

Araştırma Makalesi/Research Article

Determining the Relationship Between Metacognition and Academic Success in Nursing Students

Hemşirelik Öğrencilerinde Üst Biliş ve Akademik Başarı Arasındaki İlişkinin Belirlenmesi

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Abstract: Objective: The purpose of this study was to determine the relationship between nursing students' metacognition and their academic success. Methods: The sample of this descriptive study consisted of 227 students. The research was conducted with students of the nursing faculty of a private university. For data collection, "Descriptive Characteristics Form" and "Metacognition Scale" were used and interviewed through face-to-face interviews with the students. Results: It was found the cognitive awareness sub-dimension of the metacognition scale of nursing students as 16.2±2.3 high. The study showed that the 4th grade students got better mean scores calculated as 16.5±3.5 for positive beliefs, 14.1±3.8 for need to control thoughts, and 17.4±0.5 for cognitive awareness due to increased self-confidence. Conclusion: The study determined that the awareness of nursing students is high, that an independent variable such as gender affects metacognition. It is thought that increasing the metacognitive skills of nursing students will contribute to improving patient care outcomes.

Keywords: Metacognition, Academic success, Students, Nursing.

Öz: Amaç: Bu çalışmanın amacı hemşirelik öğrencilerinin üst biliş ile akademik başarıları arasındaki ilişkiyi belirlemektir. Gereç ve Yöntem: Tanımlayıcı tipte olan çalışmanın örneklemini 227 öğrenci oluşturmuştur. Çalışma, özel bir üniversitenin hemşirelik fakültesi öğrencileri ile yürütülmüştür. Veri toplamada, "Tanımlayıcı Özellikler Formu" ve "Meta Biliş Ölçeği" kullanılmış ve öğrencilerle yüz yüze görüşmeler yapılmıştır. Bulgular: Hemşirelik öğrencilerinin üst biliş ölçeğinin bilişsel farkındalık alt boyutunun 16,2±2,3 yüksek olduğu bulunmuştur. Çalışma, 4. sınıf öğrencilerinin olumlu inançlar için 16,5±3,5, düşünceleri kontrol etme ihtiyacı için 14,1±3,8 ve artan özgüven nedeniyle bilişsel farkındalık için 17,4±0,5 olarak hesaplanan ortalama puanlarının daha iyi olduğunu göstermiştir. Sonuç: Çalışmada, hemşirelik öğrencilerinin farkındalıklarının yüksek olduğunu, cinsiyet gibi bağımsız bir değişkenin üst bilişi etkilediğini belirlenmiştir. Hemşirelik öğrencilerinin üst bilişsel becerilerinin artırılmasının hasta bakım sonuçlarını iyileştirmeye katkı sağlayacağı düşünülmektedir.

Anahtar Kelimeler: Üst biliş, Akademik başarı, Öğrenciler, Hemşirelik.

Introduction

Self-regulated learning is a complex educational construct. It has many dimensions, including cognitive, affective, and metacognitive processes. Cognitive processes include taking notes, summarizing, and making inferences used during thinking, comprehending, and problem-solving, while metacognitive processes involve making judgments of learning and feelings of knowing while monitoring the products of strategy-use (Asadzandi et al., 2022; Taub et al., 2021).

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Metacognitive awareness includes the individual being aware of what knows and does not know, controlling mental processes, taking responsibility for learning, being aware of learning strategies, evaluating learning, planning, monitoring, and using strategies to manage the knowledge (Rivas et al., 2022). Metacognitive learning strategies allow students to control their own cognition. Those strategies allow them to correct the learning process by using functions such as centering, sequencing, planning and evaluation (Dutemple et al., 2023). Individuals are expected to have metacognitive skills and awareness, and as a result, to use learning strategies. For this, teaching strategies aimed at gaining metacognition should be developed in educational programs (Simonovic et al., 2023).

Unlike cognition, metacognition is the awareness of cognition and the ability to use it appropriately (Versteeg et al., 2021; Yurdakul and Demirel, 2011). While cognitive teaching focuses on introducing specific strategies to situations, metacognitive teaching focuses on teaching the skills of monitoring and controlling this process. The metacognitive theory is based on the assumption that when an individual understands how their cognitive processes work, they can control these processes and use them more effectively by reorganizing them for a more qualified learning (Kuhn, 2022). Confirming this assumption, many studies have concluded that metacognition has an important place in the education of children and adults. On the other hand, some studies have found a significant relationship between success levels and metacognitive skills (Dennis and Somerville, 2023; Mert and Baş, 2019; Schneider et al., 2022).

The ability to use metacognition is associated with intelligence based on its definition. Metacognitive skill requires an understanding about the problem encountered, making a solution-oriented plan, producing alternatives instead of just solving the problem. Supporting this approach, studies showed that problem solving skills were higher in groups in which metacognition was activated (Duman and Semerci, 2019; Rivas et al., 2022; Yurdakul and Demirel, 2011).

In science, engineering, medicine or other fields that require diagnostics, the student needs to keep in mind a significant amount of prior knowledge in order to understand, learn, and even solve problems. Sometimes students may not remember preliminary information very well or may not learn fully at the first time. Students who can realize these situations correctly, review and distinguish what they know and do not know, may be more advantageous than those who cannot evaluate their knowledge correctly by reviewing the missing information to close their gap (Sevgi and Çağlıköse, 2020). Considering the success of medical students by being the first few thousand in university entrance exams, these students are expected to have high

learning skills. Therefore, the expectation that they exhibit positive metacognitive beliefs affecting their learning skills is also high (Abedini, 2022).

Researches show that metacognitive skills have an important effect on students' success and students with higher metacognition levels are more successful. On the other hand, studies show that there is an increase in the success levels of students who learned metacognitive strategies. Therefore, metacognition can be used as a useful tool in the development of students. In this regard, all teaching processes should include elements supporting metacognitive skills (Adıgüzel and Orhan, 2017; Demir and Baloğlu, 2020).

Educational efforts to raise conscious individuals have started to progress rapidly in a more meaningful way with the emergence of the metacognition theory (Akkurt, 2021; Eggen and Kauchak 2012). In this respect, the importance of metacognition in nursing profession has been increasing since nurses are the ones determining the needs of patients and following their care plans. The nursing process steps include data collection, diagnosis, purpose, planning, interventions and evaluation. In the light of all this information, the researchers think that performing metacognitive evaluation of students during nursing education will increase the quality of education and the effectiveness of the care. Literature reviews showed no studies with nursing students on this subject and in Northern Cyprus. For these reasons, the researchers planned to evaluate the nursing students' metacognitive skills and their academic success.

Research Questions

What are the metacognition levels of nursing students?

What are the factors affecting the metacognition levels of nursing students?

Methods

Design and Sample

The research is planned to evaluate the metacognitive skills and academic success of nursing students. The study was carried out descriptively with the quantitative research method. The research was conducted with students studying at the nursing faculty of a university which hosts local and foreign undergraduate nursing students. Students that have passed the student selection examination are included in the program. The universe of the study consists of all 1st and 4th year students studying at the faculty of nursing. In the study, an attempt was made to reach the entire universe without selecting a sample. The sample of the study consists of a total of 227 students in the first and fourth grades of the faculty of nursing. The reason why 1st and 4th grade students were specifically chosen for the study was to see the determinants of the metacognitive level or influencing factors according to the levels of these two groups.

Data Collection

The study data were collected by the researchers in the spring semester of the 2018-2019 academic year in the classroom environment, through face-to-face interviews with the students. The purpose of the research was explained to the students before the data collection. Forms were distributed to the students who voluntarily accepted to participate in the study and their consents were obtained. The data collection form took an average of 20 minutes to fill out by the students.

Data Collection Tools

The researchers used "Descriptive Characteristics Form" and "Metacognition Scale" to collect the data. Descriptive Characteristics Form was prepared by scanning the literature (Adıgüzel and Orhan, 2017; Demir and Baloğlu 2020; Demir and Kaymak Özen, 2011). This form included features such as students' age, gender, and class. The researchers prepared the questions in the form considering that they may affect the level of metacognition. The researchers interviewed students face to face to obtain the data.

Cartwright-Hatton and Wells (1997) created a 61-point scale with the original name of "Meta-Cognitions Questionnaire", and then they turned it into a 30-point scale with the name "Metacognition Scale" in 2004 (Cartwright-Hatton et al., 2004). Cronbach alpha values of the scale were calculated between 0.72-0.89. The validity and reliability of the scale in Turkish was performed by Tosun and Irak (2008), and Cronbach alpha value was calculated as 0.86.

Each item in the MCQ-30 has a 4-unit Likert-type rating scale starting from "(1) strongly disagree" and ending with "(4) strongly agree". The scores that can be obtained from the scale vary between 30 and 120, and the increase in the score indicates that the metacognitive activity in the pathological style increases. Items in MCQ-30 are categorized into five sub-dimensions. These sub-dimensions are (1) Positive beliefs (1, 7, 10, 20, 23, and 28th items), (2) Uncontrollability and danger (6, 13, 15, 21, 25, and 27th items), (3) Cognitive confidence (8, 14, 18, 24, 26, and 29th items), (4) The need to control thoughts (2, 4, 9, 11, 16, and 22nd items) and (5) Cognitive Awareness (3, 5, 12, 17, 19, and 30th items).

Data Analysis

SPSS 20.0 (SPSS Inc., Chicago, IL, USA), a statistical package program used in social sciences, was used for the analysis of the study data. Number, percentage, mean and standard deviation were used for the data representation. Suitability of the data for the normal distribution was tested by the Kolmogorov-Smirnov test. The data with normal distribution

were tested by independent samples t-test and one-way analysis of variance. For the results, $p < 0.05$ was considered statistically significant.

Results

The characteristics of the students' socio-demographic characteristics was shown in Table 1. 53.3% of students are 1st grade, 46.7% are 4th grade, and 80.6% are female. Almost all of the students (97.4%) are single, 51.5% were regular high school graduates. The study showed that more than half of the students (61.7%) chose the profession voluntarily and 57.6% of them chose the profession because they love it very much. Those who unwillingly selected the profession (79.3%) stated that the reason was family pressure. Almost all of the students (84.1%) had transcript grades below 2.5 and 46.3% of them were staying in private dormitories.

In the study, we observed that 69.6% of the students' mothers were literate and almost half of them (44.5%) were housewives. We found that 89.9% of students' fathers were literate and 58.6% of them were self-employed. We found that nearly half of the students (48.9%) had their income equal to the expense and more than half of their families (58.6%) had an accepting attitude towards them. 47.6% of our students in our study stated that they start studying for an exam one week before the exam, 58.9% of them had 6 or more final exams to take, and 51.7% of them were feeling ready for only 3 of these exams. 83.3% of the students stated that they were feeling successful and 65.5% stated that they experienced stress about the course.

Table 2 shows that the students got the highest score (15.9 ± 2.7) in the cognitive awareness subject among the sub-dimensions. In addition, it shows that they had a moderate arithmetic average in the dimensions of the need to control thoughts (15.1 ± 2.8), positive beliefs (14.7 ± 3.7), uncontrollability (12.7 ± 2.3), and they had the lowest arithmetic average in the cognitive confidence dimension (12.2 ± 2.4).

Sub-dimension average scores and socio-demographic data of individuals' metacognition was shown in Table 3. The positive beliefs (16.5 ± 3.5) and cognitive awareness (17.4 ± 0.5) average scores of the 4th grade students were significantly different than the 1st grades ($p < 0.005$). On the other hand, the need to control thoughts of first grade students (16.0 ± 1.0) was significantly higher compared to 4th grade students (14.1 ± 3.8) ($p < 0.005$).

Table 1: Distribution of Data on the Socio-Demographic Characteristics of Students in Nursing Education

Socio-demographic characteristics	Number (n)	Percentage (%)
Grade		
1 st grade	121	53.3
4 th grade	106	46.7
Gender		
Female	183	80.6
Male	44	19.4
Marital status		
Married	6	2.6
Single	221	97.4
Have children		
Yes	6	2.6
No	221	97.4
Graduated high school		
Regular high school	167	73.6
Private high school	60	26.4
Choose the nursing profession willingly		
Yes	140	61.7
No	87	38.3
Reasons to choose nursing profession willingly (n: 140)		
Job opportunity	24	17.6
To help people	17	12.1
To love the profession	81	57.6
Academic promotion	18	12.7
Reasons to choose nursing profession unwillingly (n: 87)		
Family pressure	69	79.3
Want another profession	8	9.2
Economic advantage	10	11.5
Current transcript score		
0-2.5 points	191	84.1
2.6 points and above	36	15.9
Living place		
State dormitory	12	5.3
Private dormitory	105	46.3
Homestay	18	7.9
Shared house with friends	82	36.1
Other	10	4.4
Education level of mother		
Not literate	69	30.4
Literate	158	69.6
Occupation of mother		
Private sector employee	32	14.2
Government employee	19	8.3
Self-employed	75	33.2
Housewife	101	44.5
Education level of father		
Not literate	23	10.1
Literate	204	89.9

Table 1 (Continue): Distribution of Data on the Socio-Demographic Characteristics of Students in Nursing Education

Occupation of mother		
Private sector employee	44	19.4
Government employee	10	10.4
Self-employed	133	58.6
Unemployed	14	4.1
Retired	26	11.5
Socio-economic status		
Income is less than expenses	14	6.2
Income is equal to the expense	111	48.9
Income is more than expenses	102	44.9
Family structure		
Overly authoritarian	4	1.8
Overprotective	74	32.6
Inconsistent	8	3.5
Overly tolerant	4	1.8
Indifferent and apathetic	4	1.8
Accepting and reassuring	133	58.6
Your preparation time for the exam		
Days parallel to the lesson	14	6.2
Parallel to the lesson every weekend	26	11.5
Once in a while	61	26.9
One week before the exam	108	47.6
Two days before the exam	18	7.9
Number of final exams you will take (n: 209)		
0-5	86	41.1
6-10	123	58.9
The number of exams that you feel ready (n: 143)		
0-3	74	51.7
4-7	61	42.7
8 or more	8	5.6
Feeling successful		
Yes	189	83.3
No	38	16.7
Stressful situations in your education (n: 58)		
About the course	38	65.5
Physical environment	14	24.1
About social life	6	10.4

Table 2: Metacognition Scale Score Averages

Sub-dimensions	Min-Max scores	Average scores	Cronbach alpha
Positive beliefs	4-16	14.7±3.7	0.77
Uncontrollability	6-36	12.7±2.3	0.74
Cognitive confidence	6-36	12.2±2.4	0.73
The need to control thoughts	6-36	15.1±2.8	0.68
Cognitive awareness	6-36	15.9±2.7	0.71

Table 3: Comparison of Metacognition Sub-Dimension Score Averages and Socio-Demographic Data

Socio-demographic characteristics	Average Scores									
	Positive beliefs		Uncontrollability and danger		Cognitive confidence		The need to control thoughts		Cognitive awareness	
	\bar{x}	p	\bar{x}	p	\bar{x}	P	\bar{x}	p	\bar{x}	p
Grade										
1 st grade	12.6±2.7	0.002	12.6±0.8	0.088	12±0.0	0.072	16.0±1.0	0.003	14.2±3.2	0.000
4 th grade	16.5±3.5		12.8±3.2		12.5±3.6		14.1±3.8		17.4±0.5	
Gender										
Male	13.1±2.3	0.113	13.0±3.1	0.101	12.0±2.1	0.021	14.3±3.6	0.000	14.9±3.9	0.003
Female	15.1±3.8		12.6±2.0		15.1±3.5		15.3±2.6		16.2±2.3	
Marital status										
Married	8.3±0.5	0.001	11.6±0.5	0.071	8.0±1.5	0.893	12.6±2.0	0.721	14.3±1.0	0.061
Single	14.9±3.5		12.7±2.3		12.3±2.4		15.1±2.8		16.0±2.8	
Graduated high school										
Regular High School	15.0±4.1	0.000	12.6±2.7	0.065	12.3±2.8	0.097	15.1±3.3	0.104	15.2±2.9	0.002
Private High School	13.0±0.0		12.9±0.2		12.0±0.0		15.0±0.0		18.0±2.1	
Willingness for the job										
No	12.4±1.8	0.002	12.7±2.2	0.644	11.8±2.4	0.891	14.4±2.8	0.189	15.8±3.0	0.000
Yes	18.3±2.9		12.7±2.4		12.9±2.3		16.2±2.4		16.1±2.2	
Education of mother										
Not literate	19.1±2.2	0.861	12.3±1.6	0.062	11.7±0.9	0.091	17.3±1.0	0.003	16.6±1.6	0.097
Literate	12.7±2.2		12.8±2.5		12.4±2.8		14.1±2.8		15.7±3.1	
Education of father										
Not literate	15.1±4.0	0.251	13.1±1.3	0.071	12.3±1.5	0.161	15.1±2.1	0.062	16.3±2.0	0.118
Literate	14.7±3.6		12±2.4		12.2±2.5		15.1±2.9		15.9±2.8	
Number of final exams to take										
0-5	12.2±2.8	0.004	13.2±3.3	0.803	12.1±3.7	0.122	14.4±3.7	0.001	14.3±3.2	0.001
6 or more	16.5±3.4		12.6±0.9		12.1±0.8		16.0±1.0		17.5±0.5	
Feeling successful about courses										
Yes	13.0±2.3	0.003	12.9±2.0	0.102	13.2±2.6	0.073	12.9±3.4	0.000	16.3±2.3	0.000
No	15.0±3.8		11.5±3.1		12.0±2.4		15.5±2.5		14.3±3.9	
Current transcript average										
0-2.5	15.5±3.6	0.001	12.7±2.2	0.090	12.3±2.4	0.082	15.4±2.4	0.001	12.9±3.2	0.000
2.6 and above	13.0±1.8		12.6±3.0		12.6±2.6		14.2±4.2		16.7±2.2	

The positive beliefs (15.1±3.8), the need to control thoughts (15.3±2.6) and cognitive awareness (16.2±2.3) sub-dimensions of female students were significantly higher than male students ($p < 0.005$). Single students scored higher in all sub-dimensions, but only significant difference was in the area of positive beliefs ($p < 0.005$).

The positive beliefs average score of students who graduated from regular high school was significantly higher than other students (15.0±4.1) ($p < 0.005$). The cognitive awareness sub-dimension average score (18.±2.1) of students who graduated from private high school was

significantly higher ($p < 0.005$). Students who chose the profession willingly got higher scores in all sub-dimensions than unwilling individuals. But positive beliefs and cognitive awareness sub-dimensions had significant differences ($p < 0.005$). While students with illiterate mothers had higher average scores in sub-dimensions of positive beliefs (19.1 ± 2.2), need to control thoughts (17.3 ± 1.0), and cognitive awareness (16.6), students with literate mothers got higher scores in sub-dimensions of uncontrollability and danger (12.8 ± 2.5), and cognitive confidence (12.4 ± 2.8). Statistically, a significant difference was found only in the sub-dimension of the need to control thoughts ($p < 0.005$). Although the average scores of those whose fathers were illiterate were higher, there was no significant difference between them ($p > 0.005$).

Discussion

In the present study, students who had six or more final exams to take got significantly higher average scores in positive beliefs (16.5 ± 3.4), need to control thoughts (16.0 ± 1.0), and cognitive awareness (17.5 ± 0.5) sub-dimensions than those who had 5 or less final exams to take. Researchers determined that students who feel successful had higher scores in all sub-dimensions except the need to control thoughts and positive beliefs. A significant difference was found in positive beliefs, the need to control thoughts, and cognitive awareness sub-dimensions. Students whose transcript grades are below 2.5 received higher scores in all sub-dimensions except cognitive confidence and cognitive awareness. At the same time, a significant difference was found in positive beliefs, the need to control thoughts, and cognitive awareness sub-dimensions. In the study conducted by Pradhan et al. (2021) on the effect of metacognition on academic achievement and learning styles of undergraduate students, it was reported that it had a limited effect on academic achievement. This leads us to the conclusion that there is a limited interaction between academic achievement and metacognition.

This study aimed to determine the level of metacognition of nursing students and to examine whether there is a relationship between them according to socio-demographic characteristics. The research found the highest score in the cognitive awareness sub-dimension. The cognitive awareness subscale refers to people constantly developing their own thought processes (Hidayat et al., 2021; Ađır and Tosun, 2023). In this sense, high scores of students in this sub-dimension can be associated with education. Altun and colleagues (2021) reported that metacognitive awareness was high in mathematics teaching students receiving postgraduate education. This supports the idea that the education was effective since the education levels of the students in both studies were above a certain level. University education can positively affect the cognitive awareness process (Döş and Eraslan, 2024). The students got the lowest

average score in the cognitive confidence sub-dimension, and a low average in this dimension expresses a high cognitive confidence due to the 274ort h of the scale. This situation is explained by the fact that university education develops the ability to think abstractly and question (Hidayat et al., 2021).

The study showed that 4th grade students scored higher than 1st grades in all other sub-dimensions, except 274ort he need to control their thoughts. Since those who are lower in class are inadequate in terms of accumulation of knowledge, they have less self-confidence and consequently more need to control their thoughts (Karakuyu and Akkaya, 2023). Unlike cognitive skills, metacognitive skill is something learned and starts to develop at the age of 5-7 and it develops though school years (Guo, 2022). This situation explains the difference between the 1st and 4th grades in our study.

In this study, female students scored significantly higher in terms of “cognitive confidence”, “need to control thoughts” and “cognitive difference” than male students. Getting high scores from these areas of the scale means not trusting their own memory and attention skills, and controlling negative beliefs. The metacognition system plays a 274ort role in the functional and adaptive work of human cognitive processes. Therefore, any deviation in this system will naturally be an important factor in the development and maintenance of many psychopathologies. Based on this theoretical knowledge, pathological metacognitive activities are higher in female students and they tend to worry more. Acar-Erdol and Akin-Arikan (2022) reported that female students’ metacognitive abilities were better in all areas. This supports the findings of the study. It shows parallelism with the results of our study. Çetin (2021) examined the effect of gender and similar factors on the level of metacognition; unlike the findings of this study, he reported that it was not very effective.

When the reasons of the students preferring the profession willingly were examined, the students who chose the nursing profession willingly were higher than those who were unwilling. The reasons for choosing the nursing profession are mostly employment and financial income anxiety. The students who have low family income level are worried, so that they hope to finish school quickly and start working as soon as possible. Students who do not choose the profession willingly are usually those who have to choose it because of family pressure. Because of the unwilling choice, the student may not have financial or employment concerns (Özdelikara et al., 2016; Sönmez et al., 2024; Tosunöz et al., 2019).

In the study, the average score of the children of illiterate mothers in the need to control thoughts sub-dimension was significantly higher than the literate ones' children. This sub-dimension includes the need to control negative beliefs, including themes of superstition, punishment and responsibility (Döş and Eraslan, 2024). The study conducted by Nazik et al. (2014) on the factors affecting the metacognition level of nursing students reported that students whose mothers had low levels of education received more negative scores.

In the study, it was found that the students who have more than six final exams and feel unsuccessful have significantly higher averages in the areas of positive beliefs, cognitive awareness and need to control their thoughts. Excessive number of exams may proportionally increase the feeling of unsuccessfulness and failure. Researchers think that the thought process is effected negatively in parallel with the increasing anxiety. While anxiety is accepted as a positive motivation source in the exam study strategy, the increase of anxiety has opposite results (Güner and Gökçe, 2021). Similarly, the study where Mert and Baş (2019) examined the relationship between achievement in mathematics and metacognitive awareness of students reported that the unsuccessful students' metacognition scores were negatively affected. Our study has similar results with the study of Silaj et al. (2021) who examined the negative effects of exam anxiety on metacognition.

Limitation of the Study

The study reflects the profile of students of the nursing faculty of a private university. Therefore, it is not possible to generalize it to the universe.

Conclusion

It was examined nursing students' metacognition levels and affecting factors in the study. According to the results of the research, as the education level of the students' were increased, their positive beliefs, uncontrollability and danger, cognitive confidence, cognitive awareness increases, however the need to control thoughts were decreased. Their metacognition score average was increased. The increase in the number of final exams that students will enter causes anxiety to increase and they feel unsuccessful. Students' feeling of failure causes their transcript score to decrease. All these reasons cause students' metacognition score averages 275ort he and psychological thinking processes to be affected pathologically.

Creating comprehensive mentoring programs that combine metacognitive practices with traditional mentoring activities may provide a holistic approach to personal and 275ort he275onal development. In addition, research into developing practical tools and resources for mentors is important 275ort he development of metacognitive education. Students who are

well-equipped, independent, and highly self-aware must be supported, as well. The methods of coping with stress, the steps required for adaptation to the university (university adaptation course, etc.) may increase the level of success and self-confidence of students.

Ethical Consideration: Informed consent was obtained from the Health Sciences Ethics Committee of University (YDU/2017/52-478), the Deanship of Nursing Faculty and the students who agreed to participate in the study.

Conflict of Interest Statement: There is no conflict of interest with any institution or person within the scope of the study.

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