

Critical thinking in nursing: scoping review of the literature

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Running title: Critical thinking in nursing

ABSTRACT

This article seeks to analyze the current state of scientific knowledge concerning critical thinking in nursing.

The methodology used consisted of a scoping review of the main scientific databases using an applied search strategy. A total of 1518 studies published from January, 1999, to June, 2013, were identified, of which 90 met the inclusion criteria.

The main conclusion drawn is that critical thinking in nursing is experiencing a growing interest both in the study of its concepts and its dimensions, as well as in the development of training strategies to further its development among both students and professionals.

Furthermore, the analysis reveals that critical thinking has been investigated principally in the university setting independent of conceptual models, with a variety of instruments used for its measurement.

We recommend the (i) investigation of critical thinking among working professionals, (ii) the designing of evaluative instruments linked to conceptual models, and (iii) the identification of strategies to promote critical thinking in the context of providing nursing care.

Keywords: *critical thinking, nursing, nursing education, nurses, systematic review*

INTRODUCTION

Critical thinking (CT) is a cognitive process that includes rational analysis of information to facilitate clinical reasoning, judgment, and decision-making¹. The complexity and ever-changing nature of the healthcare workplace, along with the need for care centered on the patient in tandem with practice based on evidence, combine to highlight CT as a competence of great importance in education and in professional practice.

Several international organizations have put forward initiatives to pay greater attention to CT. For example, the *National League for Nurses*² included critical thinking as a specific criterion in the accreditation of academic programs. For its part, the *Joint Commission for Accreditation for Healthcare Organisations*³ included CT among its norms, as a key skill in nursing.

Critical thinking is particularly important in the nursing profession, given its potential impact upon the care that patients receive. The capacity of the nursing professional

to achieve improvements in the quality of care depends, in large measure, upon developing critical thinking skills so as to improve diagnostic decisions⁴.

CT is a process that may be explored and then assimilated during both the educational period and the professional career that follows. Nevertheless, some problems associated with it remain to be resolved, such as the ambiguous nature of the concept, measurement of it, and strategies for better developing it.

The present article reports on a review of studies published in the past fourteen years, with the aim of analyzing the current state of knowledge regarding CT in nursing.

METHOD

We carried out a scoping review of the scientific literature on CT in nursing and related concepts, following the guidelines set forth in the PRISMA standard⁵ (*Preferred Reporting Items for Systematic reviews and Meta-Analyses*). Studies were identified principally by means of systematic conventional searches of electronic databases. Various combinations of the following medical subject headings (MeSH) were used: critical thinking, problem solving, decision-making, judgment, competence and nursing. The search strategy was carried out in MEDLINE, CINAHL, LILACS, and Cochrane Library Plus. Table 1 presents the search strategy that was used.

In addition, a secondary search was carried out by reviewing the bibliographic references cited in the studies that were included. The language for the review was English, and the publications considered ran from January, 1999, to June, 2013. The review was limited to original articles. The search strategy was not restricted by any particular research design. Figure 1 illustrates the search procedure that was followed.

Some 1518 references were obtained, of which 93 were eliminated as duplicates. A process of discrimination was then carried out by means of analysis of the titles and abstracts of the remaining 1425 citations. The 155 documents that passed this filter were then subjected to further screening based on a reading of the complete text, which led to the elimination of an additional 50 papers. In the end 90 articles were included in the review.

Analysis was carried out in two stages. First, descriptive aspects of the studies were analyzed, and then a topical analysis of the studies was carried out.

The variables studied were the following:

The productivity characteristics of the publications:

- Number of articles, by annual distribution.
- Country of origin of the study, with 13 categories: the United States, Sweden, the United Kingdom, Turkey, the Netherlands, Canada, Australia, China, Korea, Iran, South Africa, Mexico, and Jordan.

The methodological characteristics of the studies:

- Study design type, with 6 categories: descriptive, quasi-experimental, experimental, qualitative, mixed methodology, and analysis.
- Sample type, with 4 categories: nursing students, working nurses, nursing teachers, and nursing managers.
- Sample size, defined by the range between lowest and highest values.
- Aim of the study, with 4 categories according to the main topic of the study: evaluation of the strategies for advancing CT, evaluation of the components of CT in nursing students and working nurses, perception of CT in students, and analysis of the factors that influence CT. For this last category the following sub-categories were identified: workplace, clinical competence, nursing process, self-sufficiency, clinical judgment, and diagnostic precision.

RESULTS

Description of the studies

Analysis of the annual distribution of publications on CT revealed increasing interest in this subject in recent years, with a notable surge of production in the year 2010, as may be seen in the details of the MEDLINE search by publication date (Fig. 2).

In terms of the country of origin of the studies, the majority were carried out in the United States (n = 66; 73.3%). Europe was the second source of articles (n = 20; 22.2%), divided among Sweden (n = 7; 7.7%), the United Kingdom (n = 6; 6.6%), Turkey (n = 5; 5.5%), and the Netherlands (n = 2; 2.2%). Other studies were carried out in Canada (n = 7; 7.7%), Australia (n = 4; 4.4%), and China (n = 5; 5.5%). The rest were in Korea (n = 1; 1.1%), Iran (n = 1; 1.1%), South Africa (n = 1; 1.1%), Mexico (n = 1; 1.1%), and Jordan (n = 1; 1.1%).

In terms of the type of study design, the percentages were as follows: the greatest number were descriptive (n = 32; 35.5%), geared toward evaluating educational strategies for advancing CT, measuring CT skills in students, and analyzing factors related with CT. In lesser numbers were quasi-experimental studies (n = 10; 11.5%), experimental studies (n = 6; 6.6%), and studies with mixed methodology (n = 5; 5.5%). This design type was used to evaluate the impact of educational initiatives on the CT skills of students. Next were qualitative studies (n = 17; 18.8%), which focused principally on exploring the perception of CT in students. Finally, analytical articles (n = 20; 22.2%) explored various aspects of CT.

As to the populations under study, CT was examined mainly in nursing student samples at various stages of training (n = 42; 48.8%), and less so in samples of working nurses (n = 16; 17.7%), nursing teachers (n = 3; 3.3%), and nursing managers (n = 1; 1.1%).

Sample size ranged from 6 to 2144, in accordance with the research design.

Regarding the main topic of the studies, the following focuses of interest were identified: (i) evaluation of strategies for promoting CT in the field of education, (ii) evaluation of the CT of students or nurses by means of various measuring instruments, (iii) exploration of the perception of CT in students, and (iv) analysis of several factors related to CT and their influence upon the results, such as the workplace, clinical competence, nursing procedure, self-sufficiency perceived in students, and clinical judgment. Table 2 presents the classification of the articles by the main topic under study and the research design type.

Topical analysis

Topical analysis of the contents of the articles examined led to grouping them into three main areas: (i) conceptualization of CT, (ii) measurement of CT, and (iii) strategies for promoting CT.

Conceptualization of critical thinking

CT in nursing is seen as specific and distinct from CT in other disciplines owing to the dynamics of the clinical process, the affective dimension of nursing practice, and the incorporation of nursing knowledge⁶. The definitions of CT found in the literature are diverse^{7, 8} although one of the most often cited is that of Facione⁹. This author defines

CT as the intellectual process that decidedly, deliberately, and in a self-regulated manner tries to arrive at a reasonable judgment. There is general recognition of the fact that CT is a complex process whose components include cognitive abilities and attitudinal dispositions¹⁰⁻¹³.

CT has been defined as controlled, useful thinking that requires strategies in order to obtain the desired results¹. According to other authors it is the process of searching, obtaining, evaluating, analyzing, synthesizing, and conceptualizing information¹³; its attributes are reflection, context, dialogue, and time¹⁴.

For a number of authors there is at present a continuing lack of clarity about the concept^{6,15,16}. The complexity is owing to the fact that CT requires various types of knowledge—abstract, generalizable, and applicable in different situations. It depends upon experience and contextual factors (the work flow, and social and political factors).

The definition of CT in nursing has been supplemented by alternative terms: clinical reasoning, clinical judgment, problem-solving, clinical decision-making, and nursing process^{17,18}. The process of clinical reasoning appears in the literature linked to the making of professional judgments, resolution of problems, and making of diagnostic decisions. It has been described as the cognitive process of application of critical thinking, knowledge, and experience in clinical practice¹⁹⁻²¹.

Another term related to CT, clinical judgment, is defined as the result attained by means of clinical reasoning²². While CT is not centered upon the search for a response, the resolution of problems seeks to obtain a result^{13,23-25}. CT facilitates the making of decisions, understood as the systematic process of evaluating and deciding that contributes to obtaining a desired result¹⁹.

Another concept linked with CT is the nursing process. This is a cognitive process that involves the use of CT skills to obtain desired results. The nursing process constitutes the basis of CT skills in nursing^{26,27}.

Measuring critical thinking

Six standardized instruments for evaluating CT in nursing students and working nurses have been identified: the *California Critical Thinking Disposition Inventory* (CCTDI), the *California Critical Thinking Skills Test* (CCTST), the *Health Science Reasoning Test* (HSRT), the *Watson Glaser Critical Thinking Appraisal* (WGCTA),

the *Performance Based Development System* (PBDS), and the *Critical Thinking Diagnostic* (CTD). Table 3 presents the measuring instruments.

In the studies using a quantitative methodology (n=53; 5.8%), the CCTDI²⁸ was the most frequently used instrument (n = 8; 15.0%) for examining the disposition of nursing students²⁹⁻³², working nurses^{33,34}, nursing managers⁷, and nursing teachers³⁵.

The CCTST³⁶ (n = 4; 7.5%) was used to measure the CT skills of nursing students^{37,38}, post-graduate nursing students³⁹, and recently graduated nurses⁴⁰.

The HSRT⁴¹, designed to evaluate the CT skills of students and professionals in the health sciences, was used in one study (n = 1; 1.8%) for construct validation²¹.

Other research studies (n = 4; 7.5%) have employed the WGCTA⁴² as an instrument in the evaluation of the CT skills of student samples⁴³ and of working nurse samples^{24,44,45}.

With the aim of jointly analyzing disposition and CT skill, some authors have used the CCTDI and the CCTST^{15,35,46-48} (n = 5; 9.4%), offering as a result the positive correlation between the two instruments. Others have used the CCTDI and the WGTCA^{49,50} (n = 2; 3.7%) without, however, finding statistically significant relations. The studies that used the CCTDI and the HSRT⁵¹⁻⁵³ (n = 3; 9.6%) did not provide information on the correlation between the two instruments.

Finally, there are two instruments that were used to evaluate nursing competence by means of CT skills, the PBDS⁵⁴ (n = 1; 1.8%) and the CTD⁵⁵ (n = 1; 1.8%).

It will be noted that several instruments are frequently combined in the same study in order to analyze influencing factors in CT such as expertise⁵⁶, educational level^{24,57,58}, failure to rescue⁵⁷, self-confidence^{58,59}, learning style¹⁹, self-esteem⁵³, work complexity⁵⁹, level of anxiety⁶⁰, job satisfaction⁶¹, and diagnostic precision^{33,62}.

Faced with the choice of instruments, some authors have opted for using alternative methods of evaluation, such as the rubric^{63,64}, the concept map⁶⁵, the case study^{66,67}, and the questionnaire^{59, 68, 69}.

From the year 2000 onward, various researchers focused their attention on an evaluation of CT by means of qualitative methods, using semi-structured interviews⁷⁰⁻⁷², group discussions⁶⁴, on-line discussions⁷³, and questionnaires^{74,75}.

Strategies for promoting critical thinking

There is interest in developing post-graduate and master's training programs that include specific strategies for the development of CT skills in nursing students. The most frequently analyzed strategies are simulations using anatomical models, questioning, group dynamics, reflective diaries, the creating of concept maps, and teaching models focused on reasoning.

Studies that have used simulation as a didactic technique have posted good results in the development of CT skills and dispositions in nursing students⁷⁶⁻⁸⁰ and in working nurses⁵⁷, with the exception of two studies that failed to find significant results following exposure to simulation⁸¹. Other studies have linked simulation with the development of clinical judgment⁸², especially following post-simulation debriefings⁸³.

The use of questioning as a didactic technique encourages reflection and stimulates CT in students⁸⁴⁻⁸⁶ and in inexperienced nurses^{67,87}.

Group dynamics encourages the development of CT skills in students⁸⁸ without, however, showing any improvement among working nurses³⁷.

The reflective diary is reported to be an effective strategy for increasing CT skills in students^{6,59,89}, in that it encourages reflection, the assimilation of newly learned material, and the creation of new knowledge.

The concept map is an analytical tool that helps in the synthesizing, organizing, and prioritizing of data in a logical sequence. Some studies opted for using the concept map to encourage the development of CT skills, which bore positive results both among students^{38,69,90} and beginning nurses⁹¹.

The use of educational models focused on reasoning proved effective in developing CT skills. Examples include *Developing Nurses' Thinking*⁶², *Structured Observation and Assessment of Practice*⁹², *Paul's model critical thinking*⁹³, and *Clinical Judgment Model*⁹⁴.

Learning based on problems^{95,96} was introduced into nurse training as a method for promoting the development of CT, the acquisition of knowledge, and the development of the ability to resolve problems and make decisions. However, the results of a recent systematic review yielded no evidence of improvement in CT among nursing students⁹⁷.

Furthermore, orientation programs have yielded satisfactory results in the development of CT skills among nurses starting out in their careers⁶¹.

Finally, some studies have provided evidence of the contribution of information technology and communication technology in fostering CT^{73,98,99}.

DISCUSSION

The present scoping review of the concept of CT in nursing, and related concepts, has clearly shown this to be an area of interest in nursing, even though it has turned up a number of difficulties in researching the topic.

Regarding the conceptualization of CT, we found, as have other previous reviews^{100,101}, that there is no universally accepted conceptual framework for describing and evaluating CT in nursing. The studies suggest that the conceptualization of CT needs to be consolidated and adapted, beyond the merely theoretical, to the current healthcare system and the clinical environment. There is a need for clarification of the terminology related with CT used in the literature.

As for the measurement of CT, we found, as did prior reviews^{102,103}, that the currently available standardized instruments are not sensitive to measurement in the nursing discipline.

CT has been identified as an essential element in nursing practice, yet there is little evidence that there is regular evaluation of CT competence.

CT applied to clinical practice encourages professional activity based on evidence and advances those aspects of the profession related to competence. The acquisition of CT skills, in bringing about safer, more competent care, may serve to improve diagnostic precision and decision-making, yielding more favorable outcomes for patients. Nevertheless, our review of the literature has shown there to be only a limited number of studies exploring CT in clinical practice. It may be the case that optimized CT skills improve the quality of patients care, but the exact relation between CT and outcomes remains unclear.

Finally, as to the strategies for advancing CT, we found, as have other researchers, inconsistent conclusions when it comes to presenting results regarding the evaluation of teaching and learning strategies for nursing students¹⁰⁴. This may be owing to the complexity of the construct and to the lack of a conceptual model of CT that would permit its evaluation in all its dimensions. The nursing profession has not adopted an evaluation standard for CT, which makes it extremely difficult to generalize results. In

order to be able to improve CT skills in the clinical setting specific strengths and weaknesses need to be identified.

The challenge for the future of research into CT lies in focusing on the development of models and evaluation instruments that are specific to the discipline of nursing, and in analyzing those factors that encourage and those that inhibit the acquisition of CT, so as to develop strategies to foster CT in clinical practice.

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FIGURES

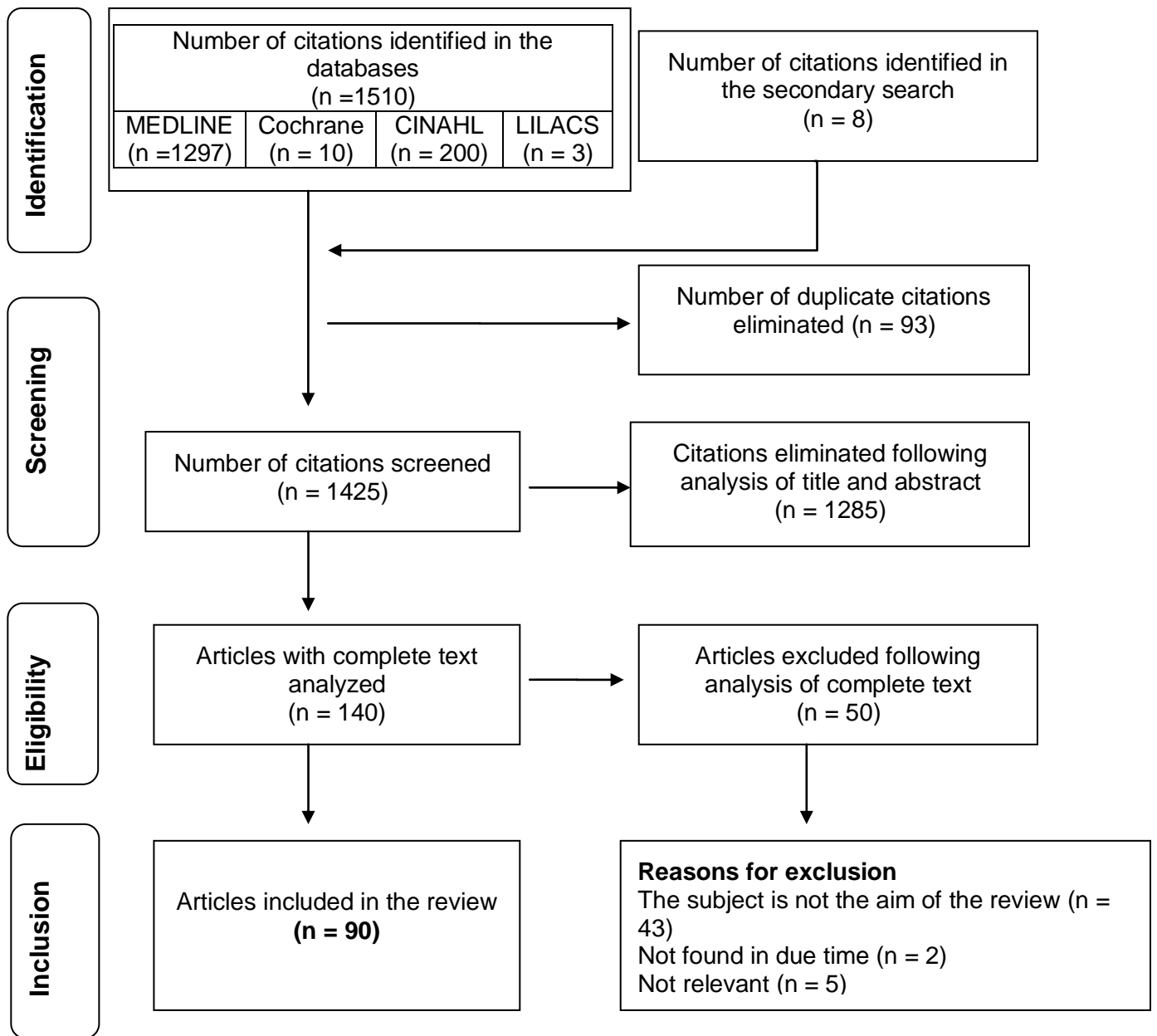


Figure 1. Flow chart of the results of the search according to the PRISMA standard.

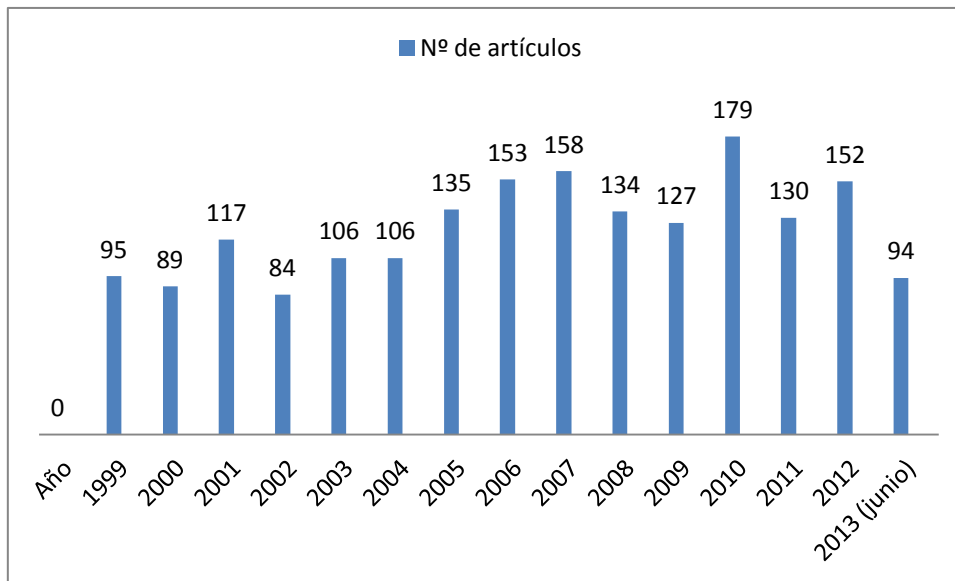


Figure 2. Distribution of the recovered bibliographic references, by year of publication (January 1999-June 2013). Source: Medline.

TABLES

Table 1. Strategy for bibliographic search.

Medline	CINHAL	Cochrane Library Plus	LILACS
# 1 "critical thinking"	# 1 (critical thinking)	# 1 (Critical	# 1 "critical
# 2 nursing	# 2 (nursing care)	thinking and	thinking"
# 3 (# 2) and # 3	# 3 (clinical	nurs*)	# 2 "nursing"
# 4 "Nursing" [Majr]	competence)		#3 "critical thinking
# 5 ("Thinking" [Majr] or	# 4 (1 and 2)		and nursing"
"Clinical	# 5 (1 and 3)		# 4 (Judgment
Competence/standards"	# 6 (1 and 2 and 3)		clinic and nurs*)
[Mesh] or "Nursing			
Care/standard" [Mesh]			
# 6 (# 5) and # 4			
#7(("Thinking"[Mesh]) or			
"Clinical			
Competence/standards"			
[Mesh] or "Nursing			
Care/standard"			
# 8 "Nurses" [Mesh]			
# 9 (# 7) and # 8			

Table 2. Classification of the selected articles, by research design and object of the study.

	Descriptive (n = 32)* n (%)	Quasi- experimental (n = 10)* n (%)	Experimental (n = 6)* n (%)	Qualitative (n = 17*) n (%)	Mixed methodology (n = 5)* n (%)	Analytical articles (n = 20)* n (%)
Evaluation strategy for the promotion of CT	14 (43.7)	8 (80.0)	3 (50.0)	9 (52.9)	5 (100)	16 (80.0)
Evaluation of CT in students	8 (25.0)	2 (20.0)				
Evaluation of CT in nurses	1 (3.0)					
Perception of CT in students				8 (47.0)		
Workplace and CT	4 (12.5)					
Clinical competence and CT	4 (12.5)					
Nursing process and CT	1 (3.0)					1 (5.0)
Self-sufficiency in students and CT			1 (16.6)			
Diagnostic precision and CT			2 (33.3)			2 (10.0)
Clinical judgment and CT						1 (5.0)

*Number of studies, by design.

CT: critical thinking; n = number of studies; % = percentage of studies

Table 3. Type of population studied and range of simple size, by research design.

	Descriptive (n = 27)*		Quasi- experimental (n = 10)*		Experimental (n = 6)*		Qualitative (n = 17)*		Mixed methodology (n = 5)*	
	n (%)	SR	n (%)	SR	n (%)	SR	n (%)	SR	n (%)	SR
Nursing students ^a	19 (70.3)	120-350	9 (90.0)	13-163	3 (50.0)	31-100	11 (68.7)	7-36	3 (60.0)	8-53
Working nurses ^b	7 ^c (2.5)	14-2144	1 (10.0)	58	3 (50.0)	95-249	4 (25.0)	8-19	1 (20.0)	31
Nursing teachers							2 (12.5)	6-12	1 (20.0)	6-11
Nursing managers	1 ^d (3.7)	12								

* Number of studies in which sample type is specified.

n = number of studies; % = percentage of studies; SR: Sample range

^a Students at different levels of studies.

^b Nurses with varying levels of expertise.

^c In one study the sample included students and working nurses.

^d In one study the sample included working nurses and nursing managers.

Table 4. Description of the instruments used to measure critical thinking.

Instrument/ Author/Year	Dimensions/Items	Scoring scale	Means of administe ring	Time (min) to admi nister	Psychometric characteristics
California Critical Thinking Disposition Inventory (CCTDI), Facione & Facione (1992)	7 dimensions: 75 items - Search for truth - Mental breadth - Willingness to analyze - Willingness to systematize - Self-confidence in reasoning - Curiosity - Cognitive maturity	6-point Likert	Self- reporting	15-20	Internal consistency $\alpha = .90$ ²⁸ , $\alpha = .71$ ¹⁰⁵⁻¹⁰⁶ $\alpha = .74$ ¹⁰⁷ (Danish) $\alpha = .87$ ¹⁰⁸ (Arabic) Panel of experts content validity ²⁸
California Critical Thinking Skills Test (CCTST), Form A/B Facione (1992)	5 dimensions: 34 items - Analysis - Evaluation - Inference - Deductive reasoning - Inductive reasoning	Multiple choice. Context: everyday situations.	Self- reporting	45	Internal consistency Form A/B: KR-20= $.70$ ³⁶ , $.84$ ³⁶ Panel of experts content validity ³⁶
Health Science Reasoning Test (HSRT), Facione (2006)	7 dimensions: 33 items - Analysis - Evaluation - Inference - Deductive reasoning - Inductive reasoning	Multiple choice. Context: health science situations.	Self- reporting	50	Internal consistency KR-20= $.81$ ⁴¹ Panel of experts content validity ⁴¹
Watson Glaser Critical Thinking Appraisal (WGCTA) Form A/B Watson & Glaser, (1980)	5 dimensions: 80 items and 40 items (shorter version) - Inference - Recognition of assumptions - Deduction - Interpretation - Evaluation of arguments	Multiple choice	Self- reporting	45	Internal consistency $\alpha = .45-.69$ A/B ⁴² $\alpha = .85$ ¹⁰⁹ , $.71$ ⁴⁵ (Taiwan version) Correlation coefficient $.21$, $.50$ ⁴²
Performance Based Development System (PBDS), Del Bueno (1990)	3 dimensions - CT skills - Interpersonal skills - Technical skills	Responses in narrative form	Vignettes	240	Equivalence reliability 94% ⁵⁴

<p>Critical Thinking Diagnostic (CTD), Berkow et al. (2011)</p>	<p>5 dimensions: 25 items</p> <ul style="list-style-type: none"> - Problem recognition - Clinical decision-making - Prioritization - Clinical application - Reflection 	<p>6-point Likert</p>	<p>Self-reporting</p>	<p>15</p>	<p>Internal consistency $\alpha = .97$⁵⁵</p> <p>Correlation coefficient .93⁵⁵</p> <p>Panel of experts content validity⁵⁵</p>
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