Educ Res Med Sci. 2021 June; 10(1):e116558. doi: 10.5812/erms.116558.

Published online 2021 July 14. **Research Article**

Correlations Between Critical Thinking, Self-esteem, Educational Status, and Demographic Information of Medical Students: A Study from Southwestern Iran

Ali Khavanin [1], Mehdi Sayyah [2], Shabnam Ghasemi [3] and Ali Delirrooyfard [4,*]

[1] Department of Emergency Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[2] Education Development Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[3] Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
[4] Imam Khomeini Hospital Clinical Research Development Unit, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

[*] *Corresponding author*: Department of Emergency Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Email: adelir2891@gmail.com

Received 2021 May 26; **Revised** 2021 June 22; **Accepted** 2021 June 27.

Abstract

Background: Critical thinking and individual characteristics are essential components of conscious decision-making and professional competence in medical students. The critical thinking abilities of medical students have a significant impact on their professional decision-making process. It may have direct and indirect consequences on the quality of medical care.
Objectives: This study aimed to investigate the correlation between self-esteem, demographic information, educational status, and critical thinking of medical students.
Methods: This descriptive cross-sectional study was conducted on 380 medical students in 2019. Data were collected using California Critical Thinking Skills Test (CCTST) and the Rosenberg Self-Esteem Scale (RSES). Quantitative variables were expressed as the mean and standard deviation and frequency and percentage were used to describe the qualitative variables.
Results: The results of the study revealed that 332 (87.4%) of the medical students who participated in the study had a negative inclination towards critical thinking, and 48 (12.6%) had an ambivalent inclination. The average self-esteem score of the students was 3.09 ± 3.35. Moreover, there was a positive and significant correlation between critical thinking scores and self-esteem in medical students (correlation coefficient = 0.848; $P < 0.001$). An increase in the grade level increased the critical thinking score of the students. Moreover, there was no significant relationship between overall scores of critical thinking with students' age, gender, marital status, and place of residence.
Conclusions: In the current study, critical thinking scores of medical students were lower than average level and weak, and there was a direct and positive relationship between critical thinking and self-esteem. Given the importance of critical thinking abilities in the clinical decision-making process, university educators are expected to pay more attention to developing this skill in medical students.

Keywords: Critical Thinking, Self-esteem, Medical Students

1. Background

During this period of globalization, it is expected that people have all the abilities and capabilities that are necessary for every aspect of their life, including business, education, medicine, and the market (1). Many researchers have so far reported critical thinking skill in different ways based on their observations and experiences. According to Florea and Hurjui critical thinking is a fundamental ability developed by teachers and professors for learning (2). Bassham describes critical thinking as helpful in improving one's ability to understand, construct, and make decisions and to free oneself from prejudice (3). In addition, Djumanova noted that "improving critical thinking skills is very important for learners in any field because how knowledge is acquired depends on how one thinks" (1).

Today, physicians in healthcare and clinical therapy face more complex issues and problems. Therefore, they should develop their critical thinking skills to make better decisions, because critical thinking strengthens the physician's clinical decision-making power. It increases the recognition of the patient's needs and helps the physicians to decide on a better method (4, 5). Different definitions are provided for critical thinking and there is some confusion about it. In general, however, critical thinking is a continuous and active cognitive process. The individ-

ual searches and analyzes different issues based on specific principles and methods, interprets complex ideas, considers all aspects of a situation, discusses it, and ultimately makes a decision. Critical thinking is a process of analyzing, evaluating, and improving thinking about any subject, content, or form which enhances the quality of one's thoughts (6, 7).

Self-esteem is considered an essential indicator of mental health that can be estimated in psychology. Self-esteem is determined by different factors, including one's thoughts, feelings, and experiences throughout life. Numerous factors can affect self-esteem based on the culture, including body image dissatisfaction, education, country, and family experiences. The overall level of self-esteem is affected by criteria that may vary from person to person (8-11). Researchers have reached the conclusion that identifying the barriers to critical thinking development in the medical education system can help students to augment and improve it (12-14). Since medical graduates are expected to have critical thinking and make appropriate decisions in the clinical environment, it is necessary to determine the factors influencing their critical thinking ability. Given the importance of these variables and the fact that few studies have been conducted on these issues in our country, the present study aimed to determine the relationship between critical thinking, self-esteem, educational status, and demographic information in medical students in 2019.

2. Methods

This descriptive cross-sectional correlational study was conducted in 2019 on medical students of Ahvaz Jundishapur University of Medical Sciences, one of the major universities of the southwest of Iran. According to sample size formula (α = 0.05, d = 0.05) reviewing a related study (P = 0.50), the number of participants estimated to be 385 (15).

Participants were selected through cluster sampling and informed consent was obtained from them. Initially, 400 medical students were admitted to the study, and then the incomplete questionnaires were eliminated, and finally, 380 cases remained in the study. Inclusion criteria were age of 18 - 30 years, medical students, physical health, no previous/present mental illness, and willingness to participate in the study. Exclusion criteria were incomplete or missing questionnaires. All the eligible students were invited from the teaching hospitals to participate in the study. Then the participants were informed to provide written consent before participating in the study. The questionnaires were prepared in electronic form and given to the medical students. A questionnaire on demographic information was given to them (Table 1). To assess critical thinking, the California Critical Thinking Skills Test (CCTST) was used, and the Rosenberg Self-Esteem Scale (RSES) was utilized to evaluate self-esteem (16, 17). The CCTST questionnaire has 75 items and seven subscales of truth-seeking, open-mindedness, analytical power, the power of organizing, self-confidence, maturity, and adventure, and is scored on the Likert scale. The minimum and maximum scores of this test are 70 and 420 respectively. A score less than 210 means negative inclination towards critical thinking, a score between 210 - 279 means ambivalent inclination towards critical thinking, a score between 280 - 350 means positive inclination towards critical thinking, and a score higher than 350 represents a consistent and robust inclination towards critical thinking (18, 19). The self-esteem questionnaire includes 10 items measured on 2 points; agree or disagree. The results are interpreted and scored according to the guidelines (20).

2.1. Statistical Analysis

The mean and standard deviation were used to express quantitative variables and frequency and percentage were used to describe the qualitative variables. The normality of the data was evaluated using the Kolmogorov-Smirnov test. As the normal distribution assumption was not met, the non-parametric analysis was used. Spearman's correlation coefficient, Mann-Whitney U Test, and multivariate regression were used to analysis the data. P-values < 0.05 were considered to indicate statistical significance.

3. Results

In general, the findings obtained from the students' demographic characteristics and questionnaire scores are presented in Table 1 and Table 2 respectively. In addition, Table 3 presents the results of the relationship between critical thinking and self-esteem, and the impact of demographic variables on self-esteem and critical thinking.

The mean score of the California critical thinking questionnaire was 175.21 $\pm$ 26.43, indicating that 332 students (87.4%) had a negative inclination towards critical thinking, 48 had an ambivalent inclination, and none had a positive inclination. The mean score of students' self-esteem was 3.09 $\pm$ 3.35.

The results of correlation tests showed a linear and significant relationship between self-esteem scores and critical thinking (correlation coefficient = 0.848; P $<$ 0.001). The regression coefficient (R^2) was 0.717, which indicates a strong correlation between these two variables (Figure 1). The results of the overall scores of the two questionnaires of self-esteem and critical thinking with different

Table 1. Demographic Information

Variables	Values [a]
Age (22 - 28 y)	**24.09 ± 1.59**
Gender	
Female	167 (43.9)
Male	213 (56.1)
Marital Status	
Single	228 (75.8)
Married	92 (24.2)
Residence	
Dormitory	245 (64.5)
Non-dormitory	135 (35.5)
Grade Level (2 - 7 y)	5.35 ± 1.15

[a] Values are expressed as No. (%) or mean ± SD.

Table 2. Critical Thinking and Self-esteem Scores of Participants

Variables	Mean	Standard Deviation
Critical thinking	175.2	26.4
Self-esteem	3.09	3.35

Table 3. The Relation Between Critical Thinking and Self-esteem Scores, with Demographic Variables

Variables	P-Value	
	Critical Thinking	Self-esteem
Age	0.239	0.017
Grade level	< 0.001	< 0.001
Gender	0.942	0.118
Marital status	0.654	0.407
Residence	0.955	0.375

variables are listed (Table 3). As can be seen, there was a direct and significant correlation between the critical thinking scores and the grade level, so that an increase in the grade level increased the critical thinking scores. However, there was no significant relationship between the critical thinking scores with students' age, gender, marital status, and residence. As can be seen, there was a direct and significant relationship between the scores of self-esteem with the participants' age and their grade level. An increase in their age and grade level increased students' self-esteem scores. There was no significant difference between the self-esteem scores of male and female students, single and married ones, and those living in the dormitory or other places (Table 3).

4. Discussion

As members of a healthcare team, both physicians and nurses need to have high critical thinking skills, to increase the quality of care and improve treatment outcomes. Medical students' critical thinking abilities affect the professional decision-making process and may have direct and indirect effects on medical care quality. Therefore, strengthening critical thinking skills and identifying the influential and related factors are very important (21). The results of the present study showed that the average score of critical thinking of approximately 88% of the medical students of this university was negative, and about 12% of them had an ambivalent inclination towards critical thinking. None of the 380 participants had a positive inclination towards critical thinking. In line with the results of the current study, the investigation of the critical thinking skills of medical students of an Iranian university stated that 98.6% of students had negative critical thinking, 1.4% had ambivalence thinking, and none of them had a definite tendency to use critical thinking skills (19). In other studies, postgraduate students, especially doctoral students, were more inclined to critical thinking and self-esteem. It may indicate that thinking and reasoning processes and argumentative discussions are more emphasized in higher education than primary education (22, 23). A study conducted in China showed that critical thinking was positive in medical and nursing students. Gender and age significantly impacted critical thinking abilities of students and critical thinking score was higher in medical students than nursing students (24). Due to the differences in the number of medical students participating in different studies, more research is needed to compare the differences in critical thinking of different medical students in several regions.

In the present study, there was a direct and significant relationship between self-esteem with students' age and grade level, so that increasing age and grade level increased self-esteem scores. A study examining the relationship between age and self-esteem revealed that self-esteem is independent of age and that individuals have reported varying degrees of self-esteem as they age (25). Crit-

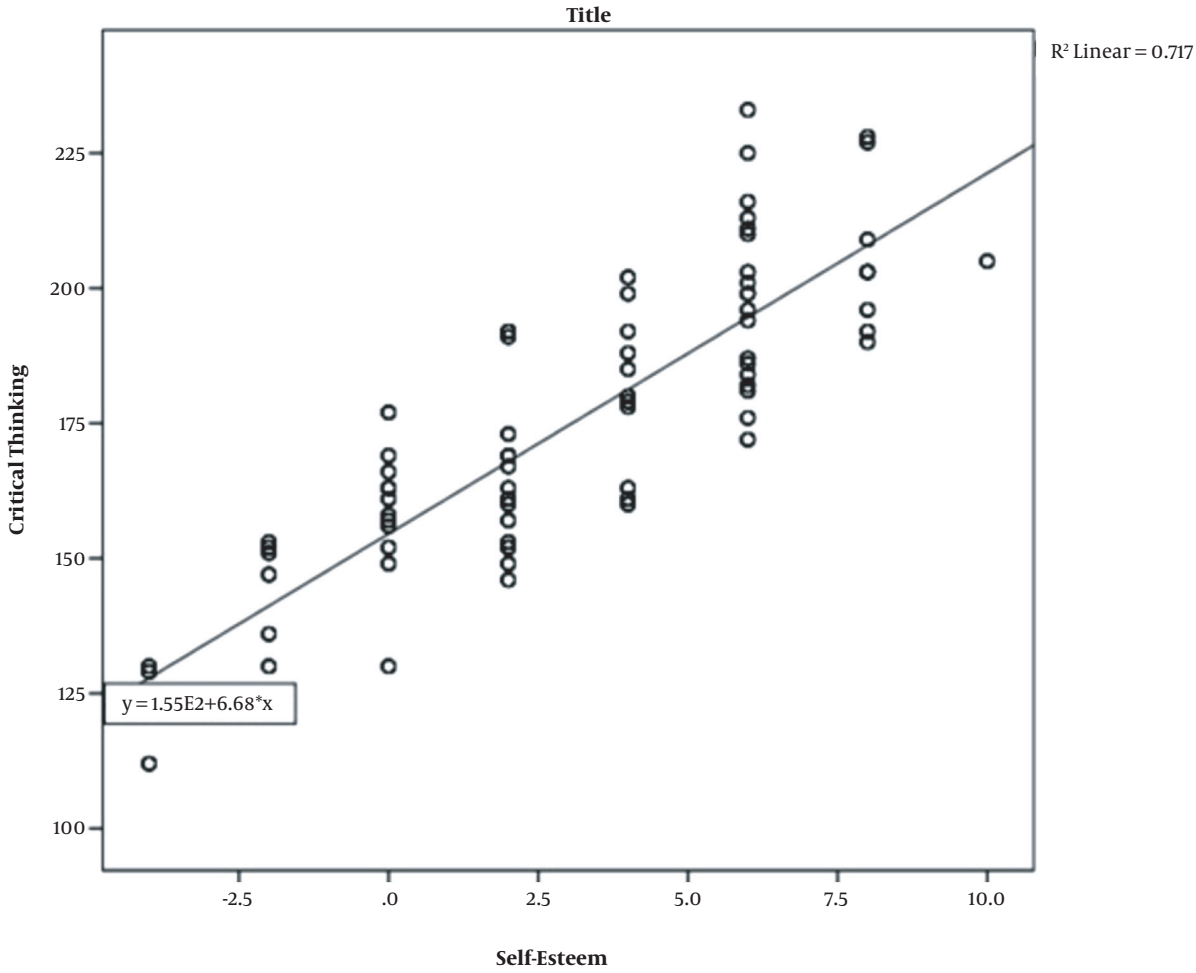

Figure 1. Correlation of self-esteem and critical thinking in medical students [regression coefficient (R^2): 0.717]

ical thinking also had a significant and direct relationship with the grade level, but no significant relationship was observed between students' age and critical thinking scores. The reason can be attributed to the fact that because medical students are usually expected to gain more experience as they learn skills and continue their higher education, they seem logical. So, educational strategies during acquisition improve students' critical thinking skills. In general, similar results are obtained in our country, indicating a low level of critical thinking skills in medical students. A similar study examined the effect of parenting skills on the critical thinking of medical students and revealed that overprotective parents, emotional warmth and understanding, rejection, and over-interference were significant predictors of critical thinking in medical students (26). A study in Iran examined the barriers of critical thinking in medical students' curriculum. The barriers included the resistance to critical society, intellectual tension, personality characteristics, lack of understanding of society's need for criticism, the rule of traditional teaching patterns, lack of critical thinking skills, ineffective evaluation, and difficulty of critical thinking training (12). A review study investigated the critical thinking skills of Asian and non-Asian nursing students and reported that Asian nursing students often had a lower score of critical thinking. In contrast, non-Asian nations had positive inclinations. These variations could be due to problems such as environmental issues, educational programs, and cultural differences (27).

As expected, the mean scores of the two questionnaires of critical thinking and self-esteem in male and female students were not significantly different. Many studies have shown that critical thinking and self-esteem are not affected by gender (28, 29). In the present inquiry, marital

status, and place of residence (dormitory/other places) had no significant relationship with the critical thinking and self-esteem of medical students. Since self-esteem is a yield of social life and the social environment has a significant impact on the development of self-esteem, it can be considered as one of the components of motivation in educational contexts and the instruments that are correlated with its promotion should be emphasized (15, 30).

There was a positive relationship between self-esteem and empathy. Self-esteem is one of the many factors that increase medical students' empathy. Age, academic pressure, attitude towards empathy, and future career also play a critical role in medical students' empathy. Enhancing medical students' self-esteem may be effective in improving medical students' empathy (31).

It seems that self-esteem is one of the emotional dimensions of critical thinking that should be developed or strengthened. In this regard, faculty heads have a supportive role in developing the critical thinking skills of students in line with professional principles and foundations. In other words, independence and self-esteem are essential to developing critical thinking skills.

4.1. Limitations of the Study

The limitations of the study were the small sample size, the low excitement and motivation of students to participate in the study, and the time-consuming process of completing the questionnaires. It should be noted that this study examined only medical students of Ahvaz Jundishapur University of Medical Sciences, so the generalization of results to other universities in the country should be made with caution and by conducting more studies with more sample size.

4.2. Conclusion

The current study showed that the mean scores of the inclination towards critical thinking in medical students of Ahvaz Jundishapur University of Medical Sciences were low, and none of them had a strong and positive inclination towards critical thinking, and the self-esteem scores of these students were relatively moderate. There was also a direct and significant relationship between critical thinking and the self-esteem of these students. Therefore, considering the positive effects of critical thinking on the education process, it is possible to promote and improve students' critical thinking by strengthening and raising self-esteem.

Acknowledgments

This study is a part of the specialty thesis of Shabnam Ghasemi and is financially supported by the vice-chancellor of research affairs of the Autonomous Campus of Ahvaz Jundishapur University of Medical Sciences. The authors would like to thank the Clinical Research Development Unit of Golestan Hospital, Ahvaz Jundishapur University of Medical Sciences.

Footnotes

Authors' Contribution: Study concept and design, A.K, A.D; Acquisition of data, S.G; Analysis and interpretation of data, A.D, A.K; Drafting of the manuscript, M.S, A.D; Critical revision of the manuscript for important intellectual content, A.D, M.S; Statistical analysis, S.G; Administrative, technical, and material support, A.D, A.K; Study supervision, A.D.

Conflict of Interests: There was no conflict of interests.

Ethical Approval: IR.AJUMS.REC.1398.934

Funding/Support: There was no funding/support.

Informed Consent: Informed consent was obtained from participants.

References

1. Djumanova B. Enhancing critical thinking of students in curriculum. *Academic research in educational sciences*. 2021;**2**(2):1007–11.
2. Florea NM, Hurjui E. Critical thinking in elementary school children. *Procedia Soc Behav Sci*. 2015;**180**:565–72. doi: 10.1016/j.sbspro.2015.02.161.
3. Bassham G. *Critical thinking: A student's introduction*. 4th ed. New York, USA: McGraw-Hill; 2011.
4. Saposnik G, Redelmeier D, Ruff CC, Tobler PN. Cognitive biases associated with medical decisions: A systematic review. *BMC Med Inform Decis Mak*. 2016;**16**(1):138. doi: 10.1186/s12911-016-0377-1. [PubMed: 27809908]. [PubMed Central: PMC5093937].
5. Shehata GM, Zaki A, Dowidar NL, El Sayed I. Critical thinking and attitude of physicians toward evidence-based medicine in Alexandria, Egypt. *J Egypt Public Health Assoc*. 2015;**90**(3):115–20. doi: 10.1097/01.EPX.0000470848.07476.f9. [PubMed: 26544840].
6. Gupta M, Upshur R. Critical thinking in clinical medicine: what is it? *J Eval Clin Pract*. 2012;**18**(5):938–44. doi: 10.1111/j.1365-2753.2012.01897.x. [PubMed: 22994988].
7. Huang GC, Newman LR, Schwartzstein RM. Critical thinking in health professions education: summary and consensus statements of the Millennium Conference 2011. *Teach Learn Med*. 2014;**26**(1):95–102. doi: 10.1080/10401334.2013.857335. [PubMed: 24405353].
8. Iorgulescu G. Low self-esteem in women with eating disorders and alcohol abuse as a psycho-social factor to be included in their psychotherapeutic approach. *J Med Life*. 2010;**3**(4):458–64. [PubMed: 21254749]. [PubMed Central: PMC3019074].
9. Zeiders KH, Umana-Taylor AJ, Derlan CL. Trajectories of depressive symptoms and self-esteem in Latino youths: Examining the role of gender and perceived discrimination. *Dev Psychol*. 2013;**49**(5):951–63. doi: 10.1037/a0028866. [PubMed: 22686175].
10. Olchowska-Kotala A. Body esteem and self-esteem in middle-aged women. *J Women Aging*. 2018;**30**(5):417–27. doi: 10.1080/08952841.2017.1313012. [PubMed: 28453407].

11. Soohinda G, Mishra D, Sampath H, Dutta S. Body dissatisfaction and its relation to Big Five personality factors and self-esteem in young adult college women in India. *Indian J Psychiatry*. 2019;**61**(4):400–4. doi: 10.4103/psychiatry.IndianJPsychiatry_367_18. [PubMed: 31391645]. [PubMed Central: PMC6657548].
12. Kasalaei A, Amini M, Nabeiei P, Bazrafkan L, Mousavinezhad H. Barriers of critical thinking in medical students' curriculum from the viewpoint of medical education experts: A qualitative study. *J Adv Med Educ Prof*. 2020;**8**(2):72–82. doi: 10.30476/jamp.2020.83053.1080. [PubMed: 32426391]. [PubMed Central: PMC7188935].
13. Velez MJ. The relationship between abusive supervision and organizational trust: The role of subordinates' self-esteem. *Análise Psicológica*. 2020;**38**(2):181–97. doi: 10.14417/ap.1738.
14. Marques J, Quelhas C, Juhos C. Counterfactual thinking: Study of the focus effect of scenarios and blame ascriptions to victim and perpetrator. *Análise Psicológica*. 2014;**32**(4):355–85. doi: 10.14417/ap.952.
15. Faramarzi M, Khafri S. A causal model of critical thinking in a sample of Iranian medical students: Associations with self-esteem, hardiness, and positive affect. *GMS J Med Educ*. 2019;**36**(4):Doc43. doi: 10.3205/zma001251. [PubMed: 31544143]. [PubMed Central: PMC6737262].
16. Ågerfalk PJ, Sjöström J, Tuunanen T. Evaluation of is curriculum design: A pilot study using the california critical thinking skills test. *Thirty Eighth International Conference on Information Systems*. Seoul, South Korea. ICIS; 2017.
17. Gnambs T, Scharl A, Schroeders U. The structure of the Rosenberg Self-Esteem Scale. *Zeitschrift für Psychologie*. 2018;**226**(1):14–29. doi: 10.1027/2151-2604/a000317.
18. Nelson Laird TF. College students? Experiences with diversity and their effects on academic self-confidence, social agency, and disposition toward critical thinking. *Res High Educ*. 2005;**46**(4):365–87. doi: 10.1007/s11162-005-2966-1.
19. Iranfar S, Sepahi V, Khoshay A, Rezaei M, Karami MB, Keshavarzi F, et al. Critical thinking disposition among medical students of Kermanshah University of Medical Sciences. *Edu R Med S*. 2012;**1**(2):17–22.
20. Classen S, Velozo CA, Mann WC. The Rosenberg Self-Esteem Scale as a measure of self-esteem for the noninstitutionalized elderly. *Clin Gerontol*. 2007;**31**(1):77–93. doi: 10.1300/J018v31n01_06.
21. Harasym PH, Tsai TC, Hemmati P. Current trends in developing medical students' critical thinking abilities. *Kaohsiung J Med Sci*. 2008;**24**(7):341–55. doi: 10.1016/S1607-551X(08)70131-1. [PubMed: 18805749].
22. West DC, Pomeroy JR, Park JK, Gerstenberger EA, Sandoval J. Critical thinking in graduate medical education: A role for concept mapping assessment? *JAMA*. 2000;**284**(9):1105–10. doi: 10.1001/jama.284.9.1105. [PubMed: 10974689].
23. Jirdehi MM, Asgari F, Tabari R, Leyli EK. Study the relationship between medical sciences students' self-esteem and academic achievement of Guilan University of Medical Sciences. *J Educ Health Promot*. 2018;**7**:52. doi: 10.4103/jehp.jehp_136_17. [PubMed: 29693033]. [PubMed Central: PMC5903166].
24. Wang X, Sun X, Huang T, He R, Hao W, Zhang L. Development and validation of the critical thinking disposition inventory for Chinese medical college students (CTDI-M). *BMC Med Educ*. 2019;**19**(1):200. doi: 10.1186/s12909-019-1593-z. [PubMed: 31196183]. [PubMed Central: PMC6567520].
25. Chen J, Zheng K, Xia W, Wang Q, Liao Z, Zheng Y. Does inside equal outside? Relations between older adults' implicit and explicit aging attitudes and self-esteem. *Front Psychol*. 2018;**9**:2313. doi: 10.3389/fpsyg.2018.02313. [PubMed: 30546332]. [PubMed Central: PMC6280639].
26. Huang L, Wang Z, Yao Y, Shan C, Wang H, Zhu M, et al. Exploring the association between parental rearing styles and medical students' critical thinking disposition in China. *BMC Med Educ*. 2015;**15**:88. doi: 10.1186/s12909-015-0367-5. [PubMed: 25966776]. [PubMed Central: PMC4437252].
27. Salsali M, Tajvidi M, Ghiyasvandian S. Critical thinking dispositions of nursing students in Asian and non-Asian countries: A literature review. *Glob J Health Sci*. 2013;**5**(6):172–8. doi: 10.5539/gjhs.v5n6p172. [PubMed: 24171885]. [PubMed Central: PMC4776879].
28. Morales A, Rodriguez-Menchon M, Lis A, Delvecchio E, Li JB, Orgiles M, et al. Spanish validation of the Adolescent Self-Consciousness Questionnaire. *Span J Psychol*. 2020;**23**. e24. doi: 10.1017/SJP.2020.17. [PubMed: 32600483].
29. Sar V, Turk T, Ozturk E. Fear of happiness among college students: The role of gender, childhood psychological trauma, and dissociation. *Indian J Psychiatry*. 2019;**61**(4):389–94. doi: 10.4103/psychiatry.IndianJPsychiatry_52_17. [PubMed: 31391643]. [PubMed Central: PMC6657544].
30. Howlett JR, Paulus MP. Decision-making dysfunctions of counterfactuals in depression: Who might I have been? *Front Psychiatry*. 2013;**4**:143. doi: 10.3389/fpsyt.2013.00143. [PubMed: 24265620]. [PubMed Central: PMC3820979].
31. Huang L, Thai J, Zhong Y, Peng H, Koran J, Zhao XD. The positive association between empathy and self-esteem in Chinese medical students: A multi-institutional study. *Front Psychol*. 2019;**10**:1921. doi: 10.3389/fpsyg.2019.01921. [PubMed: 31496978]. [PubMed Central: PMC6712570].