DOI: 10.2478/pielxxiw-2022-0021

The factors affecting the critical thinking skills among nursing students – an integrative literature review

Czynniki wpływające na rozwój umiejętności myślenia krytycznego wśród studentów pielęgniarstwa – integracyjny przegląd piśmiennictwa

Danuta Zarzycka, Monika Gesek

Department of Paediatric Nursing, Faculty of Health Sciences, Medical University of Lublin/
Katedra i Zakład Pielęgniarstwa Pediatrycznego, Wydział Nauk o Zdrowiu, Uniwersytet Medyczny w Lublinie

CORRESPONDING AUTHOR:
Monika Gesek
Katedra i Zakład Pielęgniarstwa Pediatrycznego
ul. Chodźki 7, 20-093Lublin,
e-mail: monikagesek@umlub.pl

STRESZCZENIE

CZYNNIKI WPŁYWAJĄCE NA ROZWÓJ UMIEJĘTNOŚCI MYŚLENIA KRYTYCZNEGO WŚRÓD STUDENTÓW PIELĘGNIARSTWA – INTEGRACYJNY PRZEGLĄD PIŚMIENNICTWA

Cel pracy. Przegląd i analiza dostępnych prac skupiających się wokół czynników wpływających na rozwój myślenia krytycznego studentów kierunku pielęgniarstwo.

Materiał i metodyka. Przegląd integracyjny artykułów opublikowanych w latach 2011- 2021 dostępnych w elektronicznych bazach danych PubMed, Scopus, Web of Science oraz EBSCO. Przeszukiwanie oparto na słowach kluczowych „*critical thinking*", „*nursing, nursing care*", „*nursing education*", które łączono operatorami logiki Boole`a „and" i „or".

Wyniki. Istnieje wiele czynników ważnych dla rozwoju umiejętności krytycznego myślenia. Powszechne metody nauczania promujące rozwój krytycznego myślenia stanowią aktywne strategie uczenia się, mapowanie pojęć, symulacje, metody uczenia się oparte na problemach, studia przypadków oraz metody nauczania oparte na dowodach. Wyróżnia się również czynniki kulturowe oraz czynniki indywidualne, takie jak empatia, inteligencja emocjonalna oraz zachowania opiekuńcze, które wykazują istotną zależność z myśleniem krytycznym.

Wnioski. Krytyczne myślenie stanowi ważną metakompetencję dla pielęgniarek. Przyczynia się do właściwego gromadzenia informacji o pacjencie, ich selekcji i trafnego formułowania diagnoz, rozwoju umiejętności rozwiązywania problemów i podejmowania decyzji, poprawia komunikację z pacjentem. Analiza literatury tematycznej pozwoliła na wskazanie czynników mających wpływ na myślenie krytyczne.

Słowa kluczowe: **myślenie krytyczne, studenci pielęgniarstwa, opieka pielęgniarska, edukacja pielęgniarska**

ABSTRACT

THE FACTORS AFFECTING THE CRITICAL THINKING SKILLS AMONG NURSING STUDENTS – AN INTEGRATIVE LITERATURE REVIEW

Aim. Review and analysis of available articles focused on factors affecting development of nursing students critical thinking.

Material and methods. Integrative review of articles published between 2011 and 2021, available in the electronic databases PubMed, Scopus, Web of Science and EBSCO. Searching was based on keywords "critical thinking", "nursing", "nursing care", "nursing education" which were connected by Boolean logic operators "and" as well as "or".

Results. There are several factors significant to advancement of critical thinking. Prevalent teaching methods, which promote development of critical thinking, constitute active learning strategies, concept mapping, simulation, problem-based learning, case study and learning methods based on evidence. Moreover, cultural and individual factors like empathy, emotional intelligence and caring behaviour show a significant relationship with critical thinking.

Conclusions. Critical thinking represents an important meta-competence for nurses. Critical thinking contributes to adequate gathering of the information about patient, selection of those and formulating accurate diagnoses, progression of problem-solving skills and making decisions, improves communication with the patient. Analysis of relevant literature made it possible to indicate factors affecting critical thinking.

Key words: **critical thinking, nursing students, nursing care, nursing education**

INTRODUCTION

The beginnings of critical thinking date back to time of Socrates. The Socratic method focuses on asking the questions in structured and intentional manner to allow people to go further into their own intellect, simultaneously going beyond simple facts and relations [1]. The Socratic method, based on the theory and principles presented in the Platon dialogs, enhances critical thinking as well as clinical evaluation [2]. Critical thinking contributes to the development of skills related to asking questions, problem solving, making decisions along with tendency to use these capabilities [3,4].

Critical thinking was discussed for the first time in nursing literature in the early 1980s [5]. Literature published between 1981 and 1991 contained only seven publications on critical thinking in nursing, however, the number of articles published in the next 10 years (1992-2002) increased to 401 [6]. In 1990 within the research project *Delphi American Philosophical Association*, conceptual definition of critical thinking in nursing was formulated as "the process of purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference" [7]. In 1992 *National League of Nurses in the United States* ordered the inclusion of the development of critical thinking skills as basic element of curriculum at all levels of nursing education [8]. Subsequently, critical thinking, included in nursing education programs at the elementary level, was incorporated into accreditation standards worldwide [9].

In nursing literature, though several definitions of critical thinking were proposed, it seems that critical thinking is a multi-dimensional construct as well as difficult to define [10]. Absence of a clear definition of critical thinking involves challenges in understanding and application in nursing education. On the basis of a literature review and various definitions of critical thinking, 10 defining characteristics of critical thinking were identified: 1) recognition of unique situation which requires further evaluation; 2) determination of the group of criteria for analyses of ideas; 3) usage of reasonable resolution to assess the situation; 4) identification of personal assumptions and preconceptions; 5) remaining open and flexible; 6) intentional figuring out situation from all possible angles; 7) selection of the best solution based on personal knowledge and experience level; 8) willingness to take risks and make decisions; 9) self-confidence in the implementation of selected solution; 10) preparedness to change of opinion when new facts are presented and obligation to achieve better results [6].

Taking into account the current situation of clinical environment, health condition, age distribution of society, current human resources and lack of replacement of generations in the nurse and midwife profession in Poland, which entails a greater workload and also less time spent on patient, nurses often rely on critical thinking to make the appropriate clinical decisions and improve the quality of service [10,11]. The absence of critical thinking in the clinical sphere may contribute to delays or omission of diagnoses, cognitive mistakes and lead to the poor management [12]. Critical thinking skills are directly linked to identification of deteriorating condition of patients as well as achieving patient safety [13]. *The National League for Nursing Commission for Nursing Education Accreditation* (2016) concludes that one of the aims of nursing education is preparing future nursing staff for critical thinking to ensure optimal health care [10].

AIM

The objective of this paper is an attempt to answer the research question: which factors influence the development of critical thinking among nursing students?

MATERIALS AND METHODS

The electronic databases like PubMed, Scopus, Web of Science and EBSCO were searched in accordance with the guidelines of *Preferred Reporting Items for Systematic Review and Meta Analyzes* (PRISMA). The search used a combination of keywords: "critical thinking", "nursing", "nursing care", "nursing education" which were connected by the Boolean operators "and"" and "or". Criteria for inclusion and exclusion of publications were included in Tab. 1.

Tab. 1. Criteria for inclusion and exclusion of research in the analysis

Inclusion criteria	Exclusion criteria
• articles published in 2011-2021 • publication in Polish or English • full text of publication	• articles published before 2011 • publication in language other than Polish or English • lack of access to full text of publication

The authors in reviewing and selecting articles worked with mobile app Rayyan, a tool designed in order to facilitate the review of literature. Articles have been verified independently by two authors, while any discrepancies were discussed. In assessment of the methodological quality of the articles qualified for further analysis, package of check-lists Center of Evidence-Based Management (CEBMa, Dutch Cochrane Centre) was used. Critical evaluation allowed to analyse the character of literature in a structured manner, based on specific check-lists. The package of check-lists CEBMa contains a number of questions which can be answered: yes/can't tell/no. Assessing the methodological quality of the article, each valuable response was assigned the appropriate number of points (yes – 1 point, can't tell/no – 0 points), then result obtained was compared to the maximum number of points which can be achieved by calculating the percentage.

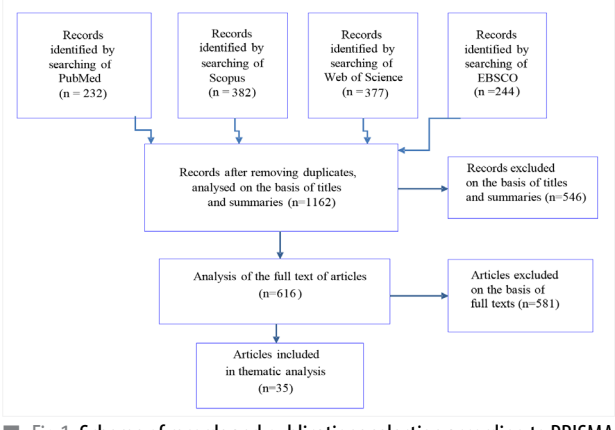

Fig 1. Scheme of records and publications selection according to PRISMA (Moher D et al. 2021)

Preliminary search resulted in 1235 records, 73 of them were duplicates. After further analysis, 546 summaries and articles were successively excluded. Finally, 616 articles were examined and 35 of them were included in the review.

RESULTS

Analysis allowed to extract many factors affecting the critical thinking. Among qualified publications, there were 8 systematic reviews, 6 meta-analyses, 2 cross-sectional studies, 9 quasi-experimental studies, 4 randomized clinical trials, 3 qualitative studies, 2 quantitative studies, 1 case-control study.

Publications under review clustered around the following thematic areas:

1. Teaching methods and strategies increasing critical thinking skills (Tab. 2, articles: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 24, 25, 26, 27, 30, 31, 35)
2. Learning styles, learning models and educational programs (Tab. 2, articles: 3, 18, 28, 33)
3. Individual factors, such as age, gender, empathy, emotional intelligence (Tab. 2, articles: 20, 22, 29, 32, 34)
4. Cultural influences (Tab. 2, article 23)

Tab. 2. Qualitative analysis of research included in the review

	Authors	Title of the article	Research method Research tool Sample	Literature Number/ Scope	Methodological quality
1	Sullivan EA (2012)	Critical thinking in clinical nurse education: Application of Paul's model of critical thinking	Method: literature analysis Resources: lack Sample: lack	34 1990-2010	40%
2	Tedesco-Schneck M (2013)	Active learning as a path to critical thinking: Are competencies a roadblock?	Method: literature analysis Resources: lack Sample: lack	36 1949-2011	50%
3	Andreou C, et al. (2014)	Learning styles and critical thinking relationship in baccalaureate nursing education: a systematic review	Method: systematic review Resources: 11 electronic databases without geographic and temporal publishing filters, manual logs searching Sample: 6 articles	76 1983-2013	70%
4	Carter AG, et al. (2016)	Efficacy of teaching methods used to develop critical thinking in nursing and midwifery undergraduate students: A systematic review of the literature	Method: systematic review Resources: CINAHL, Ovid Medline, ERIC, Informit, PsycINFO, Scopus Sample: 28 articles	53 1977-2015	60%
5	Johanns B, et al. (2017)	A systematic review comparing open-book and closed-book examinations: Evaluating effects on development of critical thinking skills	Method: systematic review Resources: Educational Resources Information Center (ERIC), Education Source, Medline/Pubmed, CINAHL, Psych Articles and PsycINFO Sample: 15 articles	22 2009-2017	60%
6	Carvalho DPSRP, et al. (2017)	Strategies used for the promotion of critical thinking in nursing undergraduate education: A systematic review	Method: systematic review Resources: National Library of Medicine and National Institutes of Health (PUBMED/MEDLINE), Cumulative Index to Nursing and Allied Health Literature (CINAHL), SCOPUS, Science Direct, Web of Science Sample: 6 articles	26 1989-2015	70%
7	Jeppesen KH, et al. (2017)	Education of student nurses – A systematic literature review	Method: systematic review Resources: PubMed, Cinahl, Scopus, Web of Science, ProQuest Sample: 45 articles	55 2000-2015	60%
8	Adib-Hajbaghery M, et al. (2017)	Effect of simulation training on the development of nurses and nursing students' critical thinking: A systematic literature review	Method: systematic review Resources: PubMed, Science Direct, ProQuest, ERIC, Google Scholar and Ovid, MagIran and SID Sample: 16 articles	33 2001-2015	70%
9	Kong LN, et al. (2014)	The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-analysis	Method: review of the literature, meta-analysis Resources: PubMed, EMBASE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Proquest, Cochrane Central Register of Controlled Trials (CENTRAL), China National Knowledge Infrastructure (CNKI) Sample: 8 articles	55 1988-2012	75%
10	Michelangelo L (2015)	The overall impact of emotional intelligence on nursing students and nursing	Method: meta-analysis Resources: lack Sample: 395 articles	38 1995-2013	33%
11	Lee J, et al. (2016)	A meta-analysis of the effects of non-traditional teaching methods on the critical thinking abilities of nursing students	Method: review of the literature, meta-analysis Resources: PubMed, Cochrane Library, CINAHL, Embase, KoreaMed databases Sample: 8 articles	30 1990-2015	67%
12	Bertacchini de Oliveira L, et al. (2016)	Effectiveness of teaching strategies on the development of critical thinking in undergraduate nursing students: a meta-analysis	Method: meta-analysis Resources: PubMed, CINAHL, EMBASE, Web of Science, SCOPUS, LILACS, Cochrane CENTRAL, PsycINFO, ERIC Sample: 12 articles	48 2003-2015	83%
13	Yue M, et al. (2017)	The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis	Method: review of the literature, meta-analysis Resources: PubMed, Web of Science, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index to Nursing and Allied Health (CINAHL) and China National Knowledge Infrastructure (CNKI) Sample: 11 articles	34 1990-2016	75%

cont. Tab. 2. Qualitative analysis of research included in the review

	Authors	Title of the article	Research method Research tool Sample	Literature Number/ Scope	Methodological quality
14	Cui C, et al. (2018)	The effectiveness of evidence-based nursing on development of nursing students' critical thinking: A meta-analysis	Method: meta-analysis Resources: Cochrane Central Register of Controlled Trials (CENTRAL), PubMed, EMBASE, Web of Science, Cumulative Index to Nursing and Allied Health (CINAHL),Chinese BioMed Database (CBM), China National Knowledge Infrastructure (CNKI), WanFang Database Sample: 9 articles	39 1992-2017	67%
15	Atay, et al. (2012)	Care plans using concept maps and their effects on the critical thinking dispositions of nursing students	Method: experimental design, diagnostic survey Research tool: California Critical Thinking Disposition Inventory Sample: 80 nursing students	30 1984-2009	89%
16	Pai HC, et al. (2013)	Effect of Caring Behavior on Disposition Toward Critical Thinking of Nursing Students	Method: cross-sectional study, diagnostic survey Research tool: Critical Thinking Disposition Inventory - Chinese Version, Caring Behaviors Scale Sample: 373 nursing students	41 1979-2009	83%
17	Chan ZCY (2013)	Exploring creativity and critical thinking in traditional and innovative problem-based learning groups	Method: exploratory qualitative study, interview, partially structured focus groups Research tool: interview questionnaire Sample: 100 nursing students	57 1973-2012	80%
18	Pucer P, et al. (2014)	An information communication technology based approach for the acquisition of critical thinking skills	Method: quasi-experiment, diagnostic survey Research tool: Moodle platform, web application BitStrips, authorial questionnaire Sample: 40 nursing students	40 1988-2013	78%
19	Hong SH, et al. (2017)	Comparison of the effectiveness of two styles of case-based learning implemented in lectures for developing nursing students' critical thinking ability: A randomized controlled trial	Method: diagnostic survey Research tool: Critical Thinking Disposition Inventory – Chinese version (CTDI-CV) Sample: 122 nursing students	70 1964-2016	73%
20	Dehghanzadeh S, et al. (2018)	Comparing the effects of traditional lecture and flipped classroom on nursing students' critical thinking disposition: A quasi-experimental study	Method: quasi-experiment, diagnostic survey Research tool: demographic questionnaire, Ricketts' Critical Thinking Disposition Inventory Sample: 85 nursing students	49 1998-2018	89%
21	Carbogim FDC, et al. (2018)	Educational intervention to improve critical thinking for undergraduate nursing students: A randomized clinical trial	Method: diagnostic survey Research tool: California Critical Thinking Dispositions Inventory (CCTDI), California Critical Thinking Skills Test (CCTST) Sample: 102 nursing students	29 1990-2017	82%
22	Boostel R, et al. (2018)	Stress of nursing students in clinical simulation: a randomized clinical trial	Method: diagnostic survey Research tool: KEZKAK Questionnaire Sample: 54 nursing students	36 1956-2016	73%
23	Hasanpour M, et al. (2018)	The relationship between emotional intelligence and critical thinking skills in Iranian nursing students	Method: descriptive correlational quantitative study, diagnostic survey Research tool: California Critical Thinking Test (form B), Bar-On Emotional Intelligence Questionnaire Sample: 169 nursing students	36 2006-2017	73%
24	Lee KE (2018)	Effects of Team-Based Learning on the Core Competencies of Nursing Students: A Quasi-Experimental Study	Method: diagnostic survey Research tool: Global Interpersonal Communication Competence Scale, Critical Thinking Disposition Instrument, Revised Self-Leadership Questionnaire Sample: 183 nursing students	29 1990-2016	89%
25	Chang CY, et al. (2019)	From experiencing to critical thinking: a contextual game based learning approach to improving nursing students' performance in Electrocardiogram training	Method: quasi-experiment, diagnostic survey Research tool: The Learning Motivation Scale, Questionnaires about Learning Performance, Critical Thinking, Learning Attitudes and Learning Satisfaction Sample: 72 nursing students	90 1967-2019	89%
26	Chan ZCY (2019)	Nursing students' view of critical thinking as 'Own thinking, searching for truth, and cultural influences'	Method: descriptive qualitative study, interview, focus groups Research tool: interview questionnaire Sample: 65 nursing students	29 1998-2019	80%
27	Kim JS, et al. (2019)	Effects of an evidence-based practice education program using multifaceted interventions: a quasi-experimental study with undergraduate nursing students	Method: quasi-experiment, diagnostic survey Research tool: Evidence Based Practice Evaluation Competence Questionnaire (EBP-COQ), Knowledge of EBP Subscale, Attitudes Toward EBP Subscale, Cognitive Skills of Evidence-Based Practice, Essential Competencies for Evidence-Based Practice in Nursing, Future Use of EBP, Knowledge, Attitude and Behavior Questionnaire (KABQ), Critical Thinking Disposition Scale for Nursing Students Sample: 44 nursing students	39 2000-2018	89%
28	Liu NY, et al. (2019)	The effect of gender role orientation on student nurses' caring behaviour and critical thinking	Method: quantitative correlational study, diagnostic survey Research tool: Taiwan Critical Thinking Disposition Inventory (CTDI), Caring Assessment Report Evaluation Q-sort Scale (CARE-Q), Bern Sex Role Inventory (BSRI) Sample: 449 nursing students	43 1951-2018	73%

cont. Tab. 2. Qualitative analysis of research included in the review

	Authors	Title of the article	Research method Research tool Sample	Literature Number/ Scope	Methodological quality
29	Son HK (2020)	Effects of S-PBL in Maternity Nursing Clinical Practicum on Learning Attitude, Metacognition and Critical Thinking in Nursing Students: A Quasi-Experimental Design	Method: quasi-experiment, diagnostic survey Research tool: Learning Attitude Measuring Scale, California Critical Thinking Disposition Inventory (CCTDI) Sample: 78 nursing students	30 1976-2020	89%
30	Berger K, et al. (2020)	Motivation for Critical Thinking in Nursing Students in Chile	Method: analytical cross-sectional correlation study, diagnostic survey Research tool: Critical Thinking Motivation Scale Sample: 478 nursing students	26 2004-2020	75%
31	Aein F, et al. (2020)	The effect of problem-solving-based interprofessional learning on critical thinking and satisfaction with learning of nursing and midwifery students	Method: quasi-experiment, diagnostic survey Research tool: California Critical Thinking Scale (CCTS), Visual Analogue Scale Sample: 20 nursing students and 28 midwifery students	36 2003-2019	67%
32	Bilik Ö, et al. (2020)	Effects of web-based concept mapping education on students' concept mapping and critical thinking skills: A double blind, randomized, controlled study	Method: diagnostic survey Research tool: information form, concept map evaluation keys, Critical Thinking Motivational Scale (CTMS), structured interview form Sample: 419 nursing students	32 2006-2018	82%
33	Lopez M, et al. (2020)	The impact of an educational intervention on nursing students' critical thinking skills: A quasi-experimental study	Method: quasi-experiment, diagnostic survey Research tool: Critical Thinking Questionnaire Sample: 112 nursing students	36 1990-2019	78%
34	Salar AR, et al. (2020)	Comparing the effect of "learning based on classic education" and "learning based on participatory education" on nursing students critical thinking: A case-control study	Method: case-control study, diagnostic survey Research tool: California Critical Thinking Questionnaire Sample: 38 nursing students	28 1999-2014	70%
35	Boso CM, et al. (2021)	Students' and educators' experiences with instructional activities towards critical thinking skills acquisition in a nursing school	Method: exploratory descriptive qualitative study, interview Research tool: partially structured conversation guide Sample: 11 nursing students, 4 full-time teachers	37 1990-2020	80%

DISCUSSION

There are various factors influencing the development of critical thinking skills among students. Common educational interventions which promote the growth of critical thinking are active learning strategies, problem-based learning methods (PBL), concept mapping, simulation, case studies [14,15,16]. Evidence-based learning methods are also important [17,18]. Modern methods of active learning in nursing education, which support critical thinking, include use of case studies, directed homework, simulation, storytelling, games and role playing [19].

Problem-Based Learning is an effective approach to education which motivates students to independent learning. PBL also fosters development of critical thinking skills, leadership and teamwork. Review and meta-analysis conducted by Kong et al. [20] provides evidence confirming positive impact of PBL on critical thinking abilities among nursing students as compared to traditional lectures.

Simulation based on problem learning (Simulation Problem-Based Learning) illustrates different clinical situations. The research confirms its significance and effect on attitude to learning, metacognition and critical thinking in nursing students [21]. Simulation strategy increases students' ability to self-assessment and critical reflection on responsibility for learning, but also reinforces the need for obtaining necessary skills and competence relating to providing care for patients [22].

Concept mapping strategy is also effective in increasing critical thinking skills as well as predisposition to this type of thinking [23,24]. Students confirmed that concept maps facilitated their learning process and management of nursing processes [25]. The result of meta-analysis performed by Yue et al. [26] suggested that concept maps may have impact on affective disposition of critical thinking, including analyticity, seeking truth, openness, self-confidence, orderliness, maturity, inquisitiveness and cognitive ability to think critically.

Evidence-Based Practice is a rational use of current evidence in deciding on the patient care. Kim et al. [27] in their research discovered that programme Evidence-Based Practice Education Program for Undergraduate Nursing Students (EBP-EPUNS) designed by them successfully improved knowledge, skills, competencies, attitude, future use of EBP and critical thinking in nursing students. Whereas, Cui et al. [28] in performed meta-analysis indicate that Evidence-Based Nursing may help nursing students develop critical thinking. EBN teaching method affects the ability to solve problems (inference, deduction, identification of assumptions, interpretation, assessment of arguments), along with approach to problem processing.

Approach to learning in nursing education based on games influences participants in the dimension of efficiency of learning, motivation, critical thinking and approach to the learning process. The student is situated in decision-making contexts which reflect actual cases [29].

Composing songs, writing poetry as well as role playing, increases students' awareness of the relationship between creativity, critical thinking and nursing care. Collaborative composing of songs supports mastering professional knowledge as well as allows to convert it into context situations. By writing the lines, students summarize what they have learned. Role playing arouses empathy, evolving analytical reasoning and improves communication with patients [30].

In developing critical thinking teamwork plays particular role. Salaret al. [31] in their studies proved that participative education has increased the result of critical thinking among nursing students. Aein et al. [32] observed that interprofessional education based on problem solving significantly improves general critical thinking skills in students, especially in the aspect of analysis and deductive inferencing, along with an impact on student satisfaction with the learning process. Team-Based Learning (TBL) is recommended as an effective method of teaching basic competences of nursing students [33]. Dehghanzadeh et al. [34] indicated increased results of critical thinking when inverse class is applied in the group.

Andreou et al. [35] in their research revealed possible connection between learning styles and critical thinking. The theoretical basis of learning styles and critical thinking includes cognitive and affective habitual aspects. Understanding this relationship between similar characteristics in the intellectual world of students can constitute a valuable point of departure for motivating and supporting them in learning of critical thinking and its usage during this process.

Paul's critical thinking model focuses on increasing critical thinking at all levels of science. It has both a philosophical and a theoretical approach to critical thinking and may be used in academic as well as real-time reasoning [5].

What is interesting, results of research by Liu et al. [36] indicate that students, who showed greater concern and masculinity, demonstrated higher critical thinking. Gender, age, femininity or clinical experience of students did not show any significant relationship with critical thinking. Masculinity had indirect influence on critical thinking through caring behaviours. Also research by Pai et al. [37] indicate that persons with higher frequency of caring behaviours had increased score of critical thinking level relating to nursing practice.

Training in the field of emotional intelligence strengthened critical thinking and emotional skills among nursing students. Michelangelo [38] conducted a meta-analysis including nursing skills and features connected with emotional intelligence. All studies have shown a positive correlation between critical thinking and emotional intelligence. Conversely, research of Hasanpour [39] revealed significant relationship between empathy and critical thinking skills in nursing students. The author concludes that the skills of emotional intelligence and critical thinking can hone with active learning and teaching methods, such as brainstorming, teamwork, concept mapping, Socratic questions and responses, self-education, problem solving and modelling of teacher roles in nursing education.

Chan [10] identifies cultural factors as affecting the use of critical thinking. When cultural norms support the view of own beliefs among individuals, this can induce following one's own way of thinking. However, when in society the freedom of people is restricted, or traditional perception reigns, this might prevent the development of their own thoughts. People may have a tendency to following the general way of thinking. Some study participants explained that as support for expression of opinion increases, the conditions for the development of critical thinking are more favourable and vice versa. They also underlined the significant role of education and parental culture in developing critical thinking. Passive approach to education which provides the knowledge in only one direction, such as lectures, may reduce the development of critical thinking skills. Likewise, the atmosphere which discourages questioning or clarify information.

SUMMARY

Critical thinking is essential for nursing practice. More and more publications have recently been created focusing on this subject. The analysis of thematic literature has led to the identification of factors affecting critical thinking. Among them, enormous significance is extreted by educational factors, i.e.: methods an strategies for teaching, educational programs, learning styles as well as individual factors, such as empathy, emotional intelligence, caring behaviours. Important for the development of critical thinking are also cultural circumstances. Culture can bring both the opportunities and difficulties for students, depending on its character.

ORCID

Danuta Zarzycka https://orcid.org/0000-0001-7544-4181
Monika Gesek https://orcid.org/0000-0002-2348-4912

REFERENCES

1. Bavier AR. Education's Why. Debriefing as How. Nurs. Educ. Perspect. January/February 2016; 37(1): 1.
2. Dinkins CS, Cangelosi PR. Putting Socrates back in Socratic method: Theory-based debriefing in the nursing classroom. Nurs. Philos. 2019; 20(2).
3. Dwyer CP, Hogan MJ, Harney OM, et al. Facilitating a student-educator conceptual model of dispositions towards critical thinking through interactive management. Educ. Technol. Res. Dev. 2017; 65: 47-73.
4. Nonis SA, Hudson GI. Developing and assessing critical thinking skills in marketing students: the power of making explicit problem-solving processes. J. Educ. Bus. 2018; 93: 1-9.
5. Sullivan EA. Critical thinking in clinical nurse education: application of Paul's model of critical thinking. Nurse Educ. Pract. 2012 Nov; 12(6): 322-327.
6. Robert RR, Petersen S. Critical thinking at the bedside: providing safe passage to patients. Medsurg. Nurs. 2013 Mar-Apr; 22(2): 85-93, 118.
7. Facione P. Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction. The Delphi Report: Research Findings and Recommendations Prepared for the American Philosophical Association. Executive Summary. Fullerton, California: The California Academic Press; 1990.
8. National League for Nursing. Criteria and Guidelines for the Education of Baccalaureate and Higher Degree Programs in Nursing. New York: National League for Nursing; 1992.
9. Joint Commission for Accreditation for Healthcare Organisations (JCAHO). Accreditation Manual for Hospitals. Oakbrook, IL, USA: The Joint Commission; 1993.
10. Chan ZCY. Nursing students' view of critical thinking as ‚Own thinking, searching for truth, and cultural influences'. Nurse Educ. Today. 2019 Jul; 78: 14-18.

11. Arslantaş S, Kurnaz A. Classifying master's and PhD theses whose titles contain concept of "critical thinking" by different variables. Int. J. Modern Educ. Stud. 2017; 1(1): 58-68.
12. Huang GC, Newman LR, Schwartzstein RM. Critical Thinking in Health Professions Education:Summary and Consensus Statements of the Millennium Conference 2011. Teach Learn Med. 2014; 26(1): 95-102.
13. Jacob E, Duffield C, Jacob D. A protocol for the development of a critical thinking assessment tool for nurses using a Delphi technique. J. Adv. Nurs. 2017; 73(8): 1982-1988.
14. Carter AG, Creedy DK, Sidebotham M. Efficacy of teaching methods used to develop critical thinking in nursing and midwifery undergraduate students: A systematic review of the literature. Nurse Educ. Today. 2016 May; 40: 209-218.
15. Carvalho DSRP, Azevedo IC, Cruz GKP. Strategies used for the promotion of critical thinking in nursing undergraduate education: A systematic review. Nurse Educ. Today. 2017 Oct; 57: 103-107.
16. Hong S, Yu P. Comparison of the effectiveness of two styles of case-based learning implemented in lectures for developing nursing students' critical thinking ability: A randomized controlled trial. Int. J. Nurs. Stud. 2017 Mar; 68: 16-24.
17. López M, Jiménez JM, Martín-Gil B, et al. The impact of an educational intervention on nursing students' critical thinking skills: A quasi-experimental study. Nurse Educ. Today. 2020 Feb; 85:.104305.
18. Boso CM, van der Merwe AS, Gross J. Students' and educators' experiences with instructional activities towards critical thinking skills acquisition in a nursing school. Int. J. Africa Nurs. Sci. 2021; 14: 100293.
19. Tedesco-Schneck M. Active learning as a path to critical thinking: Are competencies a roadblock? Nurse Educ. Pract. 2013; 13: 58-60.
20. Kong LN, Qin B, Zhou Y, et al. The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-analysis. Int. J. Nurs. Stud. 2014 Mar; 51(3): 458-469.
21. Son HK. Effects of S-PBL in Maternity Nursing Clinical Practicum on Learning Attitude, Metacognition and Critical Thinking in Nursing Students: A Quasi-Experimental Design. Int. J. Environ. Res. Public Health. 2020 Nov; 17(21): 7866.
22. Boostel R, Felix JVC, Bortolato-Major C. Stress of nursing students in clinical simulation: a randomized clinical trial. Rev. Bras. Enferm. May-Jun 2018; 71(3).
23. Atay S, Karabacak U. Care plans using concept maps and their effects on the critical thinking dispositions of nursing students. Int. J. Nurs. Pract. 2012 Jun;18(3): 233-239.
24. Lee J, Lee Y, Gong S, et al. A meta-analysis of the effects of non-traditional teaching methods on the critical thinking abilities of nursing students. BMC Med. Educ. 2016 Sep15; 16(1): 240.
25. Bilik Ö, Kankaya EA, Deveci Z. Effects of web-based concept mapping education on students' concept mapping and critical thinking skills: A double blind, randomized, controlled study. Nurse Educ. Today. 2020 Mar; 86: 104312.
26. Yue M, Zhang M, Zhang C, et al. The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis. Nurse Educ. Today. 2017 May; 52: 87-94.
27. Kim JS, Gu MO, Chang H. Effects of an evidence-based practice education program using multifaceted interventions: a quasi-experimental study with undergraduate nursing students. BMC Med Educ. 2019; 19(71).
28. Cui C, Li Y, Geng D, et al. The effectiveness of evidence-based nursing on development of nursing students' critical thinking: A meta-analysis. Nurse Educ. Today. 2018 Jun; 65: 46-53.
29. Chang CY, Kao CH, Hwang GJ, et al. From experiencing to critical thinking: a contextual game-based learning approach to improving nursing students' performance in Electrocardiogram training. Education Tech. Research Dev. 2020; 68: 1225-1245.
30. Chan ZC. Exploring creativity and critical thinking in traditional and innovative problem-based learning groups. J. Clin. Nurs. 2013 Aug; 22(15-16): 2298-2307.
31. Salar AR, Fouladi B, Sarabandi A. Comparing the effect of „learning based on classic education" and „learning based on participatory education" on nursing students critical thinking: A case-control study. J. Educ. Health Promot. 2020 Feb; 28(9): 47.
32. Aein F, Hosseini R, Naseh L, et al. The effect of problem-solving-based interprofessional learning on critical thinking and satisfaction with learning of nursing and midwifery students. J. Educ. Health Promot. 2020; 9: 109.
33. Lee KE. Effects of Team-Based Learning on the Core Competencies of Nursing Students: A Quasi-Experimental Study. J. Nurs. Res. 2018 Apr; 26(2):.88-96.
34. Dehghanzadeh S, Jafaraghaee F. Comparing the effects of traditional lecture and flipped classroom on nursing students' critical thinking disposition: A quasi-experimental study. Nurse Educ. Today. 2018 Dec; 71:.151-156.
35. Andreou C, Papastavrou E, Merkouris A. Learning styles and critical thinking relationship in baccalaureate nursing education: a systematic review. Nurse Educ. Today. 2014 Mar; 34(3): 362-371.
36. Liu NY, Hsu WY, Hung CA, et al. The effect of gender role orientation on student nurses' caring behaviour and critical thinking. Int. J. Nurs. Stud. 2019 Jan; 89: 18-23.
37. Pai HC, Eng CJ, Ko HL. Effect of caring behavior on disposition toward critical thinking of nursing students. J. Prof. Nurs. 2013 Nov-Dec; 29(6):.423-429.
38. Michelangelo L. The overall impact of emotional intelligence on nursing students and nursing. Asia Pac J. Oncol. Nurs. 2015; 2: 118-124.
39. Hasanpour M, Bagheri M, Ghaedi Heidari F. The relationship between emotional intelligence and critical thinking skills in Iranian nursing students. Med. J. Islam Repub. Iran. 2018; 32: 40.

Manuscript received: 03.09.2021
Manuscript accepted: 26.01.2022

Translation: Monika Gesek