

Self-assessment the competencies of surgical and critical area nurses. A cross-sectional study

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Abstract. *Background and aim of the work:* Today, competence represents an important requirement of nursing care and influences nurses in the quality of nursing care provided. This study aims to measure the competencies of surgical and critical area nurses, and to compare the nurses' involved competencies in relation to the area to which they belong *Methods:* A cross-sectional study. The study was based on a convenience sample. The registered nurses were recruited from a hospital of the Friuli Western Health Authority. The Italian version of the Nurse Competence Scale composed from 58 items and validated in Italy in 2018 as a self-assessment tool for nursing competencies in the surgical and critical area, was self-administrated in October- November 2020. *Results:* The average competence level was found to be 68.7, with a median of 70 and a standard deviation of 19.7. The nurses felt more competent belongs to "Management of the care process", specifically in "Recognizing critical situations for the patient's life early" (82.0). Most deficient was found in "Raising problems to be deepened with research" (50.9). *Conclusions:* The study found that nurses perceive a good level of competence with differences related to care settings. The results obtained from the study can provide nurses with the opportunity to reflect on their behaviours and periodically evaluate their knowledge and competencies, to promote professional development and continuing education. (www.actabiomedica.it)

Key words: clinical competence, critical care, nurse competence scale, registered nurse, surgical care

Introduction

In recent years, the complexity of health services has greatly increased (1); while scientific and technological advances have contributed to increasing the life expectancy of patients, demographic changes and the increase in the needs of the people assisted have increased the level of responsibility of nurses and other health professionals (2, 3).

Nurses are increasingly held accountable for the quality and effectiveness of care interventions, which must be based on criteria of documented effectiveness (4). This requires a continuous updating of knowledge and skills to be able to respond appropriately to the needs of users and the systemic activation of processes of self-assessment of professional competencies

to maintain high standards of care (5). Competence therefore represents a fundamental element of nursing care and plays an important role in the quality of services provided by nurses (6).

Over the years the concept of nursing competence has undergone numerous changes, this is also due to the multidimensionality of the concept itself (7). The traditional definition of competence based on the technical dimension and understood as a set of behaviours has been strongly criticized for its oversimplification leaving room for an orientation based on a holistic definition of competence (8), in which knowledge, skills, personal attitudes and values are integrated to perform an activity in a real clinical situation, which allows the nurse to integrate theoretical knowledge (know that) with context-dependent judgment skills (know-how) (9).

Competence, according to some Authors, is described as a set of knowledge, skills, attitudes, values and skills that increase efficiency and effectiveness in professional work environments (10) and, considers care as its fundamental fulcrum (11). Therefore, the competencies applied in each care setting may depend on the type of department, the diagnoses, the different treatments, and the technologies used, reinforcing the holistic orientation of competence according to which what makes the difference between the level of competent performance is precisely the real clinical situation, which allows the nurse to integrate theoretical knowledge with context-dependent judgment skills.

The competence of nurses, in addition to having a significant impact on the quality of care, is often linked to job satisfaction and performance but also to absenteeism (12); the dynamic development of nurses' competencies is influenced to a large extent by the clinical and professional environment (13). In some contexts, the emphasis is placed on the clinical performance of competencies in specific fields, but ontology should manifest itself in all different clinical settings (14-16).

In healthcare organizations, nurses are required to continuously adapt the development of their competencies in relation to the characteristics of the clinical context (17). For this reason, nursing care must be able to reshape the processes and organizational models with which health professionals meet the care needs of patients (18).

In this perspective the development of competencies already in the 80s was described as a process since it evolves and changes over time (19-21).

In a recent review of (13) work experience, nursing environment, level of academic education achieved, sense of belonging to the profession, critical thinking, personal factors (age, gender, knowledge, attitudes) were identified as the most important factors influencing competencies development. In this regard, it is important that the assessment of nursing competencies begins already during academic training to continue in all the work path (22, 23).

In the assessment and development of nursing competencies the perspectives to be considered are different. In fact, a distinction can be made between the "formal" competence acquired during the university training course, the competence developed with the

experience "in the field" and the competence evaluated by the manager (24). Competence assessments often focus on specific contexts or specific competencies, and this raises the issue of what is really assessed in nursing practice (25, 26).

Over the years, numerous tools have been developed to assess nursing competence holistically in different clinical settings (27); one of the most used scales is the Nurse Competence Scale (NCS) developed by Meretoja in 2004 (28). The NCS is a tool for defining competence, integrating knowledge, skills, attitudes, and values in specific contexts (29). The scale is based on the conceptual model of Patricia Benner and its theoretical categories, developed in 1984 (30) "From Novice to Expert" and although it was developed to evaluate nursing competencies in specialized care settings, nevertheless there are clear indications for its use in different contexts both to assess the competencies of students, than nurses during their work experience (31).

The NCS measures the clinical competence of nurses defined as functional adequacy and ability to integrate knowledge, skills, attitudes, and values in specific situations. It was developed to overcome the shortage of competencies measurement tools, the lack of a strong theoretical background and a rigorous psychometric assessment (28). Used for some time at international level, the NCS was validated in Italy in 2009 (32).

The aims of the work to assess the competencies of surgical area and critical area nurses using the Italian version Nurse Competence Scale (I-NCS) in a hospital in Northern Italy. Our study aims to: 1) Self-assess the competencies of surgical area and critical area nurses. 2) Compare the competencies of such nurses in relation to the area to which they belong.

Materials and methods

Design and sample

A cross-sectional design was used to obtain data from registered nurses at a single time-point. The sample of this cross-sectional study was enrolled with a sample of convenience, composed of registered nurses

(n = 82) on duty between the surgical area, and critical area of the Friuli Western Health Authority. The socio-demographic characteristics of the nurses who participated in the study were detected, and the degree of job satisfaction was also investigated.

Inclusion and exclusion criteria

The nurses included in our study were those who provided direct care, while non-nursing staff and nurses with administrative or organizational functions (e.g., nursing coordinators, nursing managers, etc.) were excluded from the study, because they did not provide direct assistance to patients.

Instrument

The tool used was the Italian Nurse Competence Scale (I-NCS), validated in Italy in 2018 (33), a tool for self-assessment of nursing competencies in the clinical area. The choice of the Italian version of the NCS is because it is the only tool to measure nursing competencies translated into Italian and can be easily administered. The level of competence of nurses is measured with a VAS scale (from 0 to 100), with the two extremes indicating with the “0” a very low level of competence and with “100” a very high level. The scale is divided into four parts, which indicate the different levels of clinical competence of nurses (low from 0 to 25; quite good >25=50; good >50=75; very good >75=100). For each item, respondents are also asked to indicate how often individual skills are used in clinical practice.

To this end, the frequency with which competencies are used was measured through a four-point Likert scale, from “0” performance never performed to “3” performance performed frequently or often. The I-NCS consists of 58 items divided into seven dimensions and represents an appropriate tool to describe and compare the competencies self-assessed by nurses, thus helping to improve the quality of care in clinical environments (33).

The seven dimensions of the tool are: Use of research (12 items), Professional awareness (5 items), Ethical values (7 items), Preceptor functions (5 items), Professional leadership (9 items), Educational

interventions (11 items), Management of the care process (9 items).

Data collection

In the period immediately preceding the data collection, a meeting was held with each nursing coordinator in which both the purpose of the study and the tool were presented, with the aim of improving the level of adherence to the survey. I-NCS was administered in the period between October and November 2020; each paper copy of the I-NCS, together with the informed consent and the anonymous personal data sheet, was delivered to the nursing coordinator, who then distributed the material to the staff included in the study and interested in participating in this survey. The documentation was subsequently delivered in a sealed envelope and the consents were collected separately.

Data analysis

The data were entered into a database using the Excel application and then processed with the statistical software SPSS 25.0. A descriptive statistical analysis was conducted; specifically, for the categorical variables the absolute frequencies (N) and relative frequencies have been reported, while for the quantitative variables the position and dispersion indices have been reported. The comparison between the averages of the I-NCS scores between subgroups was carried out using student's t statistical test for data not paired with 2 tails, to analyse the differences in the competence scores by the demographic and work-related characteristics, considering as statistically significant a p-value <0.05.

Ethical consideration

The researcher explained the purpose of the study to nurses. To avoid coercion, the researcher informed the participants that they were volunteers and that they have the right to withdraw from this study at any time. The verbal and informed consent signatures were obtained by a researcher from the nurses included in the study, and their signature was affixed prior to the

administration of the questionnaire and its subsequent evaluation. Informed consent was obtained from all participants in this study. The study was not examined and approved by the Ethics Committee as, based on the type of study, it is not required by Italian legislation regarding studies that do not involve a clinical trial directly on patients and that do not involve a trial of a specific drug. All the material relating to this study was kept by a researcher.

Results

Descriptive characteristics of the sample

85 questionnaires were collected, three of which were excluded because they were incomplete. The response rate was 96.48%. The analysis was conducted on a sample consisting of 82 nurses who expressed consent to the study and who returned the questionnaire completely 82.9% of the sample was female, 52.4% was aged between 31 - 50 years and 36.6% of the sample had been in service for more than 10 years (Table 1).

The levels of competence for each class and the frequency with which the items are applied in clinical practice, 64.6% of the sample declared to have a "good" level of competence; while as regards the frequency in clinical practice of skills, most of the sample declared that they use them, 43.8% use skills in practice "occasionally", while only 34.3% use them "very often" (Table 2).

Analysing the data in relation to the variable age and the variable year of service shows that as the years of service and age increase, the perceived level of competence increases (64.4 vs 70.1), except for the class from 4 to 6 years in which there is a higher level of competence than the next class (VAS 75.4) Table 3.

Data analysis based on the context of belonging - Surgical area

The number of nurses who have fully responded to the I-NCS and who belong to the Surgical Area is 41, equal to 50% of the sample. The average age is 37.6 years, the average of the years of service of settles on 10.7 years; 92.7% of the sample are female, the most

represented age group is that between 20 and 30 with 34.1%. Most of the sample (68.2%) has no previous experience or has worked in the medical area and reports a university-type education, 78% have obtained a bachelor's degree. 82.9% have no post-basic training, the rest have obtained a first-level master's degree or master's degree (Table 1).

For nurses (n =41) in the surgical area the competencies were applied in clinical practice "occasionally" or "very often" in 47.1% and 28.9% respectively (Table 2). Nurses reported a good level of competence with an overall average of 67.0. Analysing the various dimensions, the areas in which nurses most apply the competencies described in the I-NCS are in *professional awareness* (VAS 75.3) and management of the care process (VAS 76.0); *educational interventions* (VAS 65.5) and use of *research* (VAS 58.8) have been reported as the categories with the lowest competence use (Table 3).

Analysing the years of service grouped according to Benner's theoretical model, a non-linear growth in the level of self-perceived competence emerges, in fact in the range between 1 and 2 years the average level of competence is 59.6, in the range between 3 years and 5 the average self-perception is 76.1 and for nurses with more than 5 years of service it is 68.9 (Table 4).

The dimensions that scored the highest were *care process management* (VAS 76.0) and *professional awareness* (VAS 75.3), while the dimension with the lowest average score was that relating to *using research* (VAS 58.8) (Table 5).

The item with the highest and lowest competence levels for each dimension of the I-NCS was then identified. For D1 the items with minor and major VAS were to *pose problems to be deepened with research* (VAS 47.6) and *recognize the support and help needs of colleagues* (VAS 70), for D2 *coordinate with the members of the team on the distribution of care activities* (VAS 74) and *demonstrate responsibility in the use of resources avoiding waste* (VAS 78), for D3 *use the results of the research in taking care of patients* (VAS 56.9) and *modify the care plan with reference to the needs of the individual patient* (VAS 73.4), for D4 *help develop induction paths in the operative unit for newly hired nurses* (VAS 55.7) and *support new hires* (VAS 64.6), for D5 *implement strategies to avoid excessive stress* (VAS 60.8) and *act autonomously* (VAS 80.5), for D6 *ascertain the psychological needs of family members* (VAS 59.9) and *provide the patient with*

Table 1. Socio-demographic variables of nurses working in the Surgical and the Critical Area.

		Total (n=82)		Surgical Area (n=41)		Critical Area (n=41)	
		N	%	N	%	N	%
Gender	F	68	82.9%	38	92.7%	30	73.2%
	M	14	17.1%	3	7.3%	11	26.8%
Age Classes	20-30	25	30.5%	14	34.1%	11	26.8%
	31-40	21	25.6%	11	26.8%	10	24.4%
	41-50	22	26.8%	8	19.5%	14	34.1%
	>50	14	17.1%	8	19.5%	6	14.6%
Department	Surgical Area	41	50.0%				
	Critical Area	41	50.0%				
Years of service	Less than a year	9	11.0%	6	14.6%	3	7.3%
	1-3 years	21	25.6%	10	24.4%	11	26.8%
	4-6 years	11	13.4%	5	12.2%	6	14.6%
	7-10 years	11	13.4%	5	12.2%	6	14.6%
	>10 years	30	36.6%	15	36.6%	15	36.6%
Previous experience	None	19	23.2%	14	34.1%	5	12.2%
	Medical Area	32	39.0%	14	34.1%	18	43.9%
	Surgical Area	8	9.8%	8	19.5%		
	Critical Area	10	12.2%			10	24.4%
	Maternal and Child Area	1	1.2%	1	2.4%	4	9.8%
	Territorial Area	4	4.9%			4	9.8%
	Other	8	9.8%	4	9.8%		
Basic Education	Bachelor's degree	56	68.3%	32	78.0%	25	61.0%
	Professional diploma	26	31.7%	9	22.0%	16	39.0%
Post-Basic Training	Master's Degree	9	10.9%	4	9.8%	5	12.2%
	Master (other)	9	11.0%	3	7.3%	6	14.6%
	No Training	64	78.1%	34	82.9%	30	73.2%
I like the Operating Unit	Yes	77	93.9%	37	90.2%	40	97.6%
	No	5	6.1%	4	9.8%	1	2.4%
Where I would like to work	In this operating unit	57	70%	22	53.7%	35	85.4%
	In another operating unit	5	6.1%	3	7.3%	2	4.9%
	In the medical area	3	3.7%	3	7.3%		
	In the surgical area	1	1.2%	2	4.9%		
	In critical area	10	12.2%	10	24.4%	1	2.4%
	In the territorial area	3	3.7%	1	2.4%	3	7.3%
	More choices	3	3.6%				

personalized educational interventions (VAS 70) and for D7 cooperate showing flexibility in rapidly changing situations (VAS 69.3) and coordinating their care activities with those of other members of the nursing team

(VAS 79.1). The absolute item with the lowest VAS average was to pose problems to be investigated with research (VAS 47.6) and the item with the highest VAS is average was to act autonomously (80.5) (Table 6).

Table 2. Overall average level of competence and average level of application of the activity in clinical practice (n=82).

Overall average competence level		Application competencies in clinical practice		Critical Area (n=41)	Surgical Area (n=41)
Low	0.0%	Never	3.6%	3.6%	3.6%
Pretty good	6.1%	Rarely	18.3%	16.2%	20.4%
Good	64.6%	Occasionally	43.8%	40.5%	47.1%
Very good	29.3%	Very often	34.3%	39.7%	28.9%

Table 3. Age and years of service divided into classes and perceived level of competence.

Age	Mean VAS	Years of Service	Mean VAS
21 – 30	66.8	<1 – 3	64.4
31 – 40	69.3	4 – 6	75.4
41 – 50	70.1	7 – 10	67.6
> 51	71.8	> 10	70.1

Table 4. Years of service and VAS media divided according to the theoretical model of Benner relating to the employees of the Surgical and Critical Area.

Years of service	Surgical Area (n=41)			Critical Area (n=41)			Total (n=82)		
	N	%	Mean VAS	N	%	Mean VAS	N	%	Mean VAS
> to 1 year	9	22%	61.7	4	10%	58.6	13	16%	60.8
> 1 year to 2 years	4	10%	63.5	7	17%	73.3	11	13%	68.3
> 2 years up to 3 years	3	7%	66.7	3	7%	63.7	6	7%	65.2
> to 3 years up to 5 years	3	7%	76.1	6	15%	75.3	9	11%	75.6
> 5 years	22	54%	68.6	21	51%	72.8	43	52%	70.7

Table 5. Average VAS competence level relative to each section and calculated on average on a sample of 41 subjects belonging to the Surgical and Critical Area.

INCS Dimensions	Surgical Area (n=41)	Critical Area (n=41)	Total Mean (n=82)
D1 - Using Research	58.8	62.5	60.4
D2 - Professional awareness	75.3	79.9	77.8
D3 - Ethical values	65.0	71.5	68.2
D4 - Tutoring functions	59.7	61.1	60.4
D5 - Professional leadership	68.8	74.1	71.5
D6 - Educational interventions	65.5	66.5	66.3
D7 - Management of the care process	76.0	82.0	78.8

Data analysis based on the context of belonging – critical area

The number of nurses who have fully responded to the I-NCS and who belong to the Critical Area is

41, equal to 50% of the sample. The median age was 39.8 years and the average of the years of service was 10.3 years (Table 1).

The socio-demographic variables, 73.2% of the sample was female, the most represented age group

Table 6. Items with higher and lower levels of competence related to the Surgical Area.

I-NCS Dimensions	Items with a lower average level of competence	Mean VAS	Items with higher average level of competence	Mean VAS
Using Research	“Posing problems to be deepened with research”	47.6	“Recognize the support and help needs of colleagues”	70.0
Professional awareness	“Coordinate with team members on the distribution of care activities”	74.0	“Demonstrate responsibility in the use of resources avoiding waste”	78,0
Ethical values	“Using research results in patient care”	56.9	“Modify the care plan in reference to the needs of the individual patient”	73.4
Preceptor functions	“Contribute to developing pathways of insertion in the operating unit for newly hired nurses”	55.7	“Supporting new hires”	64.6
Professional leadership	“Put in place strategies to avoid excessive stress”	60.8	“Acting autonomously”	80.5
Educational interventions	“Ascertaining the psychological needs of family members”	59.9	“Provide the patient with personalized educational interventions”	70.0
Management of the care process	“Cooperate. showing flexibility. in rapidly changing situations”	69.3	“Coordinate their care activities with those of the other members of the nursing team”	79.1

is that between 41 and 50 years with 34.1%. Most of the sample (43.9%) have previous experience in the medical area, 24.4% in another critical area and only 12.2% have no previous experience. 73.2% have no post-graduate education, the remaining 26.8% have obtained a master's degree (14.6%) or master's degree (12.2%) (Table 1).

Competencies were applied “occasionally” or “very often” in 40.5% and 39.7% respectively. Analysing the various dimensions, the areas in which nurses most apply the competencies described in the I-NCS are the role of help and education competencies; ensuring quality was the category with the lowest frequency of use of competencies (Table 2).

Analysing the years of service grouped according to the theoretical model of Benner it emerges that in the range between 1 and 2 years the average level of competence is 73.3, in the range between 3 and 5 years the average self-perceived is 75.3 and for nurses with more than 5 years of service is 72.8 (Table 4).

The overall I-NCS average of all items was VAS 71.1. The dimensions that scored the highest were *care process management* (VAS 82) and *professional awareness* (VAS 79.9), while the dimension with the lowest

average score was that relating to *tutoring functions* (VAS 61.1) (Table 5).

The item with the highest and lowest skill levels for each dimension of the I-NCS was then identified. For D1, the items with minor and major VAS were *used to help develop multidisciplinary diagnostic-therapeutic pathways* (VAS 50.7) and to *provide quality care based on the possession of in-depth knowledge* (VAS 73.9), for D2 *recognize identity profession as a resource for the nursing profession* (VAS 76.2) and *be aware of one's limitations* (VAS 83.4), for D3 *use the results of the research in patient management* (VAS 62.9) and *plan nursing care with reference to the needs of the individual patient* (VAS 79.7), for D4 *follow the students present in the operative unit with tutoring activities* (VAS 59.2) and *supporting nursing students in achieving the training objectives* (VAS 65), for D5 *giving constructive feedback regarding the activity of colleagues* (VAS 66.4) and *acting autonomously* (VAS 81.1), for D6 *evaluate with family members the results of educational interventions aimed at the patient* (VAS 57.5) and *recognize the patient's health education needs* (VAS 71.5) and for D7 *cooperate showing flexibility in rapidly changing situations* (VAS 77.9) and *early recognition of life-critical situations* (VAS 85.8).

Table 7. Items with higher and lower levels of competence related to the Critical Area.

I-NCS Dimensions	Items with a lower average level of competence	Mean VAS	Items with higher average level of competence	Mean VAS
Using Research	“Contribute to the development of multidisciplinary diagnostic-therapeutic pathways”	50.7	“Provide quality care based on the possession of in-depth knowledge”	73.9
Professional awareness	“Recognize professional identity as a resource for the nursing profession”	76.2	“Be aware of your limits”	83.4
Ethical values	“Using research results in patient care”	62.9	“Planning nursing care in reference to the needs of the individual patient”	79.7
Preceptor functions	“Follow the students present in the operating unit with tutoring activities”	59.2	“Support nursing students in achieving educational objectives”	65.0
Professional leadership	“Give constructive feedback regarding the activity of colleagues”	66.4	“Acting autonomously”	81.1
Educational interventions	“Evaluate with family members the results of educational interventions aimed at the patient”	57.5	“Recognizing patients’ health education needs”	71.5
Management of the care process	“Cooperate. showing flexibility. in rapidly changing situations”	77.9	“Recognize early critical situations for the patient’s life”	85.8

The absolute item with the lowest VAS mean was to *help develop multidisciplinary diagnostic-therapeutic pathways* (VAS 50.7) and the item with the highest VAS mean was the *early recognition of critical situations for the patient’s life* (VAS 85.8) (Table 7).

A comparison was made between the two clinical areas (Surgical and Critical) in terms of the average score for the different dimensions of the INCS. The difference in score was statistically significant (p-value less than 0.05) for dimension 3, 5 and 7 of the INCS, respectively “Ethical Values” = p-value 0.033; “Professional leadership” = p-value 0.044; “Management of the care process” = p-value 0.019 (Table 8).

Discussion

The results of our study show that nurses consider their level of competence to be good with an average scale value (VAS 68.7). Specifically, in Critical Area the average was VAS 71.1. Therefore, our study is in line with the results obtained in the Italian study by Colagrossi et al. (VAS 71.5) (34) and, higher than that

Table 8. Results of p-value for each section between the comparison of the Surgical and Critical Area in terms of average score for the different sections of the I-NCS.

I-NCS Dimensions	p-value
D1 - Using Search	0.275
D2 - Professional awareness	0.159
D3 - Ethical values	0.033
D4 - Preceptor functions	0.791
D5 - Professional leadership	0.044
D6 - Educational interventions	0.728
D7 - Management of the care process	0.019

of the results obtained in the Finnish study (VAS 56) (35) and, also in that of Sponton et al. (VAS between 50 and 75) (36).

Compared to the research by Salonen et al. (35) the perceived level of competence does not increase linearly with increasing years of service and in both subgroups the average VAS drops after 5 years, this could indicate that there are other factors that influence the development of competencies. There are probably other variables that should be investigated

that affect the self-perception of competence, for example the workload and the number of nurses per shift require staff to train faster and therefore they themselves feel more competent.

Experience is significant in competencies development, as shown by the results obtained in line with other international studies (10, 13) which indicate professional experience and age as a factor that affects the development of competencies. About the relationship between perceived competencies and the different training paths, the data obtained show a discrepancy between the results of our study with those obtained from Finnish research, in which the self-assessment of the level of competence does not differ between nurses with a different qualification. While it is in line with the results that emerged from the study of Colagrossi et al. (6) in 2012 (34). This leads to say that, based on the results obtained, the development of advanced competencies through post-basic university training courses provides nurses with greater competence in clinical activities; but in perception what affects the most is the work experience.

The results obtained are however in line with other studies in the literature that show conflicting results with respect to the effect that different types of vocational training have on nursing competencies (37).

Our study showed that the Critical Area showed higher scores in all dimensions than in the Surgical area. In fact, nurses considered themselves more competent in skills on care management, awareness, and professional leadership, while the areas that found the lowest scores were the use of research, preceptor functions and educational interventions. The interpretation of this result could be consistent with the hospital context analysed as the high intensity of care and the short stay reflect the great complexity, linked to high-risk patients who require timely care responses.

From the results related to individual competencies, nurses consider themselves more competent in acting appropriately, independently, recognizing their limitations, showing flexibility in different situations, and providing ethical assistance, even if not very personalized. This seems to confirm the importance of combining ethics and values, reflective practice, context-specific knowledge, and skills as competent

performance elements as evidenced by some authors such as Meretoja (2015), Bartlett et al. (2000), Scholes et al. (2018), and Istomina (2011) (29, 37-39). Nurses seem to consider themselves less competent in assessing outcomes following educational interventions on the patient, in using the results derived from research and in contributing to the continuous development of patient care.

The analysis carried out in the two areas confirms the results, with good levels of perceived competence but with room for improvement. Higher levels of competence emerged in the intensive and semi-intensive area, this could be linked to the different organizational model analysed used in these contexts, specifically in the intensive and semi-intensive area they adopt a model for small teams, while in the surgical area for tasks.

These differences emerge more clearly in the "*Use of research and management*" and in the "*Ethical values*", in which in Surgical Area we find lower levels of competence than in Critical Area; this could also be attributable to the organizational model used. In inpatient wards, care is organized according to a task model, which allows the organization to respond to the patient's standard needs; however, it does not allow the overall taking charge of the patient; from the results that emerged it can be deduced that this model still allows to develop competencies in the management of the care process in its entirety.

The two subgroups showed overlapping results in "*Educational Interventions*", with good but improvable levels of competence. In this dimension there are important *competencies* that concern the educational process of the patient and his family members. Educational competence is very difficult to develop in the hospital environment, the results that emerged seem to confirm that care models that do not favour personalization (such as models for tasks) limit the exercise of educational competence and the use of EBNs. In this dimension nurses consider themselves less competent in planning, monitoring outcomes and using EBN research; these results are consistent with the data obtained in dimension the "*Use of research and management*". In addition, the data that emerged seem to show how the training intervention for the development of competence is attributable not only to the

clinical aspect of taking charge, but also to the area of research and training.

The results of our study show that the staff is motivated, the level of competence is good and overall nurses like the operative unit where they work. In general, the correlation between age and duration of work experience and the overall level of self-assessed competence seems to be positive; this result is encouraging and highlights that nurses increase their levels of competence as their professional experience increases, thus promoting professional development during services and working life.

Conclusions and future implications

The strength of our study lies in the fact that it confirms Benner's theory that experience plays a fundamental role in the development of clinical nursing competencies. However, there are other factors that affect the development of competencies, which should be investigated.

In addition, our study is one of the few that compares the nursing competencies of the surgical area and critical area, this poses new perspectives in the educational development of nurses. A limit was also the administration of the questionnaire in this pandemic period, many nurses did not want to participate precisely because of this situation not having time available; therefore, we would probably have had a better response rate if the questionnaire was administered in another period.

The results showed that nurses perceive a good level of competence with differences related to the care settings under study. In the Critical Area the scores are higher than in the Surgical Area in all dimensions of the scale. Nurses feel more competent in care process management and professional leadership, while the areas with lower scores relate to research usage, preceptor functions, and educational interventions.

The overall results show that nurses are motivated, the level of competence is good and the operative unit where they work like it. The competencies found to be more lacking could depend on organizational reasons on which the Directorate of Health Professions could act, for example, with structured paths of insertion of

the new employee and with human resources management policies based on professional development.

Defining the competence of health professionals is one of the fundamental scientific constructs to determine and refine the training processes in progress, which must be activated for a quality health response and in step with new scientific discoveries, this is because we must always try to understand how the acquisition of knowledge translates or is transformed into understanding competencies, of action and choice on the part of the subjects involved and as such the result of the training process, it is transformed into knowledge and skills, that is, in their own ability not only to act in reality but also, and above all, to interpret it and interact with it.

This can provide nurses with the opportunity to reflect on their behaviours and assess their knowledge and skills periodically, to promote professional development and continuing education. In addition, it can be useful for healthcare organizations to identify the skills needed for excellent nursing performance.

For this reason, the systematic use in practice of a nursing competencies self-assessment tool, such as the questionnaire I-NCS, improves the process of analysing training needs and facilitates the development of essential nursing skills for staff. In this way, important information can be obtained on evidence-based competence profiles and specific context, which provide valuable help in structuring staff development interventions that aim to ensure a high quality of patient care.

The results obtained from the study, therefore, can be used as a basis for defining research studies and training and work paths, including local ones, which aim at the growth of professionals. In this way, the areas of expertise that need to be valued or that are already a professional added value can be identified, also considering those factors sociodemographic that directly affect the perception of the level of competence.

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References

- Kemppainen V, Tossavainen K, Turunen H. Nurses' roles in health promotion practice: an integrative review. *Health Promot Int.* Dec 2013;28(4):490-501.
- Yaqoob Mohammed Al Jabri F, Kvist T, Azimirad M, Turunen H. A systematic review of healthcare professionals' core competency instruments. *Nurs Health Sci.* Mar 2021;23(1):87-102.
- Aqtash S, Robb WF, Hunter LH, Almuhtasib M, Hamad A, Brownie SM. Self-Assessed Competence of Experienced Expatriate Nurses in a Rural and Remote Setting. *SAGE Open Nurs.* 2017;3:1-7
- Karami A, Farokhzadian J, Foroughameri G. Nurses' professional competency and organizational commitment: Is it important for human resource management? *PLoS One.* 2017;12(11):e0187863.
- Batt AM, Tavares W, Williams B. The development of competency frameworks in healthcare professions: a scoping review. *Adv Health Sci Educ Theory Pract.* 2020/10/01 2020;25(4):913-987.
- Coster S, Watkins M, Norman IJ. What is the impact of professional nursing on patients' outcomes globally? An overview of research evidence. *Int J Nurs Stud.* Feb 2018;78:76-83.
- Moradi Y, Ahmadi F, Sadeghi A, Oshvandi K. Conceptualizing and determining core clinical competencies in nursing students: a qualitative study. *Int Nurs Rev.* Dec 2019;66(4):530-540.
- Numminen O, Ruoppa E, Leino-Kilpi H, Isoaho H, Hupli M, Meretoja R. Practice environment and its association with professional competence and work-related factors: perception of newly graduated nurses. *J Nurs Manag.* Jan 2016;24(1):E1-e11.
- Fitzgerald A. Professional identity: A concept analysis. *Nurs Forum.* Jul 2020;55(3):447-472.
- Faraji A, Karimi M, Azizi SM, Janatolmakan M, Khatony A. Evaluation of clinical competence and its related factors among ICU nurses in Kermanshah-Iran: A cross-sectional study. *Int J Nurs Sci.* Oct 10 2019;6(4):421-425.
- Feo R, Kitson A, Conroy T. How fundamental aspects of nursing care are defined in the literature: A scoping review. *J Clin Nurs.* Jun 2018;27(11-12):2189-2229.
- Alreshidi NM, Alaseeri R, Garcia M. Factors Influencing Absenteeism among Nursing Staff in the Primary Health Care Centers in Hail: A Preliminary Study for Enhancing Staff Commitment. *Health Sci J.* 2019;13:(3:658)1-7
- Rizany I, Hariyati RTS, Handayani H. Factors that affect the development of nurses' competencies: a systematic review. *Enferm Clin.* 2018;28:154-157.
- Kahya E, Oral N. Measurement of clinical nurse performance: Developing a tool including contextual items. *J Nurs Educ Pract.* 2018;8(6):112-123
- Jeon Y, Lakanmaa RL, Meretoja R, Leino-Kilpi H. Competence Assessment Instruments in Perianesthesia Nursing Care: A Scoping Review of the Literature. *J Perianesth Nurs.* Dec 2017;32(6):542-556.
- Jarvinen T, Virtanen H, Kajander-Unkuri S, Salminen L. Nurse educators' perceptions of factors related to the competence of graduating nursing students. *Nurse Educ Today.* Jun 2021;101:104884.
- Dolezel J, Zelenikova R, Finotto S, et al. Core Evidence-Based Practice Competencies and Learning Outcomes for European Nurses: Consensus Statements. *Worldviews Evid Based Nurs.* Jun 2021;18(3):226-233.
- Fulton JS, Mayo A, Walker J, Urden LD. Description of work processes used by clinical nurse specialists to improve patient outcomes. *Nurs Outlook.* Sep - Oct 2019;67(5): 511-522.
- Benner P. From Novice to Expert. *Am J Nurs.* 1982;82
- Smith LMK, M.; Turkelson, C.; Yorke, A. M.; Sachs, B.; Berg, K. Simulated Interprofessional Education Discharge Planning Meeting to Improve Skills Necessary for Effective Interprofessional Practice. *Prof Case Manag.* Mar/Apr 2018;23(2):75-83.
- Smith LM, Keiser M, Turkelson C, Yorke AM, Sachs B, Berg K. Simulated Interprofessional Education Discharge Planning Meeting to Improve Skills Necessary for Effective Interprofessional Practice. *Prof Case Manag.* Mar/Apr 2018;23(2):75-83.
- Kajander-Unkuri S, Meretoja R, Katajisto J, Leino-Kilpi H, Suikkala A. Students' Self-assessed Competence Levels during Nursing Education Continuum – A Cross-sectional Survey. *Int J Nurs Educ Scholarsh.* 2020;17(1)
- Bradshaw T, Blakemore A, Wilson I, Fitzsimmons M, Crawford K, Mairs H. A systematic review of the outcomes of using voice hearing simulation in the education of health care professionals and those in training. *Nurse Educ Today.* Jan 2021;96:104626.
- Paric M, Kaihlanen AM, Heponiemi T, Czabanowska K. Nurse teacher's perceptions on teaching cultural competence to students in Finland: a descriptive qualitative study. *Nurse Educ Today.* Apr 2021;99:104787.
- Jangland E, Teodorsson T, Molander K, Muntlin Athlin A. Inadequate environment, resources and values lead to missed nursing care: A focused ethnographic study on the surgical ward using the Fundamentals of Care framework. *J Clin Nurs.* Jun 2018;27(11-12):2311-2321.
- Lejonqvist G-B, Kajander-Unkuri S. Evaluating nursing competence with the Nurse Competence Scale from an ontological and contextual point of view: An integrative literature review. *Nord J Nurs Res.* 2021;
- Immonen K, Oikarainen A, Tomietto M, et al. Assessment of nursing students' competence in clinical practice: A systematic review of reviews. *Int J Nurs Stud.* Dec 2019; 100:103414.

28. Meretoja R, Isoaho H, Leino-Kilpi H. Nurse competence scale: development and psychometric testing. *J Adv Nurs*. Jul 2004;47(2):124-33.
29. Meretoja, Riitta, et al. Nurse competence between three generational nurse cohorts: A cross-sectional study. *J Clin Nurs*. 2015, 21.4: 350-358.
30. Benner P. From novice to expert: Excellence and power in clinical nursing practice. *Am J Nurs*. 1984;84(12):1480.
31. Flinkman M, Leino-Kilpi H, Numminen O, Jeon Y, Kuokkanen L, Meretoja R. Nurse Competence Scale: a systematic and psychometric review. *J Adv Nurs*. May 2017;73(5):1035-1050.
32. Dellai M, Mortari L, Meretoja R. Self-assessment of nursing competencies--validation of the Finnish NCS instrument with Italian nurses. *Scand J Caring Sci*. Dec 2009;23(4):783-91.
33. Notarnicola I, Stievano A, De Jesus Barbarosa MR, et al. Nurse Competence Scale: psychometric assessment in the Italian context. *Ann Ig*. Nov-Dec 2018;30(6):458-469.
34. Colagrossi R, Venturini G, Esposito G, Sili A, Alvaro R. The self-assessment of clinical nursing competencies in the Critical Area. Scenario. 2012;
35. Salonen AH, Kaunonen M, Meretoja R, Tarkka MT. Competence profiles of recently registered nurses working in intensive and emergency settings. *J Nurs Manag*. Nov 2007;15(8):792-800.
36. Sponton A, Zoppini L, Iadeluca A, Angeli C, Caldarulo T. Mappare le competenze infermieristiche per lo sviluppo organizzativo: utilizzo della Nursing Competence Scale. 2013;
37. Bartlett HP, Simonite V, Westcott E, Taylor HR. A comparison of the nursing competence of graduates and diplomates from UK nursing programmes. *J Clin Nurs*. May 2000;9(3):369-79.
38. Scholes J, Albarran J, Price A. Editorial Comment: Nursing in Critical Care Journal Survey 2018. *Nurs Crit Care*. 2018 Sep;23(5):225-226.
39. Istomina N, Suominen T, Razbadauskas A, Martinkėnas A, Meretoja R, Leino-Kilpi H. Competence of nurses and factors associated with it. *Medicina (Kaunas)*. 2011; 47(4):230-7.

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