Systematic Review

Factors associated with clinical competency of nursing students

Bonsak Yoeum[1], Virya Koy[1,2]*, Rany Sam[1]

[1]Postgraduate School of National University of Battambang, Ministry of Education, Youth and Sport, Cambodia
[2]Department of Hospital Services, Ministry of Health, Cambodia

*Correspondence:
Dr. Virya Koy,
E-mail: virya2403koy@gmail.com

ABSTRACT

A critical priority and challenge in nursing education today is caused by the variability of the healthcare environment. This systematic review reported findings on the independent variables that are associated with nursing students' clinical competency. A literature review search was conducted using Mendeley's website in 2023 with using keywords such as nursing clinical competency and nursing student. The Mixed Methods Appraisal Tool (MMAT) was used to appraise and describe the methodological quality. A narrative report was given on the synthesis of the results. Based on the inclusion and exclusion criteria, 16 papers were retained out of 1162 identified research publications. Among 16 papers, the common predictive factors mentioned in the reviewed articles on the clinical competency of nursing students include clinical learning environment, self-efficacy, and self-awareness. Other factors such as clinical training program, type of learning-teaching, learning experiences, and socio-demographics were involved as the significant variables toward clinical competency. There are several other characteristics or predictors of clinical competency that require further investigation.

Keywords: Clinical competency, Factors associated, Clinical learning environment, Self-efficacy, Self-awareness, Nursing students

INTRODUCTION

A critical priority and challenge in nursing education today caused by the variability of the health care environment. In nursing education, there are 8 domains: theories and principles of adult learning; curriculum design and implementation; nursing practice (clinical competence); research and evidence; communication, collaboration and partnership; ethical/legal principles and professionalism; monitoring and evaluation; management and leadership. However, nursing practice maintains current knowledge and skills in theory and practice, based on the best evidence available.[1] Clinical competence is one of the competencies for effective learning in nursing education. Clinical competence has been cited as the final goal of nursing education. It includes skills in utilizing knowledge and information, communication and interpersonal skills, problem-solving, and technical skills.[2] The study's results suggest that undergraduate nursing student achievement can be predicted by four variables, which account for 72 percent of the variance of scores that assess academic and clinical performance after the third-year level of nursing studies.[3] Currently, there is a study about the Cambodian history of nursing education in Cambodia, which has not examined the factors affecting the student's clinical

performance yet. This review paper was the first attempt to identify the associated factors toward clinical competency for nursing students.

Clinical competency

Clinical competency is defined by several different perspectives, for example, the taxonomy of educational objectives defined clinical competence as a psychological construct including cognitive, emotional, and psychomotor areas. This categorization is based on Bloom's taxonomy for education goals. Nursing competence involves knowledge, skills, and the ability to take action to satisfactorily perform one's professional duties in addition to ethics, values, and the ability to perform reflective practice.[4,5] The novice to expert theory by Benner offers a methodical approach to comprehending how learners students, novices, or experienced nurses develop their abilities and comprehension of a practice scenario or event over time. The theory has demonstrated its applicability across various contexts, encompassing nursing education, nurse retention, graduates, nursing leadership, and management. The Dreyfus model of skill acquisition was the cornerstone of Benner's theory, incorporating engineering and philosophical insights. Given its applicability to nursing, the theory can be regarded as a shared theory change to numeric style.[6]

Aim

This systematic review reported findings on the independent variables that are associated with nursing students' clinical competency. In addition, this was part of a dissertation: "factors associated with clinical competency of nursing students, Cambodia". The review used the following questions: what are the predictive factors that affect the clinical competency in nursing students?

METHODS

Review methodology

The literature search aimed to gather the most up-to-date and relevant information. The inclusion criteria for the search were articles published between 2015 and 2023 in English using Google, CINAHL, ScienceDirect, HINARI, and PubMed and focused on the specific research question. The Mendeley program retrieved articles and then screened them based on their relevance to clinical competence, nursing competence, and nurse competencies in clinical settings.
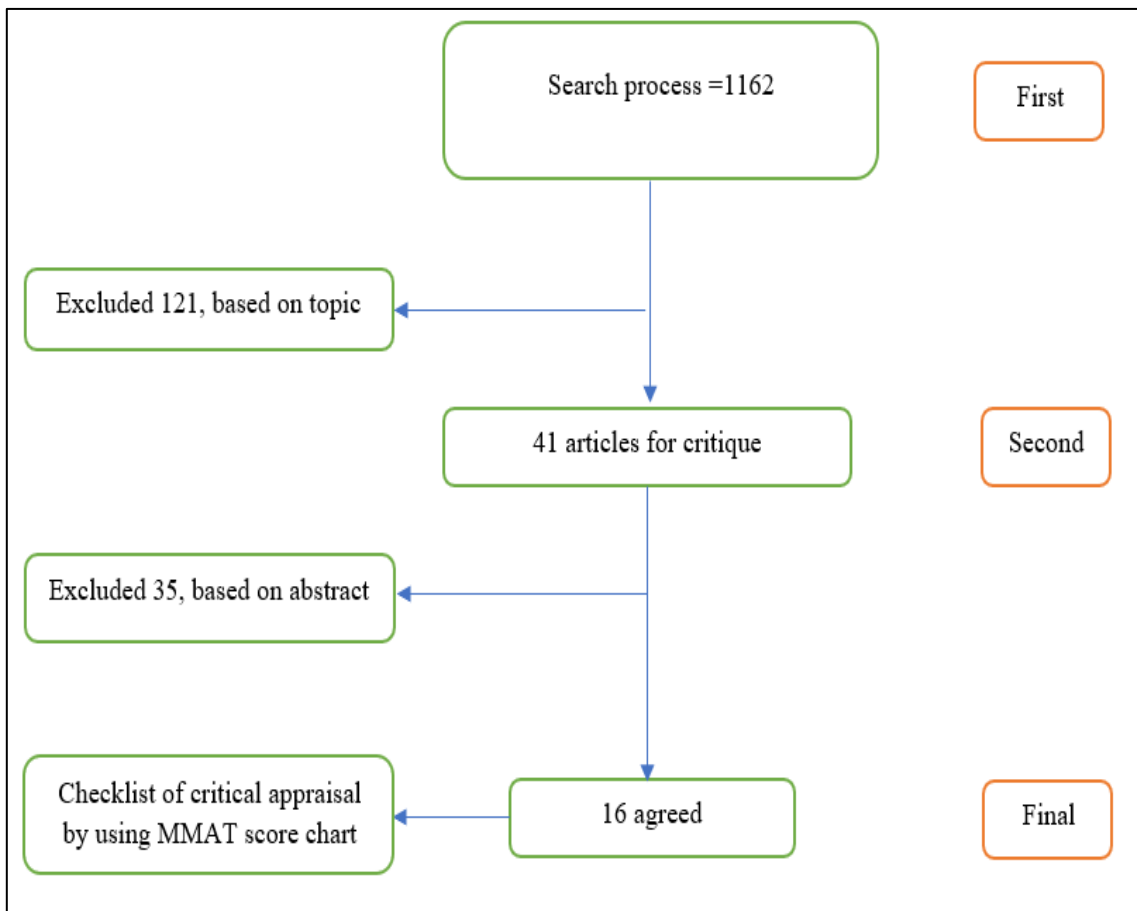

Figure 1: Flow chart of articles selection.

Inclusive and exclusive criteria

The following inclusion criteria were applied when choosing the literature: publications concentrating on hospital clinical nurses' competency development; English-language articles released between 2015 and 2023; papers where the study title and abstract reference nursing competency; publications using hospital nurses as the study's sample; and those who use a cross-sectional, experimental, or qualitative approach. The researchers also excluded articles that focused on specific cultural, safety, or information technology competencies and those in which the study sample did not include nurses or nursing students. Furthermore, articles that did not meet the sample size or study duration criteria were also excluded from the analysis.

Retrieval of the articles for review and critical appraisal

Four phases comprised the review (Figure 1). Initially, 1162 extracts were obtained from the primary search: 445 from Google, 315 from PubMed, 252 from Mendeley, 116 from ScienceDirect, and 34 from HINARI.

Furthermore, the papers were assessed based on the inclusion criteria; abstracts accounted for 121 of the totals, leaving 41 articles for independent reading by three reviewers as full papers. Thirdly, 35 duplicate articles were eliminated by the three reviewers, leaving 16. Grouping the reference lists of the sixteen articles (Figure 1). The assessors then conducted an independent critical evaluation of the full texts of the sixteen selected articles. The examiners' checklist consisted of critical evaluation, as the cumulative score was 100, whereas an 80-point score indicated persuasiveness.

RESULTS

The methodological quality of the selected studies were conducted in Cambodia, Indonesia, China, Iran, Korea, Taiwan, Ethiopia, Spain, the USA, and Canada. However, the research objective, design, key findings, and MMAT score of 16 selected studies are described in Table 1. The 16 studies were taken part in Cambodia (1), Indonesia (2), China (1), Iran (2), Korea (3), Taiwan (1), Ethiopia (1), Spain (1), USA (3) and Canada (1) (Figure 2). Seven factors were identified as influencing clinical nurse competencies from a review of sixteen papers.
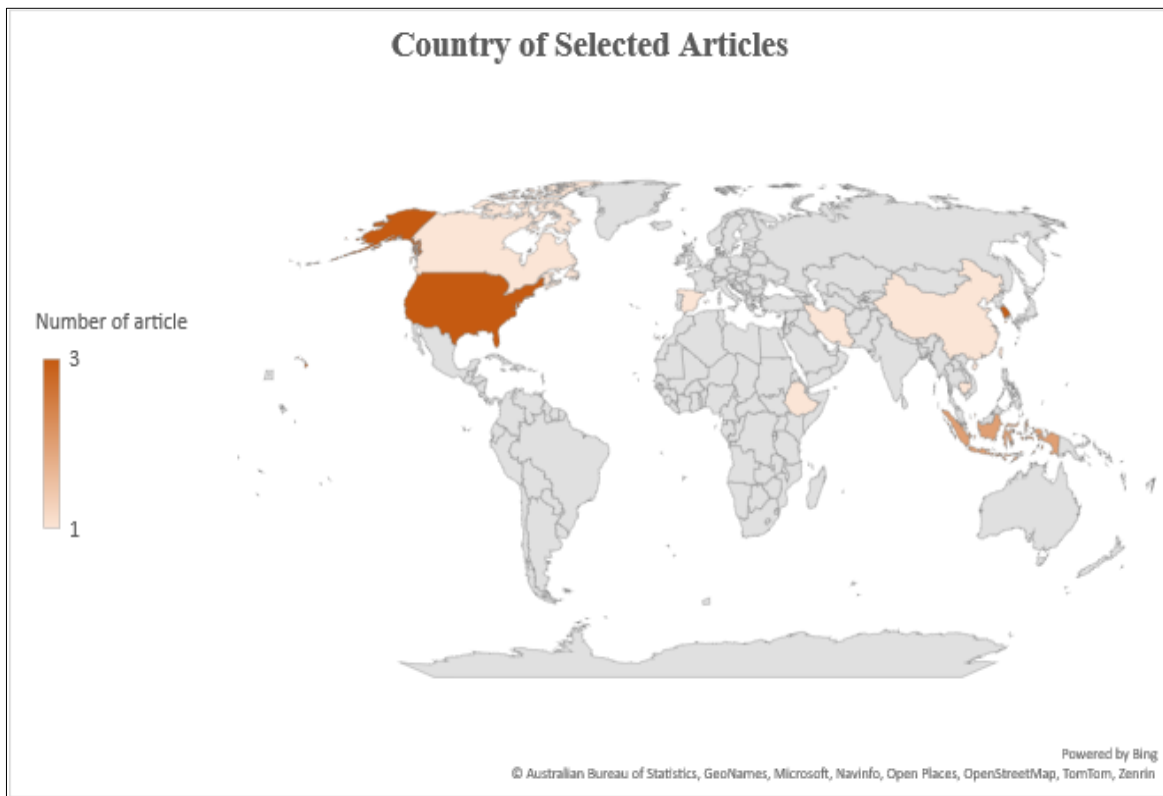
Figure 2: Studies geography.

Table 1: Data matrix.

Author/year/country	Objective	Design	Main findings	MMAT (%)
Cha et al[13] (Cambodia)	To assess improvement in the competency	This mixed-method study was used to identify competency improvement in	significant improvements in students' nursing competency (p<0.001), critical thinking (p<0.001), and research	80

Continued.

Author/year/ country	Objective	Design	Main findings	MMAT (%)
	of nursing students and faculty members through a program that prepares associate's degree nurses to obtain bachelor's degrees in Cambodia.	Cambodian nursing students and faculty who participated in the nurse-bridging program.	competency (p<0.001) and faculty members' teaching competency (p<0.001) and research competency (p<0.001) after the program. Students showed improvement in physical assessment, patient communication, critical thinking, evidence-based nursing, and research competency.	
Rezwan Hakimzadeh et al[8] (Iran)	This study aimed to investigate factors that influence learning in nursing education.	This study is descriptive research. 162 participants were studied.	The regression analysis results showed that in total, clinical learning environment, gender, self-efficacy beliefs and curricular variables explained 31/3 percent of the variance clinical competence as dependent variable. This study showed that the clinical learning environment and curriculum with self-efficacy impacted clinical competency and learning in nursing education.	40
Sung-Yun et al[19] (Korea)	This study aims to investigate the effects of clinical training stress and clinical training satisfaction on clinical competency during pediatric nursing training in nursing students	Ninety-one nursing students participated. This study is a descriptive correlational study investigating the effects of stress and satisfaction with pediatric nursing training on clinical competency in nursing students.	This study found that clinical competency had a significant negative correlation with clinical training stress (r =−0.356, p<0001) and a significant positive correlation with clinical training satisfaction (r=0.524, p<0.001). Clinical training satisfaction (β=0.439, p<0.001) and conflict with pediatric patients, a component of clinical training stress (β=−0.226, p=0.019), were identified as factors having significant effects on clinical competency during pediatric nursing clinical training.	40
Opacic[16] (USA)	The purpose of this study was to investigate the predictive relationship between student self-efficacy beliefs, achievement expectations, perceived outcome values, and subsequent clinical performance.	The research population comprised a group of approximately 300 students attending the 14 accredited programs within Pennsylvania who were beginning the clinical year of their professional education at the time of the surveys.	The result reveal that self-efficacy and not just academic performance, is a significant predictor of a student's clinical performance.	40
Arrogante et al[22] (Spain)	To evaluate the acquisition of nursing competencies through clinical	Two hundred eighteen undergraduate nursing students participated in a cross-sectional study, using a mixed-method.	Most nursing students showed adequate clinical competence. Satisfaction with clinical simulation was higher when students were assessed using formative evaluation.	80

Continued.

Author/year/ country	Objective	Design	Main findings	MMAT (%)
	simulation in undergraduate nursing students and to compare their satisfaction with this methodology using these two evaluation strategies.		The main students' complaints with summative evaluation were related to reduced time for performing simulated scenarios and increased anxiety during their clinical performance.	
Brennan[12] (USA)	To examine the effects of the Self-Efficacy Pre briefing Model (SEPM) on nursing student self-efficacy and clinical competency	An experimental design with group randomization was used to compare self-efficacy and clinical competency in nursing students who received pre briefing per the SEPM compared to a control group. 66 senior Bachelor of Science in Nursing students included.	The experimental group had statistically significantly higher self-efficacy (p = .001) and clinical competency (p < .001) as compared to the control group.	60
Page-Cutrara[21] (Canada)	This study aimed to examine the intervention of structured pre-briefing for its effect on nursing students' competency performance, clinical judgment and their perceived pre-briefing experience.	An experimental group-randomized design was used in this study; the intervention group who received structured pre-briefing was compared to the control group.	A statistically significant difference was demonstrated between groups for competency performance (p<0.001), clinical judgment (p<0.001) and pre-briefing experience (p<0.001).	60
Yu et[9] (China)	This study aimed to examine clinical competence and its association with self-efficacy and clinical learning environments among Chinese undergraduate nursing students.	A cross-sectional with 1518 participants.	Factors significantly associated with the clinical competence of undergraduate nursing students were professional interest, self-efficacy, and clinical learning environments, accounting for 36.1% of the total variance. Self-efficacy played a mediating role between clinical learning environments and clinical competence.	40
Albagawi et al[14] (Saudi Arabia)	The current investigation aims to assess the level of clinical competence and self-efficacy of	The researchers used a quantitative-comparative approach.	Both the level of clinical competency (m = 3.50, SD = 1.252) and self-efficacy (m = 3.23, SD = 0.837) of the students was high. The Pearson r test indicated no significant correlation between the students' clinical competence level and	

Continued.

Author/year/country	Objective	Design	Main findings	MMAT (%)
	fourth-year nursing students, and its relationship to the students' demographic characteristics.		gender. However, a significant correlation was noted between the students' clinical competence level and program type, civil status, and age. A significant correlation was also noted between clinical competence level and self-efficacy level.	
Setiawan et al[20] (Indonesia)	The purpose of this study was analysed the competence of the clinical learning module on the competency achievement of nursing student.	This research is a quasi-experiment with the pretest-post-test two group research design. Research samples of students in two nursing school in Surabaya who met the criteria of 50 respondents as a treatment group and 50 respondents as a control group.	The results of statistical tests in the control group obtained p value 0.14 showed there were differences in achievement of competencies before and after, in the treatment group obtained p value 0.000 which means that there were differences in achievement of competencies before and after using the learning module, and the results of Mann Whitney Test obtained p=0.000, means there is an influence of the clinical learning module on the achievement of the competence of nursing students.	60
Kim[23] (Korea)	To identify the effects of learning experience on core competencies of nursing students and other major students	The subjects were 345 nursing students located in C city, Chungcheong-namdo province in Korea participated in the descriptive research.	Core competencies of nursing students were associated with four learning experience factors (Academic challenge, learning with peers, experience with faculty, and campus environment). Among the four factors of the learning experience, the academic challenge was the main factor affecting core competencies.	40
Getie[25] (Ethiopia)	To assess clinical practice competencies and associated factors among graduating nursing students attending public universities found in the Amhara Region, Ethiopia.	307 graduating nursing students participated with an institution-based cross-sectional study design	The study revealed that 33.6% (95% CI 26.3% to 39.41%) of students were clinically competent. Orientation about the objective of clinical practice (adjusted OR, AOR 2.387; 95% CI 1.011 to 5.635), enough time for mentoring during clinical practice (AOR 2.247; 95% CI 1.100 to 4.593). Students followed by instructors during conducting a procedure (AOR 2.655; 95% CI 1.294 to 5.449), assessment checklist during clinical practice (AOR 2.663; 95% CI 1.324 to 5.358), students who were allowed by clinical staffs to perform tasks (AOR 5.858; 95% CI 2.657 to 12.916), clinical instructor factors (AOR 3.051; 95% CI 1.717 to 5.421) and student–staff interaction factors (AOR 2.348; 95% CI (1.337 to 4.124) were statistically significant variables with the level of competency	40
Hsieh[24] (Taiwan)	The study aimed at examining mean differences in nursing	A comparative study design was conducted using the competency inventory for baccalaureate senior nursing students based on learning outcomes. Participants were	There are significant mean differences in nursing competency in general clinical skills, lifelong learning, clinical biomedical science, caring, and critical thinking and reasoning between the 1st week and the 6th week	40

Continued.

Author/year/ country	Objective	Design	Main findings	MMAT (%)
	competency between the first week and the sixth week of a nursing clinical practicum as well as evaluating mean differences in nursing competency by demographic and learning factors at the sixth week of a nursing clinical practicum controlling for baseline scores of nursing competency	surveyed at the first week and the sixth week of a nursing practicum with 95% mean response rate.	of nursing practicum. Likewise, type of nursing program, prior schooling, type of nursing license, interest in nursing, and extracurricular activity experience were significantly related to mean total nursing competency. There are mean differences in nursing competency across several demographic and learning factors.	
Mohamadirizi[15] (Iran)	The present study aimed to define the relationship between clinical competencies and clinical self-efficacy among nursing and midwifery students.	This is a cross-sectional study conducted on 150 of nursing and midwifery students.	The results showed that 50% (n=75) and 37.4% (n=56) of nursing and midwifery students had good clinical competence and clinical Self-Efficacy, respectively. The mean competencies and self-efficacy in clinical performance scores were 35.05 ± 1.2 and 76.03 ± 0.4 respectively. Pearson correlation coefficient showed that there was a positive linear correlation between the score of clinical competence and clinical self-efficacy ($p<0.05$, $r=0.73$).	40
Yun et al[10] (Korea)	To identify the factors and construct a structural equation model for developing person-centered care competency among senior nursing students based on the social cognitive career theory and a subsequent literature review	The participants include 383 third- and fourth-year senior nursing students who had undergone at least one semester of clinical practice in South Korea.	Nursing professionalism, empathy, clinical practicum adaptation, self-awareness, and the clinical learning environment explained 38.8% of participants' variance.	40
Kirkpatrick[18] (USA)	This study aimed to determine relationships among previous palliative care	A quasi-experimental pretest/post-test design was used to assess these variables with a convenience sample of 75 senior nursing students during an end-of-life	The sample was highly experienced in end-of-life care (93.3% reporting experience pre-simulation). Pretest self-awareness (M = 124.5; ±1.3) and knowledge (M = 57.1%; ±2.2) were higher in students with two	40

Continued.

Author/year/ country	Objective	Design	Main findings	MMAT (%)
	nursing experience, knowledge, self-awareness, and performance in nursing students during an end-of-life simulation	simulation at a Midwest Jesuit university	or more types of end-of-life experience (n=42), there were no significant differences (p>0.10) in these outcomes by groups pre- or post-simulation. Self-awareness (M=130.1; ±1.2), knowledge (M=80.5%; ±2.6), and performance (M=94.1%; IQR 87.5 to 100) scores were high for student participants (n=36) post-simulation, with moderate correlations found between some scores (rpb<-0.40 or 0.40).	

Table 2: Summary of articles classification by study design (n=16).

Factors	Mixed	Experimental	Cross-sectional	Total	Percentages
Self-efficacy[8,9,12-16]	1	1	5	7	29
Clinical training program[14,19-22,25]	-	2	4	6	25
Clinical learning environment[8-10]	-	-	3	3	12
Learning experience[9,10,23]	-	1	2	3	12
Self- awareness[10,18]	-	1	1	2	9
Type of learning and teaching[24,25]	-	1	1	2	9
Socio-demographic[14]	-	-	1	1	4

Clinical learning environment

The clinical learning environment (CLE) is an interactive network of forces within the clinical setting that influences learning outcomes.[7] The clinical learning environment is the key component with a wide range of concepts to engage and reinforce for clinical areas as shown in several studies. The study showed that the clinical learning environment impacted clinical competency and learning in nursing education.[8] Likewise, another study also showed that factors significantly associated with the clinical competence of undergraduate nursing students were professional interest, self-efficacy, and clinical learning environments, accounting for 36.1% of the total variance.[9] Then the finding found that person-centered care competency was influenced by the clinical learning environment.[10]

Self-efficacy

Self-efficacy beliefs as a person have belief about his or her capabilities to produce the desired performance.[11] This mentioned that self-efficacy is another predictive variable in nursing student clinical competency. Meanwhile, the self-efficacy pre-briefing model demonstrated that the experimental group had statistically significantly higher self-efficacy (p=0.001) and clinical competency (p<0.001) as compared to the control group.[12] Still, other studies revealed significant improvements in students' nursing competency (p<0.001), critical thinking (p<0.001), research competency (p<0.001) and faculty members' teaching

competency (p<0.001) and research competency (p<0.001) after the program.[13] Then, self-efficacy plays a mediating role between clinical learning environments and clinical competence.[9] In addition, the findings illustrated that a significant correlation was also noted between clinical competence level and self-efficacy level.[14] Moreover, the results showed that the Pearson correlation coefficient showed a positive linear correlation between the score of clinical competence and clinical self-efficacy (p<0.05, r=0.73).[15] Next, a study found that a curriculum with self-efficacy impacted clinical competency and learning in nursing education 8. Indeed, the result revealed that self-efficacy, and not just academic performance, is a significant predictor of a student's clinical performance.[16]

Self-awareness

There are two aspects of self-awareness which consist of an individual intentionally focused on and paying attention to their external environment and an individual just thinking about oneself.[17] Self-awareness is the considerable independent variable, which is stated in nursing clinical competency studies. Certainly, the study found that person-centered care competency was influenced by self-awareness.[10] Moreover, the findings illustrated that pre-test self-awareness (M=124.5; ±1.3) and knowledge (M=57.1%; ±2.2) were higher in students with two or more types of end-of-life experience (n=42). Thus, self-awareness (M=130.1; ±1.2) scores were high for student participants (n=36) post-simulation, with

moderate correlations found between some scores (rpb<-0.40 or 0.40).[18]

Other significant factors in clinical competency

Clinical training program

The study demonstrated that clinical training satisfaction (β=0.439, p<0.001) was identified as a factor having significant effects on clinical competency during pediatric nursing clinical training.[19] Therefore, the results found that the Mann-Whitney test obtained p=0.000, which means there was an influence of the clinical learning module on the achievement of the competence of nursing students.[20] Furthermore, the findings showed that a statistically significant difference was demonstrated between groups for competency performance (p<0.001), clinical judgment (p<0.001), and pre-briefing experience (p<0.001).[21] So, the study revealed that the main students' complaints with summative evaluation were related to reduced time for performing simulated scenarios and increased anxiety during their clinical performance.[22]

Learning experience

Professional interest was a factor significantly associated with the clinical competence of undergraduate nursing students.[9] Then, person-centered care competency was influenced by nursing professionalism, empathy, and clinical practicum adaptation.[10] Last, the learning experience and the academic challenge were the main factors affecting core competencies.[23]

Type of learning and teaching

The mean total of nursing competency was significant with the type of nursing program, prior schooling, type of nursing license, interest in nursing, and extracurricular activity experience.[24] Other findings revealed that orientation about the objective of clinical practice (adjusted OR, AOR 2.387; 95% CI 1.011 to 5.635), enough time for mentoring during clinical practice (AOR 2.247; 95% CI 1.100 to 4.593), clinical instructor factors (AOR 3.051; 95% CI 1.717 to 5.421) and student-staff interaction factors (AOR 2.348; 95% CI (1.337 to 4.124) were statistically significant variables with the level of competency.[25]

Socio-demographic

A study mentioned that a significant correlation was noted between the students' clinical competence level and program type, civil status, and age.[14]

DISCUSSION

Our comprehensive analysis revealed that seven factors influenced the growth of nursing competency. This systematic review aimed to review the report findings on the independent variables that are associated with nursing students' clinical competency. Multi-source studies showed that the most common predictor factors on clinical competency for nursing students are the clinical learning environment, self-efficacy, self-awareness, and other significant factors. In similar terms of clinical learning environment, one study showed the effectiveness of vSIMs used in the clinical learning process in hospitals 26. Likewise, competence in postgraduate critical care nursing is a multidimensional concept and it is recommended to use a combination of assessment methods like self-assessment, observation, and mentor evaluation 27. Furthermore, another study suggested that the barriers included personal challenges, challenges related to nursing education, and challenges related to clinical practice; establishing competency-based education learning as a method to reduce physical assessment barriers. 28. Indeed, three main factors were associated with individual nurse students' circumstances, the clinical learning environment, and the educational institution. Individual factors such as students' attitudes towards mathematics and their self-confidence seem to be associated most strongly with medication competence 29. Other significant factors also found in the study findings. The similar findings revealed that the post-basic program, conducive clinical learning environment, good staff-student interaction, satisfaction and positive attitude towards clinical practice were factors significantly associated with clinical competency 9,25,30. On the other hand, the availability of some highly reliable tools that enable the assessment of clinical competencies in nursing education 31. Also, instruments could be categorized from three different measuring perspectives (1) nurses, (2) patients, and (3) both nurses and patients 32

CONCLUSION

Based on this review, we have identified some aspects including the student's beliefs, capabilities, intentions, concentration, and the clinical learning environment related to clinical competency. There are several other characteristics or predictors of clinical competency that require further investigation. The review's findings are used to the creation of a more thorough methodology to assess nursing students' clinical competency and related variables.

REFERENCES

1. World Health Organization. Nurse Educator Core Competencies; 2016. Available at: https://www.who.int/publications/i/item/nurse-educator-core-competencies. Accessed on 17th December 2023.
2. Hakimzadeh R, Ghodrati A, Karamdost N, Ghodrati H, Mirmosavi J. Factors affecting the teaching-learning in

nursing education. GSE Journal of Education. 2013;2013:174-84.

3. Blackman I, Hall M, Gusti I, Darmawan N. Undergraduate nurse variables that predict academic achievement and clinical competence in nursing. Int Educ J. 2007;8(2):222-36.

4. Yamamoto Y, Okuda R, Fukada M. Factors affecting clinical nursing competency: a cross sectional study. Yonago Acta Med. 2021;64(1):46-56.

5. Engelhart MD, Furst EJ, Krathwohl DR. Taxonomy of educational objectives the classification of educational goals. Handbook cognitive domain. London: Longmans; 1956.

6. Benner P. From Novice to Expert. Am J Nurs. 1982;82(3)402-4.

7. Dunn SV. The development of a clinical learning environment scale. J Adv Nurs. 1995;22(6):1166-73.

8. Mrunalini, Chandekar PA. Factors affecting the teaching-learning in nursing education. Am Res J Nurs. 2015;1(4):11-7.

9. Yu M, Tong H, Li S, Wu XV, Hong J, Wang W. Clinical competence and its association with self-efficacy and clinical learning environments among Chinese undergraduate nursing students. Nurse Educ Pract. 2021:53:103055.

10. Yun JY, Cho IY. Structural equation model for developing person-centered care competency among senior nursing students. Int J Environ Res Public Health. 2021;18(19):10.

11. Bandura A. Self-efficacy: the exercise of control. W. H. Freeman; 1997:158-166.

12. Brennan BA. The impact of self-efficacy based prebriefing on nursing student clinical competency and self-efficacy in simulation: An experimental study. Nurse Educ Today. 2022;109.

13. Cha C, Hwang H, An B, Jeong S, Yang SJ. Nursing student and faculty competency improvement through a nurse-bridging program in Cambodia. Nurse Educ Today. 2020:93:104523.

14. Albagawi B, Hussein FM, Alotaibi JS, Albougami AS, Amer MF, Alsharari AF, et al. Self-efficacy and clinical competence of fourth-year nursing students: a self-reported study. Int J Adv Appl Sci. 2019;6(8):65-70.

15. Mohamadirizi S, Kohan S, Shafei F, Mohamadirizi S. The relationship between clinical competence and clinical self-efficacy among nursing and midwifery students. Int J Pediatr. 2015;3(6):1117-23.

16. Opacic DA. The relationship between self-efficacy and student physician assistant clinical performance. J Allied Health. 2003;32(3):158-66.

17. Duval S, Wicklund RA. A theory of objective self awareness. Personal Soc Pyschol Rev. 2001;5(3):230-41.

18. Kirkpatrick AJ, Cantrell MA, Smeltzer SC. Relationships among nursing student palliative care knowledge, experience, self-awareness, and performance: An end-of-life simulation study. Nurse Educ Today. 2019:73:23-30.

19. Sung-Yun A, Young-Ju K. Factors affecting the clinical competency of nursing students in pediatric

nursing clinical practice. Medico-Legal Update. 2020;20(1):1698-703.

20. Setiawan AH, Nurjannah S, Astuti NM. The Effectiveness of Clinical Learning Module on Competency Achievement of Nursing Students. Indon Nurs J Educ Clinic (Injec). 2019;3(2):84-9.

21. Page-Cutrara K, Turk M. Impact of prebriefing on competency performance, clinical judgment and experience in simulation: An experimental study. Nurse Educ Today. 2017;48:78-83.

22. Arrogante O, González-Romero GM, López-Torre EM, Carrión-García L, Polo A. Comparing formative and summative simulation-based assessment in undergraduate nursing students: nursing competency acquisition and clinical simulation satisfaction. BMC Nurs. 2021;20(1):92.

23. Kim J. Effects of learning experience on core competencies of nursing students. Int J Innovat Technol Explor Engineer. 2019;8(3):154-9.

24. Hsieh SI, Hsu LL. An outcome-based evaluation of nursing competency of baccalaureate senior nursing students in Taiwan. Nurse Educ Today. 2013;33(12):1536-45.

25. Getie A, Tsige Y, Birhanie E, Tlaye KG, Demis A. Clinical practice competencies and associated factors among graduating nursing students attending at universities in Northern Ethiopia: Institution-based cross-sectional study. BMJ Open. 2021;11(4):44119.

26. Purwanti LE, Sukartini T, Kurniawati ND, Nursalam N, Susilowati T. Virtual simulation in clinical nursing education to improve knowledge and clinical skills: literature review. Open Access Maced J Med Sci. 2022;10(F):396-404.

27. Øvrebø LJ, Dyrstad DN, Hansen BS. Assessment methods and tools to evaluate postgraduate critical care nursing students' competence in clinical placement. An integrative review. Nurse Educ Pract. 2022:58:103258.

28. Maniago JD, Feliciano EE, Santos AM, Agunod CL, Adolfo CS, Vasquez BA, et al. Barriers in performing physical assessment among nursing students: an integrative review. Int J Nurs Sci. 2021;8(1):120-9.

29. Sulosaari V, Kajander S, Hupli M, Huupponen R, Leino-Kilpi H. Nurse students' medication competence-an integrative review of the associated factors. Nurse Educ Today. 2012;32(4):399-405.

30. Terefe TF, Geletie HA, GebreEyesus FA, Tarekegn TT, Amlak BT, Kindie K, et al. Clinical competency and associated factors among undergraduate nursing students studying in universities of Southern regional state of Ethiopia, 2021. Heliyon. 2023;9(8):18677.

31. Ličen S, Plazar N. Identification of nursing competency assessment tools as possibility of their use in nursing education in Slovenia-a systematic literature review. Nurse Educ Today. 2015;35(4):602-8.

32. Koy V, Yunibhand J, Angsuroch Y. The quantitative measurement of nursing care quality: a systematic review of available instruments. Int Nurs Rev. 2016;63(3):490-8.

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