Effect of Just Culture on Nurses' Willingness to Report Medication Errors

Heba E. El-Gazar [1], **Mohamed A. Zoromba** [2], **Mona Shawer** [3], **Ali D. Abousoliman**[4]

(1) Lecturer of Nursing Administration, Faculty of Nursing, Port Said University, Egypt
(2) Lecturer of Psychiatric Nursing and Mental Health, Faculty of Nursing, Mansoura University, Egypt
(3) Teacher in High Institution of Nursing, Mansoura, Egypt
(4) Lecturer of Nursing Administration, Faculty of Nursing, Kafrelsheikh University, Egypt

Abstract

Background: Medication error reporting is a critical healthcare issue globally. Although research has established that a just culture is beneficial for raising safety in health care settings, it's less clear whether a hospital's just culture can boost nurses' willingness to report their own medication errors. ***Aim***: This study aims to explore the effect of the hospital's just culture on nurses' willingness to report their own medication errors. ***Methods:*** A quantitative, cross-sectional, descriptive, and correlational study design was adopted. A sample of 378 clinical nurses employed in Port Said, Egypt, completed measures of the perceived just culture and willingness to report their own medication errors. Data were analyzed using descriptive statistics, point-biserial correlations, and logistic regression. ***Results:*** Nurses perceived their hospitals with a low level of just culture, and 55.8% of them were unwilling to report their medication errors. Logistic regression revealed that perceived hospital just culture among nurses increased significantly the odds of nurses' willingness to report their medication errors by 10.7%. ***Conclusion:*** Hospitals adopting the just culture boost their nurses' willingness to report their medication errors. ***Recommendations:*** Hospital managers at all levels should adopt just culture and implement all of its dimensions as a strategy to encourage nurses to report their medication errors. In addition, nursing scholars should take the responsibility to disseminate the just culture concept in hospitals through workshops, seminars, and educational studies to increase awareness of the just culture concept.

Keywords: Clinical nurses; Error reporting; Just Culture

Introduction:

The healthcare setting always remains an environment where high-pressured, fast-paced, threatening decisions are made, and mistakes are likely to occur (Denny, 2017). Among the biggest problems in health care worldwide are medical errors, which provide morale and physical complications for patients and healthcare organization members (Sharbafchi-Zadeh et al., 2017). The most common form of medical error is medication error (Shahrokhi et al., 2013) associated with serious effects, including prolonged hospitalization, adverse event, harm, permanent disability, or even death globally (WHO, 2017).

Medication errors are defined by the National Coordination Council for Medication Error Reporting and Prevention (NCCMERP) as any preventable event that may lead to inappropriate medication use or patient harm (NCCMERP, 2016). They can cause all kinds of harm to patients, hospitals, and financial systems (Zadeh et al., 2012; Musarezaie et al., 2013). They can occur in any healthcare facility and take many forms, e.g., wrong

medication, dose, procedure, administration, patient, frequency, route, time, or appropriately planned actions (WHO, 2016). Several studies reported that medication errors are primarily due to nurses' fatigue, increased workload, and long working hours (Alemdar & Aktaş, 2013).

Reporting medical errors is an important and unavoidable issue to prevent harm and improve patient safety. Critical to effective medication errors prevention and safety system is to boost nurses' willingness to report these errors (Sharbafchi-Zadeh et al., 2017; Chen et al., 2018), which refers to nurses' intentions and commitment to voluntary disclose and report medication errors (Institute of Medicine, 2000). Due to the current situation and the prevailing climate in the hospital, reporting medication errors can have negative consequences, including legal issues, blaming by colleagues and supervisors, financial hardship, and being labeled incompetent (Zadeh et al., 2012; Musarezaie et al., 2013).

Enhancing nurses' willingness to report their medication errors needs to be the priority of health care settings (Nasiripour et al., 2015).

It plays a key role in reducing error rates, improving patient safety, and preventing recurring medication errors (Ajri-Khameslou et al., 2018). Furthermore, medication error reporting is required in hospital accreditation systems (Hashemi et al., 2011). Therefore, it is essential for healthcare settings to effectively remove barriers that lead to misreporting by changing the culture of blame, following an equitable cultural framework, and ensuring a balance of responsibilities between individuals and organizations (Ajri-Khameslou et al., 2018). All of these conditions can be achieved in hospitals by adopting what is known as the " just culture" (Petschonek et al., 2013).

Just culture is defined as a healthcare organizational environment in which health professionals are safe to speak up and feel confident that they will be treated fairly when they disclose incidents (Weiner et al., 2008). It implies a shift in focus from errors being human mistakes to errors as a chance to enhance system design. The concept of just culture is related to the nursing process and nurses' critical thinking skills in identifying the root causes of errors. Since nursing relies on investigating the situation, diagnosing the problem, and developing a plan to avoid the problem, the concept of the "just culture" naturally applies to any nursing setting (Marx, 2001).

Just culture has six components: Feedback and communication (the degree of sharing event information and outcome), the openness of communication (the extent of speaking up and communicating information by the staff to hospital administrators), balance (the level of blame-free and fair treatment within the hospital), quality of event reporting process (the degree of monitoring and maintaining the reporting system), continuous improvement (the extent of learning and improving events), and trust (the degree of staff confidence in the organization, administrators, and colleagues) (Petschonek et al., 2013).

Implementing a just culture in hospitals develops a mindset across the entire organization that has a favorable impact on job outcomes and the working environment in several ways. Just culture creates a process where errors do not automatically result in

punishment but rather a procedure to identify the error's root cause (Khatri et al., 2009). Errors that are neither intentional nor malevolent are addressed through coaching, counseling, and teaching, which reduces the risk of repeated errors. Increased error reporting can result in changes to the way care is delivered. Such context empowers nurses and other staff members to feel involved in the outcome.

Khatri et al. (2009) asserted that a just culture in healthcare greatly enhances patient safety, reduces errors, and gives nurses and other healthcare workers a considerable interest in the development process by prioritizing system improvements over personal punishment. A just culture can foster innovation, multidisciplinary collaboration, and collegiality. Through this model, hospital staff and leadership share responsibilities for maintaining a safe workplace, enabling healthcare organizations to deliver highly reliable and quality care (Sirota, 2005; Gorini et al., 2012; Solomon, 2014).

Significance of the study:

Globally, unsafe medication practices and medication errors are considered the leading causes of death, injury, and harm in healthcare settings (Ferrah et al., 2017). The cost of medication errors worldwide is about $ 42 billion annually (WHO, 2017). Undoubtedly, nurses have a major responsibility in medication error reporting (Farag et al., 2017). Unfortunately, underreporting medication errors is common (Hung et al., 2016). Therefore, it is fundamental to prevent medication errors by boosting nurses' willingness to report them (Russo et al., 2015; Chen et al., 2018).

Although many researchers studied medication error reporting, most studies investigated the prevalence, and a few explored what makes nurses willing to report their medication errors, highlighting the necessity to conduct additional research on error reporting (Russo et al., 2015). However, the just culture has the potential to become the gold standard for patient safety (Solomon, 2014); no study has explored the impact of a just culture on error reporting, to the researchers' knowledge. The present study attempts to overcome these

gaps by investigating the effect of the hospital's just culture on nurses' willingness to report their own medication errors among a sample of Egyptian nurses.

Drawn on hospital adopting the just culture share the responsibility of errors with their staff and use error reporting to identify the root cause of the error, not to punish (Petschonek et al., 2013), the study hypothesize that the just culture has a positive effect on nurses' willingness to report their own medication error (Figure 1).

Figure 1: Conceptual model

Objective of the Study

This study aims to explore the effect of the hospital's just culture on nurses' willingness to report their own medication errors.

Research questions

1- What is the level of nurses' perception of the just culture of their hospital?

2- What is the proportion of nurses' willingness to report their own medication errors?

3- Are there differences between nurses' demographic characteristics, hospitals' perceived just culture, and willingness to report their medication errors?

4- Does the nurses' perception of the just culture affect their willingness to report their medication errors?

Methodology

Study Design

This study employed a quantitative, cross-sectional, descriptive, and correlational design.

Setting

The study was carried out in thirteen hospitals in Port Said, Egypt; six hospitals were affiliated with the Ministry of Health, two were affiliated with Health insurance, and five were private hospitals. The studied hospitals provided multiple adult in-patient services (e.g., medicine, surgy, intensive care of all types, gynecology, obstetrics, orthopedics, burn, and open-heart care unit).

Participants

The study population included clinical nurses working in the targeted hospitals. Nurses were eligible to be included in this study if they: (1) had an Egyptian nurse license; (2) participated voluntarily in the study; (3) were employed for at least six months in their current hospital; (4) worked in an adult in-patient unit. The exclusion criteria were: (1) being temporarily on leave during the investigation period; (2) working in the outpatient, operation room, pediatric unit, clinics, or auxiliary departments. The inclusion and exclusion criteria were specified according to the scenarios in the tool for measuring willingness to report medication errors used in this study.

As the study was quantitative and observational, and the primary outcome is a categorical variable, the sample size was estimated using the single population proportion formula of Kish (1965) with the following equation:

$$= \frac{Z\alpha^2 \; p \; (1-p)}{d^2}$$

Where

n = minimum sample size required for the study

$z\alpha$ = value for normal distribution at 95% confidence level and α = 0.05 for two-tailed (1.96)

p = prevalence of medication error reporting (57%; Jember et al., 2018)

d = the maximum allowable deviation/ marginal of error (5%)

$$= \frac{1.96^2 \times 0,57 \ (1-0.57)}{0.05^2} = 377 \ \text{nurses}$$

Adding 10% for non-response rate 377 +37.7 = 414.7. Thus, the required total sample size for the study was 415 nurses.

Sampling technique

Participants were sampled using a two-stage sampling strategy. First, the purposeful sampling method was adopted to target hospitals with multiple adult in-patient services (e.g., medical, surgical, and intensive). Pediatric hospitals and hospitals with short-term care were excluded due to the nature of the scenarios worded in the tool for measuring the willingness to report medication errors used in this study. Besides, hospitals that refused to approve data collection were excluded. Second, a stratified random sampling method was used to recruit participants. The total population was stratified by the hospital, and a sample was taken from each stratum proportionally. A total of 415 questionnaires were distributed, and 394 were returned. After excluding questionnaires with incomplete answers or incorrectly filled (n=16), the final sample size was 378 nurses, giving an effective rate of 91.1%.

Instruments

The study used a self-administered questionnaire that included three parts. The first part assessed participants' demographic information, the second part explored nurses' perception of the just culture, and the third part investigated nurses' willingness to report their own medication errors.

Demographic Data

The participants were asked to identify their hospital name, age, gender, education, marital status, experience in nursing, and current working hospital.

Just Culture

The perceived just culture of hospitals among nurses was measured using the Just Culture Assessment Tool (JCAT) developed by Petschonek et al. (2013) in English. The original English version was translated to Arabic by linguistic experts using translation and back-translation to ensure cross-linguistic equivalence (Brislin, 1970). JCAT is comprised of 27 items clustered into six dimensions: feedback and communication (3 items; e.g., 'Tthe management does a good job of sharing information about events), the openness of communication (5 items; e.g., 'Supervisors respect suggestions from staff members.'), balance (5 items; e.g., 'When an event occurs, the follow-up team looks at each step in the process to determine how the event happened.'), quality of event reporting process (5 items; e.g., 'I'm given time to enter event reports during work hours.'), continuous improvement (4 items; e.g., 'The hospital sees events as opportunities for improvement.'), and trust (5 items; e.g., 'I trust that the hospital will handle events fairly.'). Participants scored items on a 7-point Likert-type scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). All the scores on the 27-item scale were summed for a total score, given a score ranging from 27 to 189. The higher the score becomes, the greater the nurses' perception of the just culture of their hospital is.

Willingness to report medication errors

Nurses' willingness to report their own medication errors was measured by a tool developed by the research team based on previously conducted studies and an extensive literature review (Dirik et al., 2019; Espin et al., 2010; Lee, 2017; Mrayyan, 2014; Russo et al., 2015). Consistent with the literature, the tool was developed as hypothetical medication error scenarios and given a pool of 24-item scenarios in the first version. This version was reviewed, and the final scale included 20-item scenarios of a range of medication errors (e.g., wrong dose, wrong time, drug omission, food-drug interaction, incorrect preparation, wrong drug, wrong route, incorrect duration, and incorrect strength). The 20-item scenarios are

detailed in Table 3). Participants were asked, in case of committing such cases, what action should follow ("not reporting" or "reporting). The scoring of the 20-item ranged from 0 to 20. Based on expert judgment, the scores were discontinuous to reporting (nurses who score 12 or more) and not reporting (nurses who score less than 12).

Validity, reliability, and rigor

Face and content validity were confirmed to the entire questionnaire through two rounds of expert consultations consisting of nine experts, including three nurse academicians, three clinical nurses, two head nurses, and one physician. In round one, the initial set of the 24 items generated from the literature was reviewed by the expert panel. The panel recommended the elimination of four scenario-item due to redundancy and rewording of some statements. Modifications were made, and the revised tool was reassessed through round two by the same panel. In round two, the content validity index at the item level (I-CVI) for JCAT ranged from 0.96 to 1, and for willingness to report medication error, the tool ranged from 0.92 to 1. The content validity index for the entire scale (S-CVI) was 0.98 for JCAT and 0.94 for the willingness to report medication error tool. I-CVI and S-CVI exhibited acceptable content validity (Polit & Beck, 2006).

The questionnaire's reliability was verified in terms of stability and homogeneity. Stability was assessed using a two-week test re-test conducted on a sub-sample of 21 nurses from the pilot study (r = 0.79 for JCAT and 0,75 for error reporting tool). Homogeneity was assessed using Cronbach's alpha for multipoint response items (i.e., JCAT) and Kuder-Richardson (KR20) for dichotomous items (i.e., willingness to report medication error tool; Ervin & Kulbok, 2018). Cronbach's alpha for the pilot study was 0.925 and for the main study was 0,950. The KR20 for the pilot study was 0.81 and for the main study was 0.92.

Pilot testing

The finalized form of the entire questionnaire was tested through a pilot study on 31 nurses excluded from the main study

sample. The purposes of the pilot test were to (1) verify the authenticity and relevance of scenarios to the study settings and (2) ensure clarity and time needed to fill out the questionnaires. After completing the questionnaire, every participant was invited to a 5-to-10-minute interview to determine whether they understood the content of the scale items and to discuss any incomprehensible content. The pilot study recommended replacing some medications' names with others more used in their departments. The questionnaire took approximately 10–15 min to complete.

Data Collection

Data collection was carried out between October 2018 and February 2019. After obtaining permission to collect data from the administrative bodies of the studied hospitals, meetings with head nurses in hospital departments were conducted. The purposes of the meetings were to (1) clarify the aim and significance of the study, (2) gain their cooperation and encourage nurses to fill the questionnaires, (3) schedule researchers' visits to collect data, and (4) obtain the list of eligible nurses working in each department to constitute the sampling frame. After that, the sampling frame was numbered, and the participants were selected randomly. Two researchers contacted eligible selected nurses in their departments according to their shift schedules. The questionnaires package included (a) the informed consent form; (b) a participation information sheet explaining in detail the purpose of the study, assuring confidentiality of data, and asking them to fill the questionnaire in a private place; (c) giving the study tools in a sealed envelope. The researchers later collected questionnaires.

Statistical Analysis

The collected data were analyzed using SPSS, version 23 (IBM Corp). Participants' demographic characteristics were reported as numbers and percentages. Continuous variables (i.e., just culture and its dimensions) were described as means and standard deviations. The categorical variable (i.e., willingness to report medication errors) were described using frequencies and percentages. Independent sample t-test and one-way ANOVA were used

to explore whether the perceived just culture was different by the nurses' demographic characteristics. The chi-squared ($\chi2$) test was used to compare the participants' willingness to report their medication errors concerning their demographic characteristics. LSD post-hoc tests were used to examine which specific means were different.

Point-biserial correlations were used to examine the relationship between the continuous variables (just culture and its dimensions) and the categorical variable (willingness to report medication errors). Multivariable logistic regression was used to identify factors estimating nurses' willingness to report medication errors. The logistic regression model was performed with only variables that yielded a p-value <0.05 in a univariate analysis. The significance level threshold was set at 0.05.

Ethical Considerations

The permission to conduct the study was obtained from the studied hospitals. Participating nurses received written and oral information about the study's purpose and gave their informed consent. The participants were informed that their participation was wholly voluntary, and they had the right not to write their names on the questionnaire. They were reassured that all information would be handled in strict confidence, and they had the option to withdraw at any time.

Results

Descriptive statistics for the perceived just culture among the studied nurses are presented in Table 2. The mean for the overall perceived just culture was 60.86 (SD = 20.71), which was below the mid-point, considering that the total score range to be obtained from the just culture scale varied from 27 to 189, indicating that nurses had a low perception of just culture in their hospitals. Among the different dimensions, the trust dimension obtained the highest mean (M= 11.33, SD 3.65), while feedback and communication obtained the lowest mean (M = 8.07, SD 2.52).

More than half of the nurses (55.8%) reported that they were unwilling to report their own medication errors compared with 44.2% willing to report. The highest three scenarios nurses willing to report were: "Aspocid was given as a routine treatment while the patient was prepared for surgery (84.4%)"; "the physician ordered to administer the calcium gluconate diluted within 15, min but you did not notice and administer it one shot (82.5)"; "penicillin injected to a patient with a penicillin allergy as penicillin sensitivity not tested (80.2%)". Otherwise, all other scenarios were reported with scores between 68.3% and 42.3%. The scenario that scored the lowest (42.3%.) was "the head nurse assigned five patients to you, which made you overwhelmed; as a result, you administered an Antodine tablet to one of your patients twice" (Table 3).

As shown in Table 4, nurses' willingness to report their own medication error is significantly and positively associated with the just culture overall score (r = 0.583, p<0.001) and all of its dimensions; feedback and communication, the openness of communication, balance, quality of event reporting process, continuous improvement, and trust (r = 0.257, 0.532, 0.460, 0.564, .520, and 0.500, respectively; all p-values <0.001).

Table 5 summarizes the results of logistic regression analyses, predicting factors of nurses' willingness to report their own medication errors. A model was run with three variables that showed a significant individual correlation with nurses' willingness to report their own medication errors: perceived just culture, nursing working years, and hospital working years. As shown in Table 4, the perceived just culture among nurses is the only significant factor in the study model and increases the odds of nurses' willingness to report their own medication errors by 10.7% (AOR = 1.074, p < 0.001, 95% CI = 1.058-1.091). The other two variables (nursing working years and hospital working years) are no longer significant (p > 0.05).

Table (1): Participants' demographics and differences in the study variables (N = 378)

Characteristic	Category	No. (%)	Just Culture		Willingness to report medication error		
			M (SD)	t/F (P)	Willing No. (%)	Unwilling No. (%)	$\chi2$ (P)
Hospital type	Governmental [a]	223 (59.0)	59.44 ± 21.71	F = 4.79[*] (0.009) c > a,b	103 (46.2)	120 (53.8)	0.698 (0.705)
	Insurance [b]	68 (18.0)	57.34 ± 23.89		28 (41.2)	40 (58.8)	
	Private [c]	87 (23.0)	67.25 ± 23.33		37 (42.5)	50 (57.5)	
Age (years)	<30	209 (55.3)	61.07 ± 22.87	F = 0.051 (0.951)	93 (44.5)	116 (55.5)	0.310 (0.985)
	30–45	141 (37.3)	60.40 ± 22.75		62 (44.0)	79 (56.0)	
	>45	28 (7.4)	61.57 ± 22.08		12 (42.9)	16 (57.1)	
Sex	Male	48 (12.7)	57.89 ± 23.89	t = -925 (0.359)	23 (47.9)	25 (52.1)	0.268 (0.6 04)
	Female	330 (87.3)	61.29 ± 22.54		145 (43.9)	185 (56.1)	
Marital status	Single	27 (7.1)	60.26 ± 21.84	F = 0.286 (0.835)	17 (63.0)	10 (37.0)	4.167 (0.244)
	Married	314 (83.1)	61.27 ± 22.86		134 (42.7)	180 (57.3)	
	Divorced	16 (4.2)	56.63 ± 26.09		7 (43.7)	9 (56.3)	
	Widowed	21 (5.6)	58.71 ± 19.88		9 (42.9)	12 (57.1)	
Education	Diploma	129 (34.1)	60.71 ± 21.77	F = 2.025 (0.110)	57 (44.2)	72 (55.8)	3.326 (0.344)
	Associate	118 (31.2)	64.60 ± 24.00		58 (49.2)	60 (50.8)	
	Bachelor	120 (31.8)	57.38 ± 22.62		46 (38.3)	74 (61.7)	
	Master	11 (2.9)	60.27 ±15.70		6 (54.5)	5 (45.5)	
Nursing working years	<10[a]	264 (69.8)	59.53 ± 22.11	4.032[*] (0.019) b > a,c	113 (42.8)	151 (57.2)	6.160[*] (0.046)
	10–20[b]	82 (21.7)	66.89 ± 25.33		45 (54.9)	37 (45.1)	
	>20[c]	32 (8.5)	56.38 ± 17.86		10 (31.3)	22 (68.8)	
Hospital working years	≤10	326 (86.2)	59.02 ± 21.90	t = 4.01[**] (<0.001)	133 (40.8)	193 (59.2)	10.99[**] (0.001)
	>10	52 (13.8)	72.37 ± 24.50		34 (65.4)	18 (34.6)	

F = one-way analysis of variance; t = independent sample t-test; $\chi2$ = chi-squared test
[abc] Differences between the means by LSD post-hoc test
[*] $P < 0.05$; [**] $P < 0.01$

Table (2): Descriptive statistics of perceived just culture among the studied nurses (N = 378)

Variable	Mean ± SD
Feedback and communication	8.07 ± 2.52
Openness of communication	11.14 ± 3.96
Balance	11.08 ± 3.95
Quality of event reporting process	10.68 ± 2.12
Continuous improvement	8.58 ± 2.76
Trust	11.33 ± 3.65
Overall just culture	60.86 ± 20.71

Table (3): Prevalence of participating nurses willing/unwilling to report medication errors (N = 378)

Item scenarios	Medication error reporting	
	Willing No. (%)	Unwilling No. (%)
A patient suffered from status asthmaticus, and an Atrovent nebulizer was prescribed every 6 h. You omitted the 12-midnight dose because the patient was asleep, which resulted in the patient receiving only three doses on this day.	245 (64.8)	133 (35.2)
A patient received 50-unit insulin + 50 cc saline via an infusion pump with a rate of 0.05 ml/h, but you administered it with a rate of 5 ml/h. You did not realize that until the end of the shift.	258 (68.3)	120 (31.7)
The head nurse assigned five patients to you, which made you overwhelmed; as a result, you administered an Antodine tablet to one of your patients twice.	160 (42.3)	218 (57.7)
Dobutamine was administered instead of the prescribed dopamine.	225 (59.5)	153 (40.5)
At the hand-off, the head nurse assured you that the doctor omitted insulin from your assigned patient; however, you forgot and administered it to the patient.	180 (47.6)	198 (52.4)
The prescribed oral/IV antibiotic was omitted because of the need to take the patient to the X-ray department for 3 h.	173 (45.8)	205 (54.2)
The patient was given one pill of Cordarone instead of the prescribed half bill.	205 (54.2)	173 (45.8)
A patient was given the prescribed Unictam 3 h late because you were so busy.	182 (48.1)	196 (51.9)
Penicillin was injected into a patient with a penicillin allergy as penicillin sensitivity was not tested.	303 (80.2)	75 (19.8)
The doctor ordered Lasix 40 mg to a heart failure patient before blood transfusion, but you gave the blood to the patient without administering the prescribed Lasix.	197 (52.1)	181 (47.9)
A newly admitted diabetic patient took Diamicron MR 60 mg tablet as a routine treatment for diabetes. The doctor ordered to give 20-unit insulin and assured to stop the tablet. However, you forget to instruct the patient to stop the tablet. After two days, you discovered that the patient took the tablet aside from the 20-unit of insulin.	190 (50.3)	188 (49.7)
The physician prescribed paracetamol tablets to manage pain every 6 h; 6 a.m., 12 p.m., 6 p.m., and 12 a.m. At 10 a.m., the patient suffered from pain, and you responded to the patient and gave him 1 pill. At 12 a.m., you also gave the prescribed pill.	192 (50.8)	186 (49.2)
The doctor ordered to administer Nootropil in a diluted form, but you administered it undiluted.	188 (49.7)	190 (50.3)
The physician ordered to administer the prescribed medication after meals, but this morning, the patient breakfast was delayed, and you gave the medication to the patient before breakfast.	181 (47.9)	197 (52.1)
Ferosac was given to the patient to take with milk.	174 (46)	204 (54)
A patient complained of headaches; as a response, you give him a non-prescribed analgesic.	191 (50.5)	187 (49.5)
The physician ordered you to administer the calcium gluconate diluted within 15 min, but you did not notice and administered it in one shot.	312 (82.5)	66 (17.5)
The physician ordered Cefotax 1000 mg/12 h. The pharmacist gave 4 vials with 500 mg to each vial. So, you should administer two vials in a dose; however, you administered one vial instead of two.	188 (49.7)	190 (50.3)
The physician ordered to administer Cefazolin IM, but you administered it IV.	176 (46.6)	202 (53.4)
Aspocid was given as a routine treatment while the patient was prepared for surgery.	319 (84.4)	59 (15.6)
Overall nurses' willingness to report their medication errors	167 (44.2)	211 (55.8)

Table (4): Correlations matrix between the perceived just culture scale and willingness to report medication error (N = 378)

Just Culture	Willingness to report medication error
Feedback and communication	0.257[***]
Openness of communication	0.532[***]
Balance	0.460[***]
Quality of event reporting process	0.564[***]
Continuous improvement	0.520[***]
Trust	0.500[***]
Overall just culture	0.583[***]

[***]$P < 0.001$

Table (5): Multivariable logistic regression model predicting nurses' willingness to report their own medication errors (N= 378)

Variables	Nurses' willingness to report their own medication errors					
	B	**SE**	**Wald $\chi 2$**	**p**	**AOR**	**95% CI**
Just Culture	0.072	0.008	84.718	<0.001	1.074	1.058-1.091
Nursing working years (ref: >20)						
<10	0.699	0.540	1.677	0.195	2.012	0.698-5.799
10–20	0.704	0.555	1.611	0.204	2.022	0.682-6.000
Hospital working years (ref: >10)						
≤10	-0.739	0.743	2.446	0.118	0.478	0.189-1.206
Constant	-4.607					
Model $\chi 2$ (p)	153.797 (<0.001)					
% correctly predicted	79.1%					

B: regression coefficient; SE: standard error; AOR: adjusted odds ratio; CI: confidence interval; Ref: reference category

Discussion:

The present study was conducted to explore the effect of the hospital's just culture on nurses' willingness to report their own medication errors. The results revealed that the level of nurses' perception of the just culture is at a low level in the studied hospitals. This finding is a warning to clarify the current status of just culture in the studied hospitals. It agrees with Abdi et al. (2015), who reported a lack of just culture among Iranian intensive care units. In contradiction to this finding, Walker et al. (2019) and Petschonek et al. (2013) reported an average level of perceived just culture among nurses in their research hospitals. The discrepancy in results may be related to hospitals with different regional origins showing different trends in just culture. Implementing a just culture is an international recommendation, and it is the way to create a safe environment (Amalia, 2019). Therefore, this study emphasizes the importance of developing an intervention to improve a just culture in hospitals.

Pertaining to just culture dimensions, nurses in this study reported the trust dimension as the top dimension while feedback and communication as the worst dimensions. Interestingly, these findings may serve hospital leaders and nurse managers to determine which areas need intervention first to improve the overall just culture. These results are partially supported by Petschonek et al. (2013), who agreed that feedback and communication are the lowest perceived dimensions but showed that continuous improvement is the highest dimension.

According to the scenarios' scores given in this study, the largest proportion of the studied nurses was unwilling to report their own medication errors. This finding is critical and shows a serious problem in nursing practice. It is similar to those in Italy (Russo et al., 2015), Turkey (Dirik et al., 2019), Jordon (Mrayyan, 2014), and Iran (Hajibabaee et al., 2014), but lower than those in Taiwan (Chen et al., 2018) and Ethiopia (Jember et al., 2018). Differences in results may be explained that nurses' willingness to report their errors changes according to the context or error reporting system. Without nurses reporting their medication errors, most of these errors are not recognized; consequently, they cannot be tracked and would be repeated (Sharbafchi-Zadeh et al., 2017). Hence, all possible measures that can motivate nurses to report their medication errors must be prioritized in health care settings (Nasiripour et al., 2015).

The present study analyzed nurses' perceptions of just culture related to their sociodemographic characteristics. It showed that nurses working in private hospitals perceived a high just culture compared with nurses working in governmental and insurance hospitals. The studied nurses reported that private hospitals had a definite error reporting discipline, and all nurses were treated fairly under this discipline, unlike governmental and insurance hospitals, which may illustrate these findings. Moreover, the study revealed nurses with experience in the nursing profession ranging from 10 to 20 years or more than ten years in the current working hospitals perceived a high just culture compared with other nurses. Other studies reported similar results showing that nurses with higher

experience perceive their hospital as punitive-free with a safety culture (Ammouri et al., 2015; Khater et al., 2015).

The present study analyzed nurses' willingness to report their own medication errors concerning their sociodemographic characteristics. It found that nurses who showed a willingness to report had nursing work experience ranging from 10 to 20 years and over 10 years of experience in their current working hospital. This finding is concluded because nurses who work longer may build a relationship with supervisors, which gives them the trust to report errors without fear of shaming or blaming. Meanwhile, novice nurses and those with short work experience may be a feared that their errors will be kept in their files or held against them. This result agrees with the findings of Chen et al. (2018), who asserted a significant relationship between nurses' years of experience and intention to report errors. However, it is inconsistent with the results of Hajibabaee et al. (2014) and Jember et al. (2018).

Most importantly, this study showed that the perceived just culture of the hospitals is a significant contributor to increasing nurses' willingness to report their own medication errors. This finding may be because when nurses perceive that errors are accepted, and the main purpose of error reporting is not to blame or punish but to investigate the root cause of error not to be recurrent, they feel safe and confident to speak up and report unsafe events, without fear of negative consequences. Significantly, these findings may serve nurse managers who struggle to motivate nurses to disclose and report their medication errors. They are consistent with the study of Rogers et al. (2017) on pharmacists and stated just culture is the way to error reporting. Furthermore, Lederman et al. (2013) concluded that a system with adequate feedback on reporting would encourage nurses' willingness to take responsibility for their actions, resolve or confront misunderstandings, and address the root cause of errors.

Conclusion

The current study showed that the perceived just culture among nurses working in Port Said, Egypt was low. In addition, the study revealed that most nurses were unwilling to report their medication errors. The study provides evidence that hospital efforts to enhance the just culture could boost nurses' willingness to report their medication errors.

Recommendations:

Based on the findings of the study, the following recommendations are made:

1. Hospital managers at all levels should adopt just culture to encourage nurses to report their medication errors.

2. Intervention targeting improving all dimensions of just culture should be implemented.

3. The blaming culture should be replaced with a culture that considers errors an opportunity to learn and improves the medication safety system.

4. A non-punitive approach to medication error reporting should be adopted to make staff feel comfortable disclosing errors.

5. Hospital leaders need to determine all reasons for the lack of medication error reporting and take measures to increase nurses' willingness to report their medication errors (e.g., increase nurses' awareness about the importance of medication error reporting, create a guide for reporting system, and disseminate the message 'to err is human among the staff).

6. An electronic and anonymous reporting of medication errors should be adopted, and a committee to review the reported errors should be established, not including the head of nursing departments.

7. Nursing scholars should take responsibility for disseminating the just culture concept in hospitals through workshops, seminars, and educational studies to enhance awareness of this concept.

8. Further research is needed to understand and identify the root causes of unreported medication errors among nurses.

References:

Abdi, Z., Delgoshaei, B., Ravaghi, H., Abbasi, M., & Heyrani, A. (2015). The culture of

patient safety in an Iranian intensive care unit. *Journal of Nursing Management*, *23*(3), 333-345. https:// doi. org/ 10. 1111/ JONM. 12135

Ajri-Khameslou, M. (2018). Factors affecting reporting of nursing errors: A qualitative content analysis study. *Annals of Medical Health Sciences Research, 8*(1), 215-219.

Alemdar, K. D., & Aktaş, Y. (2013). Medical error types and causes made by nurses in Turkey. *TAF Preventive Medicine Bulletin, 12*(3), 307-314. 10. 5455/ pmb. 11345816200

Amalia, D. (2019). Promoting just culture for enhancing safety culture in aerodrome airside operation. *International Journal of Scientific & Technology Research, 8*(1), 260-266.

Ammouri, A. A., Tailakh, A. K., Muliira, J. K., Geethakrishnan, R., & Al Kindi, S. N. (2015). Patient safety culture among nurses. *International Nursing Review, 62*(1), 102–110. https:// doi. org/ 10. 1111/ INR.12159

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*(3), 185–216. https:// doi. org/ 10. 1177/ 1359 10457 000100301

Chen, L. C., Wang, L. H., Redley, B., Hsieh, Y. H., Chu, T. L., & Han, C. Y. (2018). A Study on the reporting intention of medical incidents: A nursing perspective. *Clinical Nursing Research, 27*(5), 560–578. https:// doi. org/ 10. 1177/ 1054 773 817692179

Denny, D. (2017). *Medical error reporting and patient safety: An exploration of our underreporting dilemma* (Doctorate's thesis).The Temple University Graduate Board, Pennsylvania.

Dirik, H. F., Samur, M., Seren Intepeler, S., & Hewison, A. (2019). Nurses' identification and reporting of medication errors. *Journal of Clinical Nursing, 28*(5–6), 931–938. https:// doi. org/ 10. 1111/ JOCN. 14716

Ervin, N., & Kulbok, P. (2018). *Advanced public and community health nursing practice: Population assessment, program planning, and evaluation (2nd ed)*. New York, NY: Springer Publishing Company, LLC.

Espin, S., Wickson-Griffiths, A., Wilson, M., & Lingard L. (2010). To report or not to report: A descriptive study exploring ICU nurses' perceptions of error and error reporting. *Intensive and Critical Care Nursing, 26*(1),1-9. https:// doi. org/ 10. 1016/ j. iccn. 2009.10.002

Farag, A., Eweda, S., & Elsayed, N. (2017). Nurses knowledge and practice in dealing with high alert medications. *Alexandria Scientific Nursing Journal, 19*(2), 1-24.

Ferrah, N., Lovell, J., & Ibrahim, J. (2017). Systematic review of the prevalence of medication errors resulting in hospitalization and death of nursing home residents. *Journal of the American Geriatrics Society, 65*(2), 433-442. https:// doi. org/10.1111/jgs.146833

Gorini, A., Miglioretti, M., & Pravettoni, G. (2012). A new perspective on blame culture: An experimental study. *Journal of Evaluation in Clinical Practice*, *18*(3), 671-675. https://doi.org/10.1111/j.1365-2753.2012.01831.x

Hajibabaee, F., Joolaee, S., Peyravi, H., Alijany-Renany, H., Bahrani, N., & Haghani, H. (2014). Medication error reporting in Tehran: A survey. *Journal of nursing management, 22* (3), 304-310. https://doi.org/10.1111/jonm.12226

Hashemi, F., Nasrabadi, A.N., & Asghari, F. (2011). The obstacles of reporting nursing errors in Iran: A qualitative study. *Iranian Journal of Medical Ethics and History of Medicine, 4*(2), 53-64.

Hung, C., Chu, T., Lee, B., & Hsiao C. (2016). Nurses' attitude and intention of medication administration error reporting. *Journal of Clinical Nursing, 25*(3-4), 445-53. https:// doi. org/ 10. 1111/ jocn. 13071

Institute of Medicine. (2000). *To err is human: Building a safer health system*. National Academy Press.

Jember, A., Hailu, M., Messele A., Demeke T., & Hassen, M. (2018). Proportion of medication error reporting and associated factors among nurses: A cross sectional study. *BMC Nursing, 17* (1), 1:8. https://doi.org/10.1186/s12912-018-0280-4

Khater, W., Akhu-Zaheya, L., AL-Mahasneh, S., & Khater, R. (2015). Nurses' perceptions of patient safety culture in Jordanian hospitals. *International Nursing Review, 62* (1*),* 82–91. https://doi.org/10.1111/inr.12155

Khatri, N., Brown, G. D., & Hicks, L. L. (2009). From a blame culture to a just culture in health care. *Health Care Management Review, 34*(4), 312-322. 10.1097/hmr.0b013e3181a3b709

Kish, L. (1965). *Survey Sampling*. New York: John Wiley and Sons, Inc.

Lederman, R., Dreyfus, S., Matchan, J., Knott, J. C., & Milton, S. K. (2013). Electronic error-reporting systems: A case study into the impact on nurse reporting of medical errors. *Nursing Outlook, 61*(6), 417-426. http:// dx. doi. org/ 10. 1016/ j. outlook. 2013.04.008

Lee, E. (2017). Reporting of medication administration errors by nurses in South Korean hospitals. *International Journal for Quality in Health Care, 29*(5), 728–734. https:// doi. org/ 10. 1093/ INTQHC/ MZX096

Marx, D. (2001). *Patient safety and the just culture: A primer for health care executives*. New York, NY: Trustees of Columbia University.

Mrayyan, M. T. (2014). Reported incidence, causes, and reporting of medication errors in teaching hospitals in Jordan: A comparative study. *Contemporary Nurse, 41*(2), 216–232. https:// doi. org/ 10. 5172/ CONU. 2012.41.2.216

Musarezaie, A., Momeni, G., Zargham, B., & Haj S. E. (2013). Survey of the medication errors and refusal to report medication errors from the viewpoints of nurses in hospitals affiliated to Isfahan University of medical sciences, Iran. *Journal of Health System Research*, *9*(1), 76-85.

Nasiripour, A., Raeissi, P., & Jafari, M. (2015). The role of disclosure and reporting in medical errors prevention. *Safety Promotion and Injury Prevention, 2*(2), 73-84.

National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) website. (2016). *About Medication Errors. What is a Medication Error?* Retrieved from https://www.nccmerp.org/about-medication-errors

Petschonek, S., Burlison, J., Cross, C., Martin, K., Laver, J., Landis, R. S., & Hoffman, J. M. (2013). Development of the just culture assessment tool (JCAT): Measuring the perceptions of healthcare professionals in hospitals. *Journal of Patient Safety*, *9*(4), 190-197. https://doi.org/10.1097/PTS.0B013E31828 FFF34

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, *29*(5), 489–497. https:// doi. org/ 10. 1002/ nur.20147

Rogers, E., Griffin, E., Carnie, W., Melucci, J., & Weber, R. (2017). A just culture approach to managing medication errors. *Hospital Pharmacy, 52(*4), 308-315. https://doi.org/10.1310/hpj5204-308

Shahrokhi, A., Ebrahimpour, F., & Ghodousi, A. (2013). Factors effective on medication errors: A nursing view. *Journal of Research in Pharmacy Practice, 2*(1), 18-23. 10.4103/2279-042X.114084

Sharbafchi-Zadeh, N., Karimi, S., Molavi Taleghani, Y., & Vejdani, M. (2017). Developing an error reporting system for health centers. *Journal of Patient Safety and Quality Improvement, 5*(4), 606-615. 10.22038/PSJ.2017.9470

Sirota, R. L. (2005). Error and error reduction in pathology. *Archives of Pathology and Laboratory Medicine, 129*(10), 1228-1233. https://doi.org/10.5858/2005-129-1228-EAERIP

Solomon. A. (2014). *Enhancing nurses' perceptions of patient safety culture through the just culture mode*l. (Doctorate's thesis). College of Health Sciences, Walden University, Washington. Retrieved from http:// scholarworks. waldenu. edu/dissertations

Walker, D., Altmiller, G., Barkell, N., Hromadik, L., & Toothaker, R. (2019). Development and validation of the just culture assessment tool for nursing education. *Nurse Educator, 44*(5), 261–264. https:// doi. org/ 10. 1097/ NNE. 0000000000000705

Weiner, B., Hobgood, C., & Lewis, M. A. (2008). The meaning of justice in safety incident reporting. *Social Science & Medicine, Elsevier, 66*(2), 403-413. https:// doi. org/ 10. 1016/ J. SOCSCIMED. 2007.08.013

World Health Organization (WHO). (2016). *Medication errors: Technical series on safer primary care*. https:// apps. who.int/iris/handle/10665/252274

World Health Organization (WHO). (2017). *WHO launches global effort to halve medication-related errors in 5 years*. https://www.who.int/news/item/29-03-2017-who-launches-global-effort-to-halve-medication-related-errors-in-5-years

Zadeh, M., Aghajari, P., & Mahdavi, N. (2012). Reasons of nurses' medication errors and perspectives of nurses on barriers of error reporting. *Hayat*-Journal of Faculty of Nursing and Midwifery, 18 (2), 66‑75.