Araştırma Makalesi
Research Article

Adnan Menderes Üniversitesi Sağlık Bilimleri Fakültesi Dergisi 2023: 7(2); 340-352
Journal of Adnan Menderes University Health Sciences Faculty
doi: 10.46237/amusbfd.1107361

Hemşirelik Öğrencilerinin Eleştirel Düşünme Eğilimlerinin ve Algılarının Belirli Faktörlere Göre Analizi: Kesitsel Bir Karma Yöntem Çalışması

Analysis of Nursing Students' Critical Thinking Dispositions and Perceptions Considering Certain Factors: A Cross-Sectional Mixed-Methods Study

Meltem AKBAŞ[1] A,B,C,D,E,F,G, Dilara KEKLİK[2] A,B,C,D,E,F,G, Ahmet DOĞANAY[3] B,D,F,G

[1]Çukurova University, Faculty of Health Sciences, Department of Midwifery, Adana, Turkey

[2]Çukurova University, Faculty of Health Sciences, Department of Nursing, Adana, Turkey

[3]Çukurova University, Faculty of Education, Department of Educational Sciences, Adana, Turkey

ÖZ

Amaç: Bu kesitsel karma yöntem araştırması, hemşirelik öğrencilerinin eleştirel düşünme eğilimlerini ve algılarını belirli faktörleri göz önünde bulundurarak analiz etmeyi amaçlamaktadır.
Yöntem: 358 hemşirelik öğrencisi katılmıştır. Nicel veriler, "Kişisel Bilgi Formu" ve "Eleştirel Düşünme Eğilimi Ölçeği (EDEÖ)" kullanılarak toplanmıştır. Nitel veriler 4 soruluk açık uçlu bir anket aracılığıyla toplanmıştır.
Bulgular: EDEÖ alt boyut puan ortalamaları 37.95±7.02, 42.44±7.53, 54.15±8.76, 22.72±4.17, 12.12±2.23 olarak bulundu. Gelir düzeyi, bölümü isteyerek seçme, bölümü sevme ve EDEÖ'nün alt boyutları arasında istatistiksel olarak anlamlı farklılıklar bulunmuştur. Hemşirelik öğrencileri eleştirel düşünme becerilerini genellikle ailelerinde/eğitimleri sırasında kazandıklarını, eleştirel düşünmenin hastaları teşhis etmede önemli bir beceri olduğunu düşündüklerini ve eleştirel düşünme becerilerinin geliştirilmesi için hemşireliğin profesyonelleştirilmesi gerektiğini belirtmişlerdir. Araştırmada hemşirelik öğrencilerinin EDEÖ alt boyut puan ortalamaları orta ve yüksek düzeyde bulunmuştur.
Sonuç: Nitel verilerin nicel verilerle uyumlu olduğu görüldü. Hemşirelik öğrencilerinde eleştirel düşünme geliştirilmelidir.

Anahtar Kelimeler: Hemşirelik öğrencisi, Hemşirelik eğitimi, Eleştirel düşünme, Eleştirel düşünme eğilimleri, Kesitsel karma yöntem.

ABSTRACT

Objective: This cross-sectional mixed-methods study aims to analyze the nursing students' CT dispositions and perceptions considering certain factors.
Method: 358 nursing students participated. The quantitative data were collected using a "Personal Information Form" and the "Critical Thinking Disposition Scale (CDTS)". The qualitative data were collected through a 4-question open-ended questionnaire.
Results: The mean scores of the sub-dimensions of CDTS were found to be 37.95±7.02, 42.44±7.53, 54.15±8.76, 22.72±4.17, 12.12±2.23. There was statistically significant differences between income level, choosing department willingly, liking the department and the sub-dimensions of CDTS. Nursing students stated that they usually gained CT skills in their family/during their education, they thought that CT was a significant skill in diagnosing patients, and nursing should be professionalized to improve CT skills. In the study, the nursing students' mean scores of CDTS sub-dimensions were found to be at medium and high levels.
Conclusion: Qualitative data were found to be compatible with quantitative data. Critical thinking should be enhanced in nursing students.

Key words: Nursing student, Nursing education, Critical thinking, Critical thinking dispositions, Cross-sectional mixed-methods.

Corresponding Author: Dilara KEKLİK
Çukurova University, Faculty of Health Sciences, Department of Nursing, Adana, Turkey.
dkkeklik@gmail.com
Geliş Tarihi: 22.04.2022 – Kabul Tarihi: 06.03.2023
Yazar Katkıları: A) Fikir/Kavram, B) Tasarım, C) Veri Toplama ve/veya İşleme, D) Analiz ve/veya Yorum, E) Literatür Taraması, F) Makale Yazımı, G) Eleştirel İnceleme

1. INTRODUCTION

Developments in the health care system require the expansion of the roles and responsibilities of health care professionals and changes in health education (1-3). As healthcare providers, nurses are often the first ones to observe the deterioration of the patient's physical condition, and they need to make a rational judgement, analysis, and reasoning quickly and accurately to solve the problem with the available information when they encounter a complicated situation. In the nursing profession, as in all professions facing with making quick and right decisions in the practice, making rational decisions by using critical thinking (CT) skills is of great importance in adapting to new developments and changes (4,5). Gaining CT skills and competence in are one of the hopes of nursing education. This is considered both a criteria of professionalism and for accreditation and assessment of undergraduate and postgraduate nursing education programs (6). Determining the level of critical thinking of students in undergraduate nursing schools is important in terms of planning interventions in this field and determining the educational methods that should be used (7). Therefore, CT skills (interpretation, analysis, evaluation, inference, explanation, and self-regulation) are significant for all healthcare professionals (8) and CT skills should be gained starting from nursing education and various types of learning styles such as case studies, role-playing, simulations, problem-based learning should be used for enhancing CT abilities of nursing students (9). National and international nursing organizations recognize the power of CT as a key element for nursing practices, and they state that undergraduate students must have CT competence and the power of CT is required as a universal behavior in nursing. Additionally, CT is defined as a purposeful and self-regulatory judgment that results in interpretation, analysis, evaluation, and inference (10-13).

Etymologically, the term critical thinking (CT) has been derived from the Greek words "kritikós" (judging) and "kritḗrion" (criterion). In the most general sense, CT is defined as making judgements based on criteria (14). Moreover, CT is defined as a way of thinking that involves organizing, analyzing thinking, improving thinking, evaluating processes, and increasing the quality of the thinking method based on intellectual standards and an active and organized mental process (14,15).

Individuals who have critical thinking skills become aware of incomplete and incorrect information while questioning the meaning and reasons of an event and reorganize the information. The process is that the individuals can form their own thoughts by analyzing the available ideas (15,16). Since individuals who do not have CT skills cannot critically assess themselves, they cannot realize how they can contribute to society. Therefore, education should improve individuals' CT skills in the process of integrating individuals into society. In the literature on CT, there have been several studies studies (8, 17-23). However, no study has been found on the CT dispositions of nursing students using a qualitative and quantitative research design and analyzed the ED dispositions of nursing students according to certain factors (such as sociodemographic characteristics, liking of the nursing department, grade level, choosing department willingly, etc.).

2. METHOD

Study Design and Setting

The causal-comparative method was used for the quantitative data. A phenomenological model was used for the qualitative data. Therefore, the research model can be referred to as a mixed nested design. Within the framework of this design, the study was carried out using a cross-sectional mixed-methods research design (24). In the quantitative part of the study, CT dispositions of nursing students were compared in terms of independent variables determined in accordance with the causal-comparative model. On the other hand, in the qualitative dimension, it was tried to be understood how nursing students perceived CT based on the qualitative data obtained from a smaller group. The study was conducted in a nursing department of a public university in Turkey between the dates of 18 April 2018 and 25 May 2018.

Research Questions

1. What are the CDTS sub-dimension scores of the nursing students?
2. Is there a significant difference between the nursing students' CDTS sub-dimension scores considering their income levels, choosing the department willingly, grade levels, family types, type of high school they graduated from, where they usually live, age, parents' education levels and gender?
3. What are the perceptions of nursing students about CT?

Study Population and Sample

Population and Sample for Quantitative Data

The population of the study consisted of 1290 students studying in the nursing department. The sample of the study consisted of the nursing students who agreed to participate in the study and could be reached in the classroom during the study. The sample size was calculated using the "National Statistical Service § Sample Size Calculator". The minimum sample size for the nursing department was calculated as 306 with a margin of error of 5% and a confidence level of 95%. Considering that there may be data loss in the study, the sample size was increased by 20%, and the study was planned to be carried out with a maximum of 367 students.

The probability proportional sampling method, one of the cluster sampling methods, was used for the quantitative data. Of all the students who made up the population, 291 students (207 females, 84 males) were first-graders, 301 students (217 females, 84 males) were second-graders, 300 students (170 females, 130 males) were third-graders, and 401 students (224 females, 177 males) were fourth-graders. The study was completed with the participation of 358 nursing students who met the inclusion criteria.

Sample for Qualitative Data

The criterion sampling method, one of the purposeful sampling methods, was used to determine the sample for the qualitative data. Among the students who participated in the quantitative research part of the study, a total of 24 students, who were willing to participate in

the qualitative research including 6 females and 6 males from the first graders, and 6 females and 6 males from the fourth graders, were involved in the qualitative study.

Quantitative Instruments

Personal Information Form: A total of 12 questions were included in the personal information form to determine the individual characteristics of the students. These questions aimed to determine the students' grade level, age, gender, family type, the place where they have spent most of their lives, economic status, education level, education level of their parents, grade point average, whether they chose the department willingly, and whether they like the department.

Critical Thinking Disposition Scale (CDTS): It was developed in Turkish by Semerci (2016). It is a 5-point Likert scale consisting of 49 items including the sub-dimensions of metacognition (38, 39, 40, 42, 43, 44, 45, 47, 48, 49, 50, 51, 54, 55), flexibility (20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30), systematicity (5, 6,7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 19), tenacity-patience (31,32, 34, 35, 36, 37, 52, 53) and open-mindedness (1, 2, 3). The scale was evaluated using the following scores: I totally agree (5), I mostly agree (4), I partially agree (3), I mostly disagree (2), I strongly disagree (1). For the metacognition sub-dimension, the scores between 14-33 indicate a weak level, the scores between 33-52 indicate a medium level, and the scores between 52-70 indicate a high level. For the flexibility sub-dimension, the scores between 11-26 indicate a weak level, the scores between 26-41 indicate a medium level, and the scores between 41-55 indicate a high level. For the systematicity sub-dimension, the scores between 13-30 indicate a weak level, the scores between 30-47 indicate a medium level, and the scores between 47-65 indicate a high level. For the tenacity-patience sub-dimension, the scores between 8-19 indicate a weak level, the scores between 19-29 indicate a medium level, and the scores between 29-40 indicate a high level. For the open-mindedness sub-dimension, the scores between 3-7 indicate a weak level, the scores between 7-11 indicate a medium level, and the scores between 11-15 indicate a high level (25). The Cronbach's alpha coefficient of the CDTS is 0.96. In the present study, Cronbach's alpha coefficient was found to be 0.91.

Collection of the Quantitative Data

Written informed consent from each student was obtained after the purpose of the study was explained. Data collection forms were distributed and they were collected after 30 minutes.

Qualitative Data Instrument

A questionnaire form consisting of four open-ended questions was used as an instrument in the phenomenological model. These questions were as follows;

1. What do you understand of the concept of CT, and how does a "critical thinker" act in your opinion?
2. What do you think about your CT level?
3. If you think that you have CT skills, how have you gained these skills?
4. According to you, how important is CT in nursing? What should be done for nurses to gain these skills?

Collection of the Qualitative Data

Written informed consent from each student was obtained. It was stated that the anonymity of the subjects would be ensured. The questionnaire forms were distributed to the students in the classroom, then, the forms were collected back after they answered the questions in about 15 minutes.

Data Analysis

Analysis of the Quantitative Data

The data were analyzed using the IBM SPSS Statistics 22.0 software package. Descriptive statistical methods were used. For comparing means of two independent groups, "Independent Samples t-test" was used, Variance Analysis and Kruskal-Wallis tests were used for comparing three or more independent group samples, and the Mann-Whitney U test was used for post-hoc analysis. There was not any missing data.

Analysis of the Qualitative Data

The content analysis method was used to analyze the data. The main objective of the content analysis is to attain the concepts and relationships that can explain the collected data. Within the scope of content analysis, the stages of categorizing the data by coding them, finding the themes, organizing the data according to codes and themes and defining them, and interpreting the findings follow each other (26).

In the study, the data obtained from the interviews were written down separately by two researchers, and the differences were reviewed. Then, these notes were turned into a written content of 41 pages. The texts obtained were read by 3 specialist nurses for their approval. Then, three researchers coded the obtained data under four groups, and they determined the themes.

The data obtained were presented in tables by transforming them into themes, theme sets, and frequencies. An agreement was ensured between the researchers who performed coding. The data obtained were presented in tables by transforming them into themes, theme sets, and frequencies. Also, direct quotations were included in the presentation of the findings. To ensure the anonymity of the students in the analysis of the qualitative data, the first-graders were specified as A1,..., A12 while the fourth-graders were specified as B1,…, B12.

3. RESULTS

Results of the Quantitative Data

No significant difference was found between any of the critical thinking sub-dimension and nursing students' grade level, family type, the place where they mostly lived, type of high school they graduated from, their gender, age, education level of their parents. The findings that only shown a significant difference at the sub-dimensions of CDTS were included in the tables.

The mean age of the nursing students was 1.27 ± 2.07, 108 (30.2%) of them were fourth-graders, 228 (63.7%) of them were female. It was determined that 192 (53.6%) of the nursing students did not choose the nursing department willingly, and 215 (60.1%) students liked the nursing department as shown in Table 1.

The mean scores of the sub-dimensions of CDTS were found to be 37.95±7.02 (medium), 42.44±7.53 (high), 54.15±8.76 (high), 22.72±4.17 (medium), and 12.12±2.23 (high)

Table 1. Individual Characteristics of the Nursing Students.

Individual Characteristics	**Mean±SD**
Age (years)	21.27±2.07
Individual Characteristics	**f(%)**
Grade level	
1st Grade	80 (22.3)
2nd Grade	85 (23.7)
3rd Grade	85 (23.7)
4th Grade	108 (30.2)
Gender	
Female	228 (63.7)
Male	130 (36.3)
Family type	
Nuclear family	301 (84.1)
Extended family	54 (15.1)
Fragmented family	3 (0.8)
Place of residence mostly lived	
Village or town	45 (12.6)
District	111 (31.0)
City	202 (56.4)
Economic level	
High-level income	53 (14.8)
Middle-level income	276 (77.1)
Low-level income	29 (8.1)
Type of high school graduated	
General high school	57 (15.9)
Anatolian and science high school	284 (79.3)
Vocational high school of health	10 (2.8)
Vocational high school	7 (2.0)
Mother's education status	
Illiterate	49 (13.7)
Literate	41 (11.5)
Primary school	143 (39.9)
Secondary school	58 (16.2)
High school	53 (14.8)
University or higher	14 (3.9)
Father's education status	
Illiterate	12 (3.4)
Literate	24 (6.7)
Primary school	116 (32.4)
Secondary school	80 (22.3)
High school	80 (22.3)
University or higher	46 (12.8)
Choosing the department willingly	
Yes	166 (46.4)
No	192 (53.6)
Liking the department	
Yes	215 (60.1)
No	143 (39.9)

Table 2. Mean Scores of the CDTS Sub-Dimensions.

Sub-dimensions	**Mean±SD**
Metacognition	37.95±7.02
Flexibility	42.44±7.53
Systematicity	54.15±8.76
Tenacity-patience	22.72±4.17
Open-mindedness	12.12±2.23

Abbreviations: † CDTS: Critical Thinking Disposition Scale

for the themes of metacognition, flexibility, systematicity, tenacity-patience, and open-mindedness, respectively as shown in Table 2.

The income level was found to have a significant effect on the tenacity-patience sub-dimension (p = 0.031). Further analysis was conducted to determine which group caused the difference. It was determined that the difference in the score was caused by the difference between the group with a high-level income and the group with a middle-level income. A significant difference was observed between the metacognition sub-dimension scores and choosing the department willingly (p<.05) as shown in Table 3.

Table 3. Spread of the Economic Level by the Tenacity-Patience Sub-Dimension of the Critical Thinking Disposition

Dependent Variable	Income level	Mean	Standard Deviation	F	p
Tenacity and patience	High-level income	23.75	3.30	F=3.502	**p=0.031***
	Middle-level income	22.40	4.09		
	Low-level income	23.83	5.67		

The metacognition sub-dimension scores of those who chose the department willingly were significantly higher than those who did not choose willingly. Significant differences were found between the liking of the department and the sub-dimensions of metacognition, flexibility, systematic, and open-mindedness as shown in Table 4.

Table 4. Mean Scores of the CDTS Sub-Dimensions by the Descriptive Criteria.

Sub- Dimensions	Characteristics	N	X	SD	t	df	p
Choosing the department willingly							
Metacognition	Yes	166	38.789	7.161	2.1	343.195	**0.036**
	No	192	37.234	6.829			
Flexibility	Yes	166	42.837	7.577	0.925	347.347	0.355
	No	192	42.099	7.488			
Systematicity	Yes	166	54.439	8.618	0.585	351.395	0.559
	No	192	53.895	8.895			
Tenacity-patience	Yes	166	23.168	4.188	1.908	347.037	0.57
	No	192	22.328	4.127			
Liking the department							
Metacognition	Yes	215	38.651	6.767	2.31	288.856	**0.21***
	No	143	36.909	7.279			
Flexibility	Yes	215	43.293	6.890	2.64	266.103	**0.008***
	No	143	41.160	8.257			
Systematicity							
	Yes	215	54.888	8.177	1.96	272.705	**0.05***
	No	143	53.035	9.491			
Tenacity-patience	Yes	215	23.065	3.886	1.93	271.841	0.053
	No	143	22.195	4.530			

	Liking the department	N	Mean rank	Total of ranks	U	p
Open-mindedness	Yes	215	188.77	40585.50	13379.50	**0.034***
	No	143	165.56	23675.50		

Abbreviations: *p<.05, CDTS: Critical Thinking Disposition Scale, T: independent sample t test, U: Mann-Whitney U test

Results of the Qualitative Data

While a specific code was given for each question and grade level, suitable 3 themes were generated as perception of critical thinking, ways of gaining critical thinking ability, elements required for developping critical thinking.

Theme 1: Perception of Critical Thinking

Students stated that they perceived critical thinking as analysing, questioning, considering the good and bad aspects of a situation, evaluating, not being biased, questioning and reasoning, scientific thinking, subjective thinking, expressing the lack, prejudiced criticism of the other person, self-expression, behaving respectfully to different ideas, propose a solution. It was determined that there were differences between the perceptions of the first-graders and fourth-graders. While "considering the good and bad aspects" (f: 8), "questioning and reasoning" (f: 7) were the most frequent codes mentioned by the first-graders, " prejudiced criticism of the other person " (f: 5) and " questioning and reasoning" (f: 4) were the most frequent codes mentioned by the first-graders. A1 said that "Critical thinking is the thought that deals with an object, a phenomenon, an event, or a person considering its good and bad aspects". B2 said that "It means criticizing the other in an environment where there is a discussion.".

While the majority of the first-graders (f: 10) stated that they were critical thinkers, CT was coded as a high level of CT (f: 4), and making criticism where necessary (f: 3) among the fourth-graders. A4 said that "I am 75% critical thinker but I do not apply it". B1 said that "I think I am too critical on sensitive issues, I do not criticize too much on ordinary issues.". The numbers of the first-graders who considered critical thinking very important (f:5) were similar to that of fourth-graders (f:3).

Theme 2: Ways of Gaining Critical Thinking Ability

The students said that they learned how to think critically through their environment, family, friends, books, personal knowledge and experience, television, education life (nursing education at university and pre-university period), newspapers, films and the internet. Some of the students (f: 3) predicted that they did not have CT abilities.

While the "family" (f: 8) was the most frequent answer among the first-graders, "education life" was the most frequent answer given by the fourth-graders. A5 said that "I can say that I gained my critical thinking skills, if I have any, from my family." B11 said that "...Nursing education provided the CT skills from a professional perspective."

Theme 3: Elements Required for Developing Critical Thinking

The majority of the students in both grades mentioned that professional requirements, personal competencies, and education were required to improve CT. Considering the frequencies of the themes of the fourth question, both the first-graders and the fourth-graders stated that the personal competencies would be the solution. A7 said that "I think CT is very important in nursing. It is gained through research, learning, and experiencing". B3 said that "Nurses should first know their work to gain this skill. They should know the right and do the right thing so that they can criticize the wrong thought". B9 said that "...Nursing is a dynamic profession intertwined with people, and CT is very important for the professionalization of the profession".

4. DISCUSSION

The sub-dimension scores of the CDTS were found to be medium and high. The variable of income level was found to cause a statistically significant difference between tenacity-patience sub-dimension scores. Also, statistically significant differences were found between choosing the department willingly and the metacognition sub-dimension and between liking of the department and sub-dimensions of the metacognition, flexibility, systematicity, and open-mindedness. Considering the qualitative data, it was observed that the nursing students stated that they mostly perceived CT as considering the positive and negative aspects of a situation, and questioning and reasoning, the majority of them had critical thinking skills, they usually gained CT skills in their family/during their education, they thought that CT was very important, and CT was a significant skill in diagnosing patients, and the profession should be professionalized and they should improve themselves to improve CT skills.

Nurses are often the first ones to observe the deterioration of the patient's physical condition, and they need to make a decision rationally (4,5). As one of the sub-dimensions of CDTS, systematicity means the habit of trying to approach problems in a regular, disciplined, and organized manner (27). In this study, there was a statistically significant difference between liking the department and systematicity sub-dimension score. This shows that students who like the department have careful and organized thinking dispositions and that nursing students approach problem-solving in a systematic way. Considering the findings related to qualitative data, the students were observed to state that critical thinking consisted of steps such as analyzing, reasoning, scientific thinking, and questioning. This shows the perceptions of the students were compatible with the literature.

As a concept applied in nursing, metacognition can be defined as different ways of revealing the mental actions of the individual in the face of an event or situation, reviewing these mental actions, and being prepared for unexpected situations. In the concept of metacognition, the previously acquired knowledge is designed in the mind and presented in the most appropriate way (28). In the nursing profession, making rational decisions by using CT skills is of great importance in adapting to new developments and changes (4,5). The variables of choosing the department willingly and liking the department were found to have a significant difference with the metacognition sub-dimension. This finding indicates that those who like the department and chose the department willingly can use their previous knowledge in problem-solving. Therefore, it can be interpreted that one should study at the nursing department willingly and like the department to be able to use CT skills. Contrary to the present study, no significant difference was found between the sub-dimension scores of CDTS considering the nursing students' willingness to choose the profession. In the same study, contrary to the present study, a statistically significant difference was found between the critical thinking disposition scale total scores of second-graders, females, and those with a mean age of 21.64 ± 2.03 (29). The reason for these differences may be that a different critical thinking disposition scale was used in that study, and that scale questioned different sub-dimensions.

Flexibility represents the process of developing different perspectives on different situations, thinking differently, and discovering new ways of problem-solving (30). In this study, the mean score of flexibility sub-dimension was found to be high. Results indicated that nursing students can think flexibly when they like their department and can bring different

solutions to different situations. Considering the qualitative findings of the study regarding flexibility, nursing students stated that they perceived CT as reasoning, considering the good and bad aspects of a situation, scientific thinking, offering solutions, respecting different ideas, analyzing and that it was necessary to gain problem-solving skills to improve CT skills. In Chan's (2019) qualitative study on nursing students, the concept of critical thinking was perceived as analyzing a subject from different perspectives, passing what was heard from others through our own thought processes without considering them true. These findings are similar to the findings in the present study. Moreover, Chan's (2019) findings are compatible with the flexibility sub-dimension.

The term open-mindedness was defined as being tolerant of different opinions and different beliefs (27). The nursing profession also requires for caring people from different cultures and being tolerant towards them (31). The study indicated that the nursing students' tolerance towards religious, political, social, family, cultural, and individual differences when they choose the nursing department willingly. According to the findings of the qualitative study, CT was also defined as "respecting different opinions". According to the findings, the students stated that CT was also important for avoiding prejudices and not criticizing everything.

Considering the results those with high-income level and middle-income level have more tenacity and patience. Also, that the economic level and the tenacity-patience sub-dimension score were at medium levels affect the CT dispositions of the nursing students. In a study with both similar and different findings compared to the present study, Özdelikara et al. (2012) applied a different CTDS to nursing students and no statistically significant difference was found between nursing students' CTDS sub-dimension scores and their place of residence, family type, income level, mother's education level. On the other hand, a statistically significant difference was found between nursing students' CTDS sub-dimension scores and their father's educational level (32).

Several studies in the literature support qualitative results. It is stated that concept maps, evidence-based nursing, case-based learning, problem-based learning, reflective training, and learning models can improve the CT skills of the nursing students. These methods can improve CT skills by improving the holistic perspective by making learning enjoyable, and they can be actively studied in the undergraduate curriculum at the university (1, 2, 33-40).

Implications for Practice

Nursing lecturers can facilitate students gain the CT skills by using different learning models and methods (concept maps, simulation applications, reflective training, training models, problem-based learning, case-based learning). These are necessary for improving the holistic assessment of individuals, cognitive thinking, and gaining clinical decision-making skills. These methods also motivate students to learn, make learning enjoyable, encourage the individual; thereby, they can make nursing students like their department/profession.

5. CONCLUSION

This study is important because it was determined the CT dispositions of the nursing students both quantitatively and qualitatively considering certain factors. In the study, the mean scores of CDTS sub-dimensions were found to be at medium and high levels. In the qualitative study, as stated by the nursing students, CT was a very essential skill, also it was a way of

thinking that should be gained for professional development, diagnosing patients, treating patients holistically, improving the nursing image, specializing in the profession, being creative, gaining problem-solving skills, and improving patient care.

Limitations of the Study

Future studies can be conducted in multiple centers or CTDS can be applied to students in the nursing department every year beginning from the first grade to the fourth grade in a longitudinal prospective study design. This study was conducted only using a cross-sectional mixed-methods design only with a single center due to time limitations.

Ethical Consideration of the Study

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval and institutional authorizations were obtained to conduct the study. The approval for the study was obtained from the Non-Invasive Clinical Research Ethics Committee of the Faculty of Medicine (Number: 2018/76). All participants were informed about the aim of the study, the voluntary nature of participation, and that they can withdraw from the study at any time. Descriptive details of the students such as their names, surnames, and school numbers were not asked in the data collection forms, and all data were collected anonymously. Also, the participants were informed that the participation in the study and the results of the study would not affect the course assessments.

Conflict of Interest Statement

The authors declare no conflicts of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgements

We all authors want to thank to all participants.

REFERENCES

1. Jeppesen, K. H., Christiansen, S., & Frederiksen, K. (2017). Education of student nurses: A systematic literature review. *Nurse Education Today*, 55, 112-121.
2. Cui, C., Li, Y., Geng, D., Zhang, H., & Jin, C. (2018). The effectiveness of evidence-based nursing on development of nursing students' critical thinking: A meta-analysis. *Nurse Education Today*, 65, 46–53.
3. Falcó-Pegueroles, A., Rodríguez-Martín, D., Ramos-Pozón, S., & Zuriguel-Pérez, E. (2021). Critical thinking in nursing clinical practice, education and research: From attitudes to virtue. *Nurs Philos* 22:e12332.
4. Bakalis, N. A., & Watson, R. (2005). Nurses' decision-making in clinical practice. *Nursing Standard*, 19, 33–39.
5. Sommers, C. L. (2018). Measurement of critical thinking, clinical reasoning, and clinical judgmentin culturally diverse nursing students–A literature review. *Nurse Education in Practice, 30,* 91-100.

6. Woo, J. H. & Song J. H. (2020). The relationship between communication self-confidence, critical thinking disposition and nursing professionalism in nursing students. *Journal of Industrial Convergence*, *18*(4), 101–110.
7. Andreou, C., Papastavrou, E. & Merkouris, A. (2014). Learning styles and critical thinking relationship in baccalaureate nursing education: A systematic review. *Nurse Educ Today*, 34(3), 362–371.
8. Carvalho, D. P. S. R. P., Azevedo. I. C., Cruz, G. K. P., Mafra, G. A. C., Rego, A. L. C., Vitor, A. F., et al. (2017). Strategies used for the promotion of critical thinking in nursing undergraduate education: A systematic review. *Nurse Educ Today*, 57, 103-107.
9. Zhang, H. & Lambert, V. (2008). Critical thinking dispositions and learning styles of baccalaureate nursing students from China. *Nursing and Health Sciences*, 10, 175–181.
10. American Philosophical Association. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. The Delphi Report, Committee on Pre-college Philosophy ERIC Document Reproduction Service No. ED 315-423.
11. American Association of Colleges of Nursing, (1999). A vision of baccalaureate and graduate nursing education: the next decade. *J. Prof. Nurs*, *15* (1), 59–65.
12. National League for Nursing, (1992). Criteria and guidelines for the education of baccalaureate and higher degree programs in nursing. *National League for Nursing,* New York.
13. WHO partners in life skills, (1999). https://www.who.int/mental_health/media/en/30.pdf, (Accessing date: 21.06.2019).
14. Paul, R., & Elder, L. (2013). *Critical thinking: Tools for taking charge of your learning and your life*. United States of America: Pearson Education Inc. https://ptgmedia.pearsoncmg.com/images/9780133115284/samplepages/0133115283.pdf.
15. Cüceloğlu, D. (1995). *İyi düşün doğru karar ver*. 10th eds. Sistem Yayıncılık, İstanbul.
16. Doğanay, A., & Ünal, F., (2006). Teaching critical thinking. A., Şimşek (Ed.), in: Instruction Based on Content Types. (ss 209-264). Ankara: Nobel Yayınevi.
17. Öztürk, C., Karayağız, G. M., & Dicle, A. (2007). A comparison of problem-based and traditional education on nursing students' critical thinking dispositions. *Nurse Education Today*, *28*(5), 627-632.
18. Bruce, R. M. (2017). The control of ventilation during exercise: a lesson in critical thinking. *Adv Physiol Educ*, *41*, 539–547.
19. Merisier, S., Larue, C., & Boyer, L. (2018). How does questioning influence nursing students' clinical reasoning in problem-based learning? A scoping review. *Nurse Educ Today*, *10*(65), 108-115.
20. Chan, Z. C. (2019). Nursing students' view of critical thinking as 'Own thinking, searching for truth, and cultural influences. *Nurse Educ Today*, 78, 14-18.
21. Oktay, A. A., Taş, F., Doğaner, A., Gülpak, M., & Avnioğlu, S. (2019). Critical thinking tendencies of Health School students. *Çukurova Medical Journal*, *44*(1), 33-43.
22. Barry, A., Parvan, K., Tabrizi, F. J., Sarbakhsh, P., Safa, B. & Allahbakhshian, A. (2020). Critical thinking in nursing students and its relationship with professional self-concept and relevant factors. *Res Dev 9*(7), 7.
23. Kobya, B. H. & Bulut, E. (2020). Critical thinking trends of pediatric nurses and the affecting factors. *Turkiye Klinikleri Journal of Nursing Sciences*. *12*(1), 37-48.

24. Creswell, J. W. (2019). *Education Research*. İstanbul: Edam,.
25. Semerci, N. (2016). The development of critical thinking disposition scale (CTHD): Study on the revision of validity and reliability." *Journal of Turkish Studies*, 11, 725-740.
26. Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*, 24, 105–112.
27. Erdoğan, İ. (2015). Din Kültürü ve Ahlak Bilgisi öğretmen adaylarının eleştirel düşünme eğilim düzeylerinin incelenmesi. *Marife, 15*(1), 321-342.
28. Hıdıroğlu, Ç. N. (2018). A critical overview of metacognition and metacognition's role in problem solving process. *Pamukkale University Journal of Social Sciences Institute*, 32, 87-103
29. Çelik, S., Yılmaz, F., Karataş, F., & Karakaş, N. S. (2015). Critical thinking disposition of nursing students and affecting factors. *HSP, 2* (1), 74-85.
30. Duman, E. Z. (2018). Flexible thinking as a kind of thinking. *Turkish Studies, 13*(26), 547-561.
31. Leininger, M. (2009). *Transcultural nursing care in the community. Community Health Nursing.* Eds: K. S. Lundy & S. Janes. (ss. 228-245). JONES AND Barlett Publishers.
32. Özdelikara, A., Bingöl, G., & Görgen, Ö. (2012). Critical thinking tendency of nursing students and factors influencing this. *İ.Ü.F.N. Hem. Derg*, *20*(3), 219-226.
33. Kong, L. N., Qin, B., Zhou, Y., Mou, S., & Gao, HM. (2014). The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-analysis. *International Journal of Nursing Studies*, *51*, 458–469.
34. Kaddoura, M. (2016). Impact of a concept map teaching approach on nursing students' critical thinking skills. *Nursing and Health Sciences*, 18, 350-354.
35. Zhang, C., Fan, H., Xia, J., Guo, H., Jiang, X., & Yan, Y. (2017). The effects of reflective training on the disposition of critical thinking for nursing students in China: A controlled trial." *Asian Nursing Research*, 11, 194-200.
36. Garwood, J. K., Ahmed, A. H., & McComb, S. A. (2018). The effect of concept maps on undergraduate nursing students' critical thinking. *Nursing Education Perspective*, *39*(4), 208-214.
37. Mahanal, S., Zubaidah, S., Sumiati, I. D., Sari, T. M., & Ismirawati, N. (2019). RICOSRE: A learning model to develop critical thinking skills for students with different academic abilities. *International Journal of Instruction, 12*(2), 417-434.
38. Sahsha, L., Ye, X., & Chen, W. (2019). Practice and effectiveness of "nursing case-based learning" course on nursing student's critical thinking ability: A comparative study. *Nurse Education in Practice*, 36, 91–96.
39. Rogers, B., & Franklin, A. E. (2021). Cognitive load experienced by nurses in simulation-based learning experiences: An integrative review. *Nurse Educ Today*, 99, 104815.
40. Saputri, A. C., Sajidan, Rinanto, Y., Afandi, & Prasetyanti, N. M. (2019). Improving students' critical thinking skills in cell-metabolism learning using stimulating higher order thinking skills model. *International Journal of Instruction*, 12(1), 327-342.