

Correlation between critical thinking and emotional intelligence: a national cross-sectional study on operating room nursing students in Iran



Original article

Armin Fereidouni^a, Esmail Teymoori^b, Tayebah Bahmani^{c,d}, Hamid Reza Sabet^e, Zahra Maleki^f, Mina Gharibi^{c,*}

^aDepartment of Operating Room Technology, Community Based Psychiatric Care Research Center, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran

^bDepartment of Operating Room Technology, School of Paramedical Sciences, AJA University of Medical Sciences, Tehran, Iran

^cDepartment of Operating Room, School of Allied Medical Science, Fasa University of Medical Sciences, Fasa, Iran

^dClinical Education Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

^eMedical Journalism Department, School of Paramedical Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

^fDepartment of Epidemiology, Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

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Abstract: Objective: According to the World Federation of Medical Education, critical thinking should be part of the training of medical and paramedical students. Professionals can improve the quality of care of patients after surgery by having or acquiring this skill in health care. Also, Emotional intelligence is introduced as an important and effective factor on the professional performance and mental health of healthcare professionals. Thus, the present study was designed and implemented to determine the relationship between emotional intelligence and critical thinking among operating room nursing students of medical sciences universities in Iran.

Methods: This cross-sectional study was done on 420 operating room students in 10 top medical sciences universities of Iran in 2022. The sampling method in this research was multistage sampling. The data collection instruments included demographic characteristics, Rickett's critical thinking, and Bradberry-Greaves' emotional intelligence questionnaires. After receiving the ethics code, data collection was done for 2 months. For data analysis, descriptive and inferential analyses including independent *t*-tests, analysis of variance, and Pearson correlation were used. The collected data were analyzed by SPSS 18 (IBM Corporation, Armonk, New York, United States). *P*-value <0.05 was considered significant.

Results: The mean age of the students participating in this study was 23.02 ± 3.70 years, with women constituting 67.4% of them. The results of data analysis indicated that the mean total score of critical thinking and emotional intelligence was 124.10 ± 37.52 and 114.12 ± 43.63 , respectively. A direct significant correlation between critical thinking and emotional intelligence ($r = 0.459$, *P*-value <0.001) and a significant relationship between gender and emotional intelligence (*P*-value = 0.028) were found.

Conclusions: Based on the present study results, educational managers in the Ministry of Health are suggested to consider suitable educational programs for improving critical thinking and emotional intelligence to enhance the quality of care provided by students in operating rooms.

Keywords: critical thinking • emotional intelligence • operating room students • operating room nurses

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*Corresponding author.

E-mail: gharibimin99@gmail.com (M. Gharibi).

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1. Introduction

According to the WHO's recommendation, critical thinking is one of the main learning skills.¹ Critical thinking is a process that begins with problem presentation and ends with solution and interpretation.² Also, critical thinking is defined as examining a question about the studied subject for presenting a solution or hypothesis.³ Nurses, as providers of clinical and healthcare affairs, can use critical thinking skills.⁴ Having this skill helps to make accurate decisions in providing better quality services to patients.⁵ Indeed, its use can contribute to reducing clinical errors.⁶

The study by Sutriyanti et al.⁷ indicated that having critical thinking skills by nurses can lead to improved patient care after surgery. World Federation of Medical Education has stated that critical thinking should be part of the education of medical and paramedical students.⁸ Another important dimension in education is attention to the psychological background of students⁹; emotional intelligence is introduced as an important and effective factor on professional performance and psychological health of healthcare specialists.¹⁰

Emotional intelligence means the ability to understand, control, and evaluate one's and others' emotions.¹¹ Kim and Han¹² found that a significant and positive relationship exists between emotional intelligence and problem-solving skills as well as adaptation; nurses, through increasing emotional control, can adopt effective strategies against stress. Nurses who have more awareness of their emotions show more respectful and suitable behavior when interacting and communicating with patients, and they can better manage the patient's behavior.¹³ Thus, those with higher emotional intelligence have greater stress and anxiety tolerance and when facing such situations, they will have greater resilience and flexibility.¹⁴ The study of Rezvani et al.¹⁵ indicated a significant and direct relationship between emotional intelligence and academic progress of operating room students; higher emotional intelligence contributed to improved psychological health and academic progress of students.

In this regard, the results of studies on medical students also showed that emotional intelligence and critical thinking play a key role in students' psychological health.¹⁶ Critical thinking and emotional intelligence can enhance a person's stress tolerance.^{4,16} Students are under higher levels of stress in the operating room than in other wards of the hospital due to the special conditions of surgery,^{17,18} thus to provide better care for patients, investigating the relationship between critical thinking and emotional intelligence is essential. The present study was designed and implemented to determine the correlation between critical thinking and emotional intelligence among operating room nursing students of medical sciences universities of Iran.

2. Materials and method

2.1. Study design and participants

This cross-sectional study was done on the 420 operating room students in 10 top medical sciences universities of Iran from February 2022 to July 2022. Based on the study of Bagheri et al.¹⁹, the minimum required sample size was determined 404 participants using the sample size formula for correlation coefficient considering $\alpha = 0.05$, $\beta = 0.2$, and $r = 0.139$.

In this research, a multistage sampling method was used. In the first stage, out of 71 medical sciences universities in Iran, 10 top universities were chosen via simple sampling (through lottery). In the next step, the list of operating room students along with their mobile numbers in different academic years was prepared from the universities. Thereafter, the students were chosen via a stratified sampling method in each academic year using a random numbers table. The study aims, emphasis on the anonymity of questionnaires, and confidentiality of information were explained to the students. Then, if they wanted to participate in the study, an informed consent form and an online questionnaire were sent to them through social networks (WhatsApp, Telegram, Instagram). Follow-up of participants for their response was done for 3 times, and in case they were unwilling to cooperate in the study, the next random number was chosen. In designing the online questionnaire, Internet Protocol address (IP) filtering was used to prevent duplicate answers. Also, the participants could refuse to fill in questionnaires at any time they wished.

The inclusion criteria in this study were studying in the field of the operating room and having the experience of completing at least one internship in the operating room. The exclusion criteria included those transferred from other universities, incomplete filling of questionnaires, and lack of willingness to participate in the study.

2.2. Data collection tools

For data collection, 3 questionnaires were used including demographic characteristics (age, gender, marital status, place of residence, Grade point average (GPA), academic year, and academic degree), Rickett's²⁰ Critical Thinking, and Bradberry-Greaves' emotional intelligence.²¹

2.2.1. Rickett's critical thinking questionnaire

This questionnaire has 33 items with 3 dimensions of innovativeness (11 items), cognitive maturity (9 items), and engagement (13 items), with responses measured

through a 5-point Likert scale ranging from “absolutely disagree” with score 1 to “absolutely agree” with score 5. In this way, the maximum and minimum scores acquired in this questionnaire were 165 and 33, respectively. For validation of this questionnaire, it was implemented on 60 students. The reliability coefficient of innovativeness, cognitive maturity, and engagement was found 0.79, 0.75, and 0.89, respectively, while the reliability coefficient of the total questionnaire was reported 0.86.²⁰ This questionnaire was translated, psychometrically analyzed, and validated in Iran by Pakmehr et al.²² In this study, for measuring the validity, content validity and construct validity methods were used, while for measuring reliability, Cronbach's alpha method was used, which was obtained 68%.

2.2.2. Bradberry-Greaves' emotional intelligence questionnaire

This questionnaire has 28 items with 4 subscales of “self-awareness” (6 items), “self-management” (9 items), “social awareness” (5 items), and “relationship management” (8 items).²¹ The scoring of this questionnaire was done using a 6-point Likert scale from always (score 6) to never (score 1). The range of scores was from 28 to 168.²³ The reliability and validity of this questionnaire have been confirmed in Iran by Ganji et al.²¹, and the reliability of the questionnaire according to the Cronbach alpha method is 0.83.

2.3. Data analysis

For data analysis, descriptive statistics including frequency, percentage, mean, and standard deviation, as well as analyses including independent *t*-test, analysis of variance, and Pearson correlation, were used. The collected data were analyzed by SPSS 26. *P*-value <0.05 was considered significant.

2.4. Ethical approval and considerations

The permission of implementing this study with the ethics code (IR.FUMS.REC.1400.137) has been granted by the ethics committee of Fasa University of Medical Sciences. (Access link <https://b2n.ir/s24936>). In the present study, there was no need for participants to write down their names or surnames. The confidentiality of information was also explained to the participants.

3. Results

The mean age of the participants was 23.02 ± 3.70 years. In this study, 47.4% were female and 85.7% were single.

Out of 420 participating students, 44.5% were in their last academic years, and 93.1% were studying for a bachelor's degree of operating room (Table 1).

The results showed that the mean total score of critical thinking of operating room students was 124.37 ± 10.52 , and the total emotional intelligence score was 114.43 ± 12.63 . Among the dimensions of critical thinking, the highest score was related to engagement, while among Emotional intelligence dimensions, self-management acquired the highest mean score (Table 2).

The results of Pearson correlation test revealed the direct and significant correlation between critical thinking and emotional intelligence ($r = 0.459$, *P*-value <0.001). This means when critical thinking increases, emotional intelligence also increases.

The study results indicated that there was a significant relationship between gender and emotional intelligence (*P*-value = 0.028). Based on the mean total score, men showed higher emotional intelligence. No

Variable	Frequency	Percent
<i>Age, years</i>		
≤21	151	36.0
21–23	159	37.9
≥24	110	26.2
<i>Gender</i>		
Female	283	67.4
Male	137	32.6
<i>Marital status</i>		
Single	360	85.7
Married	60	14.3
<i>Residence</i>		
Dormitory	190	45.2
With family	230	54.8
<i>Academic year</i>		
First	92	21.9
Second	80	19.0
Third	61	14.5
Fourth	187	44.5
<i>Level of education</i>		
Bachelor's	391	93.1
Master's degree	29	6.9
<i>GPA</i>		
10–13	2	0.5
14–16	47	11.2
17–18	230	54.8
19–20	141	33.6

Table 1. Frequency distribution of demographic characteristics of study participants.

Variables	Mean $\pm$ SD
<i>Critical thinking</i>	
Innovativeness	45.47 $\pm$ 4.48
Cognitive maturity	28.83 $\pm$ 3.86
Engagement	50.07 $\pm$ 5.76
Total critical thinking	124.37 $\pm$ 10.52
<i>Emotional intelligence</i>	
Self-awareness	26.40 $\pm$ 3.61
Self-management	33.59 $\pm$ 4.51
Social awareness	20.96 $\pm$ 2.78
Relationship management	33.46 $\pm$ 5.41
Total emotional intelligence	114.43 $\pm$ 12.63

Note: SD, standard deviation.

Table 2. Mean and standard deviation of critical thinking and emotional intelligence and its dimensions.

significant relationship was found between other demographic variables and emotional intelligence or critical thinking.

4. Discussion

The present study was done with the aim of investigating the relationship between critical thinking and emotional intelligence among operating room nursing students. Based on the findings obtained from this research, the mean of critical thinking in operating room students of medical sciences universities in Iran has been higher than the average. Contrary to the findings of the present study, in the research of Hasanpour et al.²⁴, the average score of the total critical thinking skills was lower than the mean, which indicated the weakness of these skills in the studied students. In the study of Carvalho et al.²⁵ as well as Barry et al.²⁶, it was found that the level of critical thinking in the studied nurses was average. In another study in Iran on nursing students, the obtained results indicated a low level of critical thinking.²⁷ It should be noted that critical thinking can be improved through education.²⁵ Since the scores obtained from critical thinking in our study have been higher compared to previous studies, this difference may be due to the different working environment of the operating room compared to other nursing wards and fields of academic. Some approaches that can improve critical thinking in nursing students include frequent use of individual and group active learning strategies, empowering instructors to prepare tests that target high levels of cognitive domain and present probing questions, encouraging students and instructors to participate in problem analysis and discussions, providing different ideas and opinions, and promoting self-directed learning.²⁸

Also, considering the emotional intelligence of operating room students, all participants had high emotional intelligence. In the study of Hasanpour et al.²⁴ and Štiglic et al.²⁹, emotional intelligence was at a high level.

In the study of Talman et al.³⁰, the level of emotional intelligence among nurses was reported average. Notably, there is a consensus that high levels of emotional intelligence are useful for nursing students. Appropriate training and interventions for improving working environmental conditions and proper job choice are important factors in emotional intelligence development.³¹ Nurses through managing good relations and social skills not only can show their emotional intelligence but will also have greater satisfaction with their job.³² Indeed, students or healthcare specialists with higher emotional intelligence are more efficient, and can better manage their stress as well as emotions. They also have better health and establish better relations with patients, families, and healthcare teams. Likewise, patients, families, and colleagues who interact with nurses who have high emotional intelligence report more satisfying experiences.³² However, Dugué et al.³³ stated that training based on the development of emotional intelligence has been done less in nursing education or nursing care programs.

The findings of the present research indicated that there was a direct and significant correlation between critical thinking and emotional intelligence. Unlike the findings obtained from the present study, the study of Kaya et al.⁵ and Hasanpour et al.²⁴ found no significant relationship between critical thinking and emotional intelligence. A person with a high level of critical thinking and powerful emotional intelligence can make precise decisions, appraise those decisions, and regulate their emotions so that they can improve their abilities. Smith et al.³⁴ support this argument and state that emotional intelligence influences critical thinking and decision-making processes.

Based on the results obtained from this research, we can say that gender and emotional intelligence showed a significant correlation with each other, and the emotional intelligence score was significantly higher in men. Unlike our findings, in the study by Štiglic et al.,²⁹ female students showed higher emotional intelligence scores compared to males, but this difference was not significant in their study. However, the study by Khademi et al.³⁵ concur with the present study result that gender was the most powerful predictor of emotional intelligence. Regarding the relationship between emotional intelligence and gender, the difference in research results can be due to the different cultures of societies. However, in relation to the relationship between gender and emotional intelligence and its components, it is possible because of the type of tool and the way of using the tool, which is self-reported or functional, so that sometimes,

in self-report, people's desire to report good results is more. On the other hand, it can be mentioned due to the gender differences of men and women in some dimensions of emotional intelligence.³⁶

5. Conclusions

In the present study, a significant positive relationship was found between critical thinking and emotional intelligence. Thus, it is recommended that educational managers in the Ministry of Health consider proper educational programs for improving critical thinking and emotional intelligence for enhancing the quality of care provided by operating room students.

Strengths and limitations

The strong points of the present study included the wide coverage of studied population from different medical science universities of Iran. One of the limitations of the present study is the self-report method in completing the questionnaire by the participants, which the researcher tried to reduce by providing the necessary explanations for the purposes of the study.

One of the innovations of the present study is not finding a similar study on operating room students in Iran and other countries with extensive searches. In Iran, operating room students are specialized and familiar with surgical courses from the beginning of their study period, and their training is separate from nursing students. Also, the present study included a wide coverage of studied population from different medical science universities of Iran. One of the limitations of the present study is the self-report method in completing the questionnaire by the participants, which the researcher tried to reduce by providing the necessary explanations for the purposes of the study.

Ethical approval

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Conflicts of interest

All contributing authors declare no conflicts of interest.

References

1. Griffin P, Care E. Assessment and Teaching of 21st Century Skills: Methods and Approach. Dordrecht: Springer; 2014.
2. Alsaleh NJ. Teaching critical thinking skills: Literature review. *Turkish Online J Educ Technol*. 2020;19:21–39.
3. Andreou C, Papastavrou E, Merkouris A. Learning styles and critical thinking relationship in baccalaureate nursing education: a systematic review. *Nurse Educ Today*. 2014;34:362–371.
4. Noone T, Seery A. Critical thinking dispositions in undergraduate nursing students: a case study approach. *Nurse Educ Today*. 2018;68:203–207.
5. Kaya H, Şenyuva E, Bodur G. The relationship between critical thinking and emotional intelligence in nursing students: a longitudinal study. *Nurse Educ Today*. 2018;68:26–32.
6. Zayapragassarazan Z, Menon V, Kar SS, Batmanabane G. Understanding critical thinking to create better doctors. *J Adv Med Educ Res*. 2016;1:9–13.
7. Sutriyanti Y, Misniarti M, Utario Y. The Application of the Nurse's Critical Thinking Model in Implementing Nursing Care of Post Operative Patients. Atlantis Press; 2019.
8. Schwarz MR, Wojtczak A. Global minimum essential requirements: a road towards competence-oriented medical education. *Med Teach*. 2002;24:125–129.
9. Wu D, Luo Y, Liao X. Correlation between critical thinking disposition and mental self-supporting ability in nursing undergraduates: a cross-sectional descriptive study. *J Nurs Res*. 2017;25:68–75.
10. Sarabia-Cobo CM, Suárez SG, Crispín EJM, et al. Emotional intelligence and coping styles: an intervention in geriatric nurses. *Appl Nurs Res*. 2017;35:94–98.
11. Musonda A. Algebraic competences and emotional intelligence of first year Bachelor of Science in Mathematics and Science Education students at the Copperbelt University in Zambia. *Tuning J Higher Educ*. 2017;5:171–195.
12. Kim M-R, Han S-J. Nursing students' emotional intelligences and coping strategies. *Adv Sci Technol Lett Healthcare Nurs*. 2015;88:53–56.
13. Mattingly V, Kraiger K. Can emotional intelligence be trained? A meta-analytical investigation. *Hum Resour Manage Rev*. 2019;29:140–155.
14. Afshar HS, Rahimi M. Reflective thinking, emotional intelligence, and speaking ability of EFL learners: is there a relation? *Think Skills Creat*. 2016;19:97–111.

15. Rezvani S, Imani B, Naderi Behrad R. Correlation of mental health and emotional intelligence in academic achievement of operating room students of university of medical sciences. *Pajouhan Sci J*. 2020;18:39–45.
16. Heidari Gorji AM, Shafizad M, Soleimani A, Darabinia M, Goudarzian AH. Path analysis of self-efficacy, critical thinking skills and emotional intelligence for mental health of medical students. *Iranian J Psychiatry Behav Sci*. 2018;12:e59487.
17. Chevillotte J. Operating room nursing diploma soon to be accessible through competence validation. *Rev Infirm*. 2014;199:10 (in French).
18. Teymoori E, Rahmani V, Fereidouni A, Khachian A, Hannani S. Ethical climate of the operating room from the perspective of the surgical team and its relationship with organizational culture and organizational commitment. *Perioper Care Oper Room Manag*. 2022;26:100238.
19. Bagheri M, Ghaedi Heidari F, Malchi F, Zeinab R. The relationship between emotional intelligence components and critical thinking in nursing and midwifery students of Bushehr University of Medical Sciences. *Nurs Midwifery J*. 2019;17:102–110.
20. Ricketts JC. Critical Thinking Skills of Selected Youth Leaders: The Efficacy of Leadership Development, Critical Thinking Dispositions, and Student Academic Performance. Gainesville, US: University of Florida; 2003.
21. Ganji H, Mirhashemi M, Sabet M. Bradberry-Greaves' emotional intelligence test: preliminary norming-process. *J Thought Behav*. 2006;1:23–35.
22. Pakmehr H, Mirdrogi F, Ghanaei A, Karami M. Reliability, validity and factor analysis of Ricketts' critical thinking disposition scales in high school. *Q Educ Meas*. 2013;3:33–54.
23. Nazi Dizji S. Relationship between emotional intelligence and design skills in architecture students. *Technol Educ J*. 2012;7:21–32.
24. Hasanpour M, Bagheri M, Heidari FG. The relationship between emotional intelligence and critical thinking skills in Iranian nursing students. *Med J Islamic Republic of Iran*. 2018;32:40.
25. Carvalho DPSRP, Vitor AF, Cogo ALP, Bittencourt GKGD, Santos VEP, Ferreira Júnior MA. Critical thinking in nursing students from two Brazilian regions. *Rev Bras Enferm*. 2020;73:e20170742.
26. Barry A, Parvan K, Jabbarzadeh F, Sarbakhsh P, Safa B, Allahbakhshian A. Critical thinking in nursing students and its relationship with professional self-concept and relevant factors. *Res Develop Med Educ*. 2020;9:7.
27. Azizi-Fini I, Hajibaghery A, Adib-Hajbaghery M. Critical thinking skills in nursing students: a comparison between freshmen and senior students. *Nurs Midwifery Stud*. 2015;4:e25721.
28. Shirazi F, Heidari S. The relationship between critical thinking skills and learning styles and academic achievement of nursing students. *J Nurs Res*. 2019;27:e38.
29. Štiglic G, Cilar L, Novak Ž, et al. Emotional intelligence among nursing students: findings from a cross-sectional study. *Nurse Educ Today*. 2018;66:33–38.
30. Talman K, Hupli M, Rankin R, Engblom J, Haavisto E. Emotional intelligence of nursing applicants and factors related to it: a cross-sectional study. *Nurse Educ Today*. 2020;85:104271.
31. Khandan M, Kavousi A, Koohpaei A. Application of structural equations modeling to assess relationship among emotional intelligence, general health and occupational accidents. *Int J Occup Hyg*. 2015;7:124–131.
32. White DE, Grason S. The importance of emotional intelligence in nursing care. *J Compr Nurs Res Care*. 2019;4:1–3.
33. Dugué M, Sirot O, Dosseville F. A literature review of emotional intelligence and nursing education. *Nurse Educ Pract*. 2021;54:103124.
34. Smith KB, Profetto-McGrath J, Cummings GG. Emotional intelligence and nursing: an integrative literature review. *Int J Nurs Stud*. 2009;46:1624–1636.
35. Khademi E, Abdi M, Saeidi M, Piri S, Mohammadian R. Emotional intelligence and quality of nursing care: a need for continuous professional development. *Iranian J Nurs Midwifery Res*. 2021;26:361.
36. Banihashemian K, Seif M, Moazzen M. Relationship between pessimism, general health and emotional intelligence in college students at Shiraz University and Shiraz University of Medical Sciences. *J Babol Univ Med Sci*. 2009;11:49–56.