



Evaluation of Critical Thinking Disposition among College Students: A Study among Healthcare Management Students

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Abstract

Background: Today, most experts believe that critical thinking skill and dispositions among learners provide them opportunities for better understanding and evaluating new knowledge. Therefore most educational programs put an effort to develop such potentiality among students. Our study aimed to evaluate critical thinking disposition among healthcare management students of Shahid Sadoughi University of Medical Sciences in 2016.

Methods: This was a descriptive-analytical study which has been done in a cross-sectional form among healthcare management students of both BSc and MSc degree in Shahid Sadoughi University of Medical Sciences in 2016. To collect data, a standard questionnaire entitled "California Critical Thinking Disposition Inventory (CCTID)" was used. Gathered data were analyzed by SPSS version 20 through the use of descriptive and analytical statistical tests including Pearson correlation coefficient, t-test and ANOVA.

Results: 80% of the students were female and 56.6% were upper than twenty years old. Significant statistical relationship was confirmed between gender and truth seeking also between educational degree and systematicity ($P < 0.05$). Furthermore a direct significant correlation was seen between critical thinking disposition and its seven dimensions ($P = 0.00$). In addition, those MSc students who were studying in the first semester, had the highest level of systematicity ($P = 0.04$).

Conclusion: Given the importance of critical thinking skill and the fact that such ability can help healthcare managers get success in the workplace, officials of educational deputies at the level of the health ministry and its affiliated medical universities should emphasize on the establishment and continuity of training courses regarding such an important skill among students. Furthermore student should be encouraged to apply what they have learned to promote their managerial skills.

Keywords: Critical thinking disposition, university student, Health care management, master degree, bachelor degree.

Background & Objectives

Movement of educational systems toward critical futures study, community based and outcome-oriented approaches has led medical education to revise and reconstruct itself to train more creative and capable students. Critical thinking is mentioned as one of the necessary outcomes in many medical and health services training programs^{1,2}. Healthcare professionals including hospital managers and health policy makers need to foster critical reasoning, decision making skills, ability to anticipate possible consequences of future events and precede organizational procedures in a systematic way to ensure provision of effective and safe care for patients³. In fact critical thinking provides an opportunity for quality of care, patient safety and professional responsiveness through developing essential skills of creativity, flexibility, open mindedness and confidence among healthcare providers⁴.

Nowadays, labor market conditions have been increasingly different for university graduates. Employers expect to hire those with educational qualifications also necessary creativity and innovation skills to solve their organization's problems².

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The importance of developing such thinking skills is to the extent that some experts have considered it as the major educational and academic experiences' goals^{5,6}.

Learning critical thinking improves students' academic performance through empowering them in analysis or critical reasoning of issues to present their thoughts in an organized manner. As a whole, through the establishment of rational relationship between human beings and promotion of critical thinking as a foundation of science and a democratic society, citizens can critically think about social issues to effectively overcome existing problems^{7,8}.

Literature provides different definitions for critical thinking. According to Beyer, it means making distinct and rational judgement⁹. Another definition as proposed by National Council for Excellence in Critical Thinking as "mentally well-organized process of intellectualizing, relating, exploring and examining, creating or evaluating data collected through observation or communication¹⁰. There are some major critical thinking skills including surveillance, analysis, investigation, extrapolation, assessment, clarification and reasoning¹¹. Intellectual criteria such as transparency, reliability, precision, accuracy, deepness, coverage, importance and justice are also essential to apply such approach of thinking^{12,13}.

Training medical and paramedical fields are one of the areas which authorities try to improve their quality. For the purpose, they emphasize on the importance of fostering critical thinking skills among learners¹⁴. Cognitive skills and affective dispositions are two aspects of critical thinking. The first one mainly refers to clarification, investigation, assessment, extrapolation, enlightenment and self-control while the second includes curiosity, desire to get enough information, awareness, trust

seeking, self-confidence, flexibility, open mindedness, caution in making judgements and willingness to change or reform ideas^{15,16}. Without a positive attitude toward critical thinking (disposition aspect), such a skill would not occur or will remain below standard¹⁷. Today many researches worldwide have dedicated to critical thinking issues. Facione concluded that to promote critical thinking among medical students both disposition and ability to apply such a skill is required¹⁵. The relationship between critical thinking skills and affective disposition is still questionable. Some individuals have both criteria while others are weak in one of the aspects. Mc Grath in his study concluded that nursing students in Canada had strong critical thinking skills both from cognitive and disposition aspects¹⁸. In a study conducted by Jin et al environmental health students of a state university in the United States were evaluated in this respect. Findings revealed that students had a positive attitude toward critical thinking but more than half of them were weak in terms of truth seeking¹⁹. Gharib et al also evaluated critical thinking skills among healthcare management students and revealed conforming results. They concluded that although students were willing to critically think and analyze issues but there was still a long way to achieve global standards². While critical thinking skills can be taught in a short time but its dispositions are not influenced in an easy way and take longer time to develop²⁰. Therefore addressing critical thinking in terms of disposition is needed as well²¹⁻²³. Given the importance of critical thinking and knowing that such ability is not enough for developing thinking ability, it is necessary to assess the status of disposition among individuals and determine existing weaknesses through the evaluation process. Such an approach would be beneficial in

improvement planning and consequently delivering of effective solutions²⁴.

In addition, due to the important role of health care managers in ensuring the effective delivery of healthcare services also the necessity for accountability in running such delivery systems, we conducted a study to evaluate the level of critical thinking disposition among healthcare management students of Shahid Sadoughi University of Medical Sciences in 2016.

Methods

This was a descriptive-analytical study which has been done in a cross-sectional form among healthcare management students of both BSc and MSc degree in Shahid Sadoughi University of Medical Sciences in 2016. Due to the limited number of students, all of them were participated in the study through consensus method. Number of study participants in bachelor degree was 24 individuals studying in the first semester, 16 in the third and 18 in each of the fifth and seventh semesters. In master's degree, 6 individuals from semester one and 8 students studying in semester three were selected for the research.

To collect data a standard questionnaire entitled "California Critical Thinking Disposition Inventory" (CCTDI) which has been developed by Facione in 1990. CCTDI is a measurement tool which has been validated to evaluate critical thinking disposition and is appropriate for use among healthcare management students. The questionnaire is consisted of 75 questions in seven subgroups of trust seeking (12 questions), maturity (12 questions), analyticity (11 questions), systematicity (11 questions), self-confidence (9 questions), inquisitiveness (10 questions) and open mindedness (10 questions) was used (15, 23-25). Furthermore, students were asked some demographic questions such as age, gender, educational degree, and their study semester. Questions were organized in a five Likert

scale ranging from (1=strongly disagree) to (5=strongly agree). Based on the scores achieved by the study participants and the expert opinion of statistical advisor, a total mean score of disposition could be in a range of lower than 75 (depicting weak tendency), 75-225 (representing a moderate tendency) and upper than 225 (signifying strong tendency toward critical thinking).

The validity and reliability of questionnaire was approved in similar studies conducted among Iranian university students^{26,27}. Gathered data were analyzed by SPSS version 20 through the use of descriptive analysis methods (mean and standard deviation) and analytical statistical tests including Pearson correlation coefficient, t-test and ANOVA. Significant level for analyses was 0.05.

Results

Demographic characteristics of study participants showed that of the total participants, 84.4% were bachelor student. The greatest number of participants belonged to BSc degree students in the first semester (31.75%), and MSc students in the third semester (57.15%). Furthermore 80% of the students were female and 56.6% were upper than twenty years old.

As table 1 depicts the highest mean score relating to critical thinking disposition belonged to maturity among students upper than 20 years old (41.45 ± 0.53) while the lowest disposition was related to criticism among students less than 20 years old (30.12 ± 0.79). The total mean score of critical thinking disposition in two category of students' age groups were relatively 251.71 ± 4.13 and 257.86 ± 3.04 which confirmed the idea that students had strong tendency for such type of thinking. Furthermore, no statistical significant relation was seen between different aspects of critical thinking disposition and age variable ($P > 0.05$).

Also table 1 shows that the highest mean score related to critical thinking disposition belonged to truth seeking among male students (41.11 ± 1.3) while the lowest was affiliated with open mindedness among female students (30.5 ± 0.39). Total mean score of critical thinking disposition in two gender groups were relatively 261.056 ± 6.1 in male and 253.73 ± 2.71 in female students. As a whole an average score of critical thinking disposition was higher than a moderate level except for criticism which confirmed that students had strong tendency for such type of thinking. Furthermore, among study variables a statistical significant relation was observed between truth seeking and students' gender ($P=0.01$). In fact, the mean score of critical thinking disposition in terms of truth seeking was lower among female students compared to males (37.2 ± 0.7 versus 41.1 ± 1.3).

Study results also showed that the highest mean score related to critical thinking disposition among bachelor students belonged to criticism (30.52 ± 0.49) while among MSc students it was related to maturity (42.14 ± 0.94). As data in table 3 depicts, MSc students had stronger tendency toward critical thinking compared to those studying in bachelor degree (261.14 ± 5.39 ; 254.1 ± 2.77). Furthermore, among study variables no statistical significant relation existed between different aspects of critical thinking disposition and educational degree ($P>0.05$) (Table 1).

As data in table 1 depicts, mean scores of all critical thinking disposition sub groups were upper than a moderate level except for criticism. In fact in bachelor degree no statistical significant relation was seen between disposition sub groups and study semester ($P>0.05$) while in master's degree a significant relation was confirmed between systematicity and study semester ($P<0.05$).

As a whole, there were statistical significant correlations between critical thinking disposition and its subgroups (table 2).

Table 1. Relationship between Mean Score of Critical Thinking Aspects and Demographic Characteristics

			Dimensions of Critical thinking							
Degree	Semester	bachelor	truth seeking	criticism	analyticity	systematicity	self-confidence	Open mindedness	Maturity	Total disposition
			Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Degree	bachelor	1	37.16±1.4	29.9±1	39.8±1	37.5±1.14	30.95±0.7	30.33±0.68	39.7±1	251.1±6.3
		3	37.25±1.18	30.62±1.2	37.8±1.07	37.3±1.15	30.93±1.3	30.68±0.9	40.25±1.3	259.7±5.1
		5	40.16±1.4	30.44±0.8	39.16±0.94	37.8±0.8	32.94±0.7	31.72±0.66	41±1.09	253.3±5.5
		7	37.27±1.6	31.33±0.86	38.4±1.1	36.8±1.1	32.11±0.92	29.8±0.9	41.05±0.8	252.3±5.3
		P-value	0.41	0.77	0.52	0.93	0.38	0.41	0.78	0.72
	Master	1	41±2.9	32.3±1.7	43±1.43	40±1.75	33.3±0.91	31.3±1.72	41.6±1.68	270.1±10.2
		3	36.8±0.8	31±1.13	38.62±1.5	35.5±1.18	32.3±1.17	30.75±0.6	42.5±1.14	254.3±4.7
Age	≤20 years old		37±1	30.12±0.79	39.07±0.75	37.48±0.83	31.15±0.7	30.43±0.55	39.79±0.8	251.7±4.13
	>20 years old		38.8±0.85	31.11±0.49	39.25±0.62	37.35±0.59	32.4±0.49	30.88±0.45	41.45±0.5	257.8±3.04
	P-value		0.16	0.27	0.85	0.89	0.13	0.53	0.08	0.22
Gender	Male		41.1±1.3	31.11±1.25	39.83±1.2	38.5±0.88	31.77±0.84	31.44±0.79	40.6±1.06	261.05±6.1
	Female		37.26±0.7	30.58±0.45	39.01±0.51	37.13±0.56	31.88±0.48	30.5±0.39	40.7±0.53	253.73±2.7
	P-value		0.018	0.63	0.49	0.26	0.91	0.28	0.89	0.24
Degree	Bachelor		37.9±0.73	30.52±0.49	38.93±0.51	37.4±0.54	31.6±0.47	30.6±0.39	40.4±0.52	254.1±2.7
	Master		38.64±1.38	31.57±0.96	40.5±1.2	37.42±1.14	32.7±0.76	31±0.78	42.1±0.94	261.14±5.3
	P-value		0.69	0.39	0.23	0.98	0.34	0.72	0.23	0.31

Table 2. Correlation between Critical Thinking Disposition and its Subgroups

Critical thinking disposition	truth seeking	Criticism	analyticity	systematicity	self-confidence	Open mindedness	maturity
Correlation coefficient	0.77	0.76	0.75	0.73	0.71	0.66	0.69
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Discussion

Study findings revealed that students both studying in bachelor and master's degree had positive tendency toward critical thinking. Mean scores achieved regarding to all disposition aspects were upper than moderate level except for criticism confirming the idea that students were somehow equipped with characteristics needed for critical thinking. Gharib et al got similar findings in their study and concluded that although students had positive tendency to critical thinking but they were weak in some aspects of disposition including criticism, truth seeking and maturity². In another research conducted by Barkhordary, findings revealed positive tendency of learners toward analyticity, self-confidence and open mindedness, their moderate preference to criticism and systematicity finally negative feeling to truth seeking²⁶. Results obtained from a study in Iran similarly reported that total mean score of critical thinking disposition among management students of Tehran University was evaluated in a high level (289.64)². Also a study in Canada confirmed the results and reported the mean score of nursing students' disposition to be 312.2 affirming a strong positive tendency toward this kind of thinking²⁸. Tiwari et al found that unlike Chinese students, Australian learners had high level of tendency toward critical thinking²⁹. These consistencies might be due to the similarity of values, and principles of some educational entities. In fact, promoting

critical thinking skills among students during the study years increases their thinking abilities which consequently help them in achieving work objectives in an effective way. Dissimilar to our research, a study conducted among nursing students in Hong Kong revealed somehow a negative preference of learners toward critical thinking (mean=264.7)³⁰. Although our study reported that criticism got the lowest mean score among disposition subgroups, in a study conducted among nursing students in Norway truth seeking was found as the lowest inclination among study participants³¹. The low mean score for this subscale has been also explained in several studies^{28, 32}. The same as our findings, Tiwari revealed a significant statistical relation between critical thinking disposition and all its subgroups; while contrary to our results, Gharib et al found a significant correlation only between critical thinking disposition and truth seeking among understudy participants^{2,29}. The probable reason for such discrepancy was due to nurses used to old approaches and their unwillingness to apply new knowledge in their care procedures.

Study results also declared that critical thinking disposition was not different among various age and gender groups and only truth seeking had a significant statistical relation with gender variable ($p < 0.05$). Similarly Barkhordary (2011) and Ranjbar (2006) found no significant relation between critical thinking disposition, age, and gender^{27,33}. Unlike to our findings Wangenstein reported that nurses older than

30 years had higher level of critical thinking tendency³¹. Tiwari et al also Facione revealed statistically significant correlation between age and several disposition subscales; but similar to our study results they concluded that the correlation was only high enough with respect to Truth-seeking subscale^{15,29}. In fact, critical thinking starts at an early age and develops in higher age groups; thus it is not necessarily dependant on a particular age.

Regarding the fact that no gender differences were found in present study, Walsh and Hardy reported no statistically significant gender differences with respect to disposition subscales³⁴. In contrast to findings, some other studies believed that women were stronger in some aspects of critical thinking dispositions including open mindedness and maturity^{35,36}. This might be due to the fact that through the passing years, women have learned to be good critical thinkers as men in order to resolve their life difficulties and accomplish their goals more independently.

Another finding was related to non-significant correlation between students' tendency to critical thinking and different academic levels. Sabouri in his study evaluated such a preference among medical students both in pre and post internship. Results similarly rejected any significant difference in study variables between various educational levels ($p > 0.05$). But a statistical significant correlation was only reported between three disposition subgroups of truth seeking, self-confidence, open mindedness and two groups of educational degrees ($p < 0.05$)¹. Unlike to our findings, Marcia et al indicated differences in critical thinking based on academic level so that bachelor students' critical thinking skills were significantly lower than master's participants³⁷. Also in a study conducted among nursing students, significant differences were found between

improvement of critical thinking skills and graduation level of study participants. In the study they also revealed that students at the baccalaureate level had higher levels of critical thinking ability than those at diploma or associate educational level³⁸. King and Kitchener introduced educational degree as a powerful predictor variable for critical thinking³⁹.

Finally our study results showed a significant statistical relation only between systematicity and study semester of MSc students ($p < 0.05$). In contrary, Gharib confirmed such a significant relation with only truth seeking and concluded that different in numbers of semesters was unlikely to explain the difference observed in mean scores of different disposition's subscales ($p < 0.05$)². Similarly a study conducted by Tahery et al found that the distribution of critical thinking score was similar across students in different study semesters⁴⁰, while Salehi et al and Shin et al concluded that as years of studying increase, students' ability for critical thinking rises significantly^{41,42}.

Conclusion

Critical thinking is an essential component of professional accountability for healthcare managers and plays an important role in improving quality of care rendered to patients. Those managers who had learned critical thinking skills and have developed truth seeking, open mindedness, analyticity, systematicity, self-confidence, criticism and maturity during their college time, would be more ready to apply such type of creative thinking in their personal and professional lives. Given the importance of critical thinking skills and the fact that such ability cannot solely guarantee success in the workplace, individuals should have tendency to apply what they have learnt as critical thinking skills. Although in our study the overall students' inclination toward critical thinking has been evaluated

in a high level but weakness of some aspects such as criticism necessitates continuum strengthening of such dispositions among students of different faculties.

Competing interests

Authors declared no competing interest regarding this study.

Authors' contributions

RA developed the project idea, ZH and F Sh gathered study data, FS conducted the statistical tests, RM and SR organized the manuscript and revised necessary revisions.

Abbreviation

CCTDI: California Critical Thinking Disposition Inventory

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