Critical thinking among institutional academic advisors and sociodemographic, professional and academic variables: a multicenter correlation study

Maria-Antonia Martínez-Momblan, PhD, RN [a,b] | ORCID: https://orcid.org/0000-0002-5364-5270

[a] Fundamental Care and Medical-Surgical Nursing Department, School of Nursing, University of Barcelona, Pavelló de Govern, 3° pl., 08907 L'Hospitalet de Llobregat, Barcelona, Spain

[b] Biomedical Research Networking Centre of Rare Diseases (CIBER-ER), Unit 747 ISCIII, Madrid, Spain
Tel. +34 687773008, , e-mail mmartinezmo46@ub.edu

Inmaculada Bonilla Aguilar, MSc, RN [c,d] | ORCID: https://orcid.org/0000-0002-6436-4239

[c] Nursing Research Group (GRIN). IDIBELL, Bellvitge Biomedical Research Institute. Avinguda de la Granvia, 199, 08908 L'Hospitalet de Llobregat, Barcelona, Spain.

[d] Assistant Nurse, Hospital Universitari de Bellvitge, C/Feixa Llarga s/n, 08908 L'Hospitalet de Llobregat, Barcelona, Spain
Tel. +34 687446566, , e-mail ibonilag@hotmail.com

Sergio Alonso-Fernández, PhD,MSc, RN[a,c] | ORCID: https://orcid.org/0000-0001-6969-9380

[a] Fundamental Care and Medical-Surgical Nursing Department, School of Nursing, University of Barcelona, Pavelló de Govern, 3° pl., 08907 L'Hospitalet de Llobregat, Barcelona, Spain

[c] Nursing Research Group (GRIN). IDIBELL, Bellvitge Biomedical Research Institute. Avinguda de la Granvia, 199, 08908 L'Hospitalet de Llobregat, Barcelona, Spain
Tel. +34 934024224, e-mail: sergioalonsodue@gmail.com

Marta Romero García PhD, RN [a a,c] | ORCID: https://orcid.org/0000-0002-7093-5982

[a] Fundamental Care and Medical-Surgical Nursing Department, School of Nursing, University of Barcelona, Pavelló de Govern, 3° pl., 08907 L'Hospitalet de Llobregat, Barcelona, Spain

[c] Nursing Research Group (GRIN). IDIBELL, Bellvitge Biomedical Research Institute. Avinguda de la Granvia, 199, 08908 L'Hospitalet de Llobregat, Barcelona, Spain
Tel. +34 934024232, email: martaromero@ub.edu

Esperanza Zuriguel-Pérez, PhD, RN[e,f] | ORCID: https://orcid.org/0000-0002-0622-8423

[e] Multidisciplinary Nursing Research Group. Vall d'Hebron Research Institute (VHIR), Passeig Vall d'Hebron 119-129, 08035 Barcelona, Spain

[f] Department of Knowledge Management and Evaluation; Vall d'Hebron University Hospital, Passeig Vall d'Hebron 119-129, 08035 Barcelona, Spain
Tel. +34 659832191, , e-mail: ezuriguel@vhebron.net

Anna Falcó-Pegueroles, PhD, RN [a] | ORCID: https://orcid.org/0000-0002-3702-3009

[a] Fundamental Care and Medical-Surgical Nursing Department, School of Nursing University of Barcelona, Pavelló de Govern, 3° pl., 08907 L'Hospitalet de Llobregat, Barcelona, Spain
Tel. +34 636585434 , , e-mail: annafalco@ub.edu

Llúcia Benito Aracil, PhD, RN[a,c] | ORCID: https://orcid.org/0000-0002-9956-3633

[a] Fundamental Care and Medical-Surgical Nursing Department, School of Nursing, University of Barcelona, Pavelló de Govern, 3° pl., 08907 L'Hospitalet de Llobregat, Barcelona, Spain
[c] Nursing Research Group (GRIN). IDIBELL, Bellvitge Biomedical Research Institute. Avinguda de la Granvia, 199, 08908 L'Hospitalet de Llobregat, Barcelona, Spain
Tel. +34 647728873, e-mail: lbenito@ub.edu

Corresponding Author:

Dr. Sergio Alonso-Fernández, PhD,MSc, RN[a,c] | ORCID: https://orcid.org/0000-0001-6969-9380

[a] Fundamental Care and Medical-Surgical Nursing Department, School of Nursing, University of Barcelona, Pavelló de Govern, 3° pl., 08907 L'Hospitalet de Llobregat, Barcelona, Spain
[c] Nursing Research Group (GRIN). IDIBELL, Bellvitge Biomedical Research Institute. Avinguda de la Granvia, 199, 08908 L'Hospitalet de Llobregat, Barcelona, Spain
Tel. +34934024224 , e-mail: sergioalonsodue@gmail.com

Declarations of interest: none.

Funding: this study has not been funded

ABSTRACT

Background

In nursing education, essential skills include Critical Thinking (CT). There is scant evidence on how nurse educators could promote CT in students in a clinical context.

Objective

To analyse the level of CT and correlated variables in healthcare nurses overseeing the clinicals of nursing undergraduates.

Methods

The study population were all nurse educators for clinicals at hospitals with nursing undergraduates. To evaluate the CT skills of nurses the Nursing Critical Thinking in Clinical Practice Questionnaire (N-CT-4 practice) was administered. Frequencies, percentages and measures of central tendency and scatter were obtained. A bivariate analysis was performed to analyze the correlation between the nurse educators' CT level and the sociodemographic, professional and academic levels. The nonparametric Mann-Whitney and Kruskal-Wallis tests were used to compare two independent groups. Statistical significance was defined as $P < .05$.

Results

The total number of participants was 639. The highest mean CT level was seen in clinical nurses involved in undergraduate nursing instruction and with experience of up to 10 years (mean CT score = 372 (33.3), p=.007). Global CT levels were similar in women and men (mean CT score: 364 (31.9) in women and 358 (40.5) in men, p=.187), with statistically significant differences only observed in the intellectual and cognitive indicator ($P = .022$).

Conclusions

CT levels are high in teaching healthcare professionals in the clinical environment.

Keywords

Nursing Faculty Practice

Education

Nursing

Thinking

Clinical Reasoning

Mentoring

INTRODUCTION

The sociopolitical, economic and cultural transformation of the 21st century is having a significant impact on healthcare, bringing new therapeutic opportunities and global challenges that require highly competent, ever more specialized professionals. This unique situation has led to an increasingly complex demand for specialized care and for a rapid, precise response that should be considered when educating future healthcare professionals. In nursing education, essential skills include critical thinking (CT), considered to be strategic in responding to these needs in both the healthcare system and in people with current or potential health conditions. This ability consists of a set of skills that allow nurses to develop the capacity to interpret and analyze problems and situations, to evaluate and make inferences, to predict outcomes and to implement effective actions (O'halloran, 2022; Shin et al., 2015). As observed by Lunney et al. (Berger et al., 2021; Lunney, 2009, 2010; Nes et al., 2022) the nursing reasoning process is complex and is based on the human response and on how it interacts with interpersonal, technical and intellectual processes. The studies consulted show that higher levels of CT foster a good response to clinical problems and the delivery of safe, high-quality care. CT has been a considerable interest for the nursing profession and the scientific literature have been focusing mainly on fostering CT among nursing students or inexperienced nurses (Berger et al., 2021; Lunney, 2009, 2010; Westerdahl et al., 2022).

Therefore, CT is a key competency for the nursing profession and for problem-solving, as well as for achieving effective professional and academic outcomes. These competencies allow reasoning strategies to be developed, thus combining cognitive and metacognitive processes, defined by Ellis and Alfaro-LeFevre as a higher-order thought process: thinking about thinking, characterized by systematic scrutiny, open-

mindedness, curiosity and complex inquisitive skills, fair-mindedness, systematic approaches, clarity of concepts, self-regulated judgment, truth-seeking, maturity and metacognition (Alfaro-LeFevre, 2016; Carbogim et al., 2016, 2018; Carvalho et al., 2020; Christianson, 2020; Ellis, 2017; Falcó-Pegueroles et al., 2021; Shin et al., 2015; Yuan et al., 2008; Zuriguel-Pérez et al., 2022, 2018).

A literature review showed that authors recommend considering CT as a key cross-cutting and final component in all nursing syllabi, as it is considered pivotal for forming clinical discernment in the context of clinicals and complex decision-making (Dickison et al., 2019; Raymond et al., 2018b). These studies establish specific lines of research needed to identify clearly defined pedagogical approaches for fostering CT among students during clinicals (Azizi-Fini et al., 2015; Carbogim et al., 2016; Jiménez-Gómez et al., 2019; Riegel & Crossetti, 2018). Furthermore, this recommendation puts a clear focus on the CT competency of healthcare professionals, themselves academic advisors for clinicals undertaken by the students they advise and responsible for fostering this skill during the students' clinical training.

Because the literature reinforces the idea that encouraging CT among future professionals involves a combination of skills for problem-solving, conflict resolution, decision-making, inference, divergent thinking, reasoning and critical skills, these skills should also be included in university programs to train academic nursing advisors (Carbogim et al., 2016; Ellis, 2017). Consequently, it involves a complex learning and teaching process which, in view of the various definitions of CT, is not merely a method to be learned, but rather a transformative process that requires skills, know-how, attitudes and dispositions and that depends on the context, is purposeful and seeks the professional's self-improvement. This means that ongoing cross-cutting training is needed throughout nursing school (Zuriguel-Pérez et al., 2019). Some authors report

that CT is important in the teaching and learning process between peers and between students and nurses and that it shapes the professional profile of future healthcare workers. The use of professional healthcare instructors in the clinical setting to help guide and develop clinical skills in new professionals is well documented in nursing literature. Nevertheless, there is scant evidence on how nurse educators could promote CT in students in a clinical context (Forneris, 2004; Jin & Ji, 2021; Locke et al., 2011). A nurse educator plays a key role in supporting the competency transfer in clinical practice and promoting a culture of learning within academic and hospital organizations through CT, thus ensuring the quality and suitability of the teaching/learning process (Hornberger et al., 2014). These nurse educators are essential, as they guide, foster and create positive learning environments for students while conveying practical skills from the syllabi as well as those related to understanding the physical and social environment and the values of the nursing profession through reflection in both national and international training settings (Raymond et al., 2018a, 2018b).

Nevertheless, the evidence observed clearly indicates that certain sociodemographic, professional, institutional and academic aspects of clinical nurses can have an impact on their CT skills (Oliveira et al., 2021; Riegel & Crossetti, 2018; Shirazi & Heidari, 2019; Wu & Wu, 2020; Yu et al., 2015; Zuriguel Pérez et al., 2015), although few studies to date have explored this issue in depth with large samples. This can have a positive impact on how nurses encourage CT in the students they advise. Therefore, it is necessary to understand the influence of sociodemographic, academic and professional variables on CT levels in university nurse educators, to plan strategies aimed at improving the CT competency of students during clinicals.

METHODS

Aim

The aim of this study was to analyze the level of CT and correlated variables in healthcare nurses overseeing the clinicals of nursing undergraduates.

Design

This was a descriptive, prospective and multicenter correlation study.

Participants and setting

The study was conducted at the 11 hospitals that have agreements with the University of Barcelona (Spain) for clinicals of students from the School of Nursing of the Faculty of Medicine and Health Sciences.

The study population were all nurse educators for clinicals at hospitals with nursing undergraduates. This population included 960 professionals during the 2018-2019 school year. The inclusion criteria were defined as nurses from the various hospital units with permanent, interim, or temporary employment contracts actively working in the units during the data collection period. Exclusion criteria included any master's or postgraduate students doing clinicals and any resident nurses receiving specialty training.

The sample size was calculated according to the study population and it was determined that a random sample of 639 individuals would be sufficient to estimate (with a 95% confidence interval and a precision of ~ 1.286 units) the population-wide mean of values expected to yield a standard deviation of around 28.68 units (Zuriguel-Pérez et al., 2017). Samples were randomized and then stratified by site to ensure group heterogeneity.

Variables and questionnaires

Three groups of variables were defined, organized as follows: Demographic (sex, age), work-related (hospital unit, job category, contract type, work shift, professional seniority and years worked in the unit) and academic (academic level, specific training).

Two surveys were administered at the same time: a form with ten questions to collect sociodemographic data on sex, age and employment and academic informations, as well as the Nursing Critical Thinking in Clinical Practice Questionnaire (N-CT-4 practice) to evaluate the CT skills of nurses. The N-CT-4 Practice is a validated, self-administered questionnaire based on Alfaro-LeFevre's circular model of CT (Alfaro-LeFevre, 2016). This survey contains 109 items bridging the four indicators of the 4-Circle CT Model: personal indicator, intellectual and cognitive indicator, interpersonal and self-management indicator and technical indicator. The Personal Dimension is composed of 39 items and their total scores can vary from 39 to 156; the Intellectual and Cognitive Dimension is made up of 44 items and its total scores range from 44 to 176; the Interpersonal and Self-Management Dimension consists of 20 items and its total scores range from 20 to 80; the Technical Dimension is composed of six items and its total scores range from 6 to 24. The overall score of the instrument is obtained by adding up the scores of all items and can range from 109 to 436 points. Higher scores represent stronger CT skills in the subjects. The original study considered the level of CT skills to be low at scores equal to or below 328.6, moderate at levels of 328.7 to 395.3 and high at or above 395.4 (Raymond et al., 2018b). All items use a four-point Likert scale (1 for never to almost never; 4 for always or almost always), with professionals rating how often they have a certain skill in their clinical practice. The psychometric characteristics of the questionnaire exhibited high reliability, with a Cronbach α of .96 (Zuriguel-Pérez et al., 2017).

Data collection

Nurse educators training students in clinicals were identified by the general coordinator of three subjects consisting of clinicals at hospitals, representing an overall load of 66 credits in the European Credit Transfer System (ECTS), in other words, 27.5% of the 240 ECTS required for an undergraduate nursing degree. The professionals participating in the study from each site and unit were contacted by email to participate in a series of meetings in the hospital units to learn about the project and to distribute the case report forms (CRFs). The nurse educators returned the completed questionnaires in the same sealed envelopes, which were finally collected by the lead investigator.

Data analysis

Frequencies, percentages and measures of central tendency and scatter were obtained. CT levels were calculated globally and within subcategories. A bivariate analysis was performed to analyze the correlation between the nurse educators' CT level and the sociodemographic, professional and academic levels. The mean scores for the total score and the five subcategories were compared with factors according to age group, sex, educational level, professional seniority, unit seniority, work shift, contract type, training level and job category.

Reliability was assessed by analyzing the internal consistency thoughout cronbach's alpha coefficient, assuming optimal values equal or higher to 0.70 (Zuriguel-Pérez et al., 2017).

The nonparametric Mann-Whitney and Kruskal-Wallis tests were used to compare two independent groups. Statistical significance was defined as $P < .05$. IBM SPSS.28 was used to process and analyze the study data.

Ethical considerations

The members of the research team complied with the Declaration of Helsinki and its subsequent revisions for research in humans. The study was approved by the management at all participating sites and received favorable reports from the Clinical Research Ethics Committees at the lead site (PR272/19) and at participating sites (PI-21-024; L/20-182; 2020/144-ENF-HOSC; PR272/19; PR272/19; IRB00003099).

The confidentiality of the subjects and the data compiled was maintained by using sealed envelopes containing the CRF for each participant. Subjects voluntarily agreed to participate in the study after signing the informed consent form. All participants were assigned alphanumeric codes to conceal their identity and were free to leave the study at any time.

RESULTS

The total number of participants was 639, representing a response rate of 66.56%. The mean age was 38.9 (SD=9.65); 84.5% were women (n=540).

The highest mean CT level was seen in clinical nurses involved in undergraduate nursing instruction and with experience of up to 10 years: 21% with < 1 year (n=134), 30.2% (n=193) with 1 to 5 years and 19.2% (n=123) with 6 to 10 years, respectively. Specifically, 43.5% (278) had permanent contracts, only 3.76% (24) were nurse managers and 2.9% (n=19) were advanced practice nurses.

Global CT levels were similar in women and men, with an average difference of only 6 points in favour of women. We only found statistically significant differences only observed in the intellectual and cognitive indicator (P = .022), with an average score difference of only four points. The four factors exhibited internal consistency, as measured by a Cronbach $\alpha > 0.7$.

The youngest group accounted for 40.2% of participants and yielded somewhat lower values, with minimal differences in mean scores addressing a range of 0.5-7 points; with statistical significance observed in all indicators except the personal one.

The proportion of the type of academic advisor was different, but the various indicator scores and the total CT score were similar; statistical significance was only observed in the personal, interpersonal and self-management and technical indicators.

No statistically significant differences were observed according to shift or work unit, with a tendency to minimally higher values in night shift and surgical units. When exploring the variables related to experience in the department and the profession, the results showed somewhat higher scores in the intellectual and cognitive and the interpersonal and self-management indicators, with statistically significant differences ($P < .005$) in the range of 11 to 15 years at the unit. Nevertheless, when exploring CT and the indicator scores of the "years in the profession" variable, the highest scores were obtained for the intellectual and cognitive ($P \leq .001$) and the interpersonal and self-management ($P = .001$) indicators, as well as global CT indicator ($P = .001$).

Years in the unit were correlated with significant differences in the intellectual and cognitive ($P \leq .001$) and the interpersonal and self-management ($P = .005$) indicators, as well as in global CT indicator ($P = .007$).

The job category exhibited differences in the intellectual and cognitive ($P = .005$), interpersonal and self-management ($P \leq .001$) and technical ($P \leq .001$) indicators, obtaining statistical significance for the global CT indicator ($P = .002$).

Last, the relationship between the academic variables and CT revealed that nurses with an undergraduate degree (mean CT score = 376) or doctorate (mean CT score = 388)

showed higher CT scores, but low and not significantly significant differences were observed (P = .611). No differences were found between nurses who had postgraduate training and nurses who did not (P = .133). It was also seen that nurses trained in advanced practices had higher mean CT levels, with this difference being statistically significant (P = .002), with nurse managers having the next highest mean CT. Table 1-2

DISCUSSION

The findings show higher CT levels in nurse educators in all indicators evaluated by the Nursing Critical Thinking in Clinical Practice Questionnaire (N-CT-4 Practice), as well as statistically significant differences according to sociodemographic, professional and academic variables, consistent with the study by Zuriguel et al (Lunney, 2009, 2010; Shirazi & Heidari, 2019; Yu et al., 2015).

Relationship between CT level and sociodemographic variables

Age correlates with a higher CT level in nurse educators for “total CT” and for the “intellectual and cognitive” and “interpersonal and self-management” indicators. These findings differ from those obtained in some studies (Jaju & Crask, 1999; Ludin, 2018; Zuriguel-Pérez et al., 2019) but consistent with others confirming that CT rises with age (Boso et al., 2019; Chan, 2013; Christodoulakis et al., 2023; Westerdahl et al., 2020). This may be because more experienced nurses have stronger competency in the cognitive, psychomotor and affective domains, which are needed to acquire a high CT level.

Additionally, the fact that sex was not linked to differences in CT levels could be due to a lower representation of male professionals in the studies over the years, in keeping with the trend of nursing being predominantly a female-dominated profession

(Zuriguel-Pérez et al., 2017). To explore whether there is a statistically significant correlation, future studies should explore the global and CT indicators in a sample with similar numbers of women and men.

CT scores among academic advisors

CT levels have been studied extensively, although not in samples of professionals and academic advisors involved in clinical training of students. However, some evidence shows low CT levels in clinical nurses (Chan, 2013; Öztürk Yıldırım & Karadağ, 2016; Simpson & Courtney, 2002), while others report CT levels above the moderate mean (Christodoulakis et al., 2023; Liu et al., 2021; Zuriguel-Pérez et al., 2019). Our study detected CT levels in nurse educators higher than those measured in clinical nurses in all subcategories and in the global score (Falcó-Pegueroles et al., 2021). This aspect is particularly positive because they are intermediaries between students' theoretical and practical learning, promoting multidisciplinary teamwork in the units and problem-solving, thus encouraging theoretical knowledge gained in classrooms to become readily applicable, practical skills (Zuriguel-Pérez et al., 2018).

Despite the extensive literature on CT in the field of nursing, there are gaps in the context of nurse educators and the relationship of how the CT levels of these professionals could help student nurses acquire skills during their clinicals. There is abundant theoretical evidence to support the importance of including CT in the syllabi and its impact on the student learning (Carter et al., 2017). To determine whether there is a correlation, the levels and characteristics of CT in nurse educators for clinicals should first be explored. To date, the study and analysis of CT development among nursing students and nursing professionals (Falcó-Pegueroles et al., 2021; Öztürk Yıldırım & Karadağ, 2016; Raymond et al., 2018a; Zuriguel Pérez et al., 2015) is conclusive, although there are still only a few studies analyzing its importance and the

internal and external barriers hindering CT development among nurse educators. These nurse educators who act as academic advisors for clinicals and fulfill a mentoring role should be aware of the multifactorial aspect of academic advising models.

In recent years, studies have shown that an academic mentor/advisor is important for students' learning process and that three competency learning domains (cognitive, psychomotor and affective) must be established, which must be included for the learning process to be effective. These aspects are met when the nurse educators acting as advisors for clinicals follow a structured program, provide appropriate feedback and perform an honest assessment through CT (Ellis, 2017; Jiménez-Gómez et al., 2019; Raymond et al., 2018a; Shirazi & Heidari, 2019; Urhan et al., 2021).

Relationship between CT and work variables

However, both the "years of experience in the unit" and "professional seniority" variables correlated with greater CT in the "intellectual and cognitive" and "interpersonal and self-management" indicators as well as in total CT. This evidence is consistent with earlier studies we have reviewed (Berger et al., 2021). Nevertheless, the statistically significant relationship seen between CT levels and seniority in the unit and in the profession raises the issue of the extent to which the stability needed to reach a certain unit or department could explain why there is a mismatch between the results obtained for the two variables.

In job category, advanced practice nurses and nurse managers showed statistically significant higher CT levels in all indicators except the "personal" indicator, consistent with the findings of Zuriguel et al. (Zuriguel-Pérez et al., 2018), who confirmed that CT was related to professional variables. Other variables analyzed, such as work shift(s) showed no statistically significant differences. Moreover, nurses who had their professional career in areas of advanced practice exhibited higher levels of CT.

Relationship between CT level and academic variables

The study shows that nurses with an undergraduate degree and a doctorate had higher scores than general practice nurses. This confirms that training has an impact on CT levels, as confirmed by the various studies consulted (Carter et al., 2017; Tseng et al., 2022). However, short courses and additional training did not have an impact on CT levels among healthcare professionals. The fact that no differences were observed between professionals with postgraduate training and those without it suggests that the acquisition of CT skills depends on experience and professional setting rather than postgraduate training itself. This raises a new issue to analyze, as CT and CT skills must certainly be learned although the CT learning process does not necessarily need to be standardized.

Future research

The studies analyzed show the CT level of students, but do not explore the CT level of nurse educators responsible for encouraging it when training students. This may indicate the need for a roadmap providing information on the CT level of nurse educators and on which factors could strengthen CT skills. The acquisition of professional skills can be aided by analyzing the nursing process, using the scientific method, reflecting on nursing interventions and identifying problems from a holistic and humanitarian viewpoint.

The study findings are limited to healthcare instructors in the clinical setting of the public universities of Barcelona. Future research should focus on whether the results vary according to whether instruction takes place in public or private schools in the current university system and on the results at national and international universities.

LIMITATIONS

The main limitation of the study is that the findings apply to nurses who work at public hospitals within the Barcelona health network and are instructors at the School of Nursing of the University of Barcelona, under a well-defined, accredited academic advisor model for clinicals. This may affect extrapolation of the results. Despite these limitations, an attempt was made to minimise its effect by developing a multicentre study with a large sample size. The study should now be replicated, comparing CT results for nurse educators in the public and private settings and comparing CT differences according to academic advisor models used at other public and private universities.

CONCLUSIONS

The study confirms that the CT levels of nurse educators were high in all subcategories and global means for the scale. Higher levels of CT were observed in nurse educators than in clinical nurses. Age, seniority at work, unit, training, job category and work shift have an impact on CT levels of nurse educators.

RELEVANCE TO CLINICAL PRACTICE

This study shows that CT levels are high in teaching healthcare professionals in the clinical environment and are influenced by the age, seniority, years at the unit, job category and work shift, providing evidence on the CT levels of nurse educators in the context of clinical practice. The findings provide the basis to create or design training programs for clinical nurse educators for undergraduate nursing degrees at universities in the university context as a strategy for increasing CT of academic advisors who oversee students in training in a crosscutting manner in the undergraduate nursing degree. In addition, it sets down a foundation for analyzing whether there is a correlation between CT levels in students and clinical professionals involved in their

training, starting from the question of whether better CT in professionals could foster CT in students.

Conflict of interest:

None declared.

REFERENCES

Alfaro-LeFevre, R. (2016). *Critical Thinking, Clinical Reasoning and Clinical Judgment: A Practical Approach* (6th ed.). Saunders/Elsevier.

Azizi-Fini, I., Hajibagheri, A., & Adib-Hajbaghery, M. (2015). Critical thinking skills in nursing students: a comparison between freshmen and senior students. *Nursing and Midwifery Studies*, *4*(1). https://doi.org/10.17795/NMSJOURNAL25721

Berger, K., Cianelli, R., Valenzuela, J., Villegas, N., Blazquez, C., Toledo, C., & Ramírez-Barrantes, R. (2021). Motivation for Critical Thinking in Nursing Students in Chile. *Hispanic Health Care International*, *19*(2), 131–137. https://doi.org/10.1177/1540415320970110

Boso, C. M., van der Merwe, A. S., & Gross, J. (2019). Critical thinking skills of nursing students: Observations of classroom instructional activities. *Nursing Open*, *7*(2), 581–588. https://doi.org/10.1002/NOP2.426

Carbogim, F. da C., Barbosa, A. C. S., de Oliviera, L. B., de Sá Diaz, F. B. B., Toledo, L. V., Alves, K. R., Friedrich, D. B. de C., Luiz, F. S., & Püschel, V. A. de A. (2018). Educational intervention to improve critical thinking for undergraduate nursing students: A randomized clinical trial. *Nurse Education in Practice*, *33*, 121–126. https://doi.org/10.1016/J.NEPR.2018.10.001

Carbogim, F. da C., de Oliveira, L. B., & Püschel, V. A. de A. (2016). Critical thinking: concept analysis from the perspective of Rodger's evolutionary method of concept analysis. *Revista Latino-Americana de Enfermagem*, *24*. https://doi.org/10.1590/1518-8345.1191.2785

Carter, A. G., Creedy, D. K., & Sidebotham, M. (2017). Critical thinking evaluation in reflective writing: Development and testing of Carter Assessment of Critical

Thinking in Midwifery (Reflection). *Midwifery*, *54*, 73–80. https://doi.org/10.1016/J.MIDW.2017.08.003

Carvalho, D. P. de S. R. P., Vitor, A. F., Cogo, A. L. P., Bittencourt, G. K. G. D., Santos, V. E. P., & Ferreira Júnior, M. A. (2020). Critical thinking in nursing students from two Brazilian regions. *Revista Brasileira de Enfermagem*, *73*(1), e20170742. https://doi.org/10.1590/0034-7167-2017-0742

Chan, Z. C. Y. (2013). A systematic review of critical thinking in nursing education. *Nurse Education Today*, *33*(3), 236–240. https://doi.org/10.1016/j.nedt.2013.01.007

Christianson, K. L. (2020). Emotional Intelligence and Critical Thinking in Nursing Students: Integrative Review of Literature. *Nurse Educator*, *45*(6), E62–E65. https://doi.org/10.1097/NNE.0000000000000801

Christodoulakis, A., Kritsotakis, G., Gkorezis, P., Sourtzi, P., & Tsiligianni, I. (2023). Linking Learning Environment and Critical Thinking through Emotional Intelligence: A Cross-Sectional Study of Health Sciences Students. *Healthcare (Basel, Switzerland)*, *11*(6), 826. https://doi.org/10.3390/HEALTHCARE11060826

Dickison, P., Haerling, K. A., & Lasater, K. (2019). Integrating the National Council of State Boards of Nursing Clinical Judgment Model Into Nursing Educational Frameworks. *The Journal of Nursing Education*, *58*(2), 72–78. https://doi.org/10.3928/01484834-20190122-03

Ellis, N. (2017). Decision making in practice: influences, management and reflection. *British Journal of Nursing (Mark Allen Publishing)*, *26*(2), 109–112. https://doi.org/10.12968/BJON.2017.26.2.109

Falcó-Pegueroles, A., Rodríguez-Martín, D., Ramos-Pozón, S., & Zuriguel-Pérez, E.

(2021). Critical thinking in nursing clinical practice, education and research: From attitudes to virtue. *Nursing Philosophy : An International Journal for Healthcare Professionals*, *22*(1). https://doi.org/10.1111/NUP.12332

Forneris, S. G. (2004). Exploring the attributes of critical thinking: a conceptual basis. *International Journal of Nursing Education Scholarship*, *1*(1). https://doi.org/10.2202/1548-923X.1026

Hornberger, C. A., Erämaa, S., Helembai, K., McCartan, P. J., & Turtiainen, T. (2014). Responding to the call for globalization in nursing education: the implementation of the transatlantic double-degree program. *Journal of Professional Nursing : Official Journal of the American Association of Colleges of Nursing*, *30*(3), 243–250. https://doi.org/10.1016/J.PROFNURS.2013.09.008

Jaju, A., & Crask, M. (1999). The perfect design: optimization between reliability, validity, redundancy in scale items and response rates. In A. Menon & A. Sharma (Eds.), *Issues in Scaling: Proceedings of the AMA (Winter) Educators' Conference* (pp. 127–131). American Marketing Association.

Jiménez-Gómez, M. A., Cárdenas-Becerril, L., Velásquez-Oyola, M. B., Carrillo-Pineda, M., & Barón-Díaz, L. Y. (2019). Reflective and critical thinking in nursing curriculum. *Revista Latino-Americana de Enfermagem*, *27*. https://doi.org/10.1590/1518-8345.2861.3173

Jin, M., & Ji, C. (2021). The correlation of metacognitive ability, self-directed learning ability and critical thinking in nursing students: A cross-sectional study. *Nursing Open*, *8*(2), 936–945. https://doi.org/10.1002/NOP2.702

Liu, T., Yu, X., Liu, M., Wang, M., Zhu, X., & Yang, X. (2021). A mixed method evaluation of an integrated course in improving critical thinking and creative self-

efficacy among nursing students. *Nurse Education Today*, *106*. https://doi.org/10.1016/J.NEDT.2021.105067

Locke, R., Leach, C., Kitsell, F., & Griffith, J. (2011). The impact on the workload of the Ward Manager with the introduction of administrative assistants. *Journal of Nursing Management*, *19*(2), 177–185. https://doi.org/10.1111/J.1365-2834.2011.01229.X

Ludin, S. M. (2018). Does good critical thinking equal effective decision-making among critical care nurses? A cross-sectional survey. *Intensive & Critical Care Nursing*, *44*, 1–10. https://doi.org/10.1016/J.ICCN.2017.06.002

Lunney, M. (2009). *Critical Thinking to Achieve Positive Health Outcomes: Nursing Case Studies and Analyses*. NANDA International.

Lunney, M. (2010). Use of critical thinking in the diagnostic process. *International Journal of Nursing Terminologies and Classifications : The Official Journal of NANDA International*, *21*(2), 82–88. https://doi.org/10.1111/J.1744-618X.2010.01150.X

Nes, A. A. G., Riegel, F., Martini, J. G., Zlamal, J., Bresolin, P., Mohallem, A. G. da C., & Steindal, S. A. (2022). Brazilian undergraduate nursing students' critical thinking need to be increased: a cross-sectional study. *Revista Brasileira de Enfermagem*, *76*(1), e20220315. https://doi.org/10.1590/0034-7167-2022-0315

O'halloran, B. (2022). Strengthening Critical Thinking Skills in Associate Degree Nursing Students Through Combined Pedagogies of Concept Mapping Using the Nursing Process and Simulation. *Nursing Education Perspectives*, *43*(3), E10–E12. https://doi.org/10.1097/01.NEP.0000000000000916

Oliveira, J. F. de, Perez, E. Z., Ferreira, M. B. G., Pires, P. da S., Barichello, E., &

Barbosa, M. H. (2021). Cultural adaptation and validation of an instrument about nursing critical thinking skills. *Revista Brasileira de Enfermagem*, *74*(2), e20200720. https://doi.org/10.1590/0034-7167-2020-0720

Öztürk Yıldırım, T., & Karadağ, M. (2016). The Perceptions of Nurse Managers on Their Critical Thinking Skills and Research Utilization Barriers and Facilitators. *Journal of Health and Nursing Management*, *3*(2), 73–85. https://doi.org/10.5222/SHYD.2016.073

Raymond, C., Profetto-McGrath, J., Myrick, F., & Strean, W. B. (2018a). Balancing the seen and unseen: Nurse educator as role model for critical thinking. *Nurse Education in Practice*, *31*, 41–47. https://doi.org/10.1016/J.NEPR.2018.04.010

Raymond, C., Profetto-McGrath, J., Myrick, F., & Strean, W. B. (2018b). Nurse educators' critical thinking: A mixed methods exploration. *Nurse Education Today*, *66*, 117–122. https://doi.org/10.1016/J.NEDT.2018.04.011

Riegel, F., & Crossetti, M. da G. O. (2018). Theoretical frameworks and instruments for evaluation of critical thinking in nursing and education. *Revista Gaucha de Enfermagem*, *39*, e20170097. https://doi.org/10.1590/1983-1447.2018.2017-0097

Shin, H., Ma, H., Park, J., Ji, E. S., & Kim, D. H. (2015). The effect of simulation courseware on critical thinking in undergraduate nursing students: multi-site pre-post study. *Nurse Education Today*, *35*(4), 537–542. https://doi.org/10.1016/J.NEDT.2014.12.004

Shirazi, F., & Heidari, S. (2019). The Relationship Between Critical Thinking Skills and Learning Styles and Academic Achievement of Nursing Students. *The Journal of Nursing Research : JNR*, *27*(4). https://doi.org/10.1097/JNR.0000000000000307

Simpson, E., & Courtney, M. (2002). Critical thinking in nursing education: literature

review. *International Journal of Nursing Practice*, *8*(2), 89–98. https://doi.org/10.1046/J.1440-172X.2002.00340.X

Tseng, T. J., Guo, S. E., Hsieh, H. W., & Lo, K. W. (2022). The effect of a multidimensional teaching strategy on the self-efficacy and critical thinking dispositions of nursing students: A quasi-experimental study. *Nurse Education Today*, *119*. https://doi.org/10.1016/J.NEDT.2022.105531

Urhan, E., Zuriguel-Pérez, E., & Harmanci Seren, A. K. (2021). Critical thinking among clinical nurses and related factors : A survey study in public hospitals. *Journal of Clinical Nursing*, *00*, 1–10. https://doi.org/10.1111/jocn.16141

Westerdahl, F., Carlson, E., Wennick, A., & Borglin, G. (2020). Teaching strategies and outcome assessments targeting critical thinking in bachelor nursing students: a scoping review protocol. *BMJ Open*, *10*(1). https://doi.org/10.1136/BMJOPEN-2019-033214

Westerdahl, F., Carlson, E., Wennick, A., & Borglin, G. (2022). Bachelor nursing students´ and their educators´ experiences of teaching strategies targeting critical thinking: A scoping review. *Nurse Education in Practice*, *63*. https://doi.org/10.1016/J.NEPR.2022.103409

Wu, H. Z., & Wu, Q. T. (2020). Impact of mind mapping on the critical thinking ability of clinical nursing students and teaching application. *The Journal of International Medical Research*, *48*(3). https://doi.org/10.1177/0300060519893225

Yu, W.-C. W., Lin, C. C., Ho, M.-H., & Wang, J. (2015). Technology facilitated PBL pedagogy and its impact on nursing student's academic achievement and critical thinking dispositions. *Turkish Online Journal of Educational Technology*, *14*, 97–107.

Yuan, H., Williams, B. A., & Fan, L. (2008). A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning. *Nurse Education Today*, *28*(6), 657–663. https://doi.org/10.1016/J.NEDT.2007.12.006

Zuriguel-Pérez, E., Falcó-Pegueroles, A., Agustino-Rodríguez, S., Gómez-Martín, M. del C., Roldán-Merino, J., & Lluch-Canut, M. T. (2019). Clinical nurses's critical thinking level according to sociodemographic and professional variables (Phase II): A correlational study. *Nurse Education in Practice*, *41*. https://doi.org/10.1016/J.NEPR.2019.102649

Zuriguel-Pérez, E., Falcó-Pegueroles, A., Roldán-Merino, J., Agustino-Rodriguez, S., Gómez-Martín, M. del C., & Lluch-Canut, M. T. (2017). Development and Psychometric Properties of the Nursing Critical Thinking in Clinical Practice Questionnaire. *Worldviews on Evidence-Based Nursing*, *14*(4), 257–264. https://doi.org/10.1111/WVN.12220

Zuriguel-Pérez, E., Lluch-Canut, M. T., Agustino-Rodríguez, S., Gómez-Martín, M. del C., Roldán-Merino, J., & Falcó-Pegueroles, A. (2018). Critical thinking: A comparative analysis between nurse managers and registered nurses. *Journal of Nursing Management*, *26*(8), 1083–1090. https://doi.org/10.1111/JONM.12640

Zuriguel-Pérez, E., Lluch-Canut, M. T., Puig-Llobet, M., Basco-Prado, L., Almazor-Sirvent, A., Biurrun-Garrido, A., Aguayo-González, M. P., Mestres-Soler, O., & Roldán-Merino, J. (2022). The nursing critical thinking in clinical practice questionnaire for nursing students: A psychometric evaluation study. *Nurse Education in Practice*, *65*. https://doi.org/10.1016/J.NEPR.2022.103498

Zuriguel Pérez, E., Lluch Canut, M. T., Falcó Pegueroles, A., Puig Llobet, M., Moreno

Arroyo, C., & Roldán Merino, J. (2015). Critical thinking in nursing: Scoping review of the literature. *International Journal of Nursing Practice*, *21*(6), 820–830. https://doi.org/10.1111/IJN.12347

Ethics approval and consent to participate

The study was designed and conducted in accordance with Spain's Constitutional Law 3/2018, of December 5, on the protection of personal data and guarantee of digital rights and the European Union legislation on personal data: Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016. All participants received information about the project and signed the informed consent form. To maintain confidentiality, the data were dissociated from any identifying information, and the records entered into the database were assigned a number. The ethics protocol was approved by the management at all participating sites and received favorable reports from the Clinical Research Ethics Committee (PR272/19) at the lead site and at participating sites (PI-21-024; L/20-182; 2020/144-ENF-HOSC; PR272/19; PR272/19; IRB00003099). All parties complied with the ethical requirements laid down in Spanish legislation (Organic Law 3/2018 on Personal Data Protection). Participants were informed of the purpose of the study and given instructions for completing the questionnaire. The cover letter stated that completion of the questionnaire was voluntary, and that anonymity would be maintained.

CRediT author statement

MMM: conceptualization, methodology, formal analysis, investigation, resources, writing—original draft, writing—review & editing, project administration, funding acquisition. **IBA:** conceptualization, methodology, investigation, writing—review & editing. **SAF:** conceptualization, methodology, investigation, writing—review & editing. **MRG:** investigation, resources, writing – review & editing. **EZP:** investigation, resources, writing – review & editing. **AFP:** methodology, investigation, writing – review & editing. **LBA:** conceptualization,

methodology, formal analysis, investigation, resources, writing—original draft, writing–review & editing, project administration, funding acquisition, supervision.

Declaration of interests

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

☐The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Table 1. Sociodemographic, Professional, and Academic Variables of Nurse Educators (n=639)

		Indicator Score Mean (SD)			
Characteristics	Participants, No. (%) (n = 639)	Personal	Intellectual and Cognitive	Interpersonal and Self-Management	Technical	Total Critical Thinking
Professional Profile						
Sex						

Male		125			20.7	358
	99 (15.5)	(14.9)	147 (17.8)	66.6 (8.41)	(2.67)	(40.5)
Female		125			20.6	364
	540 (84.5)	(12.3)	151 (14.3)	67.2 (7.71)	(2.25)	(31.9)
P values		**.655**	**.022**	**.477**	**.872**	**.187**
Age group, y						
21-35		124			20.3	357
	257 (40.2)	(12.6)	147 (14.7)	65.8 (7.59)	(2.41)	(32.7)
35-45		126			20.8	368
	213 (33.3)	(13.1)	152 (15.2)	68.1 (8.04)	(2.32)	(34.6)
45-51		126			21.1	369
	79 (12.3)	(13.5)	154 (14.0)	68.2 (7.87)	(2.10)	(33.3)
51-65		126			20.8	366
	90 (14.0)	(11.0)	152 (14.3)	67.7 (7.45)	(2.17)	(30.0)
P values		**.129**	**< .001**	**.004**	**.039**	**.001**
Experience in unit						
< 1		125			20.0	356
	75 (11.7)	(11.6)	146 (13.6)	65.2 (6.71)	(2.18)	(29.1)
1-5		124			20.5	359
	254 (39.7)	(12.5)	148 (14.3)	66.2 (7.69)	(2.39)	(32.7)
6-10		126			20.8	366
	133 (20.8)	(14.1)	152 (16.5)	67.8 (8.09)	(2.37)	(37.3)
11-15		127			21.1	372
	98 (15.3)	(12.8)	155 (14.8)	69.3 (7.80)	(2.19)	(33.3)

16-20	38 (5.95)	127 (12.3)	152 (14.6)	67.7 (8.23)	20.7 (2.03)	367 (30.7)
> 21	39 (6.10)	125 (10.5)	153 (13.2)	67.6 (7.86)	21.4 (2.24)	367 (28.8)
P values		**.527**	**< .001**	**.005**	**.010**	**.007**
Job category						
Care nurse	584 (91.4)	125 (12.6)	150 (15.1)	66.7 (7.82)	20.5 (2.32)	362 (33.6)
Advanced care nurse	19 (2.97)	132 (16.1)	161 (10.5)	72.3 (6.57)	22.4 (1.80)	387 (30.7)
Nurse manager	24 (3.76)	126 (10.7)	156 (12.3)	72.8 (5.38)	22.2 (1.55)	377 (24.1)
Specialist nurse	12 (1.88)	126 (11.3)	151 (12.3)	67.2 (7.12)	20.2 (2.26)	364 (28.6)
P values		**.144**	**.005**	**< .001**	**< .001**	**.002**
Work shift						
Day	532 (83.2)	125 (13.0)	150 (15.1)	66.9 (7.87)	20.6 (2.31)	363 (33.9)
Night	106 (16.5)	126 (10.9)	150 (14.7)	68.2 (7.50)	20.8 (2.38)	365 (30.8)
P values		**.620**	**.879**	**.110**	**.374**	**.481**
Type of contract						
Permanent	278 (43.5)	125 (12.5)	152 (14.8)	67.8 (7.80)	20.9 (2.23)	366 (32.7)

Interim	274 (42.9)	125 (13.1)	150 (15.3)	66.6 (8.02)	20.5 (2.36)	362 (34.6)
Temporary	86 (13.5)	125 (11.9)	147 (14.4)	66.3 (7.11)	20.2 (2.42)	359 (31.3)
P values		**.778**	**.018**	**.137**	**.028**	**.122**
Experience						
0-5	130 (20.3)	125 (11.7)	146 (14.0)	64.9 (7.19)	20.1 (2.36)	356 (30.8)
6-10	120 (18.7)	123 (13.2)	148 (15.3)	66.3 (7.45)	20.4 (2.49)	357 (33.5)
11-15	113 (17.6)	126 (13.6)	152 (15.4)	68.0 (8.50)	20.9 (2.25)	367 (35.9)
16-20	119 (18.6)	126 (12.9)	153 (14.7)	68.6 (7.63)	20.9 (2.28)	369 (33.6)
> 21	157 (24.5)	126 (12.2)	153 (14.5)	67.8 (7.86)	20.8 (2.18)	367 (32.0)
P values		**.136**	**< .001**	**.001**	**.017**	**.001**
Current work unit						
Ward	308 (48.2)	125 (12.2)	150 (14.7)	66.9 (7.63)	20.4 (2.27)	363 (32.6)
Surgical	93 (14.5)	125 (13.3)	152 (14.5)	67.8 (7.59)	21.0 (1.94)	366 (32.1)
Complex	237 (37)	125 (13.1)	150 (15.6)	67.1 (8.17)	20.7 (2.50)	362 (35.1)
P values		**.972**	**.510**	**.620**	**.069**	**.750**

Academic Profile						
Critical thinking training						
Yes	209 (32.7)	127 (12.2)	151 (15.3)	67.8 (7.15)	20.8 (2.37)	366 (32.9)
No	430 (67.3)	124 (12.9)	150 (14.9)	66.8 (8.12)	20.6 (2.30)	362 (33.6)
P values		**.029**	**.550**	**.125**	**.359**	**.133**
Academic level						
3-year undergraduate degree	108 (16.9)	126 (11.5)	149.32 (13.6)	67.1 (6.42)	20.8 (2.14)	363 (29.00)
4-year undergraduate degree	3 (0.47)	129 (9.64)	156 (10.8)	69.3 (9.24)	21.3 (2.08)	376 (29.9)
Specialization	3 (0.47)	119.53 (7.02)	145 (3.21)	61.7 (2.52)	19.0 (2.00)	345 (7.37)
Postgraduate training	115 (18.0)	126 (12.9)	151 (15.7)	67.6 (8.54)	20.4 (2.39)	365 (35.6)
Master's degree	407 (63.7)	125 (13.0)	150 (15.2)	66.9 (7.98)	20.7 (2.35)	363 (34.1)
Doctoral degree	3 (0.47)	126 (16.0)	165 (5.69)	74.0(3.61)	23.0 (1.73)	388 (17.2)
P values		**.742**	**.468**	**.452**	**.242**	**.611**

Table 2. Critical Thinking Levels of Nurse Educators and Normality Test Results for

Critical Thinking (n=639)

Indicators	No. Items	Range	Mean	Minimum	Maximum	Mean (SD)	Cronbach α
Personal	39	39-156	117	67.00	156.00	125.13 (12.69)	.92
Intellectual and cognitive	44	44-176	132	63.00	176.00	150.32 (14.99)	.95
Interpersonal and self-management	20	20-80	60	25.00	80.00	67.11 (7.82)	.91
Technical	6	6-24	18	9.00	24.00	20.65 (2.32)	.74
Critical thinking	109	109-436	327	188.00	436.00	363.21 (33.44)	.97