



# Path Analysis of Self-Efficacy, Critical Thinking Skills and Emotional Intelligence for Mental Health of Medical Students

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## Abstract

**Background:** Mental health of medical students can be affected by quality of services in hospitals; therefore, it is essential to evaluate its effective factors. However, according to the available data, there were no similar published studies that assess the possibility of linkage between these factors with mental health, in Iranian medical students.

**Objectives:** The aim of this study was to identify the pathways applied by self-efficacy, critical thinking skills, and emotional intelligence, which influences the mental health of medical students.

**Methods:** This cross-sectional study was implemented in 2016. The population of the study consisted of medical students in Mazandaran University (Sari, Iran). Self-efficacy questionnaire of Sheerer, critical thinking skills of California (Form B), standard emotional intelligence questionnaire of Petridis, and general health questionnaire of Goldberg were used for data collecting. The data were analyzed in SPSS 18.0 for Windows (SPSS Inc., Chicago, IL, USA) by descriptive and inferential statistic operations (path analysis).

**Results:** The results showed that the average age of students participating in the study was 22.68 (SD = 1.12; 95% CI = 21.56 - 23.87). The direct path coefficient for critical thinking of mental health was -0.25, which was negative and significant ( $P < 0.001$ ). In addition, a direct relationship between the emotional intelligence and mental health was found (path coefficient = -0.39).

**Conclusions:** Generally, the results showed that both emotional intelligence and critical thinking play an important role in the mental health of self-reliant students. In addition to a direct effect, emotional intelligence had an impact on self-efficacy mediated mental health.

**Keywords:** Medical Students, Self-Efficacy, Emotional Intelligence, Mental Health, Path Analysis

## 1. Background

World Health Organization (WHO) experts, define mental health as a harmonious relationship with others, improvement and modification of personal and social situations, as well as reasonably, fairly, and appropriately resolving anxieties and personal interests (1, 2). Mental health problems are increasing among many students (3). Severe mental disorders were reported in 86% of students, in the national survey of Counseling Center College (4, 5).

Various factors can affect mental health. Critical thinking is one of these factors, which recently has attracted many trends (6). Students who focus on issues and problems adapt better with various situations, which leads to better mental health (7, 8). Improving the thinking process is the center of critical thinking (6). Interpretation, explanation, and self-regulation are considered as key components of critical thinking (9). Critical thinking is defined as exploring a question, problem, or situation for integrating all the available information regarding the studied subject as well as giving a solution or hypothesis to justify an individual's orientation (10). Along with developments acceleration and experiences gained in the beginning of the twentieth century, medical education should train graduates who are able to solve the problem, have communicative skills, and comprehensive approach to health (11). Education system of universities mainly consists of a combination of information and concepts; however, they ignore analyzing, prioritizing the positions, and organizing new sciences, which is required by critical thinking (12).

The second effective factor in mental health is self-efficacy, which recently possesses a special trend in differ-

ent aspects of life and health (13). It also plays an important role in individuals' thoughts, adapting with problems, tension, and decision making (14). Strong self-efficacy beliefs lead to relaxation, which seems to be a good predictor for mental health. Researches have shown that there is a significant relationship between self-efficacy and behavioral problems (15). In other words, self-efficacy is a prediction factor for health-related changes of behaviors, which have a positive impact on self-abilities, and have a great role on mental illnesses treatment (16).

The emotional intelligence is the third effective factor on mental health. The concept of emotional intelligence refers to the adaptability and prosperity of people in life situations (17). Researches have shown that feelings and emotions, like any other scientific issue, consists of principles and procedures (18). Emotional intelligence levels of individuals can make people flexible, adaptable, humanitarian, and successful in their personal and social life. Therefore, emotional intelligence plays an important role in people' success due to its relationship with important personal and social skills of life (19-21). However, according to the available data, there were no similar studies that assess the possible linkage between these factors and mental health in Iranian medical students. In addition, path analysis shows better and reliable results unlike the other simple statistical methods; there are no similar studies that applied this method.

## 2. Objectives

Therefore, regarding the importance of the issue, we examined the relationship between critical thinking, self-efficacy, and emotional intelligence with student's mental health in Mazandaran University of Medical Sciences, using path analysis model. In the proposed model, we checked the indirect effect of critical thinking, emotional intelligence, and mediating role of self-efficacy on mental health. The following hypotheses were selected for this study:

H1. Critical thinking beliefs possess a significant relationship with mental health.

H2. Self-efficacy possesses a significant relationship with mental health.

H3. Emotional intelligence possesses a significant relationship with mental health.

## 3. Materials and Methods

This cross-sectional study was implemented in 2016. Statistical population of the study included students of

Mazandaran University of Medical Sciences (Sari, Iran). Applying random sampling based on Krejcie and Morgan's table, a total of 500 students were selected as the study sample (22). Students were selected from all departments of the university (it had been attempt for sampling equally from each department, based on the total number of students).

### 3.1. Eligible Criteria and Procedures

Eligible students for this study included (i) individuals with no co-morbid psychiatric problems (such as schizophrenia, post-traumatic stress or other diagnosed anxiety disorder, dementia, major depressive disorder) and (ii) individuals with no physical symptom experiences that restricted the study population. The fact that excluding students with clinical depression and/or anxiety disorders need no psychiatric impairment could contribute to the presence of death anxiety. Students were also excluded in the presence of potential confounding co-occurring situations such as drug or alcohol abuse or addiction. Students with higher education levels (such as seven and eight scores for nursing students) were excluded for spending the educational process in hospitals. Then, the students were invited to participate in this study, during class meetings, and were assured that taking the survey would not affect their grades in anyway. Data were collected in a single stage by paper-and-pencil manner. Participants provided informed consent and dropped the completed questionnaires into an enclosed box. Debriefing forms were given to participants as they have exit the classroom. The institutional review approved the research prior to implementation of the research.

### 3.2. Instruments

Demographic, the self-efficacy scale, California critical thinking skills test (CCTST), Bradbury-Graves standard emotional intelligence questionnaire, and general health questionnaire (GHQ) were applied to collect the data.

The self-efficacy scale was introduced by Sheerer (1982), which consists of 17 five-option questions that measure three aspects of behavior: initiative, effort, and persistence (23). This questionnaire is scored based on the Likert scale, in which, higher scores indicate a stronger self-efficacy (85 is the highest score), and lower scores indicate a weaker self-efficacy (17 is the least score). In a study by Bosscher and Smit (24), Cronbach's alpha coefficient for reliability was reported as 0.69. In another study that was performed by Dehghani et al. (25), Cronbach's alpha for this questionnaire was reported as 0.81. In this study, the content validity was confirmed by 15 nurse experts. In addition, the reliability of the scale was qualified by Cronbach's alpha as 0.86.

The CCTST was applied for assessing the critical thinking skill. This questionnaire introduced by Facione et al. (1990), which consists of 34 multiple-choice questions for assessing the critical thinking at five interpretation levels include analysis and evaluation (as core skills), inductive reasoning, and deductive reasoning (as traditional skills) (26). In a research by Tashi et al. (27) the reliability of proposed questionnaire was investigated and Cronbach's alpha was obtained as 0.62. In a study by Sheikhoonesi et al. (28) the reliability of this questionnaire was achieved as 0.72. In the present study the content validity was proved by 15 nursing experts. In addition, the reliability of scale was confirmed by Cronbach's alpha as 0.79 for medical students.

Bradbury-Graves standard emotional intelligence questionnaire was used to evaluate the emotional intelligence (17). This experiment consists of 28 questions and developed based on the five-point Likert scale, in which, the questions of 1 - 6, assess self-consciousness (minimum score = 6 and maximum score = 30), questions of 7 - 15, assess self-management (minimum score = 9 and maximum score = 45), questions of 16 - 20, assess social consciousness (minimum score = 5 and maximum score = 20), and questions of 21 - 28, assess relationship management (minimum score = 8 and maximum score = 45) (19). In a study by Ganji et al. (29) the reliability of questionnaire was examined and Cronbach's alpha for this questionnaire was obtained as 0.83. In the present study, the content validity was proven by 15 nurse experts. In addition, the reliability of scale was proved by Cronbach's alpha as 0.81 for medical students.

GHQ, developed by Goldberg and Hillier (30), consists of 28 questions, which were applied to assess mental disorders. In this questionnaire, questions are answered in a 4-point Likert scale (31). Possessing the cut-off point of 23, those who have scored less than 23 are placed in the group with mental health and those who have scored higher than 23 are placed in the group with inappropriate mental health (32). The validity and reliability of this scale were previously approved by several studies (31, 32). In the present study, the reliability of questionnaire was obtained by Cronbach's alpha coefficient as 0.86.

### 3.3. Ethical Considerations

Ethical approval, was obtained by Research Deputy, from the Research Ethics Committee of Mazandaran University of Medical Sciences (IR.MAZUMS.REC.95. S.66). All the participants received oral and written information regarding the research objectives. It was made clear to them that their participation was voluntary, thus, all data would remain confidential. All participants should not be identified personally, and they were assured that their participation would not affect their academic attempts.

### 3.4. Data Analysis

The statistical tools, which apply for social sciences (SPSS V.20 and PROCESS V.2.04), were used for data analysis. Kolmogrov-Smirnov test was used for proving the normality ( $P = 0.630$ ). For demographic analysis, means  $\pm$  standard deviations or frequencies were reported for continuous or categorical variables. Pearson correlation was used to find primary agreement between research variables. For assessing autocorrelation of residuals and independent errors, we used the Durbin-Watson test. All assumptions including lack of multi-collinearity relationship, tolerance, and variance inflation factor (VIF) were assessed. Path analysis was run for better understanding of possible relationship between critical thinking, self-efficacy, and emotional intelligence with the mental health of students.  $P$  value ( $P < 0.05$ ) was statistically significant.

## 4. Results

Among 500 students, according to exclusion criteria, almost 30 students were excluded. Then, 480 students were chosen for further researches, of which, 450 students were selected for the participation stage (response rate = 93%). The results showed that the average age of the students was 22.68 (SD = 1.12; 95% CI = 21.56 - 23.87). In this study, the percent of female and male participants were 42% and 58%, respectively. In Table 1, mean and standard deviation of variables for critical thinking, self-efficacy, emotional intelligence, and mental health are represented.

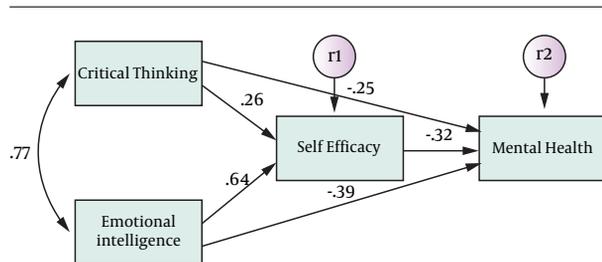
As shown in Table 2, all correlations between variables were considerable. The highest and lowest correlation was related to mental health and emotional intelligence as well as critical thinking and mental health, respectively. In order to investigate the relationship between critical thinking, self-efficacy, and emotional intelligence, with mental health of students, a path analysis was used, in which, the critical thinking and emotional intelligence regarded as independent variables, self-efficacy as mediating variable, and mental health as dependent variable. In addition to their direct impact, the critical thinking and emotional intelligence also affect the mental health through the mediating role of self-efficacy. The fitted model of critical thinking, emotional intelligence, self-efficacy, and mental health of students is shown in Figure 1. In Figure 1B, the

**Table 1.** Mean and Standard Deviation Scores of Critical Thinking, Self-Efficacy, Emotional Intelligence, and Mental Health ( $n = 450$ )

Variables	Mean $\pm$ SD	95% CI
Critical thinking	13.53 $\pm$ 8.8	12.23 - 14.56
Self-efficacy	65.6 $\pm$ 12.34	64.1 - 66.2
Emotional intelligence	106.5 $\pm$ 14.45	105.9 - 107.5
Mental health	21.26 $\pm$ 9.74	21.02 - 22.12

**Table 2.** Linear Correlation Between the Variables of Critical Thinking, Self-Efficacy, Emotional Intelligence, and Mental Health (n = 450)

Variables	Critical Thinking	Self-Efficacy	Emotional Intelligence	Mental Health
Critical thinking	1			
Self-efficacy	0.43 <sup>a</sup>	1		
Emotional intelligence	0.52 <sup>a</sup>	0.39 <sup>a</sup>	1	
Mental health	-0.49 <sup>a</sup>	-0.64 <sup>a</sup>	-0.70 <sup>b</sup>	1

<sup>a</sup>P < 0.001<sup>b</sup>P < 0.05**Figure 1.** The predicting factors of mental health

standardized weights were reported for showing path coefficients. All of the path coefficients were significant at  $P < 0.001$ .

The variance inflation factor of the predictor variable was 2.36. According to [Figure 1](#), there is mutual correlation between critical thinking and self-efficacy (path coefficient = 0.77). The path coefficient between critical thinking and self-efficacy was 0.26. However, the direct path coefficient between critical thinking and mental health was -0.25, ( $P < 0.001$ ). The path coefficient between emotional intelligence and self-efficacy was 0.64, and the direct path coefficient between emotional intelligence and mental health was -0.39. The path coefficient between self-efficacy and mental health was -0.32, which was significant. Indirect path coefficient between critical thinking and mental health (self-efficacy variable = -0.08), and between emotional intelligence and mental health (self-efficacy variable = -0.20) were not significant. Generally, the results showed that both emotional intelligence and critical thinking, play an important role in the students' mental health mediated by self-efficacy. In addition to its direct effect, the emotional intelligence it has also has an effect on mental health through self-efficacy, however, the direct effect of critical thinking on mental health was more than its indirect impact through self-efficacy. Critical thinking through emotional intelligence had a low impact on mental health. The fit indices of model are shown in [Table 3](#). The obtained data confirmed a remarkable path model for mental health.

**Table 3.** Indices of the Path Model Fit

Indices	RSMEA	$\chi^2$	AGFI	Fit Indices	GFI
Value	0.03	1.2	0.92	-	0.91

## 5. Discussion

Results showed that the provided path model had a good compatibility with obtained data; thus, mental health can be explained by critical thinking, self-efficacy, and emotional intelligence. There was a positive and significant correlation between critical thinking and emotional intelligence. The path coefficient between critical thinking and self-efficacy was positive and considerable, however, the direct path coefficient between critical thinking and mental health was negative and significant. In other words, obtaining higher scores in mental health questionnaire represent a lower mental health. Therefore, people with a higher critical thinking possess higher mental health. The achieved data are reasonable due to the fact that it seems that critical thinking has been accepted as a key component in mental health. In a research by Bijnavand et al. (33) it was concluded that there is a negative relationship between critical thinking and mental health, which was compatible with the results of our study. Many studies have shown that students who focus and think on issues have higher critical thinking skills and are more able to adapt themselves with various positions and possess a better mental health (34, 35). The above findings are coordinated with those researches, which show a significant and positive correlation between critical thinking and public health (36, 37).

The findings showed that the path coefficient between emotional intelligence and self-efficacy and between emotional intelligence and mental health were considerably positive and negative, respectively. The positive relationship between self-efficacy and emotional intelligence indicates that the person with higher emotional understanding possess an appropriate relationship with others and has a higher self-efficacy (38). People who cannot discern others' emotions have a weaker social adaptability, which leads to a reduced social supports and sense of self-efficacy, due to the fact that according to Bandura's research, en-

couragement and approval of others is one of the self-efficacy factors (39). In other words, individuals who are able to understand and regulate the emotions of themselves and other people can establish strong social support networks, and consequently, possess more empowerment feelings. In contrast, individuals with low emotional intelligence are not able to distinguish and adapt their feelings with others, which is a prerequisite for social relationships. These people tend to attempt rather than discussing in distress times (40).

Path coefficient between emotional intelligence and mental health was negative, which suggests that students with higher levels of emotional intelligence possess a better mental health (41), that is coordinated with result of Aradilla-Herrero et al. (42) and Resurrección et al. (43). Indirect path coefficient between critical thinking and mental health, by considering the self-efficacy, was not significant. Indirect path coefficient between emotional intelligence and mental health by considering the self-efficacy was significant, which both of them were less than that of direct path coefficients. In addition, path coefficient between self-efficacy and mental health was significant and negative. It is suggested that people with poor self-efficacy attitude tolerate more difficulty, lead to increase the stress, and reduce the mental health. In contrast, strong self-efficacy beliefs result in relaxation and can predict the mental health of individuals (44).

### 5.1. Limitations

The present study also had some major limitations included (1) controlling the emotions and cultural differences between participants, (2) possible carelessness of students during complete the questionnaires, and (3) small sample size, which may limit the generalizability of results. Therefore, it is recommended for more research to be done for detail assessing of this issue.

In addition, qualitative studies can be performed for probably solving of cultural differences.

### 5.2. Implications for Psychiatry and Behavioral Sciences Practices, Medical Education and Future Trends

According to the obtained data, it is possible to suggest the increased mental health of students. It seems that considerable evaluations regarding possessing the emotional intelligence and critical for students would help increase the mental health levels. It is recommended to percept these factors and add them to educational charts in universities.

### 5.3. Conclusion

In totally, the results showed that both emotional intelligence and critical thinking play an important role in self-efficacy mediated mental health of students. Therefore, it

seems that by emphasizing these factors for students, we can significantly improve their mental health (that results more ability for these students in work place). More researches are necessary to gain detailed and trustful results.

### Footnotes

**Authors' Contribution:** Ali Morad Heidari Gorji, Misagh Shafizad, Morteza Darabinia and Aria Soleimani were on the management committee. Ali Morad Heidari Gorji, Misagh Shafizad, Amir Hossein Goudarzian and Aria Soleimani were responsible for data interpretation and writing the report. Ali Morad Heidari Gorji, and Misagh Shafizad did the statistical analysis. Morteza Darabinia, Amir Hossein Goudarzian and Aria Soleimani were on the writing committee. Ali Morad Heidari Gorji, Misagh Shafizad, Morteza Darabinia and Aria Soleimani reviewed and revised the manuscript. All authors reviewed the manuscript.

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