

Original Article

Comparison of Critical Thinking Levels of Nursing Students at Two Universities and the Influencing Factors

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This study aimed to examine critical-thinking levels of nursing students who were educated at two separate universities. The population of the study included nursing students who were educated at the Group1, and the Group2. The study was conducted with the participation of 832 students. The students' total mean score obtained from the Critical-Thinking-Disposition-Inventory was found to be 207.03 ± 22.91 in Group1, 216.30 ± 20.92 in Group2 and a statistically significant difference was observed between the groups. Although the critical-thinking mean scores of the students in each group were low, the students in Group2 obtained higher scores than those in Group1. In addition, factors such as being a female, being a fourth-year-student, participating in social and scientific activities positively affected the tendencies of critical-thinking.

Keywords: Critical thinking, nursing students, nursing process**Introduction**

Rapid developments in information and technology have influenced the social life in terms of social, economic, and cultural aspects. It is important for nurses who strive for receiving responses to social issues to adapt themselves to these developments and changes. In such a rapidly changing world, particularly nurses who should make quick and right decisions about patient care are expected to be the members of profession who can easily adapt themselves to the developments and innovations; place emphasis on personal and collective development; think, question, and search; make rational decisions; produce new ideas; communicate in a high-quality manner; and think critically (Banning, 2006). Critical thinking is the most developed and advanced way of thinking. Critical thinking is an individual's ability and skill to search for, obtain, evaluate, analyze and synthesize, decide on, and, as a result, use information to improve their thinking by being aware of their own thinking

and adding their creativity and taking risk. Critical thinking has similar steps to those of nursing procedures that are benefited from to provide planned nursing care. It is an essential thinking process for its steps, such as gathering and arranging information obtained from many resources, deciding on what is required using this information, selecting and implementing one of the possible approaches, and evaluating the results of the process (Papathanasiou et. al., 2014). Nurses should be able to search for and question information, think critically, and provide solutions for problems to perform safe care practices and respond to the health care requirements of the society. Furthermore, critical thinking gives nurses the opportunity to question events and make decisions about patients. It also allows them to evaluate and perform the basic nursing education, their occupational experiences, and the results of studies (Caldwell & Grobbel, 2013). In addition to all these benefits, it should be noted that critical thinking empowers nurses' independent decision

making, improves their ability to analyze and synthesize the situations they encounter, establishes a cause-and-effect relation, enhances occupational professionalism, and facilitates ethical issue solving. Further, it is a dynamic process that has a positive effect on their having autonomy and power (Senita, 2008). The quality of the nursing care depends on nurses' ability to think critically and integrate this thought into the practice setting (Simpson & Courtney, 2002). It is quite important for nurses, who make and implement vital and critical decisions, to improve their critical thinking skills because their profession is not considered to be the procurement of bedside care services only, and because of the fact that nursing is a discipline based on science and connected with theories, which searches for and implements the facts, uses mental power in addition to manual dexterity, and performs evidence-based practices (Lai, 2011; Simpson & Courtney, 2002). Furthermore, the modern education is intended to raise individuals who know what to learn, and how and why to learn it, use and develop the information they have learned, and produce new information instead of those who accept ready information without questioning them. Thus, it is a responsibility for nursing professionals to ensure that nursing students are educated to have the critical thinking skills required for them to play active and autonomous roles in the rapidly changing health care services (Hughes & Lavery, 2015). Nurses should promote and protect health and provide services to prevent diseases in every environment where nursing students are present. In the case of a disease, they should play an executive, educative, administrative, and investigative role during the care and treatment of these individuals. They should also educate them to be individuals who have active responsibilities and think critically (Lai, 2011). As the relevant literature and descriptions refer, critical thinking is a required skill in the nursing profession. In Turkey, a large number of studies have evaluated critical thinking skills of nursing students. However, limited multicenter studies have been performed with nursing students. This study was conducted to determine critical thinking tendencies of students at Group1, and Group2 and the factors influencing them.

Materials and Methods

Study design: This study designed to examine critical thinking levels of nursing students who were educated at two universities and the influencing factors.

Setting and sample: The population of the study included the nursing students who received undergraduate education at the Group1 ($N=1224$), and the Group2 ($N=327$). The sample of the study

included the nursing students who met research criteria selected using simple random sampling, a probability sampling method. The study was conducted with the participation of 832 students; 618 in the Group1 and 214 in the Group2.

Data collection: The data were collected on the specified dates using the "California Critical Thinking Disposition Inventory (CCTDI)" and a "Sociodemographic Characteristics" survey form.

Data collection tools: A survey form: This form included questions about the parameters, such as students' years of education, ages, schools they graduated from, places of residence, and parental education levels. CCTDI: The original CCTDI was developed by Facione et al., (2008) and the validity and reliability of the Turkish version were tested by Kokdemir (2003). The Cronbach's alpha coefficient of the scale was reported to be 0.88. The Turkish version of the scale included 51 items and 6 subscales. The data were collected using the CCTDI, a 5-point Likert-type scale including 51 items based on the scores given for each item. Regarding the individuals' levels of critical thinking, scores below 240 were considered to be low, those ranging from 240 to 300 were considered to be medium, and those above 300 were considered to be high. The researchers visited each class at different times, made necessary explanations to the students about the study and the scale, and placed emphasis on the fact that the study was on a voluntary basis to administer the data collection tools. The data were collected by the researchers. The study was completed with the participation of 832 students because 217 were reluctant to participate in the study, 421 students were absent from the class at the time of data collection, and 183 students did not complete the surveys.

Results: The CCTDI Cronbach's alpha score was 0.83, confirming the validity of the scale. Table 1 shows the socio-demographic characteristics of the students who participated in the study. The percentage of females was 71.2% in Group 1 and 71.0% in Group 2, and the percentage of first-year students was 30.1% in Group 1 and 33.2% in Group 2. Additionally, the percentage of students who were 17–19 years old was 46.6% in Group 1 and 53.7% in Group 2. The percentage of single students was 96.3% in Group 1 and 95.9% in Group 2. The percentage of students who had four or more siblings was 22.0% in Group 1 and 7.6% in Group 2. Of the mothers of the students in Group 1, 48.1% completed elementary school, and of the fathers of the students in the same group, 53.7% completed elementary school. Of the mothers of the students in Group 2, 49.9% completed elementary school, and of the fathers of the students in the same group,

48.8% completed elementary school. Of the students in Group 1, 47.7% came from preventive families, and of the students in Group 2, 41.7% came from democratic families. Of the students in Group 1, 83.2% were from middle-income families, and of the students in Group 2, 83.8% were from

middle-income families. Although 57.5% of the students in Group 1 wanted to join social activities, 47.2% took part in them. In Group 2, 61% wanted to join social activities,; however, 59.1% took part in them.

Table 1. Sociodemographic Characteristics of Students According to University (n=832)

Sociodemographic Characteristics		Total		1. group		2. group		p
		n	%	n	%	n	%	
Gender	Famale	592	71.2	440	71.2	152	71.0	.962
	Male	240	28.8	178	28.8	62	29.0	
Class	1	257	30.9	186	30.1	71	33.2	.627
	2	218	26.2	159	25.7	59	27.6	
	3	215	25.8	166	26.9	49	2.9	
	4	142	17.1	107	17.3	35	16.4	
Age	17-19	403	48.4	288	46.6	115	53.7	.197
	20-22	332	39.9	255	41.3	77	36.0	
	23 ↑	97	11.7	75	12.1	22	10.3	
Marital status	Single	592	95.8	206	96.3	798	95.9	.765
	Married	26	4.2	8	3.7	34	4.1	
Number of Siblings	1	88	14.2	106	49.5	194	23.3	.000
	2	148	23.9	18	8.4	166	20.0	
	3	116	18.8	43	20.1	159	19.1	
	4 ↑	266	43.0	4	22.0	313	37.6	
Education of Mother	İliterate	126	20.4	51	23.8	177	21.3	.880
	Literate	94	15.2	32	15.0	126	15.1	
	Primary Education	312	50.5	103	48.1	415	49.9	
	High School	72	11.7	23	10.7	95	11.4	
	License/Associate	14	2.3	5	2.3	19	2.3	
Education of Father	İliterate	18	2.9	6	2.8	24	2.9	.112
	Literate	82	13.3	18	8.4	100	12.0	
	Primary Education	291	47.1	115	53.7	406	48.8	
	High School	151	24.4	57	26.6	208	25.0	
	License/Associate	69	11.2	14	6.5	83	10.0	
Family Structure	Authoritarian	108	17.5	55	25.7	163	19.6	.000
	Democratic	290	46.9	57	26.6	347	41.7	
	Protector	220	35.6	102	47.7	322	38.7	
	Economical Situation	Low	56	9.1	21	9.8	77	
Middle	519	84.0	178	83.2	697	83.8		
High	43	7.0	15	7.0	58	7.0		
Living Place	With My Family	173	28.0	91	42.5	264	31.7	.000
	My Relatives	13	2.1	5	2.3	18	2.2	
	With My Friends	98	15.9	50	23.4	148	17.8	
	Home Alone	5	0.8	3	1.4	8	1.0	
	The Residence	329	53.2	65	30.4	394	47.4	
Activity You Want To Attend	Scientific	134	21.7	87	40.7	221	26.6	.000
	Social	391	63.3	123	57.5	514	61.8	
	To Both	93	15.0	4	1.9	97	11.7	
Being in Social Event	Yes	391	63.3	101	47.2	492	59.1	.000
	No	227	36.7	113	52.8	340	40.9	

Table 2. The Total CCTDI Scores and the Mean Subscale Scores of The Students at the two Universities

CCTDI scores and the mean subscale scores	Total	1. group	2. group	p
Analytical	44.89±7.25	44.21±7.57	46.86±6.24	t: 5.07 p: .000
Open-Mindedness	44.97±10.08	43.88±10.23	48.12±8.65	t: 5.87 p: .000

Curiousness	38.10±6.25	37.73±6.22	39.16±6.17	t: 2.94 p:.003
Self-Confidence	28.85±5.33	28.78± 5.45	29.04±5.19	t: 0.62 p:.533
Truth-Seeking	23.57±5.95	23.48±6.07	23.82±5.74	t: 0.82 p:.473
Systematicity	27.68±4.28	27.53±4.33	28.10±4.36	t: 0.88 p:.091
TOTAL	209.41±22.89	207.03±22.91	216.30±20.92	t: 0.06 p:.000

Table 3. The Students' Scores Obtained from the Critical Thinking Subscales Based on Their Genders

CCTDI scores and the mean subscale scores	1. group			2. group		
	Famale (n:592)	Male (n:240)	p	Famale (n:152)	Male (n:62)	p
Analytical	45.26±6.97	43.97±7.96	t: 2.17 p:.031	47.05±5.92	46.40±6.98	t: 0.69 p:.491
Open-Mindedness	45.72±9.92	43.12±10.09	t: 3.01 p:.003	48.78±8.58	46.50±8.67	t: 1.75 p:.080
Curiousness	38.13±6.13	38.03±6.45	t: 0.32 p:.742	39.13±5.81	39.25±6.81	t:-0.13 p:.898
Self-Confidence	28.78±5.19	29.01± 5.64	t:-0.43 p:.662	28.96±4.85	29.24±5.70	t:-0.35 p:.722
Truth-Seeking	23.86±5.97	22.85±5.82	t: 1.98 p:.048	24.07±5.86	23.19±5.40	t: 1.02 p:.307
Systematicity	27.82±4.28	27.34±4.15	t: 1.60 p:.110	28.14±4.31	28.01±4.32	t: 0.19 p:.844
TOTAL	208.72±23.48	202.83±21.45	t: 2.91 p:.004	217.40±19.70	213.61±23.71	t: 1.20 p:.231

The total CCTDI scores and the mean subscale scores of the students at the two universities are given in Table 2. The CCTDI score of the students in Group 1 was found to be 209.41±22.89, whereas this score was found to be 216.30±20.92 in Group 2 ($p<.05$) (Table 2). The students' mean scores for analytical thinking (46.86±6.24), open-mindedness(48.12±8.65) and curiousness (39.16±6.17) subscales were found to be higher in Group 1 than in Group 2, and the difference was statistically significant ($p<.05$). However, no statistically significant difference was found between the groups in terms of self-confidence, truth-seeking, and systematicity subscales ($p>.05$) (Table 2). The students' scores obtained from the critical thinking subscales based on their genders are given in Table 3. The open-mindedness subscale score, truth-seeking subscale score, and total scale score were found to be 45.72±9.92, 23.86±5.97, and 208.72±23.48, respectively, for the female students in Group 1. The scores of the female students were found to be higher than those of the male students, and the difference between these scores was statistically significant($p<.05$).

The students' scores obtained from the critical thinking subscales based on their years of education are shown in Table 4. The analytical thinking subscale score, self-confidence subscale score, and total scale score were found to be 45.61±7.54, 29.76±5.55, and 211.28±25.57, respectively, for fourth-year students in Group 1. The total scores of the fourth-year students were found to be higher than those of other students, and the difference between these scores was statistically significant ($p<.05$).

Discussion

The American Nurses Association has acknowledged the measurement of critical thinking level as a criterion in the accreditation and assessment of undergraduate nursing programs (Simpson & Courtney, 2002). As critical thinking skills of members of nursing profession become higher, their practices regarding health protection and promotion as well as the improvement of life quality are more effective. The present study found the overall CCTDI mean score to be 209.41±22.89 and showed that the students' critical thinking

tendencies were low. Many studies conducted with nursing students showed that students' mean scores for critical thinking were low (Cevik et al., 2009; Cinar et al., 2012). However, some studies found nursing students' mean scores for critical thinking tendencies to be at a medium level (Shin et al., 2006). On the contrary, some studies found nursing students' mean scores for critical thinking to be high (Profetto-McGrath, 2003; Wangenstein et al., 2010). Nursing students' low ability to think critically can be a result of previous educational and sociocultural features of the sample, the differences in the education and practice fields, presence of nursing education provided at school in traditional curriculum, highly crowded classrooms and low number of instructors, the relationship between authoritarian teachers and students, and the characteristics of instructors. This study found the total CCTDI mean score to be 207.03 ± 22.91 in Group 1 and 216.30 ± 20.92 in Group 2. Both groups had low levels of critical thinking tendencies, although the mean score of Group 2 was found to be higher (Table 2), and the difference between the groups was reported to be statistically significant ($p < .05$). This difference might have been caused by the fact that lessons that increased the critical thinking level, such as psychology and drama, were included in the curriculum of Group 2 while Group 1 did not take such lessons. A study (Kokdemir, 2003) reported that critical thinking was taught in the "Introduction to Psychology" lesson provided to undergraduate students, and revealed that this education improved the critical thinking tendency, as expected. Moreover, the reason why the total CCTDI mean score of Group 2 was high could be that the students were able to participate in the lessons more actively and had more say because the number of students in the classroom was lower (Group 1, 130; Group 2, 75). Critical thinking is not a simple and linear process that can be learned overnight. Experience is a process that can be acquired through sharing and active learning. Students can improve their critical thinking skills by making decisions alone, questioning their decisions, and implementing them (Potter et al., 2016). The reason why the mean scores of the students in Group 1 were low could be that they were always alone with instructors during clinical practices and faced obstacles created by instructors before they implemented their decisions. Students' critical thinking skills are expected to be improved if some steps are taken: problem-focused research is conducted in addition to teaching based on the literature; role-play practices are performed, and students do not receive help every time, but only when required; and they do not face obstacles created by instructors. The CCTDI subscales were

examined, and the highest mean scores were observed for open-mindedness (44.97 ± 10.08) and analytical thinking (44.89 ± 7.25). Additionally, the students were found to have medium-level critical thinking tendencies. The lowest mean score was obtained from the truth-seeking subscale (23.57 ± 5.95), and all remaining subscales had low levels of critical thinking tendencies (Table 2). This finding supported the results of other previous studies. The study conducted by İskender and Karadag (2015) revealed that students obtained medium-level scores from the analytical thinking subscale (İskender & Karadag, 2015). Kim et al. (2014) reported the mean score for truth-seeking subscale to be low (Kim & Choi, 2014). The students' medium-level scores from the open-mindedness subscale in this study might be because they studied in groups in theoretical and practical sessions, interacted with each other coherently, and were tolerant toward other individuals in the group and aware of their responsibilities. Medium scores from analytical thinking might be a result of the fact that students were placed in nursing schools based on their math and science scores in Turkey. The students' low scores on the truth-seeking subscale could be the indication of that they had a low tendency to evaluate other options and different thoughts. The mean scores of all subscales for students in Group 2 were found to be higher than those for students in Group 1. The difference was found to be statistically significant for the open-mindedness ($p < .05$), analytical thinking ($p < .05$), and curiousness ($p < .05$) subscales. The greatest factor in the high scores of students in Group 2 on the analytical thinking, open-mindedness, and curiousness subscales could be the fact that the students spent less time with instructors in clinical practices; thus, they stayed alone for longer times and felt confident to implement their decisions by themselves. The study examined the relationship between the students' total CCTDI score and subscale mean scores and found the critical thinking levels of both the female and male students to be low. In both groups, the total CCTDI mean scores of the female students were found to be higher than those of males. The mean score difference between the females (208.72 ± 23.48) and the males (202.83 ± 21.45) in Group 1 was found to be statistically significant ($p < .05$), whereas the mean score between two genders in Group 2 was not found to be statistically significant ($p > .05$). In general, similar results were obtained in the studies included in the literature, which supported the presence of a significant relationship between gender and critical thinking tendency. Previous studies conducted by İskender and Karadag, Cevik et al. showed that critical thinking levels were low

for both genders (Cevik et al., 2009; İskender & Karadag, 2015). Kim et al., Yildirim and Ozsoy, and Cinar et al. found, on the contrary, that critical thinking levels of males were statistically significantly higher than those of females (Cinar et al., 2012; Kim & Choi, 2014; Yildirim & Ozsoy, 2011). The number of male students in the nursing schools has increased in Turkey in recent years. However, the number of males ($n=240$) was less than half of the number of females ($n=592$) in this study. The higher CCTDI mean scores of the female students might be a result of the fact that the females were higher in number. The study also compared the gender with the subscales and found that the mean scores for open-mindedness and truth-seeking subscales for female students in Group 1 were statistically significantly higher than those of the male students. Although the subscale scores for female students in Group 2 were higher, they were not found to be statistically significant ($p>.05$). Regarding the students' CCTDI scores based on their years of education, the critical thinking levels were found to become higher as the year of education increased, except for the second year. Some studies supported the findings of the present study (Goodin & Isobel 2005). In this study, the lower scores than the mean score of the scale for the nursing student implied that the students were at the basic critical thinking level, and as their year of education increased in time (except for the second year), they became more experienced and had increased professional information and skills, and their CCTDI scores improved. Similarly, the study found that the total CCTDI mean scores of the fourth-year students were higher than those of the other students in both groups. The study compared the students' years of education with their mean subscale scores and reported that the second-year students obtained the lowest score and the fourth-year students obtained the highest score from the analytical thinking and self-confidence subscales. The study found the difference between their scores to be statistically significant. The reason why the critical thinking level of the fourth-year students was higher could be that they did not encounter situations requiring multidimensional thinking to a great extent, their professional liability increased as their graduation was about to complete, and they became more professional because they made use of nursing procedures more compared with the first-year students. Similarly, the high mean scores of the first-year students could be explained by the fact that they were at the first step of entering a profession; as a result, they had a mentality of trying to think from different perspectives, being curious, and seeking the truth.

Conclusion and Recommendations: The CCTDI Cronbach's alpha score was found to be 0.83. The CCTDI score of the students was found to be 207.03 ± 22.91 and 216.30 ± 20.92 in groups 1 and 2, respectively ($p<0,005$). Furthermore, characteristics, such as gender, participation in social activities, parental education level, and participation in scientific activities, were found to affect critical thinking tendencies. The mean scores from analytical thinking (46.86 ± 6.24), open-mindedness (48.12 ± 8.65) and curiousness (39.16 ± 6.17) subscales for the students in Group 2 were found to be higher than those of students in Group 1 ($p<.05$), while no statistically significant difference was found in terms of self-confidence, truth-seeking, and systematicity subscales ($p>.05$).

Thus, the following steps should be taken: New studies should be planned to determine different methods to raise nursing students' medium-level critical thinking skills to higher levels. To develop students having higher levels of critical thinking skills and clinical success, new regulations should be introduced to the curriculum and strategies for education models and education techniques that ensure active participation of students in the education process, include lessons regarding critical thinking skills (psychology, critical thinking, problemsolving, and so on), and help students acquire problem-solving skills should be used. Consideration should be given to the fact that each student has different learning styles, and passive learning/teaching techniques should be avoided in the class, while different learning/teaching strategies, such as case studies, role-play activities, games, mental exercises, case discussions, and simulations, should be used. Since students' critical thinking levels increase with their participation in social and scientific activities, nursing activities regarding art and science should be organized and, students should be encouraged to participate in such activities.

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Table 4. The Students’ Scores Obtained from the Critical Thinking Subscales Based on Their Years of Education

CCTDI scores and the mean subscale scores	1. group					2. group				
	1. (n:71)	2. (n:59)	3. (n:49)	4. (n:35)	p	1. (n:186)	2. (n:159)	3. (n:166)	4. (n:107)	p
Analytical	44.06±7.71	42.36±7.33	45.22±7.28	45.61±7.54	F:5.61 p:0.001	46.38±6.92	46.42±5.54	47.67±5.52	47.45±6.82	F:0.61 p:0.605
Open-Mindedness	44.24±10.77	43.40±9.08	43.82±10.12	44.06±11.29	F:0.20 p:0.894	48.08±7.85	47.64±7.72	47.36±9.65	50.05±10.01	F:0.76 p:0.515
Curiousness	37.78±6.40	38.03±6.14	38.03±6.05	38.71±6.01	F:2.47 p:0.061	39.14±7.26	37.98±5.97	39.87±4.18	40.22±6.02	F:1.32 p:0.269
Self-Confidence	28.44±5.75	28.06± 4.82	29.21±5.28	29.76± 5.55	F:2.73 p:0.043	29.15±4.67	28.49± 5.06	29.46±4.93	29.17± 6.29	F:0.36 p:0.782
Truth-Seeking	23.10±6.72	24.23±5.13	23.38±5.69	23.17±6.40	F:1.19 p:0.313	23.39±6.66	25.03±4.98	22.32±5.67	24.74±4.52	F:2.47 p:0.063
Systematicity	27.00±4.52	27.38±4.05	28.06±3.87	27.88±4.36	F:2.18 p:0.089	28.15±4.52	27.86±3.91	28.65±4.88	27.65±3.87	F:0.44 p:0.719
TOTAL	205.72±24.11	203.25±21.82	209.37±22.3 3	211.28±25.5 7	F:3.48 p:0.016	215.46±22.9 1	214.33±18.90	217.00±22.04	220.34±22.06	F:0.65 p:0.578