid, and sensitive tools are needed to measure it accurately (Streiner et al., 2015). Self-assessment scales promote professional development, job satisfaction, and may reduce turnover, improving care quality (Dellai et al., 2009). In Italy, literature on this topic remains limited (Emanuela et al., 2023; Notarnicola et al., 2018; Notarnicola et al., 2024; Prendi et al., 2022), highlighting the need for research tailored to the national context.

This study aims to investigate self-perceived competencies among nurses in four factors—management, nursing care, leadership, and ethics—using the Italian version of the Nurse Professional Competence Scale – Short Form (I-NPCS-SF) (Emanuela et al., 2023).

Methods

Design

A multicenter cross-sectional study was conducted between October and December 2024 at two hospital facilities in northern Italy. The study followed the STROBE guidelines for observational studies (von Elm et al., 2007). (Supplementary File 1).

Population and sample

The study population consisted of employed nurses and freelance professionals working in operating units of the medical area (internal medicine, specialized medicine, long-term care), the surgical area (general surgery, specialized surgery, orthopedics and traumatology), the rehabilitation area, and the critical area, day hospital nurses (medical/oncological – surgical), nurses working in outpatient services/sample collection centers, and diagnostic areas (e.g., radiology, endoscopy), as well as territorial services.

The study included shift nurses and nurses working day shifts, performing clinical activities, with a Bachelor's Degree in Nursing or equivalent qualifications, Postgraduate Certificate, MSc in Nursing, Postgraduate Diploma, and Doctor of Philosophy (PhD) in Nursing, with no limits on total work experience or experience in the department at the time of the study. Both full-

time and part-time nurses were included.

Nurses with roles in coordination, management, research, or training, as well as those not involved in direct clinical activities, were excluded from the study.

Setting

The study was conducted at a public hospital facility and a private hospital facility in northern Italy.

Instruments

For the assessment of nursing competencies, the I-NPCS-SF was used, a shortened version of the Nurse Professional Competence Scale originally developed by Nilsson et al. (2014) and later validated in several international contexts (Gardulf et al., 2016; Nilsson et al., 2018; Van de Mortel et al., 2021).

The Italian version of the I-NPCS-SF, validated by Emanuela et al. (2023), is a valid and reliable tool for measuring nurses' professional competence.

The scale is based on Benner's competence framework (Benner, 2003) and consists of 35 items divided into four factors: Management, Acts, Leadership, and Ethics (Supplementary File 2).

The Management factor concerns the management of care, focusing on safety, technology, interprofessional collaboration, and evidence-based practices.

Acts explores clinical competencies, including medication management, patient monitoring, and safety of care. Leadership focuses on empathetic communication and psychological support for bennerpatients from a holistic perspective.

Ethics reflects ethical competence, emergency management, and the nurse's role in supervision.

Responses are provided on a seven-point Likert scale, ranging from 1 (very low) to 7 (very high), based on the nurse's level of agreement with each statement. For the use of the I-NPCS-SF in this cross-sectional study, authorization was obtained from corresponding author Notarnicola.

Data collection

The data collection was carried out between October and December 2024.

It involved the anonymous completion of the I-NPCS-SF tool, administered via the Microsoft Forms application by the assigned researcher, following approval from the General Management and with the collaboration of the nursing coordinators from all the enrolled facilities.

Participants were sent an invitation via email from the project leader and/or a team member familiar with the contact, followed by several reminders approximately every three weeks.

The email invitation contained information about the study, and after consent to participate, a link to the survey.

Data analysis

Data were analyzed using Jamovi software (The jamovi project, 2024). At the end of the data collection, a statistical analysis of the demographic variables considered was conducted, representing and summarizing the sample characteristics with absolute values and frequencies. The mean and standard deviation were calculated for each factor in relation to the different demographic characteristics examined.

The results of the competence scale by factors were summarized following the calculation formulas provided by the authors of the Italian validation of the scale (Emanuela et al., 2023) (Supplementary File 2).

Finally, the mean competence scores were compared between the different demographic variables, such as age range, gender, educational background, total years of work experience, contract type and profile, work schedule, and work area, using Welch's one-way ANOVA.

Ethical Considerations

The study was submitted for acknowledgment to the university board and registered under protocol number CLM.24.01. The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2024).

Written information explaining the study's purpose was provided to potential participants (Supplementary File 3).

Informed consent and data processing was obtained from all participants before their involvement.

Participants were informed that joining was voluntary and that the study results would not affect their employment.

Results

Partecipants

The study included a total population of 161 nurses, with 96 questionnaires returned from the private hospital facility and 65 from the public hospital facility.

Regarding the entire sample, the most represented age group was 20-30 years, which accounted for 34% of the total.

The female group represented 78% of the sample. In relation to the operational unit of affiliation, 25% of nurses were assigned to the critical care area, followed by the surgical area (17%), territorial services (16%), medical area (16%), outpatient services (13%), diagnostic area (5%), rehabilitation area (5%), and day hospital (3%).

The most represented level of education was the Bachelor's Degree in Nursing (47%). Forty-six nurses held a Postgraduate Certificate (28%), four nurses held a MSc in Nursing (2%), one nurse had completed a Postgraduate Diploma (1%), and no nurse had a PhD.

Additionally, 96% of the total sample were employed by the institution, with 94% holding a full-time contract and 60% reporting working in shifts.

Work experience in years was distributed as follows: <1 year (5%), 1-5 years (23%), 6-10 years (19%), 11-20 years (20%), 21-30 years (16%), >30 years (17%).

These demographic data are presented in Table 1, along with the absolute numbers and percentages.

Between the public and private facilities, the following demographic differences emerged: the nurses' age was higher in the public facility (34% over 50 years old) compared to the private facility (50% between 20-30 years old), which is reflected in the years of service, with 34% in the public facility having 11-20 years of service and 32% in the private facility having 1-5 years. No nurse in the public hospital facility had less than one year of service. The most common level of education in the public facility was a Postgraduate Certificate (38%), whereas in the private facility, it was the Bachelor's degree (58%).

Regarding the operational unit of affiliation, 40% of nurses in the public context worked in territorial services, and 57% reported working day shifts, while in the private facility, 28% worked in the critical care area, and 71% worked in shifts.

Table 1. Characteristics of study participants .

Variables		Absolute	Frequency
Operating Unit	Surgical Area	28	17%
	Critical Area	40	25%
	Diagnostic Area	8	5%
	Medical Area	26	16%
	Rehabilitation Area	8	5%
	Day Hospital	4	3%
	Outpatient Services	21	13%
	Territorial Services	26	16%
Gender	Female	126	78%
	Male	34	21%
	Not Declared	1	1%
Age Range	20-30 years	55	34%
	31-40 years	37	23%
	41-50 years	33	21%
	>50 years	36	22%
Education Level	Nursing Diploma	35	22%
	Bachelor's Degree in Nur-sing	75	47%
	Postgraduate Certificate	46	28%
	Master's in Nursing Sciences	4	2%
	Postgraduate Diploma	1	1%
	PhD	0	0%
Work Experience	<1 year	8	5%
	1-5 years	37	23%
	6-10 years	31	19%
	11-20 years	33	20%
	21-30 years	25	16%
	>30 years	27	17%
Contract Type	Employee	155	96%
	Freelancer	6	4%
Contract Profile	Full-time	151	94%
	Part-Time	10	6%
Work Schedule	Day Worker	65	40%
	Shift Worker	96	60%

Competence

The aggregated results in the four factors—Management, Nursing, Leadership, and Ethics are described. Nurses assigned high average scores across all factors.

The data suggest that, in general, the responses for all factors and for both public and private

settings are quite similar, with few significant differences in the averages (Table 2).

In the total sample, Factor 3, Leadership, has the highest average, and Ethics has the lowest.

Regarding standard deviation, Ethics has the highest, indicating greater variability in responses, while Management has the lowest, suggesting more consistency in how participants perceive the factor.

Overall, the responses tend to show moderate variability with significantly high standard deviations, but the different hospital administrations do not show substantial discrepancies among themselves, as detailed in Table 2.

Table 2. Difference between hospitals in the factors of I-NPCS-SF.

	Factor 1 (Management)	**Factor 2** (Acts)	**Factor 3** (Leadership)	**Factor 4** (Ethics)
	Mean±SD			
HF1	78,61±11,19	85,53±11,14	85,09±11,95	75,52±14,14
HF2	79,80±11,13	83,90±11,98	86,00±10,27	77,30±14,73
TS	79,09±11,15	84,87±11,48	85,46±11,28	76,24±14,36

Legend: **HF1**: Private Hospital Facility; HF2: Public Hospital Facility; **TS**: Total Sample

The analysis of means and standard deviations revealed significant differences among the various participant categories (Table 3).

Regarding Factor 1, Management, nurses from the Diagnostic Area reported the lowest score (MD 66.40) but also the highest dispersion in responses (SD 22.56), indicating that opinions on this factor vary greatly within the group. In contrast, professional with a Postgraduate Diploma perceived management particularly positively (MD 84.82).

For Factor 2, Acts, the Diagnostic Area again had the lowest score (MD 69.44), while professionals with a freelance contract had the highest (MD 89.94). Part-time workers showed considerable variability in responses for this factor (SD 24.59).

Professionals with a Master's degree demonstrated a highly positive perception of their Leadership (MD 88.69). The lowest mean, once again, was reported by the Diagnostic Area (MD 68.75). The highest variability for Factor 3 was found among part-time workers (SD 24.38).

For Factor 4, Ethics, those with a Master's degree reported the highest score (MD 89.28). In contrast, individuals with less than one year of work experience perceived their ethical competence as lower (MD 60.26). The Rehabilitation Area showed the greatest judgment dispersion for this factor, with a SD of 20.01.

The statistical analysis then compared the mean competency scores across different operational units using Welch's one-way ANOVA. The results did not show significant differences between the operational units in the overall competency scores.

However, Tukey's tests revealed some differences between specific operational units. In particular, within nursing care management (Management), a significant difference emerged between the diagnostic area and the surgical area ($p = 0.004$), as well as between the critical area and the surgical area ($p = 0.007$). Regarding Leadership, a significant difference was observed between the diagnostic area and the surgical area ($p < 0.001$), suggesting a lower perception of management competencies among professionals in the diagnostic area.

To better understand the influence of variables such as operational unit and work experience on competencies, a linear regression analysis was conducted. The results indicated that the diagnostic and rehabilitation areas had significantly lower scores in Management compared to the surgical area, with estimates of -0.683 ($p = 0.020$) and -0.564 ($p = 0.042$), respectively (Figure 1).

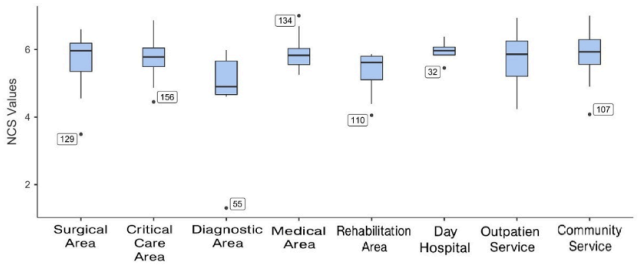

Figure 1. Linear regression analysis of Management competence scores by operational unit.

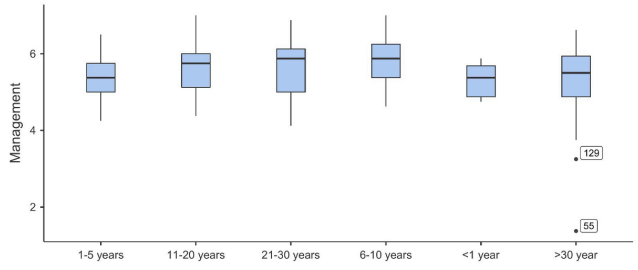

Figure 2. Linear regression analysis of Management competence scores by years of work experience.

Table 3. Mean and Standard Deviation represented by Operational Unit, Gender, Age Group, Educational Qualification, Work Experience, Contract Type, Employment Profile, Work Schedule.

		Factor 1 (Management)	Factor 2 (Acts)	Factor 3 (Leadership)	Factor 4 (Ethics)
		Mean±SD			
Operating Unit	Surgical Area	79,84±10,92	84,58±10,64	86,64±10,23	76,91±12,94
	Critical Area	78,16±8,99	86,42±9,20	86,07±9,09	75,80±13,64
	Diagnostic Area	66,40±22,56	69,44±23,18	68,75±24,98	61,60±15,24
	Medical Area	80,94± 8,21	86,87± 6,59	87,72±6,58	79,67±13,23
	Rehab Area	74,10±6,22	79,36±19,21	79,46±9,77	66,51±20,01
	Day Hospital	83,25±5,66	89,28±4,17	86,30±11,06	80,35±6,83
	Outpatient Services	79,16±11,53	86,01±10,10	85,26±12,27	77,21±15,04
	Territorial Services	82,62±11,37	85,65±10,45	88,00±8,81	78,84±13,69
Gender	Female	79,42±9,99	85,13±9,25	85,63±9,87	75,11±13,86
	Male	79,72±10,20	85,99±12,74	86,90±9,61	81,51±14,05
	Not Declared	16,07	14,28	14,28	39,28
Age Range	20-30 years	78,37±8,34	85,88±7,96	87,01±8,37	72,92±13,23
	31-40 years	81,97±9,36	87,00±7,62	84,94±10,24	78,76±13,8
	41-50 years	81,14±11,19	86,14±10,33	86,86±11,08	81,49±13,1
	>50 years	75,37±15,13	79,98±17,74	82,34±15,42	73,9±16,26
Education Level	Nursing Diploma	73,39±14,83	78,86±17,66	81,7±15,97	71,73±15,98
	Bachelor's Degree in Nursing	79,04±9,46	85,56±8,74	85,93±10,11	74,09±14,35
	Postgraduate Certificate	83,11±9,14	88,54±7,93	87,31±8,47	81,83±11,21
	Master's in Nursing Sciences	82,36±4,96	84,12±2,24	88,69±7,62	89,28±7,14
	Postgraduate Diploma	84,82	77,77	83,33	85,71
Work Experience	<1 year	77,67±6,31	82,34±6,81	87,2±5,53	60,26±13,69
	1-5 years	76,88±8,82	84,08±8,04	85,58±10,3	72,58±13,93
	6-10 years	82,51±9,25	90,06±6,73	88,17±8,34	80,64±10,00
	11-20 years	81,52±10,51	84,31±12,85	86,00±9,64	79,43±14,69
	21-30 years	81,35±10,00	85,84±9,67	85,71±10,71	80,28±14,54
	>30 years	73,57±15,94	80,54±17,65	80,77±17,16	73,28±14,67
Contract Type	Employee	79,13±11,24	84,67±11,61	85,42±11,41	76,26±14,29
	Freelancer	78,27±9,42	89,94±5,64	86,5±7,62	75,59±17,55
Contract Profile	Full-time	79,32±10,06	85,20±10,12	85,98±9,78	76,37±14,09
	Part-Time	75,62±22,58	79,84±24,59	77,61±24,38	74,28±18,73
Work Schedule	Day Worker	81,25±12,75	84,98±12,51	86,04±13,65	78,35±14,45
	Shift Worker	77,64±9,73	84,80±10,79	85,06±9,41	74,81±14,20

Discussion

The definition and evaluation of nursing competencies represent a crucial challenge for defining professional standards, ensuring the quality of care, and ensuring the sustainability of healthcare systems, thus creating the conditions to attract and retain nurses in healthcare (Scavone et al., 2014).

This study aims to investigate self-reported professional competencies of nurses using the I-NPCS-SF tool.

The results of this cross-sectional study showed high mean scores across all factors regarding the self-assessment of nurses' competencies. This is consistent with the findings of Nilsson et al. (2018)Formatting..., who found a high level of self-reported competence among Swedish nurses.

The second-level statistical analysis revealed that advanced education (Master's degrees and Postgraduate Diploma) seems to be associated with higher and more consistent scores across all factors, particularly Leadership and Ethics. This result aligns with the findings of Prendi, which highlighted how higher education correlates with greater professional competence in nurses (Prendi et al., 2022).

Regarding the work environment, the Diagnostic Area presented lower average scores, especially for Management, Acts, and Leadership, suggesting a less positive perception of competencies or possible issues. Professionals with less than one year of experience had a significantly lower evaluation of the Ethics factor, highlighting a potential need for training and support in this area, probably due to less familiarity with ethical issues in the work context. Moreover, work experience seems to play a key role in the development of management competencies.

This result supports the competency development model proposed by Benner's framework (Benner, 2003).

Freelance professionals reported very high scores for Acts, indicating a greater sense of autonomy and professional satisfaction compared to employees.

The Diagnostic Area and part-time workers showed greater variability in responses, indicating that the interpretation of factors may depend greatly on the specific work context.

The surgical and critical areas suggested higher average self-assessment scores of competencies.

The variability related to the work context and contractual profile has not been widely addressed in similar studies (Chae & Park, 2018; Nilsson et al., 2018; Notarnicola et al., 2018; Prendi et al., 2022), representing an interesting area for future research.

This suggests the need for further studies to understand how different work environments influence the perception of nursing competencies.

Implications for practice

This study underscores the need for further research in Italy, involving a broader sample from various regions beyond the North. Repeated use of the I-NPCS-SF can support clinical, educational, and research efforts by identifying training needs, improving education, and enhancing nurses' satisfaction—key to retention and quality care.

The tool may also help explore links between competencies and critical thinking, clinical reasoning, decision-making, and nursing-sensitive outcomes. However, its use among nurses in managerial or research roles is underexplored, highlighting the need for validation in these contexts.

Finally, it is essential to develop competencies in digital skills, methodological analysis, and emerging roles, especially with the introduction of nurse assistants and advanced clinical training in Italy. Recognizing and measuring these skills is vital for guiding care pathways aligned with the system's evolving demands.

Limitations

The results of this observational study should be interpreted with caution, as there are some limitations.

The convenience sample is limited, making it impossible to generalize the findings of this study. Additionally, the study included hospital settings with different characteristics and only two facilities from the province of Bergamo.

The study was based on nurses' self-assessment of their competencies, a method that may have influenced the results due to its self-referential nature and subjectivity, potentially leading to an overestimation of one's own competencies (Kajander-Unkuri et al., 2014; Lakanmaa et al., 2014).

Conclusions

The present study contributes to bridging the existing knowledge gap in the Italian context, where research on nursing competence remains limited.

Alongside future investigations, it supports a deeper understanding of nursing skills in Italy, representing a crucial step towards enhancing the quality of nursing care and informing future research and targeted educational strategies.

By providing valuable insights into the investigated settings, the study offers practical implications for improving staff organization and management, considering the differences observed among the analyzed groups. It highlights the importance of strengthening training in ethics and management, particularly

for less experienced professionals; addressing the challenges perceived in the Diagnostic Area to understand the reasons behind lower scores; and evaluating the support mechanisms for part-time workers, whose responses demonstrated notable variability (Osingada et al., 2015).

In conclusion, systematically assessing competencies, identifying training needs, addressing gaps through targeted education, and enhancing nurses' satisfaction with their own skills may play a pivotal role in retaining nursing staff within the healthcare system and ensuring safe, high-quality patient care.

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