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Research Article

THE VIEWS OF NURSES WORKING IN SURGICAL CLINICS AND SURGICAL INTENSIVE CARE UNITS ON MEDICATION ADMINISTRATION ERRORS AND ERROR REPORTING

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Abstract *This study aims to identify the causes of medication administration errors and the reasons stated by nurses working in surgical clinics and surgical intensive care units for not reporting these errors, and to compare the number of errors witnessed by nurses and errors actually reported. The research sample of this descriptive cross-sectional study consists of 125 nurses working in surgical clinics and surgical intensive care units. Data were collected using the face-to-face survey method. The Nurse Personal Information Form and the Medication Administration Error Scale were used to collect data. The perceived medication administration error rate was found to be 59 %; however, 61.6 % of the nurses reported that only 0-20 % of medication administration errors were actually reported. The main reasons for not reporting medication errors are administrative response (4.10 ± 1.18) and fear (3.28 ± 0.99). The most important reason for not reporting errors due to the administrative response is that no positive feedback is given after correct medication administration (4.18 ± 1.53). The perceived cause of medication administration error is pharmacy-related and system-related, which explains 26% of the reason for not reporting the error due to fear. The fact that the reason for medication administration error originates from the physician, pharmacy, and system explains 51 % of the reason for not reporting the error due to disagreement over the error. There is a major difference between the medication administration errors nurses witness and the errors they actually report. The errors are not reported due to administrative response and fear.*

Keywords: *Error reporting, Medical Errors, Medication Errors, Nursing, Surgical Nursing.*

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1. Introduction

Medical error is defined as the unexpected or undesirable results patients are exposed to either intentionally or as a result of negligence during the treatment and care process in health institutions. As a result of medical errors, undesirable situations that involve the risk of death, serious physical or psychological injuries and damage may occur [1]. Medical error includes medication errors, surgical errors, errors in diagnosis, errors due to system deficiencies, and other errors. Preventing these errors in health institutions is the basis of quality improvement and ensuring patient safety. Security reporting systems have been established in order to prevent the reoccurrence of errors that cause harm to the patient or that were noticed before they did harm and to create an educational material based on the reported events [2].

One of the most common medical errors in health institutions is medication administration (MA) errors [1;3]. Medication administration is a process that includes the procurement of the correct

medication given at the request of the doctor, administration of the medication to the correct person at the correct dose, time, and method, correct patient training, correct recording, the confirmation of the patient's rejection, correct medication preparation, and correct response follow-up [4]. Any negativity or disruption to be experienced in this process causes medication administration errors.

MA errors occur due to a multidisciplinary process. Pharmacies, the pharmaceutical industry, the health system, physicians and nurses are included in this process. Pieces of evidence is that nurses' working environments threaten patient safety, heavy workloads and low job satisfaction reduce the quality of care and services provided by nurses [4;5]. However, nurses work at the stages where the probability of error is the highest in the medication administration process [1;4]. Nurses generally experience MA errors during interventions such as medication selection, medication administration, medication dose calculation, the selection of the administration method, and medication form preparation. The most important characteristic of MA errors is that they are preventable [3]. Studies show that 56.7-100% of medication errors witnessed by nurses are preventable [3;5;6]. For this reason, nurses who are responsible for the management of the treatment and care plan of the patients have a key role in preventing MA errors.

The general opinion is that medical errors occur mostly in clinics and intensive care units where patients who have undergone surgical intervention are hospitalized [4;5]. Kırşan et al. (2019) reported that nurses frequently make mistakes in the best-known practices during medication administration [1]. Aygin et al. (2020) determined that nurses who did not make any medication errors and witnessed medication errors 56.7% of them [5]. Around a quarter of the nurses reported errors, such as medication errors and patient falls, which threatened patient safety in the emergency units. According to the study, the case report forms were not filled when these errors occurred [7]. Nurses working in clinics where surgical patients are hospitalized may reduce the occurrence of MA errors if they fulfill their treatment responsibilities in the most accurate way [8]. Thus, safer care and treatment may be provided to patients and quality service may be ensured.

The most important threat after the occurrence of MA errors is not reporting these errors and covering them up. Reporting all errors without fear of punishment is the most important quality improvement work in health institutions. The information obtained as a result of error reporting may ensure that necessary arrangements are made, measures are taken, and the awareness level of employees is increased with in-service training. Thus, it is important that healthcare institutions understand the attitudes and behaviors toward patient safety so they can determine the weak points, errors, and other factors affecting them [7]. However, errors in health institutions are not reported for reasons such as fear of the response of the administrator, fear of being blamed, being punished, and disagreement over the error. Therefore, this study aimed to reveal the perceptions of the nurses working in surgical clinics and surgical intensive care units about the causes of MA errors and not reporting errors and to compare the MA errors witnessed by nurses and the actual reported MA error rates.

2. Materials and Methods

This descriptive cross-sectional study includes the nurses working in the surgical clinics and surgical intensive care units of Yozgat Bozok University Research and Application Hospital. The research was carried out with the survey method in order to reveal the perceptions of nurses regarding the causes of MA errors and not reporting errors, and to compare the MA errors witnessed MA errors and the actual reported MA error rates.

The total number of nurses working in the surgical clinics and surgical intensive care units of the hospital was 132. The research sample included 125 (94.7 %) nurses who actively provided patient care in the hospital between 01.11.2021 and 20.11.2021 and who agreed to participate in the study. Seven (5.3 %) nurses who were on leave for various reasons (marriage, birth, death, annual leave, illness, etc.)

during the date of the research could not participate in the research. The researchers provided them with information about the study and obtained their verbal informed consent. The participants were informed that they could decide not to participate in the study, that no identifying information would feature on the survey forms, and that the data would be used only for the study.

2.1. Data collection tool

The Nurse Information Form and the Medication Administration Error Scale (MAES) were used to collect data. The Nurse Information Form aimed to gather data on the socio-demographic characteristics of the nurses (age, gender, etc.).

Medication Administration Error Survey-MAES: The scale consists of four parts. The first part includes 29 items scored on a six-point Likert type scale, where responses range from 1 = strongly disagree to 6 = strongly agree (Items from 1 to 29). These items measure nurses' perceptions of factors that may cause MA errors. The total score that can be obtained from this part of the scale ranges from 29 to 174. As the score obtained from each item increases, the probability of the factor stated in the item to cause medication error also increases. The items in this part were grouped under six subscales, which are physician (4,5,6,7), lack of knowledge (17,18,19,23), pharmacy (9,10,11), the pharmaceutical industry (1,2,3), the system (12,20,21,24,25,26,27,28,29) and susceptibility to error (13,14,15,16) [2].

The second part includes 16 items (Items from 30 to 45) scored on a six-point Likert scale, where responses range from 1 = strongly disagree to 6 = strongly agree. These items aim to reveal the reasons why nurses do not report errors. The total score that can be obtained from this part of the scale ranges from 16 to 96. As the score obtained from each item increases, the probability of the cause of not reporting an error stated in the item also increases. The items in this part are grouped under three sub-factors, which are fear (31,36,37,39,40), disagreement over the error (30,32,33,34,35,38,41), and administrative response (42,43,45) [2].

The third part consists of 21 items (Items 46-66) on a 10-point scale. The total score that can be obtained from this part of the scale varies between 21 and 210. As the score scale approaches 210, it is predicted that the error rates in the clinic and the error rates actually reported are equal [2].

The items in the fourth part of the scale aim to introduce the participants and are not scored [2].

The Turkish validity and reliability study of the scale was performed by Arat in 2016. The Cronbach's alpha values for the parts of the scale were reported as 0.89 for the first part, 0.83 for the second part, and 0.98 for the third part [2]. In the current study the total Cronbach alpha value for the scale was 0.93.

2.2. Ethical considerations

Prior to the study, Ethics Committee approval was obtained from Yozgat Bozok University (numbered E-28571837-600-38544 and dated 20.10.2021). The nurses participating in the research provided their verbal informed consent.

3. Statistical Analysis

The data were analyzed using the Statistical Package for Social Science (SPSS) 20. Since the variables of gender, marital status, the unit where the nurse works, and use of the medication dose guideline showed normal distribution, t-test was performed to reveal the relationship between the groups. Since the variable of working model did not show normal distribution, the Mann Whitney U test was performed to reveal the relationship between the groups. Since the variables of age, level of education, years of experience, frequency of non-intravenous medication administration, and frequency of monthly rotation showed normal distribution, (One-Way) ANOVA test was performed to determine

the relationship between the groups. The Kruskal-Wallis test was used to determine the relationship between the groups as to the variable of the frequency of intravenous medication administration, which did not show normal distribution. The effect between dependent and independent variables was tested with multiple regression analysis. The findings were evaluated at 95% confidence interval and 5% significance level.

4. Results and Discussion

4.1. Results

It was found that 58.4 % of the nurses working in the surgical clinic and the surgical intensive care unit were female; 68 % had a bachelor's degree; 52% were married; and their mean age was 29.38 ± 5.72 years. 65.6% of the nurses worked in surgical clinics; their working experience was 6.97 ± 5.58 years; 72% of them did not use the medication dose guideline while providing care; 72 % were patient-centered; and 64% used non-intravenous medications frequently. It was revealed that 80 % of the nurses administered intravenous medications frequently and 50.4 % of them did not have rotations over a month (Table 1).

Table 1. Distribution of the socio-demographic and working characteristics of the nurses (n=125)

Variables	Characteristics	n	%
Gender	Female	73	58,4
	Male	52	41,6
Age	20-28	71	56,8
	29-37	42	33,6
	38+	12	9,6
Level of Education	High school	40	32
	Bachelor’s degree	85	68
Marital status	Married	65	52
	Single	60	48
Unit	Surgical ICU	43	34,4
	Surgical clinic	82	65,6
Years of experience	1-5	66	52,8
	6-11	37	29,6
	12+	22	17,6
Use of the medication dose guideline	Yes	35	28
	No	90	72
Working Model	Job-centered	35	28
	Patient-centered	90	72
Frequency of non-IV medication administration	Rarely	22	17,6
	Sometimes	23	18,4
	Often	80	64
Frequency of IV medication administration	Rarely	12	9,6
	Sometimes	13	10,4
	Often	100	80
Frequency of monthly rotation	None	63	50,4
	1-5	48	38,4
	6+	14	11,2

ICU: Intensive Care Unit

The mean score of the nurses on Part I of the MAES, in which perceptions regarding the causes of MA errors are evaluated, was found to be 95.15 ± 19.57, and the most common cause of MA errors was revealed as the pharmaceutical industry (4.70 ± 0.94), followed by susceptibility to error (4.24 ± 0.82). The mean score of the nurses on Part II of the MAES, in which the reasons for not reporting the MA errors are evaluated, was 52.02 ± 12.48. The main reason for not reporting an error was found to be administrative response (4.10 ± 1.18), followed by fear (3.28 ± 0.99). The mean score on Part III of the

MAES, which evaluates whether error reporting is at the same rate as clinical reporting, was 59.28 ± 57.21. It was reported that the highest amount of error reporting was due to MA errors experienced as a result of intravenous administrations (34.20 ± 34.02) (Table 2).

Table 2. Distribution of MAES scores (n = 125)

Parts	Factors	Min-max	Mean±SD
Part I	Physician	1,50-3,00	2,63 ± 0,26
(43-144)	Lack of Knowledge	1,00-5,00	2,69 ± 1,03
95,15±19,57	Pharmacy	1,00-6,00	2,24 ± 1,09
	Industry	1,00-6,00	4,70 ± 0,94
	System	1,00-5,33	2,84 ± 0,82
	Susceptibility to error	1,75-6,00	4,24 ± 0,82
Part II	Fear	1,00-6,00	3,28 ± 0,99
(19-84)	Disagreement over the definition	1,00-5,71	2,77 ± 0,84
52,02±12,48	Administrative response	1,00-6,00	4,10 ± 1,18
Part III	Non-intravenous MA	10,00-100,00	27,88 ± 26,24
(21-210)	Intravenous MA	12,00-120,00	34,20 ± 34,02
59,28±57,21			

MA: Medication administration

Among the factors causing medication errors, the “pharmaceutical industry” has the highest mean score with 4.70 ± 0.94, and the most important reason for the error in this dimension is that the names of some medications are similar (4.77 ± 1.13). As another factor causing medication errors, “susceptibility to errors” has a mean score of 4.24 ± 0.82, and the most important reason for making mistakes in this dimension is the frequent use of equivalent medications (5.09 ± 1.10). The mean score for the "system" dimension, which is another factor causing MA error, was 2.84 ± 0.82, and it was revealed that the most important factor under this dimension was nurses’ not being aware of the known allergy of a patient (3.14 ± 1.53). The mean score for the "lack of knowledge" dimension was 2.69 ± 1.03, and the most important factor under this dimension was found to be the lack of an easy way to find information about medications in the unit (2.84 ± 1.47). The mean score of the "physician" dimension was found to be 2.63 ± 0.26, and the most important factor under this dimension was the frequent change of orders by physicians (4.04 ± 1.38). The mean score for the "pharmacy" dimension was found to be 2.24 ± 1.09, and the most important factor under this dimension is that the pharmacy does not label medications correctly (2.29 ± 1.30) (Table 3).

Table 3. Distribution of the mean scores of the nurses on the factors causing medication errors (n=125)

Part I. Subscales of the MAES		Mean±SD
Physician	Physician's medication orders are not legible.	3,29±1,65
	Physician's medication orders are not clear/understandable.	3,31±1,65
	Physicians change orders frequently.	4,04±1,38
	Physicians use abbreviations instead of writing the orders completely.	3,36±1,47
	Total (1,50-3,00)	2,63±0,26
Lack of Knowledge	There is no easy way to find information about medications in the unit.	2,84±1,47
	Nurses in this unit have limited knowledge of medications	2,66±1,34
	Nurses are pulled between their own teams and the teams of other units regarding medication administration.	2,52±1,29
	The level of knowledge of the unit personnel about medication administration is insufficient.	2,75±1,29
	Total (1,00-5,00)	2,69±1,03
Pharmacy	Pharmacy delivers incorrect dose of medication to the unit.	2,25±1,21
	Pharmacy does not prepare the medicine correctly.	2,17±1,12
	Pharmacy does not label the medicine correctly.	2,29±1,30
	Total (1,00-6,00)	2,24±1,09

Table 3. Continued

Part I. Subscales of the MAES		Mean±SD
Industry	Some medications have similar names.	4,77±1.13
	Different medications look similar	4.69±1.17
	Some medications have similar packaging/packaging.	4.65±1.04
	Total (1.00-6.00)	4.70±0.94
System	It is not possible to reach pharmacists 24 hours a day.	4.04±1.38
	When the prescribed dose of medication is delayed, nurses cannot communicate with the physician to set the duration for the next dose	2.81±1.43
	Nurses in this unit do not follow approved medication administration procedure.	1.95±0.96
	For a group of patients, all their medications may not be given at the agreed time.	2.85±1.49
	Medication orders are not recorded correctly on medication cards.	2.72±1.20
	Errors can be made on medication cards.	2.60±1.27
	Tools are not working properly or not set correctly.	2.95±1.63
	Nurses may not be aware of patients' known allergies.	3.14±1.53
	Patients are in a different area than the nurse's working area because of their other care processes.	2.99±1.41
	Total (1.00-5.33)	2.84±0.82
Susceptibility to error	The equivalent of the medications is often used (example: using the cheaper equivalent).	5.09±1.10
	Communication between physicians and nurses is poor.	3.57±1.50
	Many patients have the same or similar medications.	4.24±1.21
	Unit personnel do not receive adequate in-service training on new medications.	4.04±1.33
	Total (1.75-6.00)	4.24±0.82

Table 4 shows the distribution of the mean scores on the subscales of Part I in MAES, which evaluates the reasons for not reporting MA errors. The mean score for the "administrative response" dimension was found to be 4.10 ± 1.18, and the most important reason under this dimension for not reporting errors is that no positive feedback is given after correct medication administration (4.18 ± 1.53). The mean score for the "fear" dimension was found to be 3.28 ± 0.99, and the most important reason under this dimension is that if medication errors are reported, the patient or family may have a negative attitude towards the nurse or sue the nurse (3.86 ± 1.44). The mean score for the "disagreement over the error" dimension was found to be 2.77 ± 0.84, and the primary reason under this dimension for not reporting errors is when medication error occurs, it takes too much time to fill out the incident report form (3.07 ± 1.30) (Table 4).

Table 4. Distribution of the mean scores of the nurses regarding the reasons for not reporting errors (n= 125)

Part II. Subscales of the MAES (min-max)		Mean±SD
Fear	After medication administration, nurses do not realize that there is an error.	2.82±1.24
	Nurses believe that if they make a medication error, they will be perceived as incompetent by other nurses.	3.44±1.40
	If a medication error is reported, the patient or family may have a negative attitude towards the nurse or sue the nurse.	3.86±1.44
	Nurses are afraid that doctors will reprimand them for a medication error.	2.95±1.42
	Nurses fear negative consequences of reporting medication errors.	3.31±1.47
	Total (1.00-6.00)	3.28±0.99

Table 4. Continued

Part II. Subscales of the MAES (min-max)		Mean±SD
Disagreement over the error	Nurses disagree with the hospital's definition of medication error.	2.74±1.24
	When a medication error occurs, it takes too much time to fill out the incident report form.	3.07±1.30
	It takes too much time to contact the doctor about medication errors.	2.88±1.50
	There is no clear definition of medication error.	2.38±1.12
	Nurses may believe that the error is not significant enough to be reported.	2.66±1.36
	The expectation that medications will be delivered exactly as ordered is unrealistic.	2.59±1.41
	Total (1.00-5.71)	2.77±0.84
Administrative response	The nurse can be blamed if something happens to the patient as a result of the medication error.	3.04±1.41
	No positive feedback is given after correct medication administration.	4.11±1.26
	When there are medication errors, nursing management focuses on the individual rather than the system as the possible cause of error.	4.18±1.53
	Responses to medication error by nursing administration do not match the severity of the error.	4.00±1.57
	Total (1.00-6.00)	4.10±1.18

The nurses reported that regarding non-intravenous medication administration, they experienced MA errors most frequently in giving non-prescribed medication (3.03 ± 2.91), administering discontinued medication (3.03 ± 2.96), and giving medication to a patient with a known allergy (3.07 ± 3.34). Regarding intravenous medication administration, the nurses reported that they experienced errors most frequently in giving medication to a patient with a known allergy (3.03 ± 3.31), administering the wrong fluid (3.01 ± 3.12), and administering the given dose incorrectly (3.00 ± 3.08) (Table 5).

Table 5. Distribution of opinions on what percentage of medication administration error type is actually reported in the unit (n = 125)

Error Type	Non-intravenous MA Mean±SD	Intravenous MA Mean±SD
Wrong method of administration	2.33±2.63	2.68±2.86
Wrong time of administration	2.60±2.73	2.76±2.84
Wrong patient	2.74±2.97	2.84±3.12
Wrong dose	2.60±2.74	2.83±3.03
Wrong medication	2.78±2.95	2.80±3.06
Skipping medication	2.86±2.81	2.80±2.80
Giving non-prescribed medicine	3.03±2.91	2.79±2.96
Administration of discontinued medication	3.03±2.96	2.80±2.98
Giving medication to a patient with known allergy	3.07±3.34	3.03±3.31
Wrong liquid	-	3.01±3.12
Wrong administration of the correct dose	-	3.00±3.08

MA: Medication administration

When the nurses working in the surgical clinic and the surgical intensive care unit were asked about the percentage of actually reporting all types of MA errors including intravenous or non-intravenous medication administration, 61.6 % of them stated that this rate was 0-20 % (Table 6).

Table 6. Distribution of opinions regarding the actual reporting of MA errors in the unit

	Actual reporting rate of MA errors in surgical clinics and surgical intensive care units									
%	0–20	21–30	31-40	41–50	51-60	61–70	71-80	81-90	91-99	100
n (%)	77 (61.6)	10 (8)	3 (2.4)	4 (3.2)	11 (8.8)	0 (0.0)	4 (3.2)	5 (4)	4 (3.2)	7 (5.6)

Multivariate linear regression analysis was conducted in order to predict the factor of not reporting error due to "fear", using the independent variables of "physician", "lack of knowledge", "pharmacy", "industry", "system" and "susceptibility to error" in Part I of the MAES. The analysis revealed a

significant regression model (F(6.118) = 31.09, p<0.001) and showed that 26 % of the variance in the dependent variable ($R^2_{adjusted}$ = 0.26) was explained by the independent variables. According to the model, in the "pharmacy" dimension, the causes of MA errors predicted not reporting errors due to fear negatively and significantly (*ß* = -0.25, *t*(118) = -2.46, *p*<0.05, pr^2 = 0.04). Thus, it can be said that the increase in the perception that a pharmacy-related MA error was made reduces the perception of not reporting errors due to fear. In addition, in the "system" dimension, the causes of MA errors predicted not reporting errors due to fear positively and significantly (*ß* = 0.04, *t*(118) = 5.95, *p*<0.001, pr^2 = 0.23). Thus, it can be stated that the increase in the perception that the error is caused by the system increases the perception of not reporting error due to fear. It was found that the dimensions of "physician", "lack of knowledge", "industry" and "susceptibility to error" did not predict fear-related error reporting (Table 7).

Multivariate linear regression analysis was conducted in order to predict the dependent variable of not reporting error due to “disagreement over the error”, using the independent variables of "physician", "lack of knowledge", "pharmacy", "industry", "system" and "susceptibility to error" in Part I of the MAES. The analysis revealed a significant regression model (*F*(6.118) = 22.70, p<0.001) and that 51 % ($R^2_{adjusted}$ = 0,51) of the variance in the dependent variable was explained by the independent variables. According to the model, in the "physician" dimension, the causes of MA errors negatively and significantly predict failure to report errors due to disagreement over the error (*ß* = -0.17, *t*(118) = -2.18, *p*<0.05, pr^2 = 0.03). It was found that in the "pharmacy" dimension, the causes of MA errors predicted failure to report errors negatively due to the disagreement over the error (*ß* = -0.24, *t*(118) = -2.91, *p*<0.05, pr^2 = 0.06). Thus, it can be said that the increase in the perception that there is a physician and pharmacy-induced MA error reduces the perception of not reporting errors due to the disagreement over the error. In addition, in the "system" dimension, the causes of MA errors predicted not reporting errors due to disagreement over the error positively and significantly (*ß* = 0.91, *t*(118) = 10.06, *p*<0.001, pr^2 = 0.46). Thus, it can be said that the increase in the perception that the MA error is caused by the system increases the perception of not reporting the error due to the disagreement over the error. It was found that the error factors in the dimensions of "lack of knowledge", "industry" and "susceptibility to error" did not predict failure to report errors due to disagreement over the error (Table 7).

Table 7. Multiple regression analysis results

Variables							95% confidence interval for B	
Dependent	**Independent**	**B**	**SD**	***ß***	**t**	**p**	**Min**	**Max**
Not reporting MA error due to fear	Constant	14.50	2.49		5.82	0.000	9.57	19.43
	Physician	-0.13	0.09	-0.13	-1.40	0.16	-0.32	0.05
	Lack of knowledge	-0.06	0.11	-0.05	-0.57	0.56	-0.30	0.16
	Pharmacy	-0.38	0.15	-0.25	-2.46	0.01	-0.70	-0.07
	Industry	-0.21	0.15	-0.12	-1.40	0.16	-0.52	0.09
	System	0.44	0.07	0.66	5.95	0.000	0.30	0.59
	Susceptibility to error	-0.07	0.14	-0.04	-0.49	0.62	-0.36	0.22
Not reporting MA error due to disagreement over the error	Constant	12.75	2.39		5.33	0.000	8.01	17.48
	Physician	-0.19	0.09	-0.17	-2.18	0.03	-0.37	-0.01
	Lack of knowledge	-0.08	0.11	-0.06	-0.76	0.44	-0.31	0.13
	Pharmacy	-0.44	0.15	-0.24	-2.91	0.004	-0.74	-0.14
	Industry	-0.12	0.15	-0.06	-0.86	0.39	-0.42	0.16
	System	0.72	0.07	0.91	10.06	0.000	0.58	0.86
	Susceptibility to error	-0.20	0.14	-0.11	-1.41	0.16	-0.48	0.08

MA: Medication administration

4.2. Discussion

Prevention of MA errors is the basis of quality improvement and patient safety studies in health institutions. MA is predominantly the responsibility of nurses and is an important component of patient treatment. The perceptions of nurses regarding the causes of MA errors are important in terms of preventing MA errors. In this study, the perceptions of nurses working in the surgical clinic and the surgical intensive care unit of a hospital regarding the causes of MA errors, the reasons for not reporting errors, and the MA errors they witness and the actual reported error rates were evaluated.

Perceptions of nurses working in surgical clinics and surgical intensive care units about the factors causing MA errors

The mean score of the nurses on the first part of the MAES, which evaluates the perceptions regarding the factors causing MA errors, is 95.15 ± 19.57. The highest score that can be obtained from this section is 174, and the mean score obtained by the nurses is slightly above the highest mean score that can be obtained from the scale. Therefore, it can be stated that the perceptions of the nurses regarding the causes of MA errors are at a moderate level.

It was found that the nurses perceived "Industry" (4.70 ± 0.94) as the main reason behind MA errors, followed by "Susceptibility to Error" (4.24 ± 0.82). Contrary to this, Vural et al. (2014) stated that medical errors are system-related [9]. Our study revealed that the nurses reported system as the third reason for MA errors. It is believed that the difference between the findings is due to the fact that the nurses in the institution where the research was conducted perform their practices in line with the standards, reducing the number of system-related MA errors.

You et al. (2015) found that according to nurses, the causes of industry-related MA errors are similar packaging of some medications and similar appearance of different medications [10]. Similarly, in our study, the nurses listed the causes of industry-related MA errors as the similar names of some medications (4.77 ± 1.13), similar appearance of different medications (4.69 ± 1.17), and similar packaging of some medications (4.65 ± 1.04). In addition, the nurses in our study reported that the major cause that increases susceptibility to error is the frequent use of equivalent medications (5.09 ± 1.10). Although the content is the same, it is understood that nurses make mistakes more often due to the fact that they use the equivalent of the medication they are used to and that some of the characteristics of the medications are similar. It is thought that this is due to the fact that the representatives of pharmaceutical companies do not include nurses in the information meetings regarding the promotion and use of medications in the clinic.

Perceptions of nurses working in surgical clinics and surgical intensive care units about the reasons for not reporting MA errors

The total mean score the nurses obtained from Part II of the MAES, which evaluates nurses' perceptions of the reasons for not reporting MA errors, was 52.02 ± 12.48. The highest score that can be obtained from this section is 96, and the mean score of the nurses is slightly above the highest mean score that can be obtained from the scale. Therefore, it can be said that the perceptions of the nurses regarding the reasons for not reporting MA errors are at a moderate level.

In this study, the first reason why nurses do not report errors was "administrative response" (4.10 ± 1.18) and the second reason was "fear" (3.28 ± 0.99). Similarly, the study of Ala'a et al. (2016) conducted in Saudi Arabia revealed that the primary reason for not reporting MA errors was "administrative response" (3.48) and the second reason was "fear" (3.32) [11]. One study conducted in Ethiopia by Bifftu et al. (2016) revealed that the nurses who thought that administrative response did not constitute an obstacle to reporting MA errors were 35 times more likely to report errors [12]. Studies conducted in Taiwan and South Korea reported that 50 % of health professionals did not report their MA errors due to administrative response [13;14]. Nourian et al. (2020) showed that the most important barriers to reporting errors for nurses are fear and administrative response [15]. Similarly, the results of

some studies conducted in Turkey show that nurses do not report errors due to concerns such as punishment, exclusion by their colleagues, and administration's focusing on the individual rather than the cause of the error [5;9;16]. This similarity in the literature indicates that nurses have the same perceptions of MA error reporting barriers although they work in different locations and cultures.

Özlü et al. (2015) reported that according to 63.8 % of the nurses in their study, there was no positive feedback about the correct administration of medications, which is a major reason for not reporting errors [5]. Nourian et al. (2020) also found that the most common reason for not reporting MA errors is the lack of positive feedback given to nurses after correct medication administration [15]. Our study also revealed that the most important reason for not reporting MA errors under the "administrative response" dimension is the lack of positive feedback after correct medication administration (4.18 ± 1.53). Although the studies have been carried out in different geographies and cultures, they point to a universal truth: being appreciated not only provides spiritual satisfaction but also encourages the right behavior and motivates people to do the right thing. As stated in the literature, the common problem that prevents nurses from reporting errors is that administrators do not motivate employees by appreciating correct practices.

As for the fear dimension, You et al (2015) reported that the reason why nurses did not report the MA errors was the anxiety of being blamed if something happened to the patient [10]. In the studies of Özlü et al. (2015) and Nourian et al. (2020), nurses stated that if a medication error is reported, the patient or family may develop a negative attitude toward them or may accuse and sue them [5;15]. Karagözoğlu et al. (2019) found that nurses tend not to report their MA errors because administrators focus on the individual when a medical error occurs [17]. In our study, the most important reason for not reporting MA errors related to the fear factor is the anxiety that the patient or family may develop a negative attitude towards the nurse or sue the nurse (3.86 ± 1.44) when medication errors are reported. In addition, we found that the pharmacy and system-related causes of MA errors explained 26 % of not reporting MA errors due to fear. This shows that as nurses believe that MA errors occur due to pharmacy-related reasons, their perception of not reporting errors due to fear decreases. Contrary to this finding, when nurses believe that MA errors are system-related, their perception of not reporting errors due to fear increases. Therefore, it can be said that nurses are afraid of criticizing the system and reporting system-related errors, whereas they have courage to report pharmacy-related errors. This finding shows that nurses report their MA errors when they do not have a fear of being accused.

El-Bialy and Hashish (2013) found that the most important obstacle to reporting MA errors is disagreement over the definition of error [18]. Kim et al. (2011) revealed that health professionals are not afraid of error reporting; however, about half of the participants did not know the definition of error clearly [19]. Similarly, there are other studies emphasizing that the tendency of not reporting MA errors has increased because there are uncertainties about the definition of MA errors in the literature [12;20]. In our study, the final reason for not reporting MA errors was the disagreement of nurses over the error (2.77 ± 0.84). In addition, the reasons for MA errors under the dimensions of "physician", "pharmacy", and "system" explain 51 % of not reporting MA errors due to "disagreement over the error". The increase in the perception that MA errors have physician and pharmacy-related reasons reduces the perception of not reporting errors due to disagreement over the error. On the other hand, the increase in the perception that MA errors have a system-related cause increases the perception of not reporting errors due to disagreement over the error. These results indicate that when nurses are afraid of the reaction of the administration, they cannot agree on the system-related errors and therefore do not report any errors. However, it is understood that nurses have more courage about error reporting and agree on the definition of error as far as pharmacy and physician-related errors are concerned.

The difference between the rate of MA errors in surgical clinics and surgical intensive care units and the actual clinical error reporting rate

The mean score obtained from Part III of the MAES, which investigates whether the rate of errors made and the rate of errors reported are the same, is 59.28 ± 57.21. The highest score that can be obtained from this section is 210, and the closeness of the score to the highest score means that errors experienced in clinical settings and the rate of reported errors are similar [2]. The very low score obtained from the research data indicates that there is an inconsistency between the errors that nurses witnessed and the rate of errors actually reported. Similarly, Karagözoğlu et al. (2019) found that 80.4 % of the nurses did not report medication errors [17]. Özlük (2020) also revealed that nurses' awareness of medical errors and error reporting was low [21].

In our study, the majority of the nurses (61.6 %) reported that 0-20 % of actual error reporting was made for all medication administrations. Similarly, many studies in the literature revealed that healthcare professionals report MA errors at a rate of 22-29.1 % [12;13;17;22]. However, some studies emphasize that MA errors are reported at a rate varying between 35 % and 86 % [13;23;24]. This difference in findings may be attributed to the differences in institutional procedures, sanctions applied as a result of errors, and the perception of patient safety culture within a specific institution.

In our study, the nurses reported that they mostly reported errors during intravenous medication administration (34.20 ± 34.02), which is similar to the findings of You et al. (2015) [10]. You et al. (2015) found that the most common MA errors in intravenous medication administration were the administration of the medication at a wrong rate, to the wrong patient, and at wrong dose. The studies of Härkänen et al. (2016), Lan et al. (2014), and Hossain-Gholipour et al. (2014) reported that the most common MA error by nurses is the administration of the wrong dose of the medication [25;26;27]. Kırşan et al. (2019) found in their meta-analysis study on MA error types that the most critical MA error performed by nurses is dose error [1]. Bişkin and Cebeci (2017) reported the most common type of MA error experienced by nurses as medication misuse [28]. In our study, the most common intravenous MA errors were found to be medication administration to a patient with known allergy (3.03 ± 3.31), wrong fluid (3.01 ± 3.12), and wrong dose (3.00 ± 3.08). The nurses in our study were found to make mistakes on the most familiar truths, which is similar to the literature. However, it is noteworthy that they reported the most common MA error as medication administration to a patient with known allergy. It is thought that this is caused by lack of communication, not paying attention to the armbands of the patients with allergies, and the busy working environment.

It has been reported in the literature that the most common errors in non-intravenous medication administration are wrong patient, wrong dose, and wrong medication selection [5;10]. Our study revealed that the most common errors of nurses in non-intravenous medication administration are the administration of non-prescribed medication (3.03 ± 2.91), the administration of discontinued medication (3.03 ± 2.96), and the administration of medication to a patient with a known allergy (3.07 ± 3.34). This result indicates that nurses do not comply with institutional standards regarding the use of intravenous medications. In addition, only 28 % of the nurses reported that they use medication administration guidelines during a procedure, which is an indication of non-compliance with clinical standards. The thought that non-intravenous medication administration is less dangerous for the patient than intravenous medication administration may cause nurses to be more susceptible to errors.

5. Conclusion

Nurses experience more MA errors than they report. Our study revealed that MA errors mainly occur due to the pharmaceutical industry and factors that increase susceptibility to error. Administrative response and fear are the main reasons why nurses do not report their MA errors. A number of technological innovations are implemented in health institutions to reduce the number of MA errors, such as pharmacy automation systems, online preparation of prescriptions, and barcode system. However, errors continue to occur despite the use of these technologies. Thus, the importance of creating

an institutional culture based on technology as well as patient safety is clearly understood. The biggest step in this regard is for administrators to develop a strategy that appreciates the correct practices and does not focus on the individual in the face of errors. In this way, nurses may be motivated to detect and report medical errors without fear of punishment.

It is not a simple task to administer medications to hospitalized patients. It is important that health professionals have knowledge and experience in this respect. Novice nurses with insufficient experience should have quick access to information in clinics. To this end, medication administration guidelines should be developed and the use of these guidelines should be encouraged. Errors are usually caused by the similarity between medications, which requires some arrangements in clinics for medications with similar names, pronunciation, and appearance. Finally, it is recommended that nurses receive periodic in-service training to increase the level of patient safety and safe reporting.

Limitations of the study:

The major limitation of our study is that it includes nurses working in the surgical clinic and the surgical intensive care unit of a hospital in Yozgat. The results obtained from a small sample may not be generalized to other parts of the country.

Ethical considerations:

Prior to the study, Ethics Committee approval was obtained from Yozgat Bozok University (numbered E-28571837-600-38544 and dated 20.10.2021). The nurses participating in the research provided their verbal informed consent.

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