

Examining the relationship between critical-thinking skills and decision-making ability of emergency medicine students

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Abstract

Background and Aims: Critical-thinking ability would enable students to think creatively and make better decisions and makes them make a greater effort to concentrate on situations related to clinical matters and emergencies. This can bridge the gap between the clinical and theoretical training. Therefore, the aim of the present study is to examine the relationship between critical-thinking ability and decision-making skills of the students of Emergency Medicine. **Materials and Methods:** This descriptive and analytical research was conducted on all the students of medical emergency students ($n = 86$) in Shahrekord, Iran. The demographic information questionnaire, the California Critical Thinking Skills Test, and a decision-making researcher-made questionnaire were used to collect data. The data were analyzed by SPSS software version 16 using descriptive and analytical statistical tests and Pearson's correlation coefficient. **Results:** The results of the present study indicate that the total mean score for the critical thinking was 8.32 ± 2.03 and for decision making 8.66 ± 1.89 . There is a significant statistical relationship between the critical-thinking score and decision-making score ($P < 0.05$). **Conclusions:** Although critical-thinking skills and decision-making ability are essential for medical emergency professional competence, the results of this study show that these skills are poor among the students.

Keywords: Decision-making, medical emergency, thinking

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Introduction

The increase in number and range of the incidents during the recent years has led the personnel of medical emergency encountering complex problems and issues, which are the result of the advancement in technology and cultural and ethical factors. It is, therefore, necessary to replace the traditional methods with decentralized emergency management systems. One of these techniques uses decision-making, creative-thinking, and

problem-solving skills in today's world of management.^[1] Decision-making is one of the most important and vital parts of the managers of emergency rooms. They must make a decision quickly most of the times even if they do not have sufficient information about the matter in hand.^[2] In addition to the problems which are common among everyone, these employees encounter unique difficulties such as working with numerous employees

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and individuals on the treatment team in the hospital, the families who are facing a crisis, happy and sad moments of life and death, accidents, disasters, etc.^[3]

Clinical decision-making is a complex process. The fact that emergency units are potentially very stressful and unpredictable and quick diagnosis and communication with the companions of the patient are vital in these units. Proper triage is a complex decision-making process which includes evaluation of the patient and other factors of the treatment system.^[4]

Patients' families, expect the students of medical emergency, to make the best decisions. This is while the students of medical sciences are unable to take decisions independently to solve the patients' problems.^[5] The students mostly execute the orders of their mentors which if done mechanically could lead to adverse consequences. Critical-thinking skills are considered the ultimate aim of training in medical education, to draw correct judgments which can reduce the gap between theoretical and clinical training.^[6]

Unfortunately, the traditional method of training provides a mixture of information and concepts to the students and leaves them unprepared when it comes to analyzing, prioritizing, and organizing.^[7] Understanding the present conditions of critical-thinking and decision-making abilities among the medical emergency students and the degree to which the contemporary teaching and training methods improve these skills could lead to improvement of the clinical decision-making abilities of the students in crisis.^[8] The need for this skill is emphasized in medical emergency due to the complexity of the current system and the rapid changes in the field of health care. The personnel of medical emergency must use critical analytical skills to present safe and proper medical emergency care.^[9]

The experts in the field of education agree that critical thinking should be the inseparable part of education at any level. Critical thinking by the use of analysis, evaluation, selection, and utilization would lead us to the best possible solution. Educationists should design training programs that promote critical thinking. Research, however, indicate that the students of medical sciences are not sufficiently skilled in critical thinking.^[10] With regard to the current conditions, the aim of the present study is to examine the relationship between critical-thinking skills and decision-making abilities among the medical emergency students.

Materials and Methods

This is a descriptive and analytical study which was conducted on all the students of medical emergency (a total number of 86) in Shahrekord in 2014. After the researcher's explanations, the demographic information questionnaire, the California Critical Thinking Skills Test, and a decision-making questionnaire were distributed among the students, and they were asked to fill up the forms, in case they are interested in participating in the study. The completed questionnaires were then collected by a researcher.

After receiving Ethics committee approval consent was obtained from all participants. The researchers undertook that all the information of the participants will be confidential and will only be presented in the form of statistical information. The demographic questionnaire included items such as age, marital status, the year the student entered the university and the semester.

The California Critical Thinking Skills Test includes various sections for assessing the critical-thinking skills of children and adults, students of different educational levels, and different professions, including medicine, law, and trading. The questionnaire's questions are divided into two groups: Three critical-thinking skills, including analysis, evaluation, and inference, are in one group, and deduction and inductions are assessed in another group.^[11]

The questionnaire which was used in the present study contained 34 questions with four or five options and only one correct answer. The given time to fill out this questionnaire was approximately 45 min. Answering some of the questions required deduction based on a series of presumptions and some other require logical reasoning. This questionnaire is suitable for assessing critical thinking of students as well as assessing people who need to solve problems and take decisions about their jobs. The scores assess the general skills of critical thinking and its five subsets. The scores ranged between 0 and 34.^[11] The validity and reliability of the Persian translation of this form were examined in Khalili and Hosseinzadeh's study, which was conducted on 405 nursing students of Shahid Beheshti, Iran, and Tehran Medical Sciences University. The reliability coefficient of the above-mentioned study, which was obtained through KR-20 (0.62), is strongly correlated with the reliability coefficient obtained during the standardization process of this test in America (0.68–0.70). Furthermore, the construct validity, which is the most important type of validity in translated tests, shows that the construct of this test correlates with its theoretical basis.^[12]

Decision-making skills of the students were evaluated by a decision-making questionnaire. The questionnaire comprised twenty questions. Each question was scored at four levels and had values between 0.25 and 1 score, based on Likert scale. The minimum score was 5, and the maximum score was 20 (Appendix 1).

This questionnaire was presented to a panel of ten experts to examine its content validity, and the questionnaire was approved by them. Cronbach's alpha was used to calculate the reliability of this test, which turned out to be 0.87 in a pilot study in which the test was administered to 15 students who were taking the fourth semester of medical emergency in the Nursing University of Shahrekord. Moreover, the reliability of this test was measured and its Cronbach's alpha was 0.74 when the test was administered to 15 students of the 2nd year of medical emergency in Shahrekord. The reliability of the test was also examined through the pretest-posttest method. The posttest was administered 2 weeks after the pretest, and the correlation between the mean score of the students on the first test and the second test was 0.66. Statistical analyses were performed using the Statistics Package for Social Scientists 16.0 (SPSS Inc. Released 2009. PASW Statistics for Windows, Version 16.0. Chicago: SPSS Inc.) And the use of descriptive and analytical statistical tests such as Chi-square and Pearson correlation coefficient.

Results

The present study was conducted on 86 students of medical emergency. All the participants were male. It is worth mentioning that only men are admitted to medical emergency in Iran. The average age of the participants was 20.35 ± 0.82 .

These students were first to fourth-semester students of medical emergency. There were 22 (25.58%) first-semester students, 25 (29.06%) second-semester students, 19 (23.25%) third-semester students, and 20 (23.25%) fourth-semester students. The mean total average of the students was 15.84 ± 1.12 and 14 students (16.27%) were married and 72 (83.73%) were single.

The total mean score of students was 8.323 ± 2.031 on critical thinking and 8.66 ± 1.89 on decision-making ability. The scores of critical-thinking and decision-making abilities of the students have been separated based on the semester and presented in Table 1.

The relationship between the age, marital status, and the mean total average of the students and their

critical-thinking and decision-making abilities was not statistically significant ($P > 0.05$).

The results of the study revealed that there was a statically significant relationship ($P < 0.001$) between the total score of critical-thinking skill (8.323 ± 2.031) and decision-making ability (8.66 ± 1.89) which is presented in Table 2.

Discussion

Critical thinking is an essential part of clinical decision-making and professional competence.^[9] Despite all that, not a lot of researches have been conducted on the critical-thinking abilities among the students and personnel of medical emergency.^[13] However, with regard to the fact that more than half of the prehospital emergency centers' staff are nurses, the researches which have been conducted on them are used in this study.

The result of the present study is, therefore, consistent with other studies, which have been conducted in Iran. Paryad *et al* reported that most of the students (86%) were poor at critical thinking.^[14] Khodamoradi study, which was conducted in the Tehran University of Medical Sciences, did not show any significant increase in the critical-thinking skills of the last semester students, and the total score on the test was low.^[15] The current study is also consistent with Lotfi *et al* study regarding the decision-making scores; the scores were low in both studies.^[11]

Akhondzade also reviewed the studies related to critical thinking conducted in an 8-year long period. He reported that the range of the scores of the medical sciences student was between 8.88 and 14.75.^[16] The test score was reported to be 11.96 in a Jamshidian study in Isfahan.^[17]

The mean score of critical thinking was noticeably lower in comparison to other countries. Yuan's research in Canada indicated that 98.2% of the nursing students had acceptable levels of critical-thinking skills. In a research in Taiwan, the mean score of the test of nursing students was calculated to be 19.39.^[18] In Hodge's study, the mean score of critical thinking was 20.2, which was obtained through California Critical Thinking Skills Test.^[19]

In a research, Gunnarsson conducted in Sweden, the factors influencing the decision-making abilities of the medical emergency staff were examined in emergency rooms. The report stated that numerous factors influenced the decision-making ability of these employees; factors relating to patient, environment,

Table 1: Comparison of mean and standard deviation of critical thinking and problem-solving ability scores and subgroups on critical-thinking, using ANOVA separated based on the semester

| Skills | First-semester students | Second-semester students | Third-semester students | Fourth-semester students | P |
|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|------|
| Decision-making ability | 7.23±1.98 | 8.81±2.03 | 8.65±2.36 | 9.54±2.10 | 0.75 |
| Critical-thinking | 8.12±3.74 | 8.25±1.99 | 9.65±2.18 | 9.76±2.10 | 0.52 |
| Deduction | 4.00±2.52 | 5.06±1.62 | 5.30±2.05 | 4.65±1.89 | 0.31 |
| Induction | 3.16±1.85 | 2.80±1.26 | 3.61±1.80 | 3.05±1.35 | 0.28 |
| Inference | 2.58±1.78 | 3.00±1.36 | 2.76±1.73 | 3.10±1.37 | 0.54 |
| Analysis | 2.41±2.06 | 2.06±1.22 | 3.15±1.67 | 2.35±1.08 | 0.69 |
| Validation | 3.16±2.03 | 3.33±1.23 | 3.84±1.90 | 3.65±1.38 | 0.83 |

Table 2: The relationship between the mean score of critical thinking and that of decision-making ability

| Variable | Mean±SD | P |
|---------------------------|-----------|------------------------|
| Critical-thinking ability | 8.32±2.03 | $r = -0.17, P < 0.001$ |
| Decision-making ability | 8.66±1.89 | |

SD: Standard deviation

colleagues, interpersonal issues, performance of the team supervisor, knowledge of other employees, and moral conflicts. These issues make it difficult for students to make decisions leading to poor choices in some cases.^[20]

Sands examined clinical decision-making in psychological health triage in Australia. The study conducted on 15 employees of medical emergency reported that most of the decisions were made based on their experiences. Most of them had not received special training courses of psychological health triage, and, importantly, there is not always a positive relationship between proper decisions and years of experience of the employees.^[21]

Franklin *et al.* conducted a study which examined the manner in which the emergency room's staff makes decisions, and they reported that the employees' decision-making is closely related to psychological processes, cognitive abilities, the importance of the decision, identification abilities, problem-solving abilities, and organizational conditions under which they worked. Therefore, the advanced courses of decision-making must be held to improve their abilities, and their training must go beyond the clinic's atmosphere.^[4]

Furthermore, the results of the studies by Dy and Purnell showed that there are many factors such as the skills of the individuals, culture, communication skills, problem solving abilities which influence the complexity of the decision-making process of the individuals who work in health and treatment centers, and they must improve these to make the best decisions.^[5]

The results of numerous studies have repeatedly expressed that it is vital to improve the competencies of the emergency room personnel.^[1,2,20] The personnel of the emergency room must utilize many cognitive strategies when making a decision. The personnel must especially improve their problem-solving, communication, and decision-making skills.^[22,23] It is clear based on the above-mentioned specifications of critical thinking that training the medical students through didactic methods alone and not utilizing learning methods based on clinical scenarios, field practice, computer simulation, and clinical problem-solving cannot improve the students' critical-thinking abilities.^[15,17] Further using assessment methods, which are based on retaining large volumes of theoretical information, may lead to rote learning which do not involve analysis and deduction.^[16]

Roberts *et al* indicated that using innovative educational models can have a significant effect on the improvement of decision-making skills of the emergency room personnel.^[23] Based the results of the present study it is clearly important to hone the problem-solving abilities of the associate degree students of medical emergency, Contrary to the belief that these students can make simple and complex decisions based on their their traditional courses,^[24] additionally problem-solving and decision-making skills must be taught to students to make the best decisions.^[25]

The findings showed that the critical-thinking scores of senior nursing students who participated in this study were poor. This is while the results of the study conducted by Profetto-McGrath on the Canadian nursing students revealed a high score.^[26] The same result is observable in a study by Bowles conducted in America.^[27] The researcher believes that the performance at schools before entering universities and also university programs may not empower students in critical thinking. Since we do not know the critical thinking scores of the participants of this study at the start of their university education, it cannot be ascertained that university training has failed in fostering the critical thinking of

the students. Besides, the programming of the 4-year academic period of nursing in Iran has not been designed to address students' critical-thinking skill, who in most cases, try to cope with their clinical problems by trial and error. From this perspective, reviewing the existing educational programs and redesigning them on the basis of increasing critical-thinking ability can be the outcome based on the findings of this study.

One of the limitations of the present research was that completing the California Critical Thinking Skills Test was time-consuming and complex requiring explanations.

Conclusions

Despite the importance of decision-making ability, the results indicate that the students lack decision making and critical thinking skills. Considering the fact that the present study was conducted on medical emergency students, the results are not generalizable to the students of other departments. It is advisable to replicate the present study with more students and in other fields.

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Conflicts of interest

There are no conflicts of interest.

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Appendix

Appendix 1: Decision-making questionnaire

Dear students,

The questionnaire, before you, has been designed with the purpose of examining the level of your decision-making skill. Please answer the questions regarding the reality and the knowledge you have about yourself. Your complete and correct answer to the questions will help us achieve the goals of the study.

Appendix 1: Decision-making questionnaire

| Question number | Questions | Never | Often | Almost always | Always |
|-----------------|--|-------|-------|---------------|--------|
| 1 | Are you the decision-maker in your life? | | | | |
| 2 | Do you pay attention to your feeling at the time of decision-making? | | | | |
| 3 | Do you consult with others for decision-making? | | | | |
| 4 | Have you ever got into trouble because of the decisions you had made? | | | | |
| 5 | Have you ever been sorry for a correct and fair decision you had made? | | | | |
| 6 | Have you ever been in precipitance at the time you were supposed to take a rapid decision? | | | | |
| 7 | Can you control the different conditions and situations? | | | | |
| 8 | To what extent do your decisions match with your ideas? | | | | |
| 9 | How much of your decisions is regardless of their consequences? | | | | |
| 10 | If there are many ways in front of you, do you choose the safest or the fastest one? | | | | |
| 11 | Do you evade from decision-making as far as you can? | | | | |
| 12 | Does your planning go well right after your decision-making? | | | | |
| 13 | At the time of decision-making, do you pay attention to the first way coming to your mind or you think about the other ways as well? | | | | |
| 14 | Do you wait for the result of your decision or you repeat your decision without concluding? | | | | |
| 15 | Do you think well at the time you are making a rapid decision? | | | | |
| 16 | Do you shape your mind with others' thoughts in your decisions? | | | | |
| 17 | Do you take advice from your decisions? | | | | |
| 18 | Do you regard all the aspects before making any decision? | | | | |
| 19 | In your decision-making, do you regard the practicality of your decision or its loyalty to the doctrine? | | | | |
| 20 | Do you regard the morality in your decision-making? | | | | |

Appendix 2: Critical-thinking performance scoring rubric.

| Criteria | Scoring |
|---|---------|
| 1. Reason clearly within a point of view. 2. Discuss the issue from different perspectives. 3. Identify pros and cons for each perspective. 4. Explain with reasons and evidence which perspective they think is best. | 5 |
| 1. Reason clearly within a point of view. 2. Discuss the issue from different perspectives. 3. Identify pros and cons for each perspective. 4. Do not explain with reasons and evidence which perspective they think is best. | 4 |
| 1. Reason clearly within a point of view. 2. Discuss the issue from different perspectives. 3. Do not identify pros and cons for each perspective. 4. Do not explain with reasons and evidence which perspective they think is best. | 3 |
| 1. Reason clearly within a point of view. 2. Do not discuss the issue from different perspectives. 3. Do not identify pros and cons for each perspective. 4. Do not explain with reasons and evidence which perspective they think is best. | 2 |
| 1. Do not reason clearly within a point of view. 2. Do not discuss the issue from different perspectives. 3. Do not identify pros and cons for each perspective. 4. Do not explain with reasons and evidence which perspective they think is best. | 1 |