

# Nurses' Perceptions of Patient Safety Culture in Intensive Care Units: A Cross-Sectional Study

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## Abstract

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**BACKGROUND:** Patient safety culture is a relatively new focus where little is known about its current status in Egypt's teaching hospitals, mainly intensive care units (ICUs). Therefore, the authors of this study attempted to assess the patient safety culture dimensions from the nurses' perspective.

**METHODS:** An exploratory cross-sectional study was conducted in two ICUs (pediatric ICU and adult ICU) at the University Hospital over 3 months from October till December 2018. Sixty nurses were interviewed using the Hospital Survey on Patient Safety Culture.

**RESULTS:** The current study findings revealed an average positive response to individual items ranging from 6% to 51%. The "Organizational learning" dimension had the highest average percent positive patient safety dimension score (51%) among all respondents, while the "Frequency of events reported" dimension had the lowest one (6%). No statistically significant difference was reported between the pediatric and adult ICUs for all mean scores except for the "Non-punitive response to error" dimension which was reported to be greater in the pediatric intensive care unit (PICU) compared to adult ICU ( $P < 0.005$ ). The overall patient safety grade was rated acceptable by 47.5% of the interviewed nurses.

**CONCLUSION:** The current study shows that patient safety is fragile in ICUs, and more effort is recommended to increase the awareness of health care providers. Also, hospital managers need to enhance the performance and practices of patient safety within a non-punitive reporting environment.

## Introduction

Patient safety is considered to be one of the global health concerns influencing patients in different healthcare settings in both developed and developing countries [1], [2]. In addition to being a substantial economic burden, patient safety causes the expenditure on health to be higher in the developing countries than the developed ones by from 5 to 10%. Fortunately, it is estimated that up to three-quarters of these lapses in health care delivery are preventable [3].

One of the essential steps to improve the patient safety is the promotion of patient safety culture; a culture that supports and allows optimal patient outcomes which are reliant on achieving a culture of trust, reporting, transparency, and

commitment to change. Patient safety is critical, mainly in the intensive care unit (ICU) [4], [5]. In ICUs, many incidents threaten patient safety due to the sensitive and complex situations such as conditions of critically ill patients [6], [7]. Farzi et al., [4] indicated that most medication errors were reported in ICUs which could severely threaten patient safety.

Assessing the ICU safety culture will help us to find areas requiring improvement and raise awareness about patient safety [8], [9], [10]. Generation of a safety culture in institutes includes an assessment of the current health care providers' perception of this culture, otherwise, safety precautions implemented may increase costs and cause unpredicted new risks [11]. A study by Verbakel et al., [12] revealed that the patient safety practices improved much after assessing patient safety culture among health care providers.

Studies on patient safety culture mostly come from the developed countries [7]. Literature shows that safety culture differs across hospital organisations depending on the organisation experience, size, and function [13]. In Egypt, patient safety culture is a relatively new focus where little is known about its current status in ICUs. Therefore, authors of this study attempted to assess patient safety culture dimensions from the perspective of nurses who play an important role in providing health care services and are in contact with patients in the pediatric intensive care unit (PICU) and adult ICU. Also, the authors aimed at testing for differences between the PICU and adult ICU regarding the patient safety grade.

## Methods

### *Study design and setting*

This is an exploratory cross-sectional study conducted in two intensive care units (ICUs) (Pediatric and Adult ICUs) at the University Hospital in PICU includes 23 beds and receives about 799 patients annually, while adult ICU includes 47 beds and receives about 3000 patients annually. The study extended over 3 months, from October to December 2018.

### *Study population*

All nurses who worked at both ICUs at the time of data collection, were in contact with the patients, worked at this unit for at least one year, and consented to share were included. Thus, based on a population of 72 nurses approached, 60 nurses were apt to share in the research.

### *Data collection tool*

A pre-tested structured interview questionnaire was used to collect data from the study participants. It included two sections: the demographic characteristics (age, marital status, education, nursing experience, and previous training in patient safety) and the Arabic translated version of the Hospital Survey on Patient Safety Culture (HSOPSC) [14]. Psychometric assessment of the Arabic translation of the American HSOPSC version in Palestine and Jordan showed that the HSOPSC is a valid and reliable tool for assessing safety culture in Arabic hospital settings [15], [16]. The HSOPSC covered the followings dimensions: Organizational learning and continuous improvement (3 items), Overall perceptions of safety (4 items), Staffing and workload (4 items), Teamwork across hospital units (4 items),

Supervisor/manager expectations and actions promoting patient safety (4 items), Hospital management support for patient safety (3 items), Teamwork within units (4 items), Hospital handoffs and transitions (4 items), Non-punitive response to error (3 items), Frequency of events reported (3 items), Feedback and communication about error (3 items), and Communication Openness (3 items) in addition to two questions; patient safety grade of the ICU (1 item) and number of events reported (1 item).

Items are scored using a five-point Likert scale reflecting agreement (1 = 'Strongly Disagree' to 5 = 'Strongly Agree') or frequency (1 = 'Never' to 5 = 'Always', or 1 = 'Excellent' to 5 = 'Failing) or frequency (No event reports, 1 to 2 event reports, 3 to 5 event report, 6 to 10 event reports, 11 to 20 event reports, 21 event reports or more).

The face and content validities were examined. After collecting the viewpoints of public health experts, required changes were made, and no phrases or words were deleted. Internal consistency/reliability was checked by calculating Cronbach's alpha for each composite to ensure that items within each composite were consistent.

In this study, the Cronbach's alpha for the composites ranged from 0.61 to 0.88. The HSOPSC user's guide indicates that a Cronbach's alpha value of 0.60 or greater is supposed to be acceptable [17].

### *Operational definition*

An "event" is defined as any error, mistake, incident, accident, or deviation regardless of whether or not it results in patient harm [17].

### *Statistical analysis*

Statistical analysis was done using the statistical package for the social science program (SPSS, version 21.0 IBM). The HSOPSC User's Guide was used to guide data management and analysis [18]. The HSOPSC includes both positively and negatively worded items; all scored using five-point frequency scales. The percentage of positive responses for each item and composite was calculated. An item's percent positivity was calculated by averaging the total percent positivity for each item. Composite percent positivity was calculated by averaging the percent positivity of all items included in the composite. The 12 HSOPSC composites were then examined to determine areas of strength (percent positive rating > 75%) and those requiring improvement (< 50%), while composites having a percent positive rating from 50% to 75% were considered neutral. Negatively worded items were reversed to compute a percent positive response rate. In addition, descriptive and univariate analyses were conducted to compare between pediatric and adult ICUs. Chi-square test was used to compare percent

positive score between areas. P value less than 0.05 was considered as a level of significance. The positive response for each item was defined as the percentage of strongly agree and agree (or always and most of the time) responses to direct-worded items and strongly disagree and disagree (or never and rarely) to reverse-worded items. In addition, the average percentage of positive responses for each level was defined as the mean of positive responses percent for that dimension's related items. Grouping of the responses was done as follows: Positive responses for (strongly agree and agree on responses), Neutral response for (neither), Negative responses for (strongly disagree and disagree responses) [19].

### Ethical considerations

The Ethical Review Committee in the Kasralainy Faculty of Medicine, Cairo University, Cairo revised and approved the study protocol. Written informed consent was obtained directly from the enrolled nurses before data collection and after explanation of the study objectives and importance. All procedures for data collection were treated with confidentiality according to Helsinki declarations of biomedical ethics.

## Results

A total number of 60 nurses working in the Pediatric and Adult Intensive Care Units at Cairo university hospitals participated in the current study. The average age of the enrolled nurses was  $30.4 \pm 5.3$ , the majority of participants were females (87.0%) and 80.8% were married. About two-thirds of the nurses (67.4%) held a Bachelor degree and 44.6% had a nursing experience of 2-5 years. About half of the nurses (50.3%) reported that they were satisfied with their jobs and a minority of them (16.6%) got training on patient safety (untabulated results).

Tables 1, 2, 3, and 4 show the detailed average percent positive dimension score perceptions regarding all patient safety culture dimensions in both pediatric and adult ICUs. Positive response to individual items ranged from 6 to 51%, with a mean total score of 30% for the positive responses to the 12 dimensions.

As displayed in Table 1, the Organizational learning dimension had the highest average percent positive patient safety dimension score (51%) among all respondents, while the Frequency of events reported dimension had the lowest score (6%). Regarding Organizational learning, Overall perception of safety, and Staffing dimensions, there were no statistically significant differences between pediatric and adult intensive care units. The highest positive

responses were for organisational learning (51%), while the least positive responses were for staffing (31%).

**Table 1: Average percent positive dimension scores of the enrolled nurses for the Organizational learning, Overall perception of safety, and Staffing dimensions at Pediatric and Adult Intensive Care Units, Cairo University Hospital, Egypt, 2018 (N = 60)**

Patient Safety Culture Dimensions	Average percentage-positive response	Average percentage-positive response Pediatric ICU	Average percentage-positive response Adult ICU	p-value
Organizational learning and continuous improvement	51%	53%	49%	0.729
We are actively doing things to improve patient safety	53%	57%	50%	0.796
Mistakes have led to positive changes here	50%	50%	50%	1
After making changes to improve patient safety, we evaluate their effectiveness	50%	53%	47%	0.797
Overall perceptions of safety	36%	38%	34%	0.502
Patient safety is never sacrificed to get more work done	57%	63%	50%	0.435
Our procedures and systems are good at preventing the occurrence of errors	53%	50%	57%	0.796
It is just by chance that more serious mistakes do not take place around here	20%	20%	20%	1
We have patient safety problems in this unit	13%	17%	10%	0.706
Staffing and workload	31%	29%	33%	0.463
We use more agency/temporary staff that is best for patient care	37%	27%	47%	0.18
The staff in this unit work longer hours which is best for patient care	30%	27%	33%	0.779
We work in "crisis mode" trying to do too much, too quickly	30%	33%	27%	0.779
Enough HR to deal with work	27%	30%	23%	0.771

As for the teamwork climate in the ICU, there was no statistically significant difference in the Supervisor/manager expectations and actions promoting patient safety or the Hospital management support for patient safety dimensions between pediatric and adult ICUs as shown in Table 2.

**Table 2: Average percent positive dimension scores of the enrolled nurses for the Teamwork across hospital units, Supervisor/manager expectations and actions promoting patient safety, and Hospital management support for patient safety dimensions at Pediatric and Adult Intensive Care Units, Cairo University Hospital, Egypt, 2018 (N = 60)**

Patient Safety Culture Dimensions	Average percentage-positive response	Average percentage-positive response Pediatric ICU	Average percentage-positive response Adult ICU	P value
Teamwork across hospital units	30%	32%	28%	0.567
Hospital units work well together to provide the best care for patients	50%	57%	43%	0.439
There is good cooperation among hospital units that need to work together	33%	40%	27%	0.412
It is often unpleasant to work with staff from other hospital units	23%	20%	27%	0.761
Hospital units do not coordinate well with each other	13%	10%	17%	0.706
Supervisor / manager expectations and actions promoting patient safety	27%	26%	28%	0.633
My supervisor/manager seriously considers staff suggestions for improving patient safety.	47%	50%	43%	0.796
Whenever pressure builds up, my supervisor/manager wants us to work faster, even if this means taking shortcuts.	40%	37%	43%	0.792
My supervisor/manager overlooks the patient safety problems happening	17%	13%	20%	0.731
My supervisor/manager says a good word when he/she sees a job done according to established patient 3s	3%	3%	3%	1
Hospital management support for patient safety	26%	24%	27%	0.714
Patient safety is never sacrificed to get more work done	30%	27%	33%	0.779
Hospital management provides a work climate that promotes patient safety	23%	23%	23%	1
Hospital management seems interested in in-patient safety only after an adverse event happens	23%	23%	23%	1

Comparing the results of the pediatric ICU to adult ICU regarding the Teamwork within units,

Hospital handoffs and transitions, Non-punitive response to error, and Frequency of events reported dimensions; all mean scores were not significantly different except for the non-punitive response to error dimension which was reported to be greater in PICU compared to Adult ICU (23% versus 8%) ( $p < 0.05$ ).

**Table 3: Average percent positive dimension scores of the enrolled nurses for the Teamwork within units, Hospital handoffs and transitions, and Non-punitive response to error dimensions at Pediatric and Adult Intensive Care Units, Cairo University Hospital, Egypt, 2018 (N = 60)**

Patient Safety Culture Dimensions	Average percentage-positive response	Average percentage-positive response Pediatric ICU	Average percentage-positive response Adult ICU	P-value
Teamwork within units	24%	30%	18%	0.229
Work together to finish quickly	27%	37%	17%	0.143
Treat each other with respect	27%	33%	20%	0.382
Others help out when busy	23%	23%	23%	1
Support each other	20%	27%	13%	0.33
Hospital handoffs and transitions	24%	17%	32%	0.103
Shift changes are problematic for patients in this hospital	27%	17%	37%	0.143
Things "fall between the cracks" when transferring patients from one unit to another.	23%	17%	30%	0.36
Important patient care information is often lost during shift changes	23%	17%	30%	0.36
Problems often occur in the information exchange process across hospital units	23%	17%	30%	0.36
Non-punitive response to error	16%	23%	8%	*0.022
The staff feel like their mistakes are held against them	23%	30%	17%	0.36
Staff worry that the mistakes they make are kept in their personnel files	13%	23%	3%	*0.052
When an event is reported, it feels like the person is being written up, not the problem	10%	17%	3%	0.195
Frequency of Events Reported	6%	6%	6%	1
When a mistake is made but caught and corrected before affecting the patient, how often is this reported?	7%	7%	7%	1
When a mistake is made but has no potential to harm the patient, how often is this reported?	7%	7%	7%	1
When a mistake that could harm the patient is made, but it does not, how often is this reported?	3%	3%	3%	1

Statistically significant.

When asked on the frequency of reporting potentially harmful events on patients, even when no harm actually occurred to the patient, only six percent of these events were reported (Table 3).

**Table 4: Average percent positive dimensions scores of the enrolled nurses for Feedback & communication about error and Communication openness dimensions at Pediatric and Adult Intensive Care Units, Cairo University Hospital, Egypt, 2018 (N = 60)**

Patient Safety Culture Dimensions	Average percentage-positive response	Average percentage-positive response Pediatric ICU	Average percentage-positive response Adult ICU	P value
Feedback & Communication About Error	40%	42%	37%	0.492
We are given feedback about the changes put into place based on event reports.	43%	47%	40%	0.795
We are informed about the errors that happen in this unit.	40%	40%	40%	1
In this unit, we discuss ways to prevent errors from happening again.	35%	40%	30%	0.589
Communication Openness	44%	47%	40%	0.312
Staff will freely speak up if they see something that may negatively affect patient care.	52%	50%	53%	1
Staff feel free to question the decisions or actions of those with more authority.	40%	40%	40%	1
Staff are afraid to ask questions when something does not seem right	38%	50%	27%	0.11

As displayed in Table 5, the overall patient safety grade was rated acceptable by 47.5% of the

interviewed nurses with a statistically significant relationship between the patient safety grade and work duration. Regarding the topic of events reporting, the present study revealed that all of the enrolled nurses reported no event during the year previous to data collection (untabulated).

**Table 5: Patient safety grade, ICU type, and hospital work duration (N = 60)**

Variables	Patient Safety Grade					
	Excellent / Very Good		Acceptable		Poor / Very Poor	
ICU type	N	%	n	%	N	%
Pediatric ICU	2	6.7	19	63.3	9	30.0
Adult ICU	6	20.0	19	63.3	5	16.7
Chi square = 3.143, P value = 0.208						
Hospital work duration	2	16.7	4	33.3	6	50.0
Less than 5 years	2	7.1	20	71.4	6	21.4
From 5 to 10 years	2	12.5	12	75.0	2	12.5
From 10 to 15 years	2	50.0	2	50.0	.0	.0
More than 15 years	Chi square = 12.836, P value = 0.046†					

† Statistically significant.

## Discussion

The present study revealed a friable safety culture in most dimensions with a mean total positive score of 40% for the positive responses to the 12 dimensions. This is in contrast with other studies conducted in ICUs, which revealed positive responses' percentages of 62% (20) and 55.24% [21]. The scores in the current study are also lower than those in a study conducted in Brazilian neonatal intensive care units with a percentage of 42.58% [21]. A possible explanation for this discrepancy of results is the lack of patient safety culture awareness where a minority of the enrolled nurses in the present study (16.6%) got training on patient safety. Regarding areas of strength, no dimension was classified as such.

However, it is considered that the "Organizational learning-continuous improvement" dimension (51%), being the main ones, demonstrates advances in the safety culture and have the potential to become an area of strength in the ICUs. This is by a previous study conducted in two adult ICUs in Brazilian public hospitals where the "Organizational learning-continuous improvement" dimension was 49% [22]. However, a higher percentage for this dimension (78.2%) was found in Aboul-Fotouh and his colleagues' study that included physicians, technical and administrative staff as well [23].

In the current study, the Non-punitive response to error composite received a low score of 16%. This agrees with Aboul-Fotouh et al., the study [23] in which the Non-punitive response to error score dimension was 19.8%, revealing that healthcare personnel are not comfortable when it comes to reporting errors. On the other hand, higher positive responses were found in other studies for this

dimension such as US hospitals which received a score of 44% [24]. However, the Non-punitive response to error dimension yielded a mean score below 50% in the abovementioned studies that were conducted in a variety of countries, indicating the need for improvement. In the present study, the Non-punitive response to an error reported by nurses working in PICU is higher than that reported by nurses working in Adult ICU. This result highlights the significance of encouraging health professionals to report events in a non-punitive environment for improving patient safety among nurses working in Adult ICU.

Concerning the Frequency of event reporting dimension, a score of 6% was reported. As observed, the reporting of events is not very frequent at the ICU, which ends up not reflecting the actual number of errors, making barriers against these errors hardly effective. In the present study, the dimensions "Non-punitive response to error" and "the Frequency of events reported" are closely related. Many errors in the health care go unreported for numerous reasons including fear, humiliation, the presence of a punitive response to errors, and the fact that reporting would not usually result in an actual change [22]. On the other hand, higher positive responses were found in other studies for these dimensions such as US hospitals where each dimension of them scored an average percent positive score of 44% [24]. The literature shows that safety culture differs across hospital organisations depending on the organisation's experience, size, and function [13].

Results of the current study revealed that the overall patient safety grade was rated acceptable by 47.5 % of the interviewed nurses. A similar result was revealed by a previously conducted study at Ain-Shams University to assess patient safety culture where 57.3% of the participants found the grade acceptable [23]. However, this result disagrees with the results of a similar study done in Saudi Arabia by Alahmadi in 2010 [25], where 33% of the respondents found the overall patient safety grade to be acceptable. This might be explained by the point that these institutions were variable in terms of size, complexity, and focus on patient safety.

Concerning the issue of events reporting, the present study revealed that all the enrolled nurses reported no event during the year previous to data collection. This result disagrees with another study results conducted in Saudi Arabia where 43% of the subjects indicated that they didn't report any events in the preceding year period, while 10% reported only one or two events [25]. The difference in the obtained results might be because of the conduction of the Saudi Arabian study in sixteen public and private hospitals that have different quality and patient safety initiatives.

The present study findings should be viewed considering the following limitations. As the data

collected is based on participants' self-report, probably, the nurses were not honest enough in completing the questionnaire because of their fear of penalties. This was lessened by anonymous questionnaires.

In conclusion, the current study shows that patient safety is fragile in ICUs, and more effort is recommended to increase health care providers' awareness of this culture. Patient safety culture needs to be incorporated into the education of health care providers across the spectrum of healthcare. A blame-free environment should be created to detect threats to patient safety, share information, and learn from events.

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