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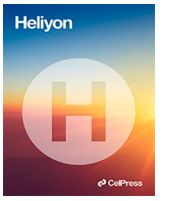

Research article

An example of evaluation of tuning nursing competences in the licensure exam: An observational study

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ABSTRACT

Introduction

The licensure exam in nursing has always focused on the curricula used in universities. 'Tuning' was the first project that sought to harmonize training purposes regarding competences and learning outcomes in Europe. The Tuning educational structures have been offered in various disciplines, including nursing with the development of the Tuning Nursing Project.

The study describes which of 47 Tuning Nursing Competences were evaluated during the licensure exam in nursing degree courses, and what types of trials were used for their assessment.

Methods

A multicentric observational study was conducted in 4 universities in Italy. Data were collected in academic years 2017–2019, using two grids: one for cognitive and one for psychomotor tests.

Results

The Tuning competences were requested 7522 times. The most frequently demanded were those associated with domain number two, "Nursing practice and clinical decision making". The level of performance most required in cognitive tests was the autonomy of judgement, and both tests concerned the fields of non-communicable diseases and the hospitalized adult patient.

Conclusions

The competences most often assessed coincided with those deemed core for the first cycle of studies at the European level. Unfortunately, it has been detected a high degree of discrepancy in the types of tests used in different schools.

1. Introduction

The concept of competence has played a leading role in the international debate in all professions, including nursing [1]. This is

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often coupled with a profound reflection on the competences that nurses have to possess and the methods that allow evaluation of their actual acquisition [2]. The definitions given for the concept of competence are numerous and are all influenced by specific disciplinary and cultural languages [3]. The training debate distinguishes 'competence' from other terms, and, according to the holistic approach, it is characterized by general and contextual attributes, which are considered essential for effective performance [4]. In this line of reasoning, the Bologna Process in Europe, set up in 1999 as an intergovernmental cooperation agreement in the field of higher education, has proposed the adoption of a system of academic qualifications based on 3 comparable training cycles within the European Community [5] through the cooperation of all countries in assessing the quality, transparency and readability of training courses [6].

A first concrete guide to implementing the policies of the Bologna Process is offered by the project 'Tuning Educational Structures in Europe' [7], initiated and financed by the European Commission in 2000. It consists of a methodology to design, develop, and evaluate courses of study according to the new cycle reform) [5]. Specifically, Tuning is a reference for developing useful platforms for academic bodies to improve competences and learning outcomes [7]. For the learning outcomes achieved by the students at the end of a cycle of education (understood as 'Performance Levels'), the Dublin Descriptors are utilized. These descriptors represent enunciation of the learning outcomes and are built on the following elements: knowledge and understanding (knowledge and understanding); applied knowledge and understanding (applying knowledge and understanding), judgement autonomy (making judgements), communication competences (communication competences), and learning competences (learning competences) [8]. The Tuning Educational Structures have been offered in various disciplines, including nursing, with the Tuning Nursing Project [9]. The Tuning Nursing Project offers 47 specific nursing competences divided into five domains: competences associated with professional values and the role of the nurse, nursing practice and clinical decision-making, knowledge and cognitive competences, communication and interpersonal competences (including technology for communication) and leadership, management, and team competences [9].

After implementing the Tuning Project in Europe, the European Federation of Nursing Associations (EFN) has played a key role in applying the latest legislation on specific nursing competencies, contained in EU Directive 2013/55/EU, which has updated that 2005/36/CE [10].

In the updated Directive, the European Federation of Nurses Association has linked the eight competences of article 31 of Directive 2013/55/EC (from A to H) and the six areas of competence (Competency Areas, CA) of the 'EFN Competency Framework, which includes the following categories of competence: CA1 (Cultures, ethics and values), CA2 (Health promotion and prevention, guidance and teaching), CA3 (Decision making), CA 4 (Communication and teamwork), CA5 (Research, development and leadership) e CA6 (Nursing Care. These core competences include, in turn, other sub-competences, which guide the development of learning objectives to be achieved through the contents of the theoretical and practical curriculum. The EFN Competency Framework has been structured taking into account documents existing and developed by the International Council of Nurses (ICN), the World Health Organization (WHO) and the Tuning Project and, like the Tuning, aims to guide the process of acquiring and assessment of nursing competences [10].

2. Background

The Tuning Nursing Project is the first document urging many countries to reform and tune their training courses at the European level. In the United Kingdom, the study reform ended with the complete and articulated acceptance of Tuning competences in nursing study plans [5]. In Italy, scholars have carried out the translation and cultural-linguistic validation of the instrument Tuning Nursing Educational, developed by the European Commission, to harmonize the educational offering of Nursing Degree courses [9,11].

In Italy, the professional licensure exam represents the formal act where the acquired competences are certified and the right of the new professional to be registered and to practice [12,13].

Despite the efforts of the training centres to standardize the content, methods, and times of the final exam in the national territory, this aim is difficult to be attained because there are relevant differences between the various educational programmes in Italian universities and the tests used to assess students' competences. To reach a better comprehension of the situation, the Authors [13] have developed a model to guide nursing evaluators in assessing competences during the final licensure exam about the Tuning Competence Framework. The model is made up of four elements: the first is represented by the 47 core Tuning competences that constitute the content of the test [9]; the second element is represented by the performance concerning the learning outcomes required during the exam and defined by the 5 Dublin Descriptors [8]; the third element is represented by the Clinical Area and the Setting in which the competences investigated are contextualized. The Clinical Area refers to the priority health problems identified in the latest Italian National Health Plan [14]. The Setting refers to the healthcare field in which competences are investigated. Finally, the fourth element consists of the tests used to assess Tuning Competences in cognitive and psychomotor examinations. The types of tests were:"-unstructured" (oral or written discussion of a clinical case, procedures and protocols, open tests, decontextualised practical test); "structured" (closed test) and semi-structured (test on the bed and practical test of a simulated case [15].

Undeniably, if, on the one hand, Authors [16], verified the nursing core competences examined by evaluators in that specific nursing sector for the 3 years, on the other hand, they also proved that there were no studies that investigated whether the same core competences were those evaluated during the licensure exam and the level of performance they were examining at broader level.

The same authors [17] highlighted that the competences assessed seemed to be guided by criteria that responded to the heterogeneous needs of the training schools: the number of students to be evaluated, resources and spaces available, evaluation habits of the individual locations, and preferences of scholars who planned the tests. Also, the times of the examination and the number of tests and questions varied by location. Reasoning on these considerations, this study has aimed to fill a gap in the literature related to investigations that describe which Tuning competences are evaluated and how they are assessed during the licensure exam in the nursing degree.

3. Methods

3.1. Objectives

The main objectives of this study were to:

1) Describe the 47 Tuning competences evaluated during the licensure exam in the nursing degree courses;
2) Determine the levels of performance of these competences;
3) Determine the clinical areas and settings these competences were assessing; and
4) Determine the types of tests utilized for competence evaluation.

3.1.1. Design

A multicentric observational prospective study was conducted.

3.1.2. Sample and setting

Data were collected from the graduation sessions in nursing (2017–2019) of 4 universities in the Lazio Region that comprise 22% (n = 3744) of the 17 394 places available nationally for all Nursing Degrees [18].

This study did not involve patients and did not foresee, in the licensure exam, the direct involvement of the students or interviews with them, as the evaluators limited themselves to observing the types of tests that the students took during the examination of license and recorded the data collected, relating to which competences were investigated during the exam and with which types of tests they were assessed, in the two grids available to them.

In this study, the term "test" has a double meaning; in fact, associated with the word cognitive and psychomotor, it assumes the connotation of an exam that the students must take, while in Section 3 of the data collection grids, it refers to the types of method used for the assessment of cognitive and psychomotor competences, regardless of whether these tests are written or oral.

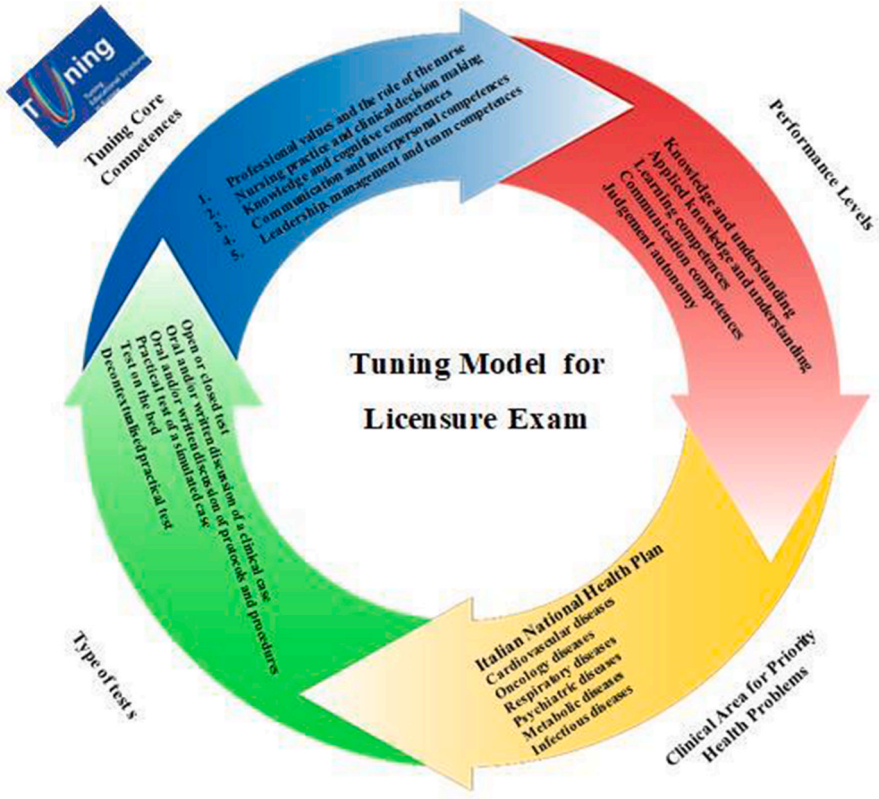

Fig. 1. Tuning Model (Centre of Excellence for Nursing Scholarship, OPI Rome, Italy 2013) https://docplayer.it/2292525-Costruzione-di-un-modello-per-la-valutazione-delle-competenze- infermieristiche-nell-esame-di-abilitazione-professionale.html. Tuning Core Competences: the 47 Tuning Nursing competences divided into 5 domains. Performance Levels: defined by the Dublin Descriptors. Clinical Area for Priority Health Problems: Clinical Area and the Setting, which refers to the reported Priority Health Problems in the latest Italian National Health Plan. Types of tests: tests used for the assessment of the 47 Tuning competences.

Table 1
Tuning nursing specific competences.

1. Competences associated with professional values and the role of the nurse
1. Demonstrates the ability to practise within the context of professional, ethical, regulatory, and legal codes, recognizing and responding to moral/ethical dilemmas and issues in day to day practice.
2. Demonstrates the ability to practise in a holistic, tolerant, non judgmental, caring and sensitive manner, ensuring that the rights, beliefs and wishes of different individuals and groups are not compromised.
3. Demonstrates the ability to educate, facilitate, promote, support, and encourage the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill death, distress, disease, disability or death.
4. Within the scope of his/her professional practice and accountability, demonstrates awareness of the different roles, responsibilities and functions of a nurse.
5. Within the scope of his/her professional practice and accountability, demonstrates the ability to adjust their role to respond effectively to population/patient needs. Where necessary and appropriate is able to challenge current systems to meet population/patient needs.
6. Demonstrates the ability to accept responsibility for his/her own professional development and learning, using evaluation as a way to reflect and improve upon his/her performance so as to enhance the quality of service delivery.
2. Competences: nursing practice and clinical decision making
7. Demonstrates the ability to undertake comprehensive and systematic assessments using the tools/frameworks appropriate to the patient/client considering relevant physical, social, cultural, psychological, spiritual and environmental factors.
8. Demonstrates the ability to undertake an effective risk assessment and take appropriate actions.
9. Demonstrates the ability to recognize and interpret signs of normal and changing health/ill health, distress, or disability in the person (assessment/diagnosis).
10. Demonstrates the ability to respond to patient/client needs by planning, delivering, and evaluating appropriate and individualized programmes of care working in partnership with the patient/client, their carers, families and other health/social workers.
11. Demonstrates the ability to critically question, evaluate, interpret and synthesize a range of information and data sources to facilitate patient choice.
12. Demonstrates the ability to make sound clinical judgments to ensure quality standards are met and practice is evidence-based.
13. Demonstrates the ability to use modern technologies to assess and respond appropriately to patient/client need (for example through telenursing, multimedia, and web resources).
14. Demonstrates the ability to appropriately use a range of nurse skills, medical devices and interventions/activities to provide optimum care.
15. Using nursing skills, medical devices, and interventions/activities to provide optimum care, demonstrates the ability to maintain patient/client dignity, advocacy, and confidentiality.
16. Using nursing skills, medical devices and interventions/activities to provide optimum care, demonstrates the ability to practice principles of health and safety, including moving and handling, infection control; essential first aid and emergency procedures.
17. Using nursing skills, medical devices and interventions/activities to provide optimum care, demonstrates the ability to safely administer medicines and other therapies.
18. Using nursing skills, medical devices and interventions/activities to provide optimum care, demonstrates the ability to consider emotional, physical and personal care needs, including meeting the need for comfort, nutrition, personal hygiene and enabling the person to maintain the activities necessary for daily life.
19. Using nursing skills, medical devices and interventions/activities to provide optimum care, demonstrates the ability to respond to a person's needs throughout the life span and health/illness experience, e.g. pain, life choices, revalidation, invalidity or when dying.
20. Demonstrates the ability to inform, educate and supervise patient/carers and their families.
3. Knowledge and cognitive competences
21. Demonstrates current and relevant knowledge of the theories of nursing and nursing practise that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
22. Demonstrates current and relevant knowledge of theories concerning the nature and challenge of professional practice that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
23. Demonstrates current and relevant knowledge of the natural and life sciences that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
24. Demonstrates current and relevant knowledge of the social, health and behavioural sciences that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
25. Demonstrates current and relevant knowledge of ethical theory, law and humanities that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
26. Demonstrates current and relevant knowledge of technology and health care informatics that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
27. Demonstrates current and relevant knowledge of international and national policies that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
28. Demonstrates current and relevant knowledge of problem solving, decision making and conflict theories that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
29. Demonstrates current and relevant knowledge of theories related to personal and professional development so as to enhance their professional practice.
30. Demonstrates current and relevant knowledge of the research process and current nursing research that can be appropriately applied to nursing actions nursing activities to provide nursing care that is rigorous and evidence-based.
4. Communication and interpersonal competences (including technology for communication)
31. Demonstrates the ability to communicate effectively (including the use of new technologies): with patients, families and social groups, including those with communication difficulties.
32. Demonstrates the ability to enable patients and their carers to express their concerns and worries and can respond appropriately, e.g. emotional, social, psychological, spiritual or physical worries.
33. Demonstrates the ability to appropriately represent the patient/client's perspective and act to prevent abuse.
34. Demonstrates the ability to appropriately use counselling skills to promote patient well being.
35. Demonstrates the ability to identify and manage challenging behaviour (using communication techniques to promote patient well being).
36. Demonstrates the ability to recognize anxiety, stress and depression (using communication techniques to promote patient well being).
37. Demonstrates the ability to give emotional support and identify when specialist counselling or other interventions are needed.
38. Demonstrates the ability to identify and use opportunities for health promotion and health education activities.
39. Demonstrates the ability to accurately report, record, document and refer care using appropriate technologies.
5. Leadership, management and team competences

(*continued on next page*)

Table 1 (*continued*)

40. Demonstrates the ability to realize that patient/client well-being is achieved through the combined resources and actions of all members of the health/social care team.
41. Demonstrates the ability to lead and co-ordinate a team, delegating care appropriately and meaningfully.
42. Demonstrates the ability to work and communicate collaboratively and effectively with other nurses in the best interests of the patient/client.
43. Demonstrates the ability to work and communicate collaboratively and effectively with all support staff to prioritize and manage time effectively while quality standards are met.
44. Demonstrates the ability to assess risk and actively promote the well-being, security and safety of all people in the working environment (including themselves).
45. Demonstrates the ability to critically use tools to evaluate and audit care according to relevant quality standards.
46. Within the clinical context, demonstrates the ability to educate, facilitate, supervise and support nursing students and other health/social care students or workers.
47. Demonstrates an awareness of the principles of health/social care funding and uses resources effectively.

https://www.unideusto.org/tuningeu/competences/specific/nursing.html.5 Domains of 47 Tuning Competences. 1. Competences associated with professional values and the role of the nurse (6 items). 2. Competences associated with nursing practice and clinical decision-making (14 items). 3. Knowledge and cognitive competences (10 items). 4. Communication and interpersonal competences including communication technologies (9 items). 5. Leadership, management, and group dynamics management competences (8 items).

The study was designed, conducted, registered, and reported consistently with the international ethical and scientific quality standards indicated by Good Clinical Practice (GCP) and Standard Operating Procedures (SOP).

The study complies with the Declaration of Helsinki, and it was approved by the Centre of Excellence for Nursing Scholarship OPI (Protocol number 1.17.1.) of Rome, Italy.

All participants were voluntarily involved and fully informed of the study's purpose and participants were also informed of the confidentiality and anonymity of their responses during the data collection and analysis processes. Evaluators expressed written informed consent.

3.1.3. Instruments

Two data collection grids, built according to the four elements of the Tuning Model [13] (Fig. 1), were used during the licensure exam to assess cognitive and psychomotor competences.

Both grids are divided into three sections:

- Section 1 collects information on the training place.
- Section 2 is divided into four subsections (both grids).
- Section 3 collects information on cognitive and psychomotor tests.

Section 1 has no subsections. In Section 2, there are four subsections as follows:

Subsection 1: 'Code of Competence'. In this subsection, it is reported, each time and for each line, which of the 47 competences of the Tuning Nursing Project is investigated during the test. Competences are divided into five domains: (1) competences associated with professional values and the role of the nurse (6 items); (2) competences associated with nursing practice and clinical decision-making (14 items); (3) knowledge and cognitive competences (10 items); (4) communication and interpersonal competences including communication technologies (9 items); and (5) leadership, management, and group dynamics management competences (8 items) [9] (Table 1).

Subsection 2: 'Performance Levels'. In this subsection, the level at which the selected competence is investigated is defined for each type of test. Performance levels refer to the Dublin Descriptors [8,19].

The cognitive test measures three levels of performance: (a) Knowledge; (b) Ability to understand, and (c) Autonomy of judgement.

The psychomotor test measures a single level of performance: Applied knowledge and understanding.

Subsection 3: 'Clinical Area' refers to the clinical area in which each competence is contextualized compared to the priority health problems and provides seven options: a) Cardiovascular diseases, b) Oncology, c) Respiratory, d) Psychiatric, e) Metabolic, f) Infectious, and g) Not specified diseases [14,20].

Subsection 4: 'Setting' defines the area where each competence is examined and provides six options: (a) Adult, (b) Child, (c) Non specified (d) Hospital, (e) Territory and (f) Not specified.

In Section 3, there are three types of tests for cognitive and three for psychomotor abilities. For cognitive competences, we have the following:

- Open or closed test, a questionnaire where, if the answer is open, the student freely expresses their thoughts on the subject of the questions; if it is closed, the student chooses one or more answers among those proposed in the questions of the questionnaire;
- Oral and/or written discussion of a clinical case consists of a care plan of a clinical case and application of the nursing process and critical thinking; and
- Oral and/or written discussion of protocols and procedures that involves discussion of the operational tools needed to standardize nursing care, such as guidelines, protocols, and procedures.

For psychomotor competences, we include:

•Practical test of a simulated case, which evaluates predetermined criteria and the ability of the student to implement nursing procedures via grids and checklists; o Test on the bed consists of evaluating the activities performed by the student on an actual patient and within the work context. The activities are selected based on three criteria: low invasiveness, low risk for patients, and consent; and o Decontextualised practical test, which evaluates the student's technical competences independently by context and clinical case [15] (Figs. 2 and 3).

3.1.4. Data collection

Data were collected in the Rome area by the Nursing Council (OPI) commissioners who were part of the evaluation committee of the professional licensure exam. Before, the commissioners accomplished a specific lifelong learning programme aimed at instructing them on the use of the grids.

3.1.5. Data analysis

Data were analyzed using descriptive statistics. Frequencies and percentages were used to describe the number of times each of the 47 Tuning competences were required, the relative levels of performance, the setting and clinical area in which they were contextualized, and the types of tests most used for their evaluation. Statistical software SPSS version 22.0 (IBM SPSS Inc. 2012, New York) was utilized for data analysis.

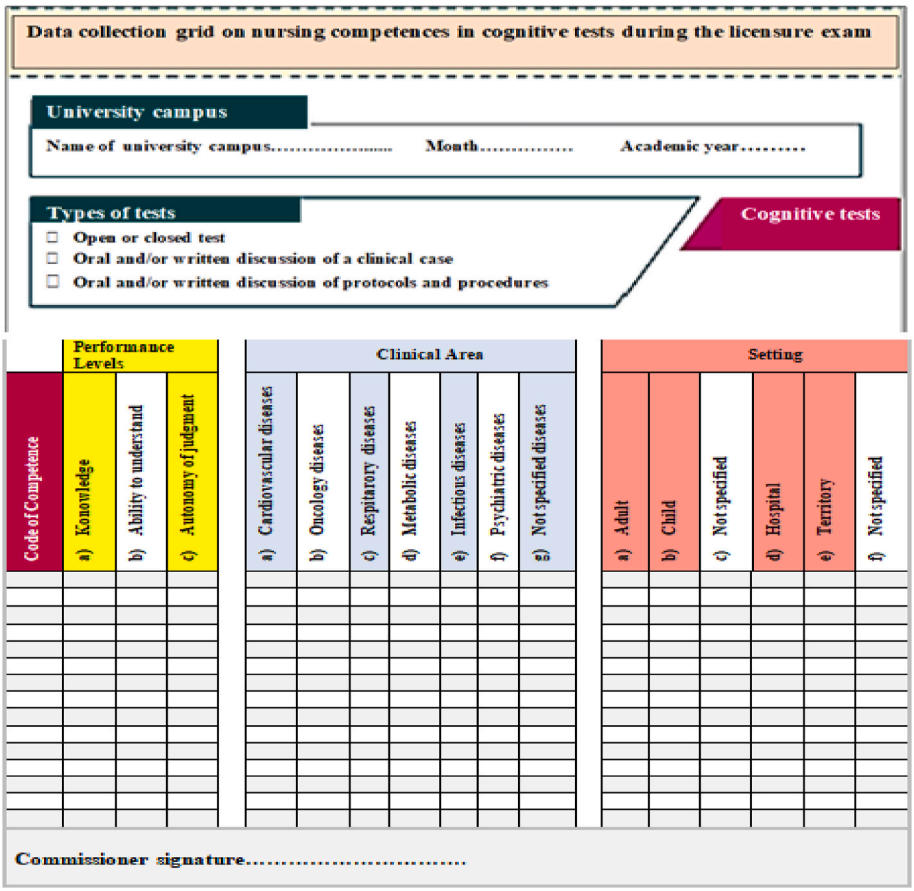

Fig. 2. Grid Cognitive tests (Centre of Excellence for Nursing Scholarship OPI Rome). "Code of Competences", refers to 47 Tuning competences. "Performance Level", refers to the Dublin Descriptors: a) knowledge (ability to memorise notions); b) ability to understand (ability to interpret data, signs and symptoms, needs, and clinical situations in general); and c) autonomy of judgement (ability to solve simple and/or complex problems through the implementation of appropriate actions). 'Clinical Area', refers to Priority Health Problems: (a) cardiovascular diseases, (b) oncology diseases, (c) respiratory diseases, (d) psychiatric diseases, (e) metabolic diseases, (f) infectious diseases, (g) Not specified diseases. 'Setting', defines the area where each competence is investigated: (a) adult, (b) child, (c) Not specified (d) hospital, (e) territory and (f) Not specified. Types of test: Open or closed test (test a questionnaire where, if the answer is open, the student freely expresses his/her thoughts on the subject of the questions; if it is closed, he/she chooses one or more answers among those proposed in the questions of the questionnaire); Oral and/or written discussion of a clinical case (consists of a care plan of a clinical case and application of the nursing process and critical thinking); Oral and/or written discussion of protocols and procedures (involves discussion of the operational tools needed to standardize nursing care, such as guidelines, protocols, and procedures).

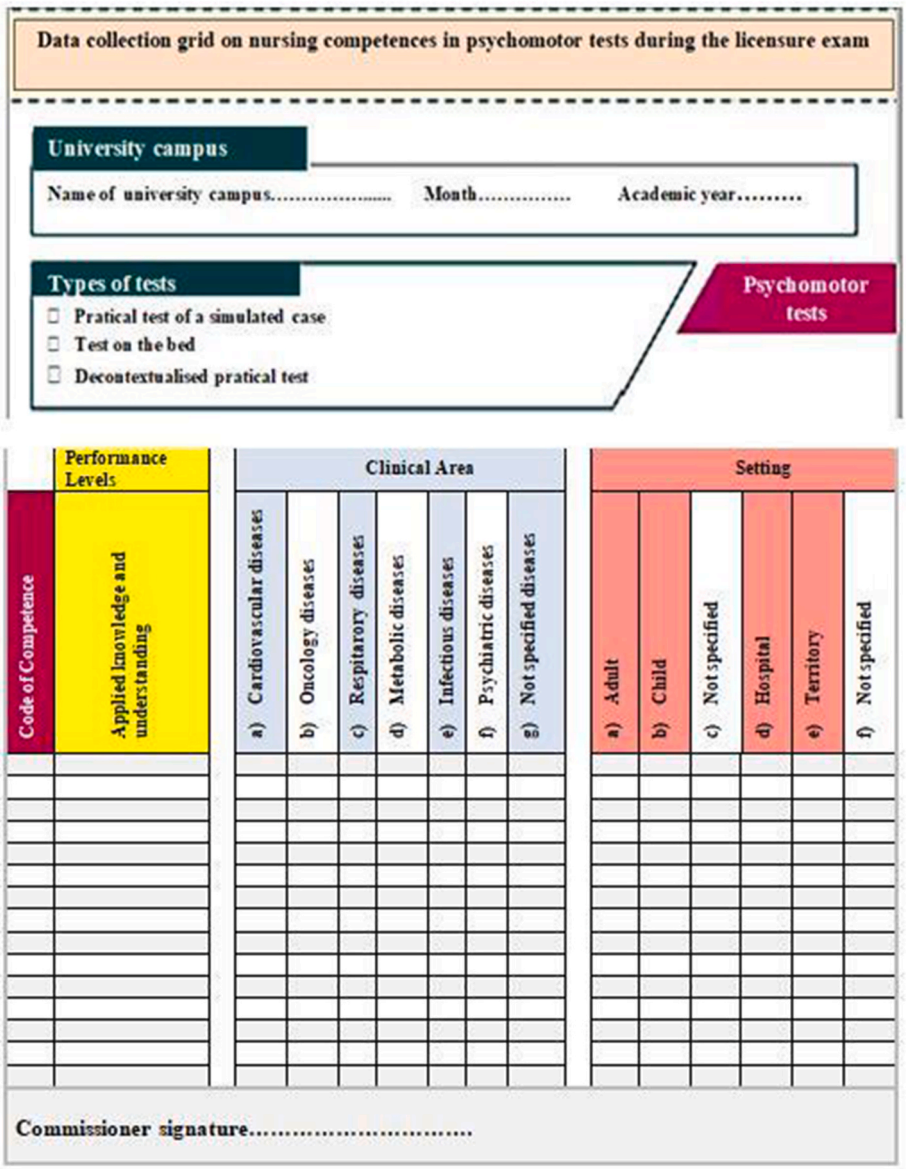

Fig. 3. Grid Psychomotor tests (Centre of Excellence for Nursing Scholarship OPI Rome). "Code of Competences", refer to 47 Tuning competences. "Performance Level", refer to the Dublin Descriptor: applied knowledge and understanding (autonomous, effective, and safe execution of simple procedures and the ability to provide information, communication, and/or a therapeutic relationship). 'Clinical Area', refers to Priority Health Problems: (a) cardiovascular diseases, (b) oncology diseases, (c) respiratory diseases, (d) psychiatric diseases, (e) metabolic diseases, (f) infectious diseases, (g) Not specified diseases. 'Setting', defines the area where each competence is investigated: (a) adult, (b) child, (c) Not specified (d) hospital, (e) territory and (f) Not specified. Types of test: Practical test of a simulated case (evaluates, in reference to predetermined criteria, the ability of the student to implement the nursing procedures via grids and checklists); Test on the bed (consists of evaluation of the activities performed by the student on a real patient and within the work context. The activities are selected on the basis of 3 criteria: low invasiveness, low risk for patients and consent); Decontextualised practical test (evaluates the technical competences of the student independently by context and clinical case).

4. Results

Overall, Tuning competences were requested 7522 times, of which 5130 (68.20%) were requested in cognitive tests and 2392 (31.80%) in psychomotor evaluations.

Regarding the first and second objectives of the study, Table 2 shows in detail the frequencies and percentages of competences required for cognitive and psychomotor tests and their connected performance levels.

In cognitive tests, the most frequently investigated competence was number 14 (n = 645; 12.57%), followed by number 10 (n =

495; 9.65%) and number 9 (n = 479; 9.34%). The three most investigated competences belong to the second domain (competences associated with nursing practice and clinical decision-making).

In contrast, the least-required competence for cognitive tests was number 33 (n = 1; 0.02%), followed by number 29 (n = 2; 0.04%) and number 25 (n = 2; 0.04%). Of the 3 least-investigated competences, numbers 25 and 29 belong to domain 3 and number 33 to domain 4.

In psychomotor tests, the most frequently investigated competence was number 14 (n = 493; 20.61%), followed by number 8 (n = 258; 10.79%) and number 17 (n = 209; 8.74%).

Table 2
Competences and Levels of Performance required in cognitive and psychomotor tests (N = 7522).

	Cognitive tests		Levels of Performance in cognitive tests			Psychomotor tests	
DOMAINS	Competence Code Required	Number of times each competence is required	Autonomy of judgement	Ability to understand	Knowledge	Level of Performance not specified	N of times each competence is required
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1.Competences associated with professional values and the role of the nurse	1	36 (0.70)	8 (22.22)	21 (58.33)	6 (16.67)	1 (2.78)	5 (0.21)
	2	14 (0.27)	7 (50.00)	5 (35.71)	2 (14.29)	0 (0.00)	5 (0.21)
	3	92 (1.79)	43 (46.74)	29 (31.52)	17 (18.48)	3 (3.26)	21 (0.88)
	4	54 (1.05)	17 (31.48)	13 (24.07)	22 (40.74)	2 (3.71)	52 (2.17)
	5	14 (0.27)	10 (71.43)	3 (21.43)	0 (0.00)	1 (7.14)	1 (0.04)
	6	9 (0.18)	5 (55.56)	1 (11.11)	3 (33.33)	0 (0.00)	6 (0.25)
2. Competences: nursing practice and clinical decision making	7	463 (9.03)	243 (52.48)	113 (24.41)	102 (22.03)	5 (1.08)	85 (3.55)
	8	441 (8.60)	259 (58.73)	94 (21.31)	81 (18.37)	7 (1.59)	258 (10.79)
	9	479 (9.34)	245 (51.15)	145 (30.27)	80 (16.70)	9 (1.88)	150 (6.27)
	10	495 (9.65)	309 (62.42)	114 (23.03)	66 (13.34)	6 (1.21)	70 (2.93)
	11	45 (0.88)	32 (71.12)	6 (13.33)	6 (13.33)	1 (2.22)	25 (1.05)
	12	62 (1.21)	37 (59.68)	12 (19.35)	10 (16.13)	3 (4.84)	102 (4.26)
	13	10 (0.19)	3 (30.00)	1 (10.00)	6 (60.00)	0 (0.00)	7 (0.299
	14	645 (12.57)	249 (38.60)	192 (29.77)	200 (31.01)	4 (0.62)	493 (20.61)
	15	72 (1.40)	23 (31.94)	32 (44.45)	12 (16.67)	5 (6.94)	147 (6.15)
	16	380 (7.41)	221 (58.15)	62 (16.32)	91 (23.95)	6 (1.58)	194 (8.11)
	17	400 (7.80)	166 (41.50)	137 (34.25)	93 (23.25)	4 (1.00)	209 (8.74)
	18	236 (4.60)	153 (64.83)	36 (15.25)	43 (18.22)	4 (1.70)	42 (1.76)
	19	68 (1.33)	43 (63.24)	8 (11.76)	13 (19.12)	4 (5.88)	10 (0.42)
	20	175 (3.41)	104 (59.43)	36 (20.57)	30 (17.14)	5 (2.86)	74 (3.09)
3. Knowledge and cognitive competences	21	72 (1.40)	33 (45.83)	22 (30.56)	16 (22.22)	1 (1.39)	31 (1.30)
	22	4 (0.08)	3 (75.00)	0 (0.00)	1 (25.00)	0 (0.00)	2 (0.08)
	23	185 (3.61)	66 (35.68)	54 (29.19)	62 (33.51)	3 (1.62)	76 (3.18)
	24	54 (1.05)	50 (92.60)	1 (1.85)	2 (3.70)	1 (1.85)	2 (0.08)
	25	2 (0.04)	1 (50.00)	1 (50.00)	0 (0.00)	0 (0.00)	1 (0.04)
	26	3 (0.06)	0 (0.00)	1 (33.33)	2 (66.67)	0 (0.00)	0 (0.00)
	27	13 (0.25)	4 (30.77)	1 (7.69)	8 (61.54)	0 (0.00)	54 (2.26)
	28	148 (2.88)	116 (78.37)	10 (6.76)	21 (14.19)	1 (0.68)	58 (2.42)
	29	2 (0.04)	1 (50.00)	0 (0.00)	0 (0.00)	1 (50.00)	8 (0.33)
	30	16 (0.31)	3 (18.75)	7 (43.75)	6 (37.50)	0 (0.00)	26 (1.09)
4. Communication and interpersonal competences (including technology for communication)	31	33 (0.64)	18 (54.55)	13 (39.39)	2 (6.06)	0 (0.00)	10 (0.42)
	32	73 (1.42)	40 (54.79)	22 (30.14)	8 (10.96)	3 (4.11)	19 (0.79)
	33	1 (0.02)	1 (100)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.04)
	34	33 (0.64)	13 (39.40)	10 (30.30)	10 (30.30)	0 (0.00)	12 (0.50)
	35	13 (0.25)	11 (84.62)	2 (15.38)	0 (0.00)	0 (0.00)	2 (0.08)
	36	61 (1.20)	23 (37.70)	27 (44.26)	9 (14.75)	2 (3.29)	11 (0.46)
	37	26 (0.51)	15 (57.69)	5 (19.23)	3 (11.54)	3 (11.54)	7 (0.30)
	38	40 (0.78)	17 (42.50)	11 (27.50)	11 (27.509	1 (2.50)	6 (0.25)
	39	14 (0.27)	4 (28.57)	4 (28.57)	6 (42.86)	0 (0.00)	57 (2.38)
5. Leadership. Management and team competences	40	9 (0.18)	4 (44.44)	1 (11.12)	4 (44.44)	0 (0.00)	5 (0.219
	41	30 (0.58)	18 (60.00)	0 (0.00)	12 (40.00)	0 (0.00)	0 (0.00)
	42	14 (0.27)	4 (28.57)	5 (35.71)	2 (14.29)	3 (21.43)	17 (0.71)
	43	20 (0.40)	18 (90.00)	0 (0.00)	2 (10.00)	0 (0.00)	0 (0.00)
	44	36 (0.70)	21 (58.33)	5 (13.89)	10 (27.78)	0 (0.00)	27 (1.13)
	45	22 (0.43)	20 (90.91)	0 (0.00)	2 (9.09)	0 (0.00)	4 (0.17)
	46	13 (0.25)	1 (7.70)	2 (15.38)	10 (76.92)	0 (0.00)	0 (0.00)
	47	3 (0.06)	1 (33.33)	0 (0.00)	2 (66.679	0 (0.00)	0 (0.00)
Total		5130 (100)	2683 (52.30)	1264 (24.64)	1094 (21.33)	89 (1.73)	2392 (100)

Competence Code Required = numbers 1 to 47 of the Tuning Nursing Specific competences. N = Total number of Tuning competences required in cognitive and psychomotor tests; n = frequencies and % = percentages of 47 Tuning competences required for cognitive and psychomotor tests and their performance levels.

Also, the three most-evaluated competences fitted in the second domain for the psychomotor test.

The least-required competence for psychomotor tests was number 25 (n = 1; 0.04%), followed by number 33 (n = 1; 0.04%) and number 22 (n = 2; 0.08%). Among the 3 least-investigated competences, numbers 22 and 25 were part of domain 3 and number 33 of domain 4.

Competence 26, which belongs to domains 3, 41, 43, 46, and 47, all included in domain 5, were never requested during the psychomotor test.

Of the 5130 times in which the Tuning competences were examined in the cognitive tests, the level of performance most frequently required was the autonomy of judgement (n = 2683; 52.30%), with the ability to understand (n = 1264; 24.64%) and knowledge (n = 1094; 21.33%) ensuing. Eighty-nine times (1.73%), the level of performance was not specified. A single level of performance was required in the psychomotor test: knowledge and applied comprehension (Table 2**)**.

Regarding the third objective of the study, Tables 3 and 4 show in detail the frequencies and percentages of the clinical area and setting for cognitive and psychomotor tests.

Regarding the 5130 times in which the competences were demanded in the cognitive tests, 2779 times (54.18%), the clinical area was not specified; in 576 cases (11.23%), the competences regarded the clinical area of the cardiovascular diseases, followed by the oncological area (n = 543; 10.58%), metabolic (n = 465; 9.06%), respiratory (n = 450; 8.77%), infectious (n = 210; 4.09%), and psychiatric (n = 107; 2.09%). Of all the competences detected, 83.29% (n = 4273) concerned the adult patient, and 70.25% (n = 3604) were contextualized in hospital.

Regarding the 2392 times in which the competences were required in the psychomotor tests, in 1639 (68.52%), the clinical area was not specified; in 227 (9.49%), the competences considered the clinical area of the respiratory diseases, followed by the cardiovascular (n = 164; 6.86%), oncological (n = 146; 6.10%), metabolic (n = 120; 5.02%), infectious (n = 73; 3.05%), and psychiatric (n = 23; 0.96%). In all, 75.5% (n = 1806) of the competences surveyed involved the adult patient, and 59.91% (n = 1433) were contextualized in hospital (Tables 3 and 4).

Regarding the fourth objective of the study, Table 5 shows in detail the frequencies and percentages of the types of tests used in the cognitive and psychomotor tests.

Altogether, 144 tests were completed; 95 (65.97%) were cognitive tests and 49 (34.03%) for psychomotor tests. The type of test most used in cognitive assessments was the oral or written discussion of a clinical case (n = 72; 75.79%), followed by oral or written discussion of protocols and procedures (n = 21; 22.11%) and open-or closed-ended tests (n = 2; 2.10%).

The type of tests most used in psychomotor tests was the decontextualised practical test (n = 26; 53.06%), followed by the simulated case test (n = 17; 34.70%) and the on-the-bed test (n = 6; 12.24%) (Table 5).

5. Discussion

The study aimed to describe which of the 47 Tuning competences were assessed during the qualification exam for the Degree in Nursing, their level of performance, the clinical area and setting in which they were contextualized, and which types of tests were used for their evaluation.

In cognitive and psychomotor tests, the competences most frequently requested during the qualification exam were those associated with nursing practice and clinical decision-making (scope 2), which coincided with core competences in nursing outlined by different scholars [16,21].

The competence most in-demand in both tests was number 14: *demonstrates the ability to appropriately use a range of nurse skills, medical devices and interventions/activities to provide optimum care*. This is in line with that expressed by Italian scholars, who believe that nursing degree courses should provide students with the preparation that would allow them to make clinical decisions independently with their knowledge, technical competences, and attitudes [21,22]. Students must be able to provide quality nursing care with proven effectiveness [16,23].

Among the competences most investigated, especially in psychomotor tests, there was number 17: *Using nursing skills, medical devices, and interventions/activities to provide optimum care demonstrates the ability to safely administer medicines and other therapies*. This data consolidates the welfare aspect linked to the 'medical paradigm' [24], according to which nurses guarantee the correct application of diagnostic–therapeutic prescriptions. This confirms the opinion of Italian academics that include this competence in the shortlist of those deemed core [21].

In the literature, there are differing opinions of scholars and students concerning the ability of recent graduates to manage drugs

Table 3
Contextualization Clinical Area of the competences required in cognitive and psychomotor tests (N = 7522).

	COMPETENCES REQUIRED	Cardiovascular diseases	Oncological diseases	Respiratory diseases	Metabolic diseases	Psychiatric diseases	**Infectious diseases**	Not specified Clinical area
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Cognitive tests	5130 (100)	576 (11.23)	543 (10.58)	450 (8.77)	465 (9.06)	107 (2.09)	210 (4.09)	2779 (54.18)
Psychomotor tests	2392 (100)	164 (6.86)	146 (6.1)	227 (9.49)	120 (5.02)	23 (0.96)	73 (3.05)	1639 (68.52)

N = Total number of Tuning competences required in cognitive and psychomotor tests. n = Frequencies and % = percentages.

Table 4
Contextualization Setting of the competences required in cognitive and psychomotor tests N = 7522).

	Competences required	Adult	Child	Not specified setting	Competences required	Hospital	Territory	Not specified
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Cognitive tests	5130 (100)	4273 (83.29)	161 (3.10)	696 (13.61)	5130 (100)	3604 (70.25)	619 (12.10)	907 (17.65)
Psychomotor tests	2392 (100)	1806 (75.50)	57 (2.40)	529 (22.10)	2392 (100)	1433 (59.91)	217 (9.07)	742 (31.02)

N = Total number of Tuning competences required in cognitive and psychomotor tests. n = frequencies and % = percentages.

Table 5
Frequency of the types of tests most used during the licensure exam in cognitive and psychomotor tests (N 144).

Cognitive tests		Psychomotor test	
Types of tests	n (%)	Types of tests	n (%)
Oral and/or written discussion of a clinical case	72 (75.79)	Decontextualised practical test	26 (53.06)
Oral and/or written discussion of protocols and procedures	21 (22.11)	Practical test on a simulated case	17 (34.70)
Open or closed answer test	2 (2.10)	Test on the bed	6 (12.24)
Total	95 (100)	Totale	49 (100)

N = Total number of Types of test required in cognitive and psychomotor tests; n = frequencies and % = percentages.

safely. Indeed, if, in some studies, it is asserted that the hours of teaching in pharmacology are sufficient to prepare students for the correct and safe management of drugs [25,26], in other studies, the authors state precisely the opposite [27].

In this research, the least-frequently required competences in both tests were related to communicative and interpersonal aspects, including communication technologies (domain 4) and leadership competences and group dynamics management (domain 5). The competences of leadership, management, and group dynamics are considered 'core' to be acquired in the second cycle of studies [21]. This suggests that Italian nursing education interprets post-basic training as a process of 'additional training.' However, according to the Bologna Process, postgraduate courses should include a 'deepening of training' of all competences already acquired in the first cycle of studies [7].

Regarding 'Performance Levels', only one level of performance is provided for psychomotor tests: autonomous, effective, and safe execution of simple procedures and the ability to provide information, communication, and/or a therapeutic relationship. In this study, in the three levels of cognitive tests, the most required was 'autonomy of judgement'. This outcome is consistent with Lewallen and Van Horn [28], who state that at the end of the training course, it is expected that the student can critically assess the decisions that were employed [8,29], but it is discordant with the opinion of new graduate students. In fact, in the study by López-Entrambasaguas et al. (2019), in which according to the EFN Competency Model, the perception of recent graduates regarding the acquisition of competences at the end of university studies was explored, concerning the area of competences CA3 (Decision Making), new practitioners, reported a lack of confidence in taking their own clinical decisions and responsibilities [25].

Concerning the clinical area, the most frequently investigated competences were to be found mainly in chronic non-communicable diseases. Chronic non-communicable diseases are the leading causes of death worldwide [20].

Regarding the setting, the most-investigated competences dealt with the adult patient, treated mainly in hospitals rather than in the outpatient clinics. These data could derive from the fact that the study examined the evidence of the Degree courses in General Nursing, where, in fact, the pediatric patient is little investigated, in fact assistance to the child should be the peculiarity of the Degree course in Pediatric Nursing. Furthermore, these results reveal how even today, the educational process remains anchored to the "hospital-centered" model [30]. It would be advisable to redesign the educational programs in order to train nurses who will deal with territorial and home assistance, given the direction of national and international policies, which, driven by the epidemiological structure of an increasingly long-lived population [31], have activated for some time to promote the development of the care network in this direction [32]).

Compared to the types of tests used to assess competences, the field mainly evaluated was the cognitive one. The test most used in cognitive evaluations was discussing a clinical case, even if it required a significant commitment from the assessors, both in its elaboration and correction.

This finding matches with opinions expressed by Italian academics [17], urging a further investigation of the cognitive sphere. This also depends on the logistical difficulty of organizing a complex test able to evaluate all nursing competences, such as the test on the bed [2], which, in this study, was the least used. Indeed, even if the test on the bed allows the evaluation of all nursing competences, it is not frequently employed because it is costly and requires sizable close human, instrumental, and structural resources. Furthermore, this could be the reason for the lower demand for communicative, leadership, and management competences [33] since they imply a fundamental relationship between the student, the patient, and other health professionals [34]. However, these tests are organized based on the availability of the operational units and the planning of their activities and are difficult to recreate during the examination session. The least-used test in cognitive assessment was the open- or closed-response test. This is probably because educators require considerable effort in structuring and correcting the test, especially if it is open-ended [35].

The most appropriate tests for the evaluation of psychomotor competences were the practice tests on the simulated case and on the

bed [36], which, in this study, however, were the least used. The reason that the simulated case practical test was little used can be explained by the difficulty in applying the Objective Structured Clinical Examination (OSCE) [37].

Considering the results obtained, there are many differences concerning how the licensure exam is regulated in the various universities and the methods to assess the competences during the exam [3,16].

The objective assessment of competence in nursing education is a complex process, often influenced by cultural and educational differences in different countries. The common goal to be pursued is to standardize the assessment tests of these skills during the qualification exam.

The Tuning Model embraced in this study could represent a concrete model to be adopted both at the national and European stages to standardize the assessment of competences during the qualification exam, in line with the indications of the Bologna Process and the Tuning Nursing Project in Europe.

6. Limitations and future implications

The study has limitations and strengths.

The first limit is represented by the fact that the study was conducted in a single geographical area of Italy, even if the four university centres included in the survey hold 25% of the nursing profession's training in the Italian territory.

The second limit is dictated by the fact that the study is concentrated on the competency assessment process only during the exam for the qualification as a newly enrolled nurse.

The vital point is determined by the solution offered by the use of the competences assessment model described in this study in every Italian training centre and also the European ones that joined the Tuning Nursing Project to solve the problem of the high degree of discrepancy in the types of tests used in the nursing licensure exam.

Therefore, a radical cultural change is hoped for in the future, involving all the actors responsible for nursing education to reorient themselves and adopt a single evaluation model in the qualification exam.

It is also highly desirable to conduct a longitudinal study to collect data in the various areas of the country on the methods of assessing competences not only during the licensing exam but also throughout the training course.

7. Conclusion

In recent decades, nursing training has undergone a significant change, and the transformation is still underway; however, there are still inconsistencies with regard to which competences are evaluated and how they are evaluated during the licensure exam.

In Italy, the competences considered most relevant for the first cycle of studies are those associated with nursing practice and clinical decision-making. An evident congruence has emerged between the competences that academics define as fundamental to acquire for the first cycle of studies and those evaluated in examining nursing abilities. It is also evident that the difficulty, on the part of training centres, in evaluating the communicative competences and the management and leadership competences of the student is closely linked to the ability to define the tests themselves by educators and to the logistical commitment that characterizes the tests aimed at investigating these competences.

Nursing training still focuses on preparing student nurses to work in hospitals, since in Italy, despite the National Health System is gradually moving from a model of care organization centered on services for the acute patient to one more functional in the management of chronicity, this transition has not yet been completely completed, which is why the nursing programs still seem to be very focused on hospital assistance. Therefore, it is essential to proceed with an urgent reformulation and updating of training curricula.

Declarations

Author contribution statement

Flavia Pantaleo; Anna Marchetti: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper. Daniela D'Angelo; Beatrice Albanesi: Conceived and designed the experiments; Analyzed and interpreted the data. Alessandro Stievano: Performed the experiments; Contributed reagents, materials, analysis tools or data; Analyzed and interpreted the data. Antonello Petrizzo; Ippolito Notarnicola: Conceived and designed the experiments; Performed the experiments. Maria Grazia De Marinis: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data.

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Data availability statement

Data included in article/supp. material/referenced in article.

Declaration of interest's statement

The authors declare no competing interests.

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Appendix A. Supplementary data

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