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Examination of Nursing Students' Opinions, Experiences and Attitudes Toward Medical Errors: A Cross-sectional Study

Hemşirelik Öğrencilerinin Tıbbi Hatalara İlişkin Görüş, Deneyim ve Tutumlarının İncelenmesi: Kesitsel Bir Çalışma

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Abstract

Aim: The aim of this study was to reveal nursing students' opinions, experiences, and attitudes toward medical errors.

Method: This descriptive and cross-sectional study was conducted among 465 third and fourth-year nursing students in Turkey. Data were collected between March-June 2017 using a demographic information form and the Medical Error Attitude Scale. Data analysis was performed using descriptive statistics of mean, standard deviation, number, and percentage and the Mann-Whitney U test.

Results: The majority of students stated that they did not make any medical errors in clinical practice (76.8%) and if they made any medical error, they said they would report it to the charge nurse (72.7%). Only 5.8% of the students stated that they reported the medical error they made. While the students' total Scale of Attitudes toward Medical Errors mean score was 3.78 (SD=0.47), the subscale mean scores were determined to be 2.79 (SD=0.71) in the medical error perception, 3.94 (SD=0.60) in the approach to medical errors, and 3.90 (SD=0.59) in the causes of medical errors subscale. There were statistically significant differences between gender, age group, and class year of students and the Scale of Attitudes toward Medical Errors total and subscale mean scores ($p<0.05$; $p<0.01$).

Conclusion: Nursing students' attitudes toward the approach to medical errors, causes of medical errors, and general medical errors were positive. In contrast, their attitude toward the medical error perception was negative. This result indicates that students' awareness of medical errors and the importance of error reporting is high. Moreover, while the majority of the students stated that they did not make medical errors in their clinical practice, they stated that the majority of medical errors were caused by doctors and nurses.

Keywords: Quality of care, patient safety, error reporting, nursing students, medical errors.

Öz

Amaç: Bu çalışma, hemşirelik öğrencilerinin tıbbi hatalara ilişkin görüş, deneyim ve tutumlarını ortaya koymak amacıyla gerçekleştirilmiştir.

Yöntem: Tanımlayıcı ve kesitsel tipteki bu araştırma, Türkiye'de 465 üçüncü ve dördüncü sınıf hemşirelik öğrencisi ile yürütülmüştür. Veriler, Mart-Haziran 2017 tarihleri arasında Tanımlayıcı Bilgi Formu ve Tıbbi Hatalarda Tutum Ölçeği kullanılarak toplanmıştır. Verilerin analizi; ortalama, standart sapma, sayı ve yüzdelik tanımlayıcı istatistikleri ve Mann Whitney U testi kullanılarak gerçekleştirilmiştir.

Bulgular: Öğrenciler çoğunlukla klinik uygulamalarda herhangi bir tıbbi hata yapmadıklarını (%76,8), herhangi bir tıbbi hata yapmaları durumunda ise sorumlu hemşireye (%72,7) bildireceklerini belirtmişlerdir. Öğrencilerin sadece %5,8'i yaptıkları tıbbi hatayı raporladıklarını vurgulamıştır. Öğrencilerin Tıbbi Hata Tutum Ölçeği toplam puan ortalaması 3,78 (SS=0,47) iken alt boyut puan ortalamaları, tıbbi hata algısında 2,79 (SS=0,71), tıbbi hatalara yaklaşımda 3,94 (SS=0,60) ve tıbbi hata nedenlerinde 3,90 (SS=0,59) olarak belirlenmiştir. Öğrencilerin cinsiyeti, yaş grubu ve sınıfı ile tıbbı hata tutum ölçeği toplamı ve alt boyut puan ortalamaları arasında istatistiksel olarak anlamlı farklılıklar bulunmuştur ($p<0,05$; $p<0,01$).

Sonuç: Çalışmada, hemşirelik öğrencilerinin tıbbi hatalara yaklaşım, tıbbi hataların nedenleri ve genel olarak tıbbi hatalara yönelik tutumları olumlu bulunmakla birlikte, tıbbi hata algısına yönelik tutumları olumsuz olarak belirlenmiştir. Bu sonuç, öğrencilerin tıbbi hatalar ve hata bildiriminin önemine ilişkin farkındalıklarının yüksek olduğunu göstermektedir. Ayrıca öğrencilerin çoğunluğu klinik uygulamalarında hata yapmadıklarını belirtirken, tıbbi hataların çoğunluğunun doktor ve hemşirelerden kaynaklandığını belirtmişlerdir.

Anahtar Sözcükler: Bakım kalitesi, hasta güvenliği, hata raporlama, hemşirelik öğrencileri, tıbbi hatalar.

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Introduction

Medical errors continue to be a major problem in the provision of healthcare services in both the public and private sectors in many countries (Rodziewicz et al., 2021). Accordingly, the stressful work environment with the risk of healthcare-associated infections, violence, accidents, stigma, illness, and death, puts the physical and mental well-being of healthcare professionals at risk making them more prone to medical errors (World Health Organization [WHO], 2021).

During patient care and treatment, various medical errors can occur that may harm the patient and, in some cases, result in death (Makary & Daniel, 2016). In the World Health Organization (WHO) Global Patient Safety Action Plan (2021-2030), it is emphasized that no one should be harmed in healthcare services. However, thousands of patients worldwide suffer from preventable harm or are at risk of injury every day while receiving healthcare (WHO, 2021). One in ten patients in hospitals of high-income countries experiences some harm (Slawomirski et al., 2017). In the National Academies of Sciences, Engineering, and Medicine (NASEM) Case Report (2018) for low and middle-income countries, it is stated that approximately 2.6 million deaths occur annually as a result of 134 million medical errors/adverse events due to unsafe care provided in hospitals, and one in four patients suffer from harm (NASEM, 2018). In the United States, medical errors are the third leading cause of death after heart disease and cancer, with 9.5% of deaths each year as a result of medical errors, and over 250,000 deaths each year due to medical errors (Makary & Daniel, 2016; WHO, 2017). According to the WHO, medical errors can occur in all areas of healthcare, depending on both systemic and human factors, and the most common medical errors are surgical errors (27%), medication errors (18.3%), and healthcare-associated infections (12.2%) (WHO, 2017).

In Turkey, according to the Safety Reporting System Statistics Report of the Ministry of Health (2018), a total of 101,841 error notifications were recorded in the Safety Reporting System in 2017. 84.6% (86,155) of these notifications consisted of laboratory errors. According to this report, assistant physicians (surgical branch) comprise the occupational group that most frequently makes surgical errors, which is a type of medical error, and nurses comprise the occupational group that makes the most errors in medication, laboratory, and patient safety. The most common types of errors reported are wrong-site surgery, wrong dose, hemolyzed samples, and patient falls (Ministry of Health, 2018).

In terms of preventing errors and ensuring safe healthcare provision, it is important to train healthcare professionals on measures with additional courses, including all students enrolled in clinical practice in these training courses (WHO, 2017). Clinical practice is an indispensable part of nursing education, and it is planned to equip nursing students with the necessary knowledge and skills as professional nurses in their future professional careers (Flott & Linden, 2016). It is stated that students with insufficient experience in clinical practice are at the risk of making medical errors in patient care (Zieber & Williams, 2015). In addition, students may experience anxiety and fear when encountering patients and performing procedures for the first time in clinical practice. The tension experienced by students can lead them to make medical errors (Bodur et al., 2012). Nurses are expected to have a positive attitude toward medical errors so that they can detect medical errors in a timely manner, determine their causes, and provide solutions (Güleç & Seren İntepeler, 2013). Therefore, in nursing education, it is important to provide students with the necessary professional knowledge and skills, as well as appropriate attitudes in some courses. Providing a positive attitude to nursing students will guide their behavior in case of medical errors they will encounter while working as nurses in the future (Altuntaş et al., 2019). For this purpose, it is important to determine the opinions, experiences, and attitudes of nursing students, who are the nurses of the future, toward medical errors. This study is one of the few studies conducted to determine the attitudes of nursing students toward medical errors and related factors and to make the necessary revisions in their education in this regard.

Method

Aim and Design: The purpose of this descriptive and cross-sectional study is to determine nursing students' opinions, experiences, and attitudes toward medical errors.

Therefore, the research questions are as follows:

- What are nursing students' opinions and experiences regarding medical errors?
- What are nursing students' attitudes toward medical errors?
- What is the relationships between nursing students' attitudes toward medical error and demographics?

Sample and Participants: The study population consisted of third and fourth-year nursing students (n=768) from five private universities and one public university. Since the Scale of Attitudes toward Medical Errors (SAME) was used in this study to measure students' attitudes toward medical error, first and second-year nursing students who did not have sufficient clinical practice and training in medical errors were excluded. 142 of the students were excluded from the study for the reasons such as absenteeism at the time of the study, sick leave, and refusing to participate in the study. In total, the forms were distributed to 626 students. 465 of these forms were filled in completely, returned, and analyzed. The study sample consisted of 465 third and fourth-year nursing students who voluntarily agreed to participate in the study using the convenience sampling method. The response rate was 74.2%. The participating nursing students were predominantly female (82.8%), and 22 years of age or younger (M=22, SD=1.67). In addition, 61.7% were in the third year, while 38.3% were in the fourth year.

Data Collection Tools: The data collection tool consists of two parts. The first part is the "Information Form", which was formed by the researchers in line with the literature (Cebeci et al., 2014; Dolansky et al., 2013) to determine nursing students' sociodemographic information and their opinions and experiences regarding medical errors. The second part is the "Scale of Attitudes toward Medical Errors (SAME)", which was used to determine students' attitudes toward medical errors.
Demographic Information Form: The form consists of three parts including a total of 14 questions. The first part includes three questions about the age, gender, and class year of students. The second part includes five questions revealing the nursing students' experiences of receiving training on medical errors, making a medical error that would risk patient safety in internships, the total number of medical errors made in internships so far, and reporting a medical error they made and observed. In addition, this part includes three questions revealing the nursing students' opinions on whether the training they received on medical errors was sufficient, which members of the profession make the most medical error, and to whom to report any medical errors made during the internships. Lastly, the third part includes three questions that evaluate nursing students' opinions on different types of medical errors (1 question) as "Medical error" or "Not a medical error", various causes of medical errors (1 question) as "Yes or No", and prevalence of medical errors encountered during clinical practice (1 question) as "1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Frequently". Thus, the form includes six questions about nursing students' opinions on medical errors and five questions about their experiences.
The Scale of Attitudes Toward Medical Errors (SAME): The scale was developed by Güleç and Seren İntepeler (2013) and is a five-point Likert scale with 16 items and three subscales: medical error perception (1,2), approach to medical errors (3,8,10,11,12,13,14), and causes of medical errors (4,5,6,7,9,15,16). The scale is scored from one (I strongly disagree) to five (I strongly agree). Scale items 10 and 13 are scored in reverse. The total score of the scale is taken into consideration while calculating the scale score. The scale score is obtained by dividing the obtained raw score by the number of scale items. In the subscale score calculation, the subscales score is added and divided by the number of subscale items, and the score obtained is evaluated between 1-5. The cut-off point of the scale was determined as three. The medical error attitudes of participants who got less than three on the scale are considered negative, while three and above are considered positive. A negative attitude means low awareness of the importance of medical errors and error reporting. In contrast, a positive attitude indicates high awareness of the importance of medical errors and error reporting (Güleç & Seren İntepeler, 2013). The Cronbach's alpha value found by Güleç and Seren İntepeler (2013) was 0.75, and it was found to be 0.81 in this study.

Data Collection: Data were collected from nursing students studying at five private universities and one public university in Istanbul, between March-June 2017. Firstly, necessary permissions were obtained by sending an official letter to the universities. The students were given necessary explanations about the research verbally by the researchers visiting the institutions at the date and time deemed appropriate by the institution's administration. After obtaining informed consent from the volunteered students, the data collection tool was distributed, completed, and collected back on the same day.

Data Analysis: Data were analyzed using the Statistical Package for Social Science (SPSS) 21 program. Descriptive statistics, including means, standard deviations, numbers and percentages, and difference tests, were used in the data analysis. Since the data were not normally distributed, a nonparametric comparison analysis (Mann-Whitney U test) was used.

Ethical Considerations: Ethical approval was obtained from the Non-Invasive Clinical Research Ethics Committee of a state university (Date:06.12.2016; Number: A-27). In addition, official written permissions were obtained from the universities. Written informed consent was obtained from the participants. Permission to use the scale was obtained via e-mail from the developers of the scale.

Findings

The research findings are presented under three headings.

Nursing Students' Opinions and Experiences Regarding Medical Errors

Table 1. Nursing students' opinions and experiences regarding medical errors (N: 465)

Variables		n	%
Receiving training on medical errors	Yes	390	83.9
	No	75	16.1
Finding the training received on medical errors sufficient	Yes, it was sufficient	184	39.6
	No, it was insufficient	245	52.7
Making a medical error that would risk patient safety in internships	Yes	56	12
	No	357	76.8
	I do not remember	52	11.2
To whom to report any medical error made during the internships*	I would inform my responsible instructor	211	45.4
	I would inform the nurse manager	338	72.7
	I would inform the responsible doctor	6	1.3
	I would inform the hospital managers	6	1.3
	I would not inform anyone	6	1.3
The total number of medical errors made in internships so far	0	325	69.9
	1	79	17
	2	24	5.2
	3 and over	15	3.2
Reporting a made medical error	Yes	27	5.8
	No	94	20.2
	Unanswered	344	74
Reporting an observed medical error	Yes	68	14.6
	No	236	50.8
	Unanswered	161	34.6
Professional members who make the most medical error*	Doctors and nurses	276	59.4
	Other medical staff	73	15.7
	Nursing students	186	40
	Medical students	105	22.6

*Multiple options are marked

It was determined that most nursing students have received a course or training on medical errors (83.9%) and found the training they received insufficient (52.7%). The majority stated that they did not make any medical errors that would put patient safety at risk in clinical practice (76.8%). If they made any medical errors during clinical practice, most of them would report them to the charge nurse (72.7%). In addition, the total number of medical errors made by nursing students in clinical practices so far was mainly zero (69.9%), and 17% made one error. Only 5.8% of the students reported the medical error they made and 14.6% reported the medical error they observed. Nursing students mainly stated that members of the profession who make the most medical error are physicians and nurses (59.4%; Table 1).

Nursing Students' Opinions on the Types, Causes, and Prevalence of Medical Errors

Table 2. Nursing students' perceptions on types and causes of medical errors (N: 465)

Types of medical errors	Medical Error		Not a Medical Error	
	n	%	n	%
Wrong dosage administration	463	99.6	3	0.4
Incorrect route of drug administration	460	98.9	5	1.1
Wrong drug administration	458	98.5	7	1.5
Chemotherapy errors	440	94.6	25	5.4
Transfusion errors	438	94.2	27	5.8
Taking contaminated medication or blood	435	93.5	30	6.5
Expired drugs	434	93.3	31	6.7
Diagnostic errors	418	89.9	47	10.1
Do not perform treatment in time	408	87.7	57	12.3
Pressure wounds	360	77.4	105	22.6
Hospital infections	331	71.2	134	28.8
Inadequate monitoring of the patient	329	70.8	136	29.2
Needle / cutting tool injuries	328	70.5	137	29.5
Errors due to side effects of the drugs	300	64.5	165	35.5
Errors due to the equipment	282	60.6	183	39.4
Postoperative complications	224	48.2	241	51.8
Errors due to lack of communication	211	45.4	254	54.6
Falls	207	44.5	258	55.5
Causes of medical errors	**Yes**		**No**	
	n	%	n	%
Excessive workload	456	98.1	9	1.9
Fatigue	449	96.6	16	3.4
Stress	448	96.3	17	3.7
Lack of professional knowledge	445	95.7	20	4.3
Inexperience	445	95.7	20	4.3
Inadequate number of working nurses	442	95.1	23	4.9
Long working hours	442	95.1	23	4.9
Failure to understand doctor orders	437	94	28	6
Loading of non-tasks to nurses	436	93.8	29	6.2
Too many monthly night shifts	429	92.3	36	7.7
Not keeping records regularly	427	91.8	38	8.2
Undefined duties, authorities, and responsibilities	422	90.8	43	9.2
Errors due to lack of communication	420	90.3	45	9.7
Failure to pay attention to shift changes	419	90.1	46	9.9
Lack of protocol and procedures	414	89	51	11
Lack of information about treatment and care of patients	406	87.3	59	12.7
The lack of in-service trainings	404	86.9	61	13.1
Non-fixed working units of nurses	385	82.8	80	17.2
Unsatisfied with managers	247	53.1	218	46.9

The first three items that students considered as medical errors are "wrong dosage administration (99.6%)", "incorrect route of drug administration (98.9%)", and "wrong drug administration (98.5%)". The first three items that students considered as causes of medical errors are "excessive workload (98.1%)", "fatigue (96.6%)", and "stress (96.3%)" (Table 2).

Table 3. Nursing students' opinions on prevalence of medical errors (N: 465)

	Never		Rarely		Sometimes		Often		Frequently	
	n	%	n	%	n	%	n	%	n	%
Hospital infections	14	3	65	14	157	33.8	153	32.9	76	16.3
Bedsores	16	3.4	83	17.8	176	37.8	129	27.7	61	13.1
Needlestick/sharp injuries	18	3.9	98	21.1	182	39.1	124	26.7	43	9.2
Contaminated drug or blood collection	128	27.5	141	30.3	122	26.2	51	11	23	4.9
Incorrect medication administration	113	24.3	150	32.3	131	28.2	49	10.5	22	4.7
Tool-related errors	41	8.8	129	27.7	185	39.8	91	19.6	19	4.1
Errors due to side effects of the drug	47	10.1	155	33.3	173	37.2	71	15.3	19	4.1
Delayed or missed treatment	41	8.8	166	35.7	173	37.2	66	14.2	19	4.1
Post-operative complication	23	4.9	142	30.5	193	41.5	89	19.1	18	3.9
Incorrect dose of medication	100	21.5	149	32	142	30.5	56	12	18	3.9
Forgetting foreign body in surgeries	226	48.6	110	23.7	85	18.3	27	5.8	17	3.7
Complications of surgery	38	8.2	150	32.3	192	41.3	69	14.8	16	3.4
Incorrect place of medication	122	26.2	154	33.1	129	27.7	45	9.7	15	3.2
Errors related to hospital bed	76	16.3	166	35.7	156	33.5	54	11.6	13	2.8
Misunderstood abbreviations	145	31.2	153	32.9	117	25.2	38	8.2	12	2.6
Expired medicines	225	48.4	129	27.7	74	15.9	26	5.6	11	2.4
Transfusion errors	168	36.1	145	31.2	118	25.4	25	5.4	9	1.9
Deaths due to queue waiting	238	51.2	114	24.5	84	18.1	20	4.3	9	1.9
Chemotherapy errors	243	52.3	127	27.3	68	14.6	19	4.1	8	1.7
Surgical burns	191	41.1	154	33.1	94	20.2	18	3.9	8	1.7
Infusion pumps faults	120	25.8	174	37.4	125	26.9	39	8.4	7	1.5
Insufficient diagnostic tests	68	14.6	186	40	165	35.5	39	8.4	7	1.5
Air embolism	216	46.5	126	27.1	85	18.3	31	6.7	7	1.5
Deaths due to hypoglycemia	231	49.7	132	28.4	72	15.5	23	4.9	7	1.5
Diagnostic errors	88	18.9	176	37.8	153	32.9	42	9	6	1.3
Death due to electric shock	294	63.2	101	21.7	46	9.9	18	3.9	6	1.3
Suicide	276	59.4	114	24.5	55	11.8	14	3	6	1.3
Wrong side surgery	242	52	124	26.7	74	15.9	20	4.3	5	1.1
Problems associated with the ventilator	134	28.8	163	35.1	139	29.9	25	5.4	4	0.9
Deadly damaging falls	202	43.4	157	33.8	90	19.4	12	2.6	4	0.9
Giving wrong gas/gas mixture	269	57.8	111	23.9	66	14.2	16	3.4	3	0.6
Patient running away	237	51	177	38.1	33	7.1	16	3.4	2	0.4

Nursing students considered the prevalence of the medical errors of hospital-acquired infections (16.3%), bedsores (13.1%), and needlestick/sharp injuries (9.2%) as "frequent". Moreover, students considered medical errors' prevalence of death due to electric shock (63.2%), suicide (59.4%), and giving the wrong gas/gas mixture (57.8%) as "never" (Table 3).

Nursing Students' SAME Scores and Comparison According to Demographics

Table 4. Comparison of the Nursing Students' Demografics with their SAME Total and Subscale Scores (N: 465)

			Mean scores of SAME and subscales			
			Medical error perception Mean (SD)	Approach to medical errors Mean (SD)	Causes of medical errors Mean (SD)	Total SAME Mean (SD)
		n	2.79 (0.71)	3.94 (0.60)	3.90 (0.59)	3.78 (0.47)
			Mean Ranks			
Gender	Female	385	225.66	239.06	242.68	240.43
	Male	80	268.32	203.84	186.41	197.22
Test and p value			U=18225.50 **p=0.008****	U=13067.00 **p=0.032***	U=11673.00 **p=0.001****	U=12538.00 **p=0.009****
Age	22 years and younger	351	228.81	238.89	242.60	241.23
	23 years and older	114	245.89	214.86	203.44	207.66
Test and p value			U=21476.00 p=0.226	U=17939.00 p=0.096	U=16637.00 **p=0.007****	U=17118.50 **p=0.020***
Class year	Third-year	287	223.18	247.95	241.29	243.73
	Fourth-year	178	248.83	208.90	219.63	215.69
Test and p value			U=28361.00 **p=0.040***	U=21253.00 **p=0.002****	U=23163.00 p=0.090	U=22462.50 **p=0.029***
Receiving training on medical errors	Yes	390	235.24	232.63	236.70	235.32
	No	75	221.37	234.95	213.75	220.93
Test and p value			U=13753.00 p=0.400	U=14771.00 p=0.891	U=13181.50 p=0.174	U=13719.50 p=0.395

SAME: Scale of Attitudes toward Medical Errors; U: Mann-Whitney U test
*p<0.05; **p<0.01
Statistically significant differences in the SAME scores are given in bold values

While students scored 3.78 (SD=0.47) on the SAME total, subscale scores were 2.79 (SD=0.71) in the medical error perception, 3.94 (SD=0.60) in the approach to medical errors, and 3.90 (SD=0.59) in the causes of medical errors. When students' mean scores of the SAME total and subscales were compared according to demographics, the mean score of males in the medical error perception subscale was higher than females. At the same time, females' mean scores were higher than males' in the approach to medical errors, causes of medical errors, and the total scale. Students aged 22 years or younger had higher mean scores for the causes of medical errors and the total scale than students aged 23 years or older. Furthermore, the mean scores of the fourth-year students in the medical error perception was higher than those of third-year students. However, the mean scores of the third-year students in the approach to medical errors and total scale were higher than those of the fourth-year students (Table 4).

Discussion

In this study, it was determined that most students took courses or received training on medical errors and found the training insufficient. Similarly, Yılmaz and Yalım (2020) reported that the majority of nursing students received training on medical errors and found this training insufficient. This indicates that these issues are given importance in formal education, but the fact that students found this training insufficient suggests that the courses are not qualified in terms of content. The content quality of the courses may be low because it is not formally included in the curriculum, and there is no standard in the teaching of the courses. Similar to the United Kingdom, Japan, China, and the United States (Huang et al., 2020), there is currently no formal patient safety curriculum for undergraduate nursing programs in Turkey. Patient safety is given as a separate course in the curriculum in some nursing schools, while in others, it is only addressed as a subject within the courses. In a study examining the quality and patient safety courses conducted in undergraduate nursing programs in Turkey, it was determined that most of the undergraduate nursing curriculum include a course related to quality or patient safety, but the content of the existing courses is not sufficient in terms of quality service understanding, patient and employee safety in the provision of nursing care (Arslan & Basit, 2021). However, patient safety should be included in the curriculum of all health professionals as a separate course, and it is of critical importance (WHO, 2011).

Most of the students stated that they did not make any medical error (76.8%) that would put patient safety at risk in clinical practice. In addition, the total number of medical errors made by students in clinical practice was mostly zero, where only 17% made one medical error. In Birgili and Şahin's (2019) study, 21.8% of nursing students stated that they made medical errors during clinical practice. In the study which was conducted by Stevanin et al. (2015), approximately more than one-fourth (28.8%) of students reported that they made a medical error. Nursing students' error reporting rate is reported as low in the previous studies, but in the current study, the rate is lower than these studies' results. This situation may also be caused by the fact that nursing students do not consider certain cases as medical errors or do not state this sincerely even if they make a medical error. Moreover, clinical practice guidelines are prepared and implemented in line with the undergraduate education and training regulations at each university in Turkey. This situation may have been effective in nursing students' low rate and tendency to make medical errors.

In the current study, very few students stated reporting a made (5.8%) or observed (14.6%) medical error. Similarly, the error reporting rate of nursing students was only 3.8% in another study (Cebeci et al., 2014). This study reveals that the error reporting rate of nursing students is low in line with the previous research results (Cebeci et al., 2015; García-Gámez et al., 2020; Vaismoradi et al., 2014). Cooper (2017) also reported that nursing students are concerned about errors, and students are more likely to report an error when it could harm the patient compared to when the error has no potential harm to the patient. In contrast, in another study, the number of students who stated that more than half of the nursing students could report their own medical errors was higher than the number of students who stated that they would report the medical errors made by other health professionals (Bam et al., 2021). The underlying reason for failure to report medical errors is often the fear of being accused, convicted, and punished (Safarpour et al., 2017). Moreover, clinical nurses are role models and play an effective role in the learning process of nursing students (Baraz et al., 2015). When nursing students work with nurses who do not report errors in a clinical setting, this may be an obstacle for students to internalize error reporting practices. Therefore, it is important for nurse educators or clinical instructors to be role models for nursing students, and guide and encourage them to voice their concerns about error reporting. To increase the rate of reporting, it is also important to assess nursing students' attitudes toward medical errors and develop positive attitudes (Çınar et al., 2020; Kır Biçer, 2020). The acquisition of these positive attitudes during professional education as a student will determine their attitudes in the future while practicing their profession. In the current study, nursing students expressed that health workers who make the most medical errors are physicians and nurses, which is consistent with the results of the study conducted by Bam et al. (2021).

In this study, students most commonly considered wrong dosage administration, incorrect route of drug administration, and wrong drug administration to be medical errors. Similarly, Bam et al. (2021) reported that nursing students rated wrong drug administration as the most common medical error. In another study, one-third of students witnessed medical errors during their clinical practice, most of which were drug administration errors (Cebeci et al., 2014). Since nurses make the most frequent drug administration errors in clinics (Gunes et al., 2020), it is expected that students consider medication errors mostly as medical errors.

While students got above-average scores from total SAME, they got the highest score from the approach to medical errors subscale and the lowest score from the medical error perception subscale. Similarly, Altuntaş et al. (2019) determined that nursing students' SAME mean score was above average; they got the highest score from the approach to medical errors subscale and the lowest score from the medical error perception subscale. Similar to this study, in previous studies, nursing students' medical error perception was negative, and their attitudes toward the approach to medical errors and the causes of medical errors were positive. And their general attitude toward medical errors was positive (Bodur et al., 2012; Çınar et al., 2020; Yılmaz & Yalım, 2020). Students' negative attitude toward medical error perception suggests that they are not yet able to perceive medical errors due to their lack of professional experience and limited practice during their education. Although students' medical error perception was negative, it is pleasing that their general attitudes toward medical errors was positive.

There were significant differences in students' SAME mean scores according to age, gender, and class year variables in the current study. According to age, the mean scores of students aged 22 or younger were higher than others both in the total scale and causes of medical errors subscale. Likewise, Çınar et al. (2020) found that students in the 20-24 age group had higher scores in the medical error perception, approach to medical errors, and causes of medical errors subscales. The current literature on this subject may have increased the mean scores of third-year students in the attitude toward medical error, i.e. students aged 22 or younger, since they took more courses on patient safety in the curriculum during the study period.

According to gender, the mean score of male students in the medical error perception subscale was higher than that of females. In contrast, the mean score of female students in the approach to medical errors, the causes of medical errors, and the total scale were higher than those of males. Similarly, Çınar et al. (2020) found that female students' total and subscales mean scores of SAME were higher. Although this result shows that gender may affect attitudes toward medical errors, there are also studies indicating no difference in students' attitudes toward medical errors according to gender (Altuntaş et al., 2019; Bodur et al., 2012). Although this provides insights, the differences in attitudes toward medical errors according to gender should be further investigated in future studies.

According to class years, the mean score of fourth-year students was higher in the medical error perception than that of third-year students. In contrast, the mean scores of third-year students were higher in the approach to medical errors and the total scale. Çınar et al. (2020) also determined that third and fourth-year students' total and subscale mean scores of SAME were higher than second-year students. It is seen that studies in the literature support the current research findings (Altuntaş et al., 2019; Çınar et al., 2020). As grade level increases, it is an expected result that students become more conscious due to the completion of the education process, and therefore medical error perception increases. It is surprising and should be emphasized that fourth-year students' attitudes toward the approach to medical errors and the causes of medical errors were lower than those of third-year students. As third-year students took more courses on medical errors and patient safety in the curriculum, this may have increased their scores.

Study Limitations: The study findings are limited to the self-reports of nursing students, participating in the study. Due to the limited number of national and international studies examining the opinions, experiences, and attitudes of nursing students toward medical errors, there is a limitation in using national and international research conducted with nursing students to discuss research findings. On the other hand, the large sample size, which is representative of the target group, and the multicenter study design are strengths of the study.

Conclusion and Recommendations

Consequently, nursing students' attitudes toward the approach to medical errors, causes of medical errors, and general medical errors were positive. In contrast, their attitudes toward the medical error perception was negative. According to the scale evaluation, a positive attitude indicates a high awareness of the importance of medical errors and error reporting. Thus, this result shows that students' awareness of medical errors and the importance of error reporting is high. Moreover, the students had little experience with medical errors, and their opinions on medical errors were positive. It is suggested to revise professional education regarding nursing students' attitudes toward medical errors and take initiatives to help students acquire desired attitudes toward medical errors, regarding medical error perception in particular, during their professional education. The quality of education on patient safety and medical errors should be improved and covered as separate courses.

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