

## ORIGINAL RESEARCH

# Nurses' perception about patient safety culture in neonatal intensive care units: A comparative study

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## ABSTRACT

**Objectives:** This study aimed to (1) verify whether the translated short form of the Safety Attitude Questionnaire gives consistent results when used to evaluate safety culture in the neonatal intensive care units; and (2) describe nurses' perception about patient safety culture, comparing between both governmental and private neonatal intensive care units' nurses.

**Methods:** Research design: An exploratory, descriptive, comparative. Subjects: A purposive sample of 190 neonatal nurses. Setting: Six, level IV neonatal intensive care units (three private and three governmental) of hospitals affiliated to Mansoura City, and Mansoura University and Ministry of Health and Population, Egypt. Data collection tools were consisted of the demographic characteristics questionnaire sheet and the self-administered 4-type Likert scale Safety Attitude Questionnaire sheet with its six dimensions after it was translated into Arabic language.

**Results:** The respondents' nurses differed in their rating on the Safety Attitude Questionnaire items; as well the percentages of positive and negative responses were showed significant differences among the Safety Attitude Questionnaire dimensions, within and between nurses of the governmental and private neonatal intensive care units. In addition, Cronbach's total coefficient alpha of the six dimensions is considered strong, with Alpha coefficients were 0.86.

**Conclusions:** The study findings affirmed the psychometric properties of the Arabic form of Safety Attitude Questionnaire and it turned out to be a successful tool to assess safety culture perceptions among neonatal intensive care units' nurses. Moreover, linked with their workplaces, significant variations in the neonatal nurses' responses toward safety culture related dimensions were detected.

**Key Words:** Safety, Culture, Nurses, Perception, Neonatal intensive care units

## 1. INTRODUCTION

Patient safety ought to be a key to thematic help and is fundamental in the face of the present situation of development of health care demands and the expanded level of many-sided quality in the different areas of health services.<sup>[1-3]</sup> Patient safety is defined as decreasing the danger of unnecessary harm during the process of providing health assistance and the utilization of the best practices to accomplish ideal outcomes for the patient.<sup>[1]</sup> Among healthcare providers, safety

culture is defined as the outcome of professionals' values, attitudes, perceptions, competencies, and patterns of their behavior that decide the commitment to, and the style and capability of, an organization's health and safety management.<sup>[4]</sup> The healthcare team's awareness of patient safety culture, especially the impression of nursing staff about their workplace can affect the way they see themselves professionals in providing patient care, which can reflect directly on patient safety.<sup>[5]</sup>

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Safety culture is a central point managing the conduct of health professionals.<sup>[6]</sup> Evaluation of the safety culture in a health organization can be obtained through the perception of safety climate reported by its professionals. Safety climate is defined as “the measure of individual attitudes and perceptions of the qualities of the safety culture among the organization’s workers”, which may vary among different departments in the same institution.<sup>[7]</sup> The exploration of safety climate is taken into consideration as a marker of safety performance. Since it’s vital to comprehend and expect substantial outcomes of health institutions,<sup>[8]</sup> the climate and culture influence the satisfactory of care and the results for the patient because of its direct impact in the healthcare process.<sup>[5,7,9]</sup>

Patient safety in neonatal intensive care units (NICUs) is of great importance, since their tiny defenseless babies are at danger of experiencing mistakes during their stay in the NICUs. In these units, nurses are in charge of providing exceptional, high-quality, and safer care for those compromised patients who are oftentimes exposed to complex and prolonged intensive healthcare interventions.<sup>[10]</sup> The neonatal intensive care unit is an amazing setting to investigate the domains of safety climate. Numerous tools have been designed to assess patient safety culture. However, the Safety Attitudes Questionnaire (SAQ) is more broadly utilized for special care units, including NICUs.<sup>[11]</sup> In previous studies, SAQ is translated into languages other than English and utilized in many neonatal intensive care units and exhibited suitable psychometric houses and noteworthy version to measure safety culture.<sup>[12,13]</sup>

Safety culture reflects professionals’ technical and social roles and capacities in the case of adverse events or critical situations. Gluyas and Morrison mentioned that patient safety culture shows the priority level of patient safety from the perspectives of care providers in their workplace.<sup>[14]</sup> Various strategies aiming for patient safety have been implemented in order to reduce errors in healthcare settings.<sup>[15,16]</sup> However, it is recognized that the main barrier to safe practice is not lack of data, knowledge, or experience among workers, but the fact that many health organizations have fragile cultures that reinforce negative behaviors. These cultures hamper high-quality and effective care that is efficient and profitable. The cultures of health organizations are unable to adapt to satisfy needs and overcome limitations and offer stimulating and safe work environments.<sup>[17]</sup> The emerging of patient safety culture was one of the measures recommended by the Institute of Medicine to encourage health institutions promote safety.<sup>[18]</sup> Undoubtedly, patient safety became an important worldwide health approach; it is seen as a paradigm, practice, and movement uniting different communities as they move

toward a common goal.<sup>[19]</sup>

Despite the paramount importance of evaluating patient safety culture in hospitals, the discussion of the patient safety related topic is a recent issue, and data is scarce on various aspects of the patient safety issues in NICUs.<sup>[20,21]</sup> Consequently, and according to the literature review, no studies have investigated the safety culture in Mansoura City, Egypt; the scientific awareness on this theme is primal, particularly in specialized care departments (NICUs), thus studies are required to emphasis on the safety culture at Egyptian NICUs. In addition, these workplaces may involve entail potential dangers for patient safety<sup>[20]</sup> which would severely threaten the newborn infant;<sup>[22]</sup> because of the patient nature, intensive care, innovative medical devices and the nurses’ information and particular practices. In this manner, strategies may be developed and distinctive care advancement can be utilized at these care units.

### 1.1 Significance

The pervasion and the progress of a safety culture among nurses; considering that nursing staff is the largest category of professionals responsible for assisting patients or the first line of caring for patients in healthcare settings, can significantly enhance the quality of patient care and healthcare service outcomes. Its significance is evident and generally perceived in international writing, as it is demonstrated by the consideration of achieving safer care for patients in the main accreditation standards.<sup>[4,23,24]</sup> Moreover, the appraisal of safety climate from the perspective of nursing professionals can draw the attention of nursing directors and managers in recognizing the constraints and weaknesses that exist in the health organization, and in the implementation of strategies that energize the construction of a safety culture.<sup>[7,25]</sup>

### 1.2 Aim

The purposes behind the present research are twofold: (1) to verify whether the material of the SAQ (short form version) that designed in Arabic language, give consistent results when used to assess safety culture in the NICUs; and (2) to describe the nurses’ perception about patient safety culture, comparing between both governmental and private neonatal intensive care units’ nurses.

### 1.3 Research questions

- (1) Does the short form of Safety Attitude Questionnaire that designed in Arabic language, give consistent results when used to evaluate the safety culture in the Neonatal intensive care units?
- (2) Is there any difference between neonatal nurses’ overall perception about patients’ safety culture dimensions according to their workplaces?

## 2. SUBJECTS AND METHOD

### 2.1 Research design

An exploratory, descriptive, comparative, cross sectional, quantitative design was utilized.

### 2.2 Setting

The study was conducted in all NICUs that provide level IV neonatal care in Mansoura City. Their number was six: three private and three governmental units. The governmental units were affiliated to both University and Ministry of Health and Population hospitals (the properties of the six NICUs are shown in Table 1).

### 2.3 Subjects

A purposive sample of nursing staff (n = 190), regardless their age and gender, who were available at the study settings, and fulfilled the following inclusion criteria: licensed, professionals, work in the NICU for more than three months (thinking about this period as the least to adjust to the working environment), and willing to participate in the study. However, the participation will be excluded if the greater part of the gathered data collection instrument is not filled or any of its items is multi-checked.

### 2.4 Data collection tools

The tools were consisted of:

I-A questionnaire sheet: It was developed by the researcher to gather the socio-demographic characteristics of the participants, including: workplace, sex, age, marital status, residence, level of education, total working experience in the nursing profession, and years of working experience in NICU, total working hours/week, and work shifts.

II-The self-administered 4-type Likert scale Safety Attitude Questionnaire (SAQ) Short Form Version. It was developed from the Flight Management Attitude Questionnaire (FMAQ) by Sexton and colleagues at the University of Texas, Houston.<sup>[11,26]</sup> The survey composed of 30 items that loaded on six dimensions as the following: 6 items of teamwork climate dimension, 7 items of safety climate, 5 items of job satisfaction, 4 items in perception of management, 4 items in stress recognition, and 4 items in working conditions dimension. The SAQ was adjusted, translated into Arabic by the researcher to suit the participants' nurses' native language.

#### 2.4.1 Content validity

First, few words had been modified to contextualize the SAQ to the NICU setting; including: 'clinical area' end up adjusted into 'NICU', 'patient' into 'newborn infant' and the item 'I would feel safe being treated here as a patient' changed into 'I would feel safe if my infant being dealt with

in this NICU'. Thereafter, the SAQ English version was forward translated into the Arabic language, then assessed by a panel of five autonomous experts in the field of pediatric nursing and neonatal medicine to ascertain how words are appropriate for a NICU setting and cultural sequence, and played out a back-translation from Arabic to English language.<sup>[27]</sup> The translated copy displayed an expected consistency, accuracy, and relevance of the survey items.

#### 2.4.2 Ethical considerations

- An official permission was obtained from the directors of the participating neonatal intensive care units to conduct the study.
- Ethical approval was acquired from the Research Committee of Faculty of Nursing, Mansoura University.
- All the participants got composed data about the study purposes.
- The participants informed that, the questionnaires will be filled individually, willfully and the collected data will be treated confidentially.

### 2.5 Fieldwork

The data were collected by the researcher between September and December 2017 through the distribution of the SAQ short form in Arabic version on the studied nurses in both governmental and private NICU. Each nurse was asked to self-report her own perception, employed a 4-point Likert scale (from 1 = strongly disagree to 4 = strongly agree) in front of the short SAQ to describe, explore and compare NICUs' nurses' attitude about patient safety culture according to their workplaces. The researcher detected that, eight nurses were returned their questionnaire sheet with many missing/multi-checked data and 182 were properly completed their data collection instrument, representing a 95.8% accuracy rate.

#### Scoring system

To determine domains of strength or areas for potential improvement, the percent of positive answers for each survey dimension items were discovered for individual NICUs. Agree and strongly agree were presented positive responses in decidedly worded survey items, while those in negatively worded items were disagree and strongly disagree. Contrarily worded items were turned around scored with the goal that their valence coordinated the positively worded items.<sup>[11]</sup> Higher scores indicate a great safety culture in the assessed dimensions.

### 2.6 Data analysis

The collected data were organized, tabulated, and statistically analyzed using SPSS for Windows (version 20; IBM SPSS Statistics, Chicago, IL, USA) and descriptive statistics.

Objective 1-Variation and characteristics: descriptive analyses such as frequencies, percentages, and means ( $\pm$  SD) were used to describe respondent characteristics and organizational characteristics. For inferential statistical analysis, a comparison between the governmental and private NICUs' nurses' mean difference of patient safety culture dimensions was performed. The tests used were Chi-square test ( $\chi^2$ ), Mann-Whitney U test (z), considering the significance at  $p < .05$  for interpretation of results of tests of significance. In addition, the association between patient safety culture dimensions as perceived by the nurses was assessed using a Spearman test ( $p$ ) of correlation, with  $p$  significant at a level of 5%. Meanwhile, Objective 2-The internal consistency of

safety culture 6 dimensions scale was tested for reliability using Cronbach's  $\alpha$ , and demonstrated a range from 0.55-0.76. The Cronbach's  $\alpha$  coefficient of the study Arabic instrument of the safety culture was equal to 0.86.

### 3. RESULTS

Table 1 provides an idea about the work field environment, and the organizational characteristics, the participating NICUs provided level IV of care according to Barfield, and colleagues.<sup>[28]</sup> The annual number of each NICU admissions, number of NICU beds, the total number of staff personnel; including nurses, as well as nurses to beds ratio were also clarified.

**Table 1.** Attributes of the participating NICUs

Item	Governmental			Private		
	NICU 1	NICU 2	NICU 3	NICU A	NICU B	NICU C
Level of care	IV	IV	IV	IV	IV	IV
Beds (incubators & cots)	17	18	14	20	18	10
Annual admissions	350	420	250	277	241	122
Physicians	4	15	8	7	6	4
Nurses	42	32	36	35	26	19
Assistants	8	5	4	6	5	3
Staff personnel (total)	54	52	48	48	37	26
Nurses/beds ratio	2.5	1.8	2.6	1.8	1.4	1.9

Hospital/NICU affiliation and the socio-demographic characteristics of the participants' nurses were presented in Table 2. It is clarified that, 56% and 44% of the nurses were working in governmental NICUs and private NICUs respectively, 95.0% were females, 59.9% were aged 20 years or older but younger than 30, and 48.3% holding a bachelor's degree. In addition, 53.9% were having 5 years of experience or more in the nursing profession, and 42.3% had more than one year but less than 5 years of work experience in their NICUs. Then, 78% and 90.7% of the participants were working at least 42 hours per week of mixed shifts respectively.

Table 3 showed nurses' ratings on the SAQ items of domains that presented percentages of their positive responses. Teamwork climate is acknowledged more by 92.5% of private NICUs' nurses, while the governmental NICUs' nurses agreed with a high percentage (96.1%) that, "they can clarify issues through asking questions". Most of the private NICUs' nurses showed their higher positive responses when 95% of them reported that, "they believed their input is well received", and "found the support they need from other colleague to care for patients". On the other hand, the lowest positive response (64.7%) of the governmental NICUs' nurses was observed in the item "disagreements are appropri-

ately resolved", which revealed a workplace related significant difference at  $p < .001$ . Moreover, the difference between governmental and private NICUs' nurses in the item "I have the support I need from other colleague to care for patients" was statistically significant at  $p < .001$ .

The quality of care provided for sick infants is pertinent to safety climate at the NICUs, in which 58.8% of governmental NICUs' nurses "accept to treat their babies as patients in their NICUs", with a statistically significant difference presents between governmental and private NICUs' nurses at  $p = .001$ . Furthermore, statistically significant differences were detected related to nurses' workplace about "their knowledge about the proper channels to direct questions on patients' safety", "appropriate handling of medical errors", "receiving feedback about own performance", and "the possibility to discuss errors in the NICUs", at  $p = .009, .001, < .001$ , and  $.013$  respectively.

Add to that, the vast majority (93.1% & 95.0%, 93.1% & 92.5%, and 90.2% & 93.8%) of respondents "like their job", "proud to work at their units", and "think their hospital is a good place to work" respectively. As well as, 63.7%, and 68.8% of governmental and private NICUs' nurses respectively agreed that, they work in the NICUs and their morale

is high, which represented the lowest positive response in job satisfaction dimension. Unit management was perceived as low, in which only 32.4% of the governmental NICUs' nurses said that, their daily efforts are supported from the hospital administration side, and only 25.0% of the private NICUs' participants agreed that, staff nurses are enough to handle the rate of patients' admission in their NICUs.

**Table 2.** Socio-demographic characteristics of the participants' nurses (n = 182)

Item	N	%
<b>Hospital/NICUs affiliation</b>		
Governmental/Public	102	56.0
Private	80	44.0
<b>Gender</b>		
Male	9	5.0
Female	173	95.0
<b>Age/years</b>		
< 20	5	2.7
20 - < 30	109	59.9
30 - < 40	64	35.2
≥ 40	4	2.2
<b>Marital status</b>		
Single	57	31.3
Married	118	64.8
Divorced	7	3.8
<b>Residence</b>		
Urban	90	49.5
Rural	92	50.5
<b>Educational level</b>		
Diploma	53	29.1
Technical institute	31	17.0
Bachelor's degree	86	48.3
Graduate studies	12	6.6
<b>Years in profession</b>		
< 5	84	46.2
≥ 5	98	53.9
<b>Years of working experience in the NICU</b>		
< 1	23	12.6
1 - < 5	77	42.3
5 - < 10	42	23.1
≥ 10	40	22.0
<b>Working hours/week</b>		
< 42	40	22.0
≥ 42	142	78.0
<b>Work shifts</b>		
Morning	17	9.3
Afternoon	0.0	0.00
Night	0.0	0.00
Mixed shifts	165	90.7

Regarding the stress recognition domain, the majorities (89.2% & 83.7%, and 80.4% & 87.5%) of nurses of both governmental and private NICUs respectively, were agreed

that, "they are less dynamic at work when exhausted", or "more inclined to make a mistake in tense work or feel hostile". Concerning the working conditions, 26.5% and 46.3% of governmental and private NICUs' nurses respectively, documented that, the units' directors deal positively with the problems faced by the employees, with a statistically significant difference presented between the nurses at  $p = .001$ . 92.9% of private NICUs' nurses agreed that "they are adequately supervising the trainees of the same discipline" compared to 75.5% of governmental NICUs' nurses. This variation was thought to be factually significant ( $p = .007$ ).

Figure 1 clarified that, the participants nurses' overall perception about patients' safety culture dimensions were found to be 45% among governmental NICUs' nurses compared to 55% among nurses in the private NICUs, which indicated the mean value of SAQ dimensions.

Among the governmental NICUs' nurses, Table 4 verified that, the domain safety climate obtained an average of 16.03 points (range from 6 to 24 points), followed by domains teamwork climate and job satisfaction, whose average scores were 15.78 and 13.00 points respectively. On the contrary, the domains stress recognition, working conditions, and perception of unit management and hospital management obtained the smallest averages, 9.40, 9.39, 6.52 points respectively, with the questionnaire's total score was 70.13 points. Higher means were observed for the private NICUs' nurses in the six domains (21.06, 18.96, 14.50, 11.41, 10.14, & 8.40) and questionnaire's overall score (84.48 points) which, when compared to the governmental NICUs' nurses, the differences were statistically significant ( $p < .001$  &  $.057$ ).

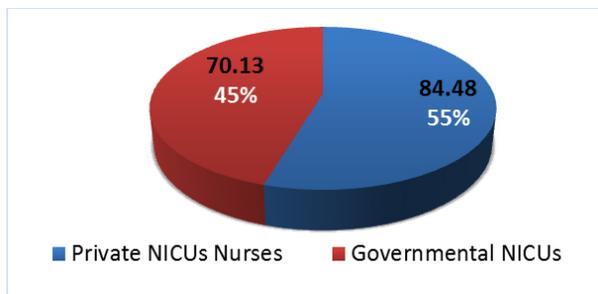
Cronbach's Alpha of the Arabic version demonstrated a range from 0.55 to 0.76 among the six dimensions in the Safety Attitude Questionnaire data collection instrument. Teamwork climate, and perception of unit management and hospital management dimensions scoring 0.55, and 0.56 respectively, indicating a low reliability of the internal consistency, while the total coefficient alpha of the six dimensions is considered strong, with Alpha coefficients was 0.86 (see Table 5).

Tables 6 & 7 illustrated the interrelation between safety culture dimensions as perceived by the nurses. Table 6 revealed that, the private NICUs' nurses reported positive associations between teamwork climate dimension and other SAQ dimensions. While, the two domains, stress recognition and perception of unit management and hospital management, did not link well with the others. On the other side, the governmental NICUs' nurses stated strong associations between all safety culture dimensions ( $p = .000 - .001$ ), except for stress recognition dimension that did not relate to others (see Table 7).

**Table 3.** Number and percentage distribution of nurses' positive response about safety attitude questionnaire items according to workplace

Dimension/Item	Governmental NICUs' nurses (n = 102)		Private NICUs Nurses (n = 80)		Significance tests	
	No.	Positive response (%)	No.	Positive response (%)	$\chi^2$	p
<b>Teamwork climate</b>		80.6		92.5		
-Nurse input about patient care is well received in this NICU	91	89.2	76	95.0	.998	.393
-It is easy for personnel in this NICU to ask questions when there is something that they do not understand	98	96.1	75	93.6	.517	.509
-The physicians and nurses here work together as a well-coordinated team	89	87.3	75	93.6	1.15	.430
-Disagreements in this NICU are resolved appropriately	66	64.7	74	92.5	19.51	< .001*
-I have the support I need from other personnel to care for patients	74	72.5	76	95.0	13.57	< .001*
-In this NICU, it is difficult to speak up if I perceived a problem with patient care	75	73.5	68	85.0	3.50	.070
<b>Safety climate</b>		73.4		88.8		
-I would feel safe being treat my baby here as a patient	60	58.8	66	82.5	11.80	.001
-I know the proper channels to direct questions regarding patient safety in this NICU	81	79.4	75	93.8	7.53	.009
-I am encouraged by my colleagues to report any patient safety concerns I may have	95	93.1	72	90.0	.584	.589
-Medical errors are handled appropriately in this NICU	71	69.6	73	91.3	11.07	.001
-The culture in this NICU makes it easy to learn from the errors of others	92	90.2	76	95.0	1.46	.272
-I receive appropriate feedback about my performance	70	68.6	76	95.0	20.71	< .001*
-In this NICU, it is difficult to discuss errors	55	53.9	59	73.8	6.85	.013
<b>Job satisfaction</b>		83.9		87.3		
-I like my job	95	93.1	76	95.0	.988	.393
-I am proud to work at this unit	95	93.1	74	92.5	.104	.793
-This unit is a good setting to work	92	90.2	75	93.8	1.61	.305
-Working in this unit is like being part of a large family	81	79.4	69	86.3	1.85	.245
-Morale in this NICU area is high	65	63.7	55	68.8	.329	.636
<b>Perception of management</b>		52.0		61.9		
-Unit/Hospital management does not knowingly compromise the safety of patients	86	84.3	77	96.2	5.27	.023
-I am provided with adequate, timely information about events in this unit that might affect my work	53	52.0	75	93.7	37.52	< .001*
-Hospital administration supports my daily efforts	33	32.4	26	32.5	.014	.906
-The levels of staffing in this NICU are sufficient to handle the number of patients	40	39.2	20	25.0	2.23	.148
<b>Stress recognition</b>		77.5		75.6		
-I am less effective at work when fatigued	91	89.2	67	83.7	.450	.528
-When my workload becomes excessive, my performance is impressed	87	85.3	67	83.7	.016	.899
-I am more likely to make errors in tense or hostile situations	82	80.4	70	87.5	.775	.426
-Fatigue impairs my performance during emergency situations	56	54.9	38	47.5	.984	.371
<b>Working conditions</b>		74.0		83.5		
-This unit does a good job of training new personnel	102	100.0	79	98.7	.030	.863
-All the necessary information for diagnostic and therapeutic decisions is routinely available for me	96	94.1	77	96.2	1.32	.352
-Trainees in my discipline are adequately supervised	77	75.5	74	92.9	7.58	.007
-This unit deals constructively with staff problems	27	26.5	37	46.3	10.79	.001*

\*p &lt; .001



**Figure 1.** Participants nurses’ overall perception about patients’ safety culture dimensions according to their workplaces

#### 4. DISCUSSION

The current study of NICU safety combined and contributes to the literature by directly comparing NICUs performance across the two most common health sectors in Egypt: the public and private hospitals/units. The aim was to rate and compare the perspectives of nurses toward patient safety culture dimensions in governmental and private NICUs. According to the results, mean value of the patient safety culture

in the governmental NICUs of the selected hospitals was 45%, and 55% in the private NICUs (see Figure 1), which indicated an average low level of the safety culture related dimensions. In accordance with this result, a study conducted by Arshadi, Jebreili, and Kargari 2015<sup>[21]</sup> concluded that, the level of patient safety culture was reported to be low among NICUs’ nurses.

The SAQ as a tool for comparative performance assessment of safety culture from the perspective of NICUs nurses presented a wide variation of perception within its domains among governmental and private NICUs across items (see Table 3). The harmony of NICU performance across domains of the SAQ suggests that, performance on one sub-scale foretells performance on another. This predicts that, the different dimensions of the SAQ may measure a cohesive underlying construct. NICUs’ nurses with high performance on safety; perceive teamwork and have better working conditions, relationships with management and job satisfaction as of greater values. This result makes the SAQ a fascinating instrument for comparative measurement of safety culture among NICUs.

**Table 4.** Distribution of the mean difference by nurses’ workplace regarding the dimensions of Safety Attitudes Questionnaire (SAQ)

Dimension	Governmental NICUs’ nurses (n = 102)			Private NICUs’ nurses (n = 80)			Significance tests	
	Min.	Max.	$\bar{x} \pm SD$	Min.	Max.	$\bar{x} \pm SD$	Z	p
Teamwork climate	3	22	15.78 ± 3.51	3	24	18.96 ± 3.73	7.027	< .001
Safety climate	6	24	16.03 ± 4.66	0	28	21.06 ± 5.25	7.246	< .001
Job satisfaction	0	20	13.00 ± 4.03	0	20	14.50 ± 4.23	3.745	< .001
Perception of management	0	15	6.52 ± 3.82	0	16	8.40 ± 3.13	3.725	< .001
Stress recognition	0	16	9.40 ± 3.47	0	16	10.14 ± 4.27	1.906	< .001
Working conditions	0	16	9.39 ± 2.30	3	15	11.41 ± 2.60	5.297	.057
Overall scores	29	99	70.13 ± 15.12	22	111	84.48 ± 14.7	6.459	< .001

Note. Z = Mann-Whitney U test

Consistent with the previous studies in this regard, Tomazoni et al. (2014), Yaghoobi et al. (2013) and Mahfoozpour et al. (2012)<sup>[29-31]</sup> reported that, the level of patient safety culture was considered to be high within the governmental and private units when the ‘teamwork climate’ dimension received a greatest safety attitude area among nurses’ positive responses (see Table 3). The existence of a robust relationship between teamwork and patient safety in critical care settings was supported by the evidence, linking this to higher patterns of communication, harmony, and cooperation between department crew.<sup>[32]</sup> From the researcher point of view, the comparatively high teamwork climates within the private NICUs may be attributed to the limited space of these units, and the professional tendency to achieve success which keep

the unit’s reputation well, which attract more patients.

**Table 5.** Result of Cronbach’s Alpha test for the Arabic form of Safety Attitude Questionnaire Six dimensions of the data collection instrument – NICUs Survey on Patient Safety Culture

Dimension	No. of items	Alpha
Teamwork climate	6	0.55
Safety climate	7	0.70
Job satisfaction	5	0.76
Perception of management	4	0.56
Stress recognition	4	0.71
Working conditions	4	0.75
Total coefficient alpha	30	0.86

**Table 6.** Correlation matrix between safety culture dimensions of private NICUs’ nurses (n = 80)

Safety culture dimensions	Sig	Teamwork climate	Safety climate	Job satisfaction	Perception of management	Stress recognition	Working conditions
-Teamwork climate	<i>r</i>	-	-	-	-	-	-
	<i>p</i>	-	-	-	-	-	-
-Safety Climate	<i>r</i>	.323	-	-	-	-	-
	<i>p</i>	.003*	-	-	-	-	-
-Job satisfaction	<i>r</i>	.414	.571	-	-	-	-
	<i>p</i>	.000*	.000*	-	-	-	-
-Perception of management	<i>r</i>	.277	.200	.237	-	-	-
	<i>p</i>	.013*	.075	.034*	-	-	-
-Stress recognition	<i>r</i>	-.264	-.044	-.143	.084	-	-
	<i>p</i>	.018*	.701	.205	.457	-	-
-Working conditions	<i>r</i>	.282	.296	.315	.236	-.132	-
	<i>p</i>	.011*	.008*	.004*	.035*	.242	-

Note. \**p* < .05

**Table 7.** Correlation matrix between safety culture dimensions of governmental NICUs’ nurses (n = 102)

Safety culture dimensions	Sig.	Teamwork climate	Safety climate	Job satisfaction	Perception of management	Stress recognition	Working conditions
Teamwork climate	<i>r</i>	-	-	-	-	-	-
	<i>p</i>	-	-	-	-	-	-
Safety Climate	<i>r</i>	.665	-	-	-	-	-
	<i>p</i>	.000*	-	-	-	-	-
Job satisfaction	<i>r</i>	.496	.511	-	-	-	-
	<i>p</i>	.000*	.000*	-	-	-	-
Perception of management	<i>r</i>	.393	.620	.326	-	-	-
	<i>p</i>	.000*	.000*	.001*	-	-	-
Stress recognition	<i>r</i>	-.053	.097	.187	.125	-	-
	<i>p</i>	.599	.331	.060	.210	-	-
Working conditions	<i>r</i>	.509	.495	.512	.432	.006	-
	<i>p</i>	.000*	.000*	.000*	.000*	.954	-

Note. \**p* < .05

In the same line with Profit et al. (2012)<sup>[13]</sup> who invoked that, teamwork climate perception may also justify the results of higher job satisfaction among the study sample; knowing that, job satisfaction area in the current study received highly positive responses (see Table 3) among governmental and private NICUs’ nurses.

Nurses in the current study bordered perception about unit and hospital management in both governmental and private units (see Table 3). According to Joint Commission (2017),<sup>[33]</sup> for creating a patient safety climate in hospitals; leadership commitment and support is essential. In another study by Hamdan and Saleem 2013<sup>[34]</sup> the participants rated management support as reasonable through 61.5% of their positive responses, which is exactly similar to the perception

of the private NICUs’ nurses about unit management and hospital management domain. This is much greater than what was reported by Hamdan (2013)<sup>[20]</sup> in his earlier assessment of safety culture in Palestinian public hospitals and in other international studies.<sup>[12,35,36]</sup> The researcher inferred that to the hospital/unit managements who are usually underestimate the work size done by the NICUs’ nurses, so that there is still a need to increase support for the daily efforts of this staff as primary care providers for sick neonates and to supply the unit with extra nurses to cope with the growing workload.

Patient safety monitoring is mainly focuses on reporting and learning from medical events that accidentally happen in different workplaces. Alves and Guirardello (2016)<sup>[37]</sup> added

that, reporting medical errors in a vulnerable, mostly un-supervised patient setting such as the NICUs is considered extremely important for building a patient safety climate. In the current study, safety climate received a highest percentage of private NICUs' nurses and about three quarters of the governmental participants' positive responses respectively (see Table 3). What is of real concern in safety climate sub-scale is that, only 58.8% of the governmental NICUs participants reported that, they feel safe being treats their babies in their units as patients. A possible interpretation is drawn from the nurses' refusers who may consider their units as harmful environments, exposing the admitted neonates to many different experiments of research points, as educational hospitals. Moreover, slightly less than three quarters of the private NICUs' nurses stated that it is difficult to disclose medical mistakes in their NICUs. The researcher possible explanation may be correlated with loss of supervisors support and/or their fears from punishing by ending their contracts.

In the neonatal intensive care units, nurses are providing specialized and imperative care to little clients who have shaky vital signs as well as those with serious medical conditions that may lead to death.<sup>[38]</sup> According to Marek, Schaufeli, and Maslach (2017),<sup>[39]</sup> both psychological and physical health status of caregivers is affected by high work-related pressure and burnout which is proven to have an impact on their accomplishment. In this study, stress recognition in the NICUs was reported by about three quarters of the nurses (see Table 3), who perceive themselves as more inclined to make medical errors in tense or hostile situations. In accordance with the present study findings, two studies disclosed that, strain, additional workload, and a troublesome workplace are strongly linked with undesirable incidents occur in the intensive care units.<sup>[36,40]</sup> Besides the nature of patients and the critical care required, the current study showed that, possibly staff shortages, and managers' loss of interest in finding solutions to the problems of the employees, may negatively affect the working conditions, which by indirect way impaired staff nurses' performance in the NICUs. This finding is supported by Hamdan (2013)<sup>[20]</sup> who mentioned that, insufficiency of employees, exaggerated workloads and consequent exertion weaken staff accomplishment in the NICUs. With regard to the overall safety culture ratings from the perspective of nurses in previous studies<sup>[12,20,41,42]</sup> no similar studies available about the differences between nurses based on their workplace ownership regarding patient safety culture in the NICUs.

In the present survey, private NICUs' nurses estimated safety culture significantly higher than public ones among the sub-scale items of the 5 dimensions: teamwork climate, safety climate, job satisfaction, perception of management, and

working conditions (see Table 3). Furthermore, higher means were observed among the private NICUs' nurses in the six domains and questionnaire's overall score, which, when compared to the governmental NICUs' nurses, the differences were found to be statistically significant at  $p < .001$  and  $.057$  (see Table 4). This may be interpreted in relation to personal property to the workplace that keep the private NICUs usually well equipped, provide adequate coaching and continuous supervision, as well as doing their best to establish and maintain a good reputation for grasping more patients to achieve the desired gains.

Very similar to a study conducted in Palestinian NICUs by Hamdan (2013)<sup>[20]</sup> the internal consistency test results of the current study showed relatively low Cronbach  $\alpha$  (0.56) for the perception of management sub-scale. Meanwhile, the total coefficient alpha of the Safety Attitude Questionnaire was considered strong at 0.86 (see Table 5). This result is similar to Abdou and Saber 2011<sup>[42]</sup> who asserted that, the Safety Attitude Questionnaire has been effectively modified for use among nurses in Egyptian community. They included that, the psychometric properties are agreeable for assessing six safety-related culture dimensions by methodically eliciting input from nurses. Therefore, it can be used to meet the increasing demand for safety culture assessment at different levels of clinical areas.

In a study of purposely reported mistakes in the NICU setting, poor cooperation and poor communication added to errors in 9% and 22% of incidents, respectively.<sup>[43]</sup> Team performance is especially important for critical care patients, in eminent situations where a rescue team must amass quickly, convey clearly, and collaborate successfully to dodge unnecessary morbidity or mortality. Regarding the existing study, the private NICUs' nurses reported positive associations between teamwork climate dimension and other SAQ dimensions (see Table 6). Similarly, the governmental NICUs' nurses stated strong associations between all safety culture dimensions ( $p = .000 - .001$ ), except for stress recognition dimension that did not relate to other dimensions from the perspective of all respondents nurses (see Table 7). In accordance with this finding, Armellino and colleagues<sup>[44]</sup> reasoned that, nurses detailed significantly positive correlation perceptions toward overall safety culture dimensions. What's more, Abdou and Saber (2011)<sup>[42]</sup> expressed that, the significant correlations of overall dimensions were extended from feeble to strong relationships among medicinal service suppliers, aside for stress recognition, which was uniformly not significant.

### Study limitations

- A relatively low Cronbach  $\alpha$  (0.55 & 0.56) for two of the SAQ sub-scales; teamwork climate and manage-

ment perception were showed in the internal consistency test results. So, the translation and adaption of the study instrument may require further revision prior more use in other work environments.

- The study population was not aware about the impact of workplace environment on patients' safety and their clinical outcomes, so they need a detailed explanation to participate.
- The limited number of NICUs that provide level IV neonatal care reduced the number of nurses who shared in the study's survey.

## 5. CONCLUSION

The study findings affirmed the psychometric properties of the Arabic form of Safety Attitude Questionnaire and it turned out to be a successful tool to assess and compare safety culture perceptions in NICUs. Moreover, the study revealed large variations in safety culture attitude within and between neonatal intensive care units' nurses united to their workplaces.

### 5.1 Approaches for improvement

The results of safety-related culture dimensions from the perspective of governmental and private NICUs' nurses are displayed by the researcher. Each taking part health sector needs a customized feedback, so that the outcomes are

discussed to achieve a superior comprehension of both the positive and negative assessment. For example, the reported shortage of staff/bed proportion for the negative evaluation of the participants' nurses may then be analyzed and the NICUs management may give solutions. Yet, the administration ought to support the improvement process with particular activities going for the weakest areas pointed out in the survey results.

### 5.2 Implication for nursing education

Within academic contexts patient safety may be introduced and highlighted as a curricular theme. Education is crucial to how nurses practice, talk and write about keeping patients safe.

### 5.3 Further study

The higher teamwork and safety climate scores showed among the private NICUs' nurses may be further investigated for advice with respect to their positive results.

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## CONFLICTS OF INTEREST DISCLOSURE

The author declares that there is no conflict of interest statement.

## REFERENCES

- [1] Sherwood G, Barnsteiner J. Quality and safety in nursing: a competency approach to improving outcomes. *Journal of Nursing Regulation*. 2013; 3(4): 64. [https://doi.org/10.1016/S2155-8256\(15\)30190-3](https://doi.org/10.1016/S2155-8256(15)30190-3)
- [2] Hwang JI, Hwang EJ. Individual and work environment characteristics associated with error occurrences in Korean public hospitals. *Journal of Clinical Nursing*. 2011; 20(21-22): 3256-3266. PMID:21733027 <https://doi.org/10.1111/j.1365-2702.2011.03773.x>
- [3] Levinson DR, General I. Adverse events in skilled nursing facilities: National incidence among Medicare beneficiaries. Washington DC: Department of Health and Human Services. 2014.
- [4] Weaver SJ, Lubomksi LH, Wilson RF, et al. Promoting a culture of safety as a patient safety strategy a systematic review. *Annals of Internal Medicine*. 2013; 158: 369-374. PMID:23460092 <https://doi.org/10.7326/0003-4819-158-5-201303051-00002>
- [5] Ausserhofer D, Schubert M, Desmedt M, et al. The association of patient safety climate and nurse-related organizational factors with selected patient outcomes: a cross-sectional survey. *International Journal of Nursing Studies*. 2013; 50(2): 240-52. PMID:22560562 <https://doi.org/10.1016/j.ijnurstu.2012.04.007>
- [6] Joint Commission. Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration and Innovation. Oakbrook Terrace, IL: The Joint Commission, Nov 2012. 2016.
- [7] Singer SJ, Vogus TJ. Reducing hospital errors: interventions that build safety culture. *Annual Review of Public Health*. 2013; 34: 373-96. PMID:23330698 <https://doi.org/10.1146/annurev-pubhealth-031912-114439>
- [8] Schneider B, Ehrhart MG, Macey WH. Organizational climate and culture. *Annual Review of Psychology*. 2013; 64: 361-388. PMID:22856467 <https://doi.org/10.1146/annurev-psych-113011-143809>
- [9] Taylor JA, Pandian RA. Dissonant scale: stress recognition in the SAQ. *BMC Research Notes*. 2013; 6: 302. PMID:23902850 <https://doi.org/10.1186/1756-0500-6-302>
- [10] Profit J, Lee HC, Sharek PJ, et al. Comparing NICU teamwork and safety climate across two commonly used survey instruments. *BMJ Quality & Safety*. 2016; 25: 954-961. PMID:26700545 <https://doi.org/10.1136/bmjqs-2014-003924>
- [11] Sexton JB, Helmreich RL, Neilands TB, et al. The Safety Attitudes Questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research*. 2006; 6(1): 44. PMID:16584553 <https://doi.org/10.1186/1472-6963-6-44>
- [12] Profit J, Etchegaray J, Petersen LA, et al. Neonatal intensive care unit safety culture varies widely. *Archives of Disease in Childhood. Fetal and Neonatal Edition*. 2012; 97(2): 120-6.
- [13] Profit J, Etchegaray J, Petersen LA, et al. The Safety Attitudes Questionnaire as a tool for benchmarking safety culture in the NICU.

- Archives of Disease in Childhood. Fetal and Neonatal Edition. 2012; 97: 127-32.
- [14] Gluyas H, Morrison P. Patient safety: An essential guide. Macmillan International Higher Education. 2013.
- [15] Wachter RM, Pronovost P, Shekelle P. Strategies to improve patient safety: the evidence base matures. *Annals of Internal Medicine*. 2013; 158(5): 350-2. PMID:23460060 <https://doi.org/10.7326/0003-4819-158-5-201303050-00010>
- [16] Oliveira RM, Leitão IMTA, Silva LMS, et al. Strategies for promoting patient safety: from the identification of the risks to the evidence-based practices. *Escola Anna Nery*. 2014; 18(1): 122-9.
- [17] Leape LL. Patient Safety in the Era of Healthcare Reform. *Clinical Orthopaedics and Related Research*. 2015; 473(5): 1568-73. PMID:24748068 <https://doi.org/10.1007/s11999-014-3598-6>
- [18] Donaldson MS, Corrigan JM, Kohn LT. To err is human: building a safer health system. Washington, DC: National Academies Press (US); 2000.
- [19] Lamont T, Waring J. Safety lessons: shifting paradigms and new directions for patient safety research. *Journal of Health Services Research and Policy*. 2015; 20(1 suppl.): 1-8.
- [20] Hamdan M. Measuring safety culture in Palestinian neonatal intensive care units using the Safety Attitudes Questionnaire. *Journal of Critical Care*. 2013; 28(5): e7-14.
- [21] Arshadi BM, Jebreili M, Kargari RM. Patient safety culture assessment in neonatal intensive care units of Tabriz from the perspective of nurses in 2013. *Iranian Journal of Nursing Research*. 2015; 10(3): 26-35.
- [22] Farzi S, Farzi S, Alimohammadi N, et al. Medication errors by the intensive care units' nurses and the Preventive Strategies. *Anesthesiology and Pain*. 2016; 6(2): 33-45.
- [23] Zenere A, Zanolin ME, Negri R, et al. Assessing safety culture in NICU: psychometric properties of the Italian version of Safety Attitude Questionnaire and result implications. *Journal of Evaluation in Clinical Practice*. 2016; 22(2): 275-282. PMID:26494199 <https://doi.org/10.1111/jep.12472>
- [24] Day SW, McKeon LM, Garcia J, et al. Use of joint commission international standards to evaluate and improve pediatric oncology nursing care in Guatemala. *Pediatric Blood & Cancer*. 2013; 60(5): 810-815. PMID:23015363 <https://doi.org/10.1002/pbc.24318>
- [25] Gandhi TK, Berwick DM, Shojania KG. Patient Safety at the crossroads. *Journal of the American Medical Association*. 2016; 15(17): 1829-30. PMID:27139052 <https://doi.org/10.1001/jama.2016.1759>
- [26] Sexton JB, Berenholtz SM, Goeschel CA, et al. Assessing and improving safety climate in a large cohort of intensive care units. *Critical Care Medicine*. 2011; 39(5): 934-939. PMID:21297460 <https://doi.org/10.1097/CCM.0b013e318206d26c>
- [27] World Health Organization. Process of translation and adaptation of instruments. 2009. Available from: [http://www.who.int/substance\\_abuse/research\\_tools/translation/en/](http://www.who.int/substance_abuse/research_tools/translation/en/)
- [28] Barfield WD, Papile LA, Baley JE. American Academy of Pediatrics Committee on Fetus and Newborn. Levels of neonatal care. *Pediatrics*. 2012; 130(3): 587-597. PMID:22926177 <https://doi.org/10.1542/peds.2012-1999>
- [29] Tomazoni A, Rocha PK, de Souza S, et al. Patient safety culture at neonatal intensive care units: perspectives of the nursing and medical team. *Rev Lat Am Enfermagem*. 2014; 22(5): 755-63.
- [30] Yaghobi FMA, Takbiri A, Haghoshaye E, et al. The survey of patient safety culture and recognizing its weaknesses and strengths in Sabzevar hospitals: 2011. *Journal of Sabzevar University of Medical Sciences*. 2013; 20(68): 154-64. <https://doi.org/10.1590/0104-1169.3624.2477>
- [31] Mahfoozpour S, Ainy E, Mobasheri F, et al. Patients' safety culture status among educational hospitals of Shahid Beheshti University of Medical Sciences in 2011. *Pajoohandeh J*. 2012; 17(3): 134-41.
- [32] Simmons D, Sherwood G. Neonatal intensive care unit and emergency department nurses' descriptions of working together: building team relationships to improve safety. *Crit Care Nurs Clin North Am*. 2010; 22(2): 253-260. PMID:20541074 <https://doi.org/10.1016/j.cce11.2010.03.007>
- [33] Joint Commission. The essential role of leadership in developing a safety culture. *Sentinel Event Alert*. 2017; 57(1).
- [34] Hamdan M, Saleem AAO. Assessment of patient safety culture in Palestinian public hospitals. *International Journal for Quality in Health Care*. 2013; 25(2): 167-175. PMID:23382367 <https://doi.org/10.1093/intqhc/mzt007>
- [35] France DJ, Greevy Jr. RA, Liu X, et al. Measuring and comparing safety climate in intensive care units. *Medical Care*. 2010; 48(3): 279-284. PMID:20125046 <https://doi.org/10.1097/MLR.0b013e3181c162d6>
- [36] Poley MJ, van der Starre C, van den Bos A, et al. Patient safety culture in a Dutch pediatric surgical intensive care unit: an evaluation using the Safety Attitudes Questionnaire. *Pediatric Critical Care Medicine*. 2011; 12(6): 310-316. PMID:21572367 <https://doi.org/10.1097/PCC.0b013e318220afca>
- [37] Alves DFS, Guirardello EB. Safety climate, emotional exhaustion and job satisfaction among Brazilian paediatric professional nurses. *International Nursing Review*. 2016; 63(3): 328-335. PMID:27265871 <https://doi.org/10.1111/inr.12276>
- [38] Currie ER, Christian BJ, Hinds PS, et al. Parent perspectives of neonatal intensive care at the end-of-life. *Journal of Pediatric Nursing*. 2016; 31(5): 478-489. PMID:27261370 <https://doi.org/10.1016/j.pedn.2016.03.023>
- [39] Marek T, Schaufeli WB, Maslach C. Professional burnout: Recent developments in theory and research. Routledge. 2017.
- [40] Lamy Filho F, da Silva AA, Lopes J, et al. Staff workload and adverse events during mechanical ventilation in neonatal intensive care units. *Jornal De Pediatria*. 2011; 87(6): 487-492.
- [41] Etchegaray JM, Thomas EJ. Comparing two safety culture surveys: safety attitudes questionnaire and hospital survey on patient safety. *BMJ Quality & Safety*. 2012; 21: 490-498. PMID:22495098 <https://doi.org/10.1136/bmjqs-2011-000449>
- [42] Abdou HA, Saber KMA. Baseline Assessment of Patient Safety Culture among Nurses at Student University Hospital. *World Journal of Medical Sciences*. 2011; 6(1): 17-26.
- [43] Kessels-Habraken M. Proactive safety management in health care: Towards a broader view of risk analysis, error recovery, and safety culture. 2010.
- [44] Armellino D, QUINN GRIFFIN MT, Fitzpatrick JJ. Structural empowerment and patient safety culture among registered nurses working in adult critical care units. *Journal of Nursing Management*. 2010; 18(7): 796-803. PMID:20946215 <https://doi.org/10.1111/j.1365-2834.2010.01130.x>