

Safety Work Climate and Performance Limitations among Intensive Care Nurses: A Comparative Study

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Abstract

Background: Nurses are striving to introduce safe quality patient care mainly in stressful environments involving intensive care units which could impact the nurses' perceived workplace safety and affect nurses' performance. **Aim:** To assess the safety work climate and performance limitations among intensive care nurses in two settings. **Research design:** A comparative-correlation design was used. **Setting:** The study was conducted in intensive care units at Tanta Main University Hospital and Itay Elbaroud General Hospital. **Subjects:** 216 intensive care nurses were included. **Tools:** Two tools were used to collect the data; **Tool I:** Intensive Care Nurses' Safety Climate Questionnaire. **Tool II:** Intensive Care Nurses' Performance Limitations Questionnaire. **Results:** 50.9% of intensive care nurses at Tanta Main University Hospital and 71.8% of intensive care nurses from Itay Elbaroud General Hospital had low levels of perceived safety work climate. The intensive care nurses who worked at Tanta Main University Hospital faced higher performance limitations (53.91%) than intensive care nurses at Itay Elbaroud General Hospital who faced lower performance limitations (30.61%). **Conclusion:** There were negative correlations between the total IC nurses' work safety climate and the total IC nurses' performance limitations at the two hospitals. **Recommendations:** The hospital management at both hospitals needs to regularly assess nurses' perceived workplace safety and performance limitations to explore the weaknesses and plan for improvement.

Keywords: Intensive Care Unit, Work Safety Climate, Performance Limitations, and intensive care nurses.

Introduction

Healthcare systems are extremely complex and changing therefore, health organizations worldwide face a variety of challenges, particularly in the current fast-paced environment, and financial challenges that add extra burden to the health sector to

provide safe and high-quality patient care (**World Health Organization, 2021**). Delivery of the best possible patient care is the goal of modern healthcare and is the basis of every quality improvement project (**WHO, 2020**).

One of the important challenges is the adoption and creation of a safety culture to support the work safety climate in hospital settings, especially in intensive care units (Aljohani & Alsharqi, 2021). Working in intensive care units (ICUs) requires many mental and physical resources, particularly nurses, who provide direct patient care at the bedside twenty-four hours (Bae et al., 2022). Safety climate is defined as a shared perception and thoughts of nurses on how their hospital conceptualizes and prioritizes workplace safety practices, policies, and procedures (Arzahan, Ismail, & Yasin, 2022).

The common safety dimensions included the teamwork climate, working conditions, job satisfaction, preparation of management, staffing stress recognitions, handoffs and transition of care, feedback and communication and patient safety (Lu, Hsing-Yu, Jui-Wen, Po-Ying, & Cary L, 2022). A teamwork climate is a workplace that ensures team spirit for working together toward a common goal through effective collaboration, mutual respect, and support for each other (Berry et al., 2020). Working condition refers to all factors that affect nurses while working in the ICU which could be modified and improved to enhance the psychosomatic well-being of nurses (Burke, 2023).

Nurses' job satisfaction reflects their sense of success and achievement in their jobs which is perceived to be linked directly to productivity and pride in work (Mousazadeh, Shahrzad, Shahrzad, & Soroor, 2019). Preparation of management is defined as the level of readiness and commitment given by the management to support the safety climate and safety performance in the organization to be the top priority (Al-Bsheish et al., 2019).

Staffing and stress recognition dimension include leading threats in the workplace which impact IC nurses' performance, well-being, and turnover and affect patient **outcomes** (Wibowo, Michael, Sunarno, & Yustinus, 2022). Handoffs and transition of care dimension is a routine and frequent nursing practice for transferring the responsibility of patient care information from one department to another or from one staff to another in the same unit during shift exchange or transferring patients to another department (Yetti, Nani, Sri Herni, & Dina, 2021).

The dimension of feedback and communication, communication is the process of sending clear, understandable, and accurate information among the health team (Noviyanti, Ahsan, & Tita, 2021). Feedback refers to reporting the actual performance to compare it with the standard performance (Burgess, Christie, Chris, & Craig, 2020). Patient safety is a leading concept defined by WHO, (2021) as the eradication of all preventable causes of patient harm associated with the healthcare provided.

Evidence shows that barriers exist in the ICU working environment and have a profound negative impact on safety performance and the quality of nursing care (Teuma Custo, Rebecca, & Sundra, 2019). Performance limitations in the workplace are the factors that exist in the work environment and increase IC nurses' workload and decrease the quality of their performance. Investigating performance limitations in the ICU is promising for improving overall nurses' safety performance, and quality of care (Aziz, Hanan, & Dalia, 2020).

Performance limitations are related to multiple elements of the work system including the work environment, organizations, equipment,

and task-related limitations (**Rajaeian & Masoudi Alavi, 2018**). The work environment limitations are the physical stressors that hinder nurses in the ICU and intensify the workload which results in nurses' physical exhaustion (**Rezaee, Mahnaz, & Alireza, 2020**). Organizational limitations are the tangible factors that restrict optimal performance due to unclear policies and regulations which could result in role overlapping (**Ullah, Sardar., 2023**).

Moreover, nurses experienced equipment-related limitations that prevented the delivery of safe patient care because of the scarcity of life-saving supplies, especially in emergencies (**Al-Jumaili et al., 2021**). Task limitations are generated by assigning nurses to non-nursing tasks to cover the insufficient staffing in clerk work which wastes nurses' time on direct patient care and impacts patient outcomes (**Grosso et al., 2019**).

Significance of study:

Nowadays, worldwide healthcare organizations have encountered several challenges, particularly ICUs, that impact the quality of care, and limit IC nurses' performance (**Ulusoy et al., 2022**). This study hopes to give a clear understanding of nurses' perceptions about different factors that could threaten the workplace safety climate in ICUs to help generate possible solutions. Exploring and eliminating performance limitations at the workplace can affect the quality of care, reduce workload and foster a safe climate for both nurses and patients.

Aim of the study

Assess safety work climate and performance limitations among intensive care nurses in two settings.

Research Questions:

1. What are the levels of ICU nurses' opinions about the perceived safety work climate?
2. What are the performance limitations facing IC nurses?
3. What is the relation between perceived safety work climate and performance limitations in intensive care units?
4. What is the difference between the safety work climate and IC nurses' performance limitations at Tanta University Hospital and Itay Elbaroud General Hospital?

Subjects and Method

Research design:

A comparative-correlation study design was used in the present study.

Setting:

The present study was conducted at Tanta Main University Hospital (Medical, Pediatric, and Neuropsychiatric ICUs) and Itay Elbaroud General Hospital affiliated to the Ministry of Health and Population (Medical, Pediatric, and Neuropsychiatric ICUs).

Subjects:

The study subjects consisted of all (N=216) ICU nurses. Tanta Main University Hospital included all nurses (n=106), and Itay Elbaroud General Hospital included all nurses (n=110).

Tools: Two tools were utilized: -

Tool I: Intensive Care Nurses' Safety Climate Questionnaire.

This tool was modified by the investigator, guided by **Sexton et al., (2006)** and **Al-Mugheed and Bayraktar, (2020)**. It was used to assess nurses' perception of work safety climate. It consisted of two parts as follows:

Part 1: IC nurses' personal data: It included their age, marital status,

educational level, working unit, hospital name and years of experience.

Part 2: Intensive Care Nurses' Safety Climate Questionnaire: It consisted of 47 items categorized into eight dimensions:

Teamwork climate included 9 items, **Working conditions** included 4 items, **Job satisfaction** included 5 items, **Preparation of management** included 5 items, **Staffing and stress recognition** included 7 items, **Handoff and transition of care** included 4 items, **Feedback and communication** included 5 items, and **Patient safety** included 8 items.

Scoring system:

Nurses' responses were measured on a five-point Likert Scales, ranging from (1) strongly disagree to (5) strongly agree. The total scores were calculated by cutting points and summing scores of all categories. The total scores represent varying levels as follows:

- High-level of safety climate >75%.
- Moderate- level of safety climate 60 -75%.
- Low- level of safety climate < 60%.

Tool II: Intensive Care Nurses' Performance Limitations Questionnaire:

This tool was modified by the investigator, guided by **Gurses & Carayon, (2009); Rajaeian & Masoudi Alavi, (2018)** It was used to detect performance limitations facing nurses in ICUs. It was divided into four domains. It included 27 items.

Work environment limitations included 6 items, **Organizational limitations** included 7 items, **Equipment or tools limitations** included 7 items, and **Task limitations** included 7 items.

Scoring system:

Nurses' responses were measured on a Dichotomous Scale included a Yes/No Scale

ranging from (0) no to (1) yes. The total scores were calculated by cutting points and summing scores of all categories. Finally, the score of each dimension summed up, a high score indicated high limitations that affect nurses' performance.

Methods

1. Official permission to conduct the study was obtained from the dean of Tanta Faculty of Nursing, Tanta University which was submitted to the responsible authorities in Tanta and Itay Elbaroud Hospitals.
2. **Ethical considerations:**
 - a. The approval of the Scientific Research Ethical Committee of Nursing Faculty, Tanta University was obtained with code (64/5/2022).
 - b. Nurses' consent for participation in the study was obtained after an explanation of the nature and purpose of the study.
 - c. The nature of the study was not to cause harm to the entire sample.
 - d. Confidentiality and anonymity were maintained regarding data collection and the participants have the withdrawal right.
3. The study tools were translated into Arabic and presented to a jury of five experts in the area of specialty to check the content validity. The experts were one professor, two assistant professors, and two lecturers of Nursing Administration from the Faculty of Nursing-Tanta University.
4. The experts' responses were represented on a four-point rating scale ranging from 4= strongly relevant to 1= not relevant. Necessary modifications were done including clarification, omission of certain items adding others and paraphrasing of some words.
 - The face validity value of tool (I) was 90 %, and 98 % for tool (II).

5. The reliability of tools was tested using Cronbach's Alpha Coefficient test. Reliability of tool (I) =**0.922** and reliability of tool (II) =**0.819**
6. A pilot study was carried out on a sample (10%) of the subjects (n=22), which carried out after the experts' opinion and before starting the actual data collection. The pilot study was done to test the clarity, sequence of items, applicability, and relevance of the questions and to determine the needed time to complete the questionnaire. The estimated time needed to complete the questionnaire items from IC nurses was approximately 20 minutes and the pilot wasn't included in the study subject.
7. **Data collection phase:** The data was collected from Main Tanta and Itay Elbaroud General Hospitals. The investigator met the nurses in small groups during their work to explain the aim of the study and distribute the questionnaire to them. The subjects recorded their responses in the presence of the investigator to ascertain whether their questions were answered during morning and afternoon shifts.
8. The data was collected over six months, from November 2022 until April 2023.

Results

Table (1): Shows intensive care nurses' personal data at Tanta University Main and Itay Elbaroud General hospitals. At Tanta University Main Hospital, the majority of IC nurses (85.8%) fall in the age group 25 to < 35, with a mean age of 29.82. \pm 3.51. The highest percentage of IC nurses (98.1%) were married and more than half (60.4%) of IC nurses had two or more children. Also, above half (52.8%) of them had Bachelor's Degrees in Nursing. About half (46.2%) of

IC nurses worked in the medical ICU. Regarding years of experience half (50%) of them had experience from 5 to < 10 years of experience. The vast majority (99.1%, and 95.3%) of them worked equally or less than 7 afternoons, and night shifts per month respectively.

At Itay Elbaroud General Hospital, the table revealed that the vast majority of IC nurses (90%) fall in the age group 25 < 35, with a mean age (29.40 \pm 2.87). Around two-thirds of them (69.1%) were married and less than half (43.6%) of nurses had two or more children. Also, more than half (59.1%) of IC nurses had Bachelor's Degrees in Nursing. More than two-fifths (41.8%) of them worked in the medical ICU. More than half (67.3%) of IC nurses had experience from 5 to < 10 years of experience. The vast majority (91.8%) of them worked equally or less than 7 afternoon shifts and more than two-thirds (70%) of them worked equally or less than 7 night shifts per month respectively.

Figure (1): shows the levels of intensive care nurses' total safety work climate at Tanta University Main and Itay Elbaroud General hospitals. At Tanta University Main Hospital, more than half (50.9%) of IC nurses had a low level, while at Itay Elbaroud General Hospital, a high percentage (71.8%) of IC nurses had a low perception level of safety work climate.

Table (2): Illustrates intensive care nurses' mean and standard deviation scores of total safety work climate at Tanta University Main and Itay Elbaroud General hospitals. The table revealed that there was a high statistically significant difference between Tanta University Main and Itay Elbaroud General hospitals at $p = < 0.001$

Table (3): Demonstrates levels of intensive care nurses' safety work climate at Tanta University Main and Itay Elbaroud General hospitals. The table revealed that there were statistically significant differences between IC nurses at Tanta University Main and Itay Elbaroud General hospitals regarding teamwork climate, preparation of management, and handoffs and transition of care dimensions.

Only less than a quarter (24.5%) of IC nurses who worked at Tanta University Main Hospital, had a high perception level of job satisfaction dimension. Around half (54.7%, and 49.1%) of them had moderate perception levels of teamwork climate and staffing and stress recognition respectively. While, more than half of them (68.9%, and 53.8%) had low perception levels of handoff and transition of care and working conditions respectively.

On the other hand, around half (54.5%) of IC nurses at Itay Elbaroud General Hospital had a moderate perception level of staffing and stress recognition dimension. While the vast majority of them (90.9%) had a low perception level of perception handoff and transition of care and more than two-thirds (72.7%) of them had low perception levels of teamwork climate, and preparation of management respectively.

Figure (2): Presents the average mean percent score of intensive care nurses' performance limitation at Tanta University Main and Itay Elbaroud General hospitals. The figure revealed that IC nurses who worked at Tanta Main University Hospital faced higher percent score (53.91%) of performance limitations compared to IC nurses at Itay Elbaroud General Hospital,

who faced lower percent score (30.61%) of performance limitations.

Table (4) Illustrates the mean and standard deviation score of IC nurses' perception of performance limitations at Tanta University Main and Itay Elbaroud General hospitals. The table revealed that there was a statistically significant difference between the two hospitals at $p < 0.001$.

Table (5) Shows intensive care nurses' mean and standard deviation scores of performance limitations dimensions at Tanta University Main and Itay Elbaroud General hospitals. At Tanta University Main Hospital, the highest ranking was related to equipment and tools followed by task limitations dimension of performance limitations with mean and standard deviation scores (79.78 ± 25.39 , and 48.25 ± 27.35) respectively. At Itay Elbaroud Hospital, the highest ranking was task limitations followed by equipment and tools with mean and standard deviation scores (39.22 ± 19.78 , and 37.92 ± 23.81) among performance limitations dimensions respectively. The lowest ranking dimensions at the two hospitals were the work environment limitations and the organizational limitations with mean and standard deviation (41.04 ± 24.58 , 16.52 ± 26.57 , and 44.74 ± 22.14 , 26.75 ± 22.49) for Tanta University Main and Itay Elbaroud General hospitals, respectively

Figure (3): Shows the correlation between intensive care nurses' perception of safety work climate and performance limitations at Tanta University Main Hospital. The figure revealed a statistically significant negative correlation between total IC nurses' safety climate and total IC nurses' performance limitations at $p\text{-value} = 0.001$.

Figure (4): Illustrates the correlation between intensive care nurses' perception of safety work climate and performance limitations at Itay Elbaroud General Hospital. The figure revealed a statistically insignificant negative correlation between total IC nurses' safety work climate and total IC nurses' performance limitations at p-value = 0.326.

Table (1): Distribution of intensive care nurses' personal data at Tanta University Main and Itay Elbaroud General hospitals (n= 216)

ICU nurses' personal data	Tanta University Main Hospital (n = 106)		Itay Elbaroud General Hospital (n = 110)		Test of Sig.	P
	No.	%	No.	%		
Age					$\chi^2=1.597$	0.450
<25	7	6.6	7	6.4		
25-<35	91	85.8	99	90.0		
35-40	8	7.5	4	3.6		
Mean \pm SD	29.82 \pm 3.51		29.40 \pm 2.87		$\chi^2=32.737^*$	<0.001*
Marital status						
Married	104	98.1	76	69.1		
Unmarried	2	1.9	34	30.9		
No of children					$\chi^2=8.799^*$	0.012*
0	18	17.0	37	33.6		
1	24	22.6	25	22.7		
≥ 2	64	60.4	48	43.6		
Educational level in Nursing					$\chi^2=0.877$	0.645
Nursing Diploma	0	0.0	0	0.0		
Associate degree in Nursing	44	41.5	40	36.4		
Bachelor Degree in Nursing	56	52.8	65	59.1		
Post Graduate Studies	6	5.7	5	4.5		
Department					$\chi^2=7.024^*$	0.030*
Medical ICU	49	46.2	46	41.8		
Pediatric ICU	26	24.5	44	40.0		
Neuropsychiatric ICU	31	29.2	20	18.2		
Years of experience					$\chi^2=14.080^*$	0.001*
<5	14	13.2	20	18.2		
5-<10	53	50.0	74	67.3		
≥ 10	39	36.8	16	14.5		
Mean \pm SD.	8.11 \pm 3.0		6.65 \pm 2.97			
No of morning shift/ month					$\chi^2=0.047$	0.828
≤ 7	64	60.0	68	61.8		
> 7	42	39.6	42	38.2		
No of afternoon shift/ month					$\chi^2=6.406^*$	^{FE} p=0.019*
≤ 7	105	99.1	101	91.8		
> 7	1	.9	9	8.2		
No of night shift / month					$\chi^2=23.802^*$	<0.001*
≤ 7	101	95.3	77	70.0		
> 7	5	4.7	33	30.0		
No of long shift from 8 am to 8 pm/ month					$\chi^2=4.736^*$	0.030*
≤ 7	58	54.7	76	69.1		
> 7	48	45.3	34	30.9		

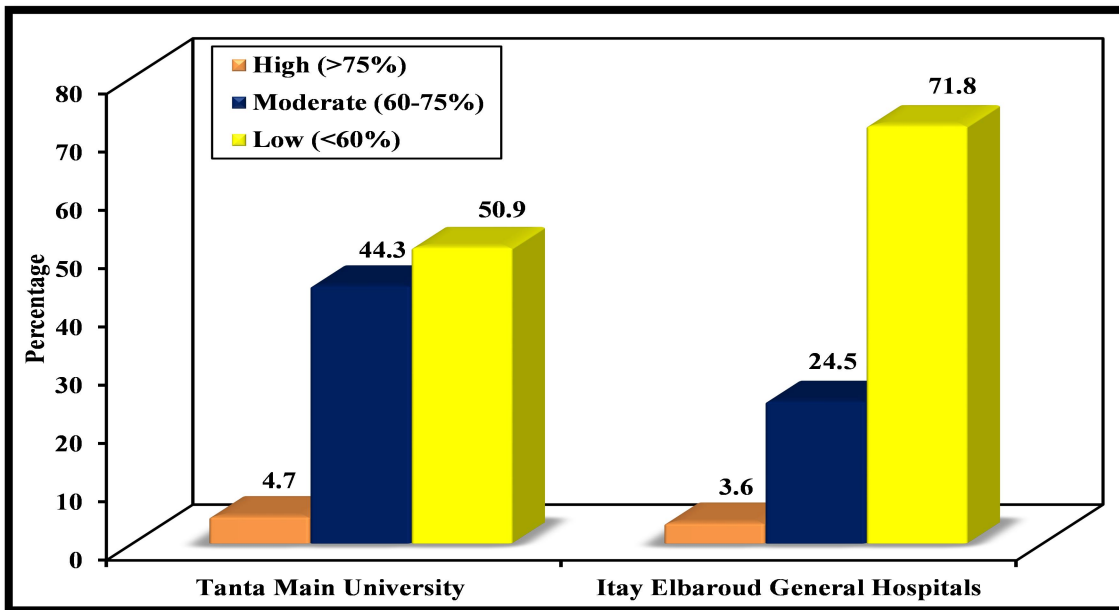


Figure (1): The levels of intensive care nurses' total safety work climate at Tanta University Main and Itay Elbaroud General hospitals (n=216)

Table (2): Intensive care nurses' mean scores of total safety work climate at Tanta University Main and Itay Elbaroud General hospitals (n= 216)

Safety Climate	Tanta University Main Hospital (n = 106)	Itay Elbaroud General Hospital (n = 110)	Test of Sig.	p
Total Score (47–235)				
Min. – Max.	110.0 – 217.0	77.0 – 194.0		
Mean ± SD.	159.02 ± 19.82	149.45 ± 18.44		
Median	159.0	146.50		
% Score			t= 3.673*	<0.001*
Min. – Max.	33.51 – 90.43	15.96 – 78.19		
Mean ± SD.	59.58 ± 10.54	54.50 ± 9.81		
Median	59.57	52.93		

Table (3): Levels of intensive care nurses' safety work climate dimensions at Tanta University Main and Itay Elbaroud General hospitals (n=216)

Intensive Care Nurses' Safety Climate Dimension	Tanta University Main Hospital (n = 106)		Itay Elbaroud General Hospital (n = 110)		χ^2	p
	No.	%	No.	%		
Teamwork climate						
High	13	12.3	4	3.6	34.502*	<0.001*
Moderate	58	54.7	26	23.6		
Low	35	33.0	80	72.7		
Working conditions						
High	4	3.8	4	3.6	5.000	MC p=0.073
Moderate	45	42.5	31	28.2		
Low	57	53.8	75	68.2		
Job satisfaction						
High	26	24.5	17	15.5	3.536	0.171
Moderate	36	34.0	48	43.6		
Low	44	41.5	45	40.9		
Preparation of management						
High	8	7.5	5	4.5	12.773*	0.002*
Moderate	46	43.4	25	22.7		
Low	52	49.1	80	72.7		
Staffing and stress recognition						
High	10	9.4	6	5.5	1.498	0.473
Moderate	52	49.1	60	54.5		
Low	44	41.5	44	40.0		
Handoffs and transition of care						
High	7	6.6	1	0.9	16.903*	MC p<0.001*
Moderate	26	24.5	9	8.2		
Low	73	68.9	100	90.9		
Feedback and communication						
High	5	4.7	3	2.7	0.751	0.692
Moderate	46	43.4	46	41.8		
Low	55	51.9	61	55.5		
Patient safety						
High	9	8.5	14	12.7	1.656	0.437
Moderate	48	45.3	42	38.2		
Low	49	46.2	54	49.1		

High (>75%)

Moderate (60-75%)

Low (<60%)

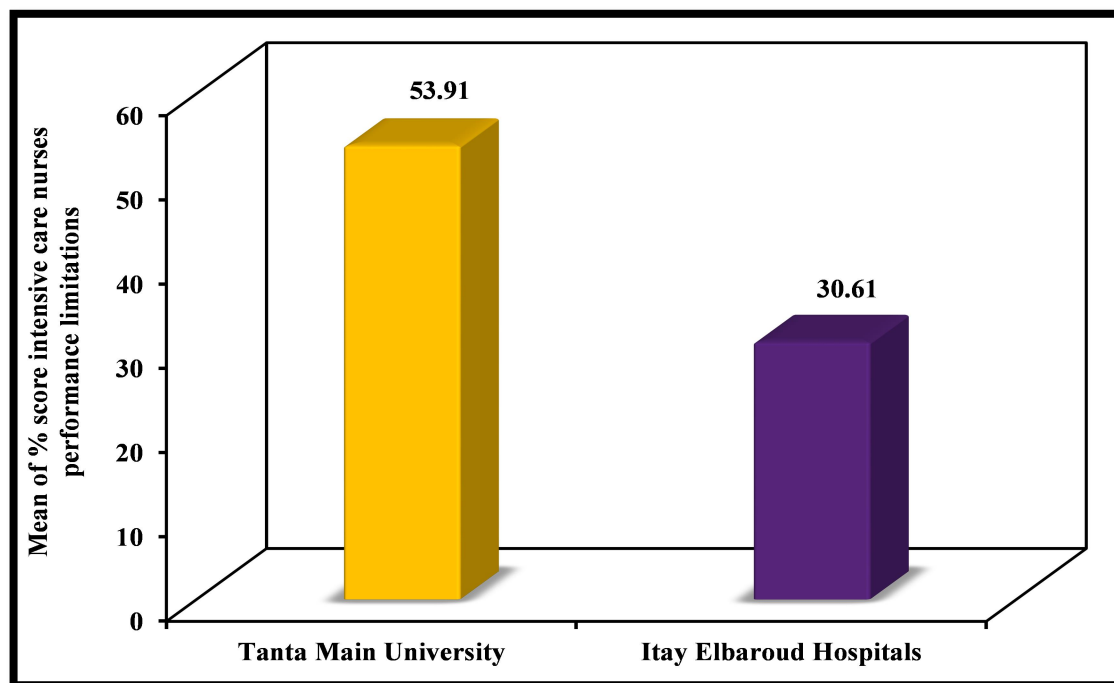


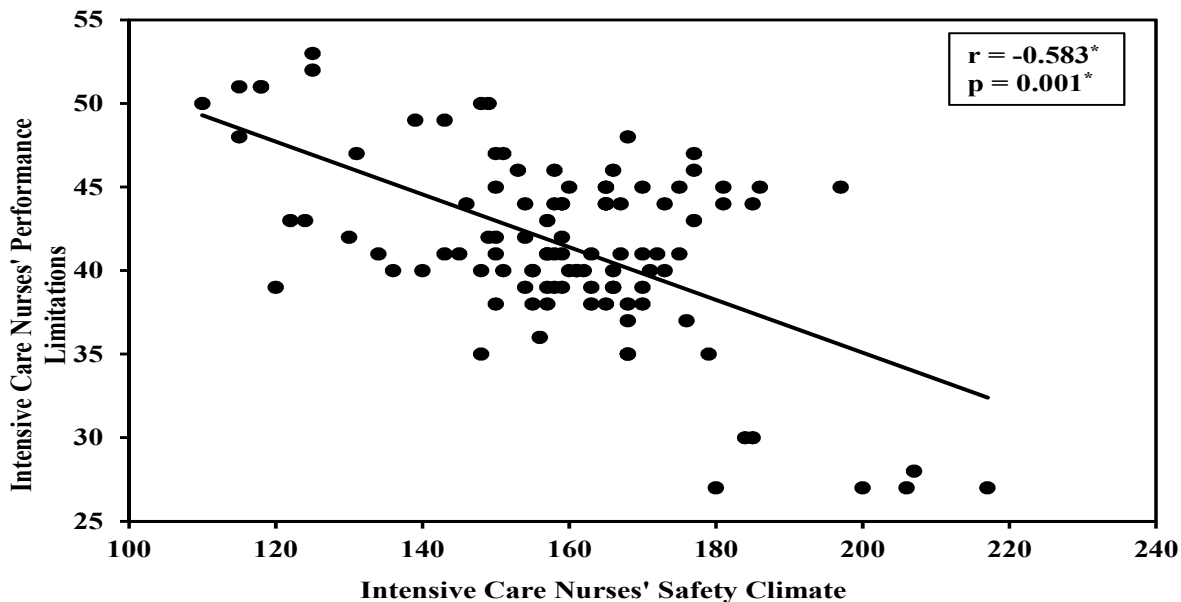
Figure (2): Mean score of intensive care nurses' performance limitations at Tanta University Main and Itay Elbaroud hospitals (n= 216)

Table (4) Mean score of intensive care nurses' perception of performance limitations at Tanta University Main and Itay Elbaroud General hospitals (n=216)

Intensive care nurses' performance limitations	Tana University Main Hospital (n = 106)	Itay Elbaroud General Hospital (n = 110)	U	p
Total Score (27 – 54)				
Min. – Max.	27.0 – 53.0	27.0 – 49.0		
Mean ± SD.	41.56 ± 5.37	35.26 ± 4.83		
Median	41.0	34.0		
% Score			2193.0*	<0.001*
Min. – Max.	0.0 – 96.30	0.0 – 81.48		
Mean ± SD.	53.91 ± 19.88	30.61 ± 17.88		
Median	51.85	25.93		

Table (5): Ranking of intensive care nurses' perception of performance limitations dimensions at Tanta University Main and Itay Elbaroud General hospitals (n=216)

Intensive care nurses' performance limitations dimensions	Tanta University Main Hospital (n = 106)		Itay Elbaroud General Hospital (n = 110)	
	Mean ± SD.	Rank	Mean ± SD.	Rank
Work environment limitations	41.04 ± 24.58	4	16.52 ± 26.57	4
Organizational limitations	44.74 ± 22.14	3	26.75 ± 22.49	3
Equipment or tools limitations	79.78 ± 25.39	1	37.92 ± 23.81	2
Task limitations	48.25 ± 27.35	2	39.22 ± 19.78	1

**Figure (3): Correlation between intensive care nurses' perception of safety work climate and their performance limitations at Tanta University Main Hospital (n = 106)**

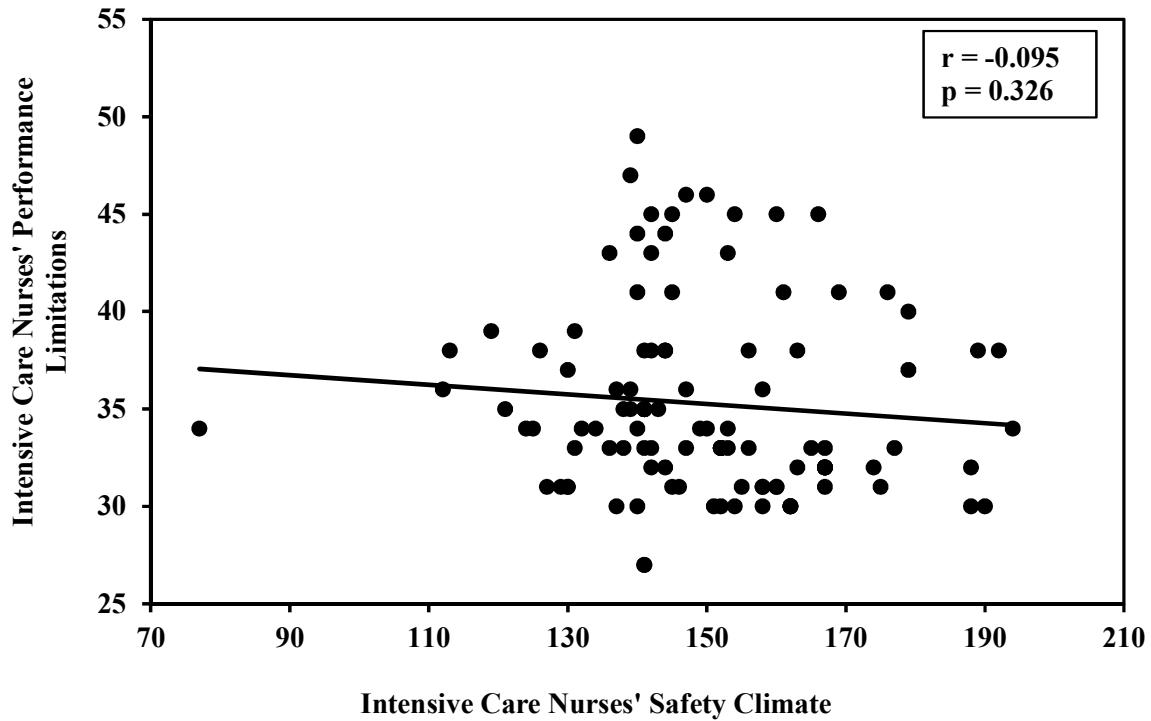


Figure (4): Correlation between intensive care nurses' perception of safety work climate and their performance limitations at Itay Elbaroud General Hospital (n = 110)

Discussion

A safety climate in ICUs is essential for improving the safety outcomes of critically ill patients. Assessing the safety climate in ICUs is important to explore weaknesses that may impact the quality of care delivered to critically ill patients (**Sania, Raja, Sajid, & Junaid, 2022**). Experiencing an unsafe work climate can limit nurses' performance and waste their time and energy. Performance limitations are different and related to various work aspects. Detection and elimination of nurses' performance limitations can improve the efficacy and quality of safe nursing performance in ICUs (**Berry et al., 2020**).

The result of the current study revealed that half of the IC nurses at Tanta University Main Hospital and three-quarters of IC nurses at Itay Elbaroud General Hospital had a low perception level of the total safety work climate. This may be due to the lack of staff nurses' perception of the safety climate, and suboptimal handoff practice which obtained the lowest nurses' perception in both hospitals. In addition, to poor working conditions, and unavailability of medical devices. The current study findings matched those of **Ali, Asmaa, Eman, Manal Shfik, & Eman, (2022)** and **Hussein, Seham, Raghda, & Rasha, (2022)** who reported a poor and negative safety perception among healthcare professionals including IC nurses. On the contrary, **Al Nadabi et al., (2020)** reported high to moderate perception levels of safety climate in Arab countries.

The result of the current study revealed that the total safety work climate was less than the international benchmark of sixty-four percent as stated by the Agency for Healthcare Research and Quality (**Sorra et al., 2018**). The present study revealed a statistically significant difference between IC nurses at Tanta University Main and Itay Elbaroud General hospitals regarding the overall levels of safety

work climate as well as the dimensions of safety work climate including, teamwork climate, preparation of management, handoffs and transition of care dimensions.

These differences could be explained by work-related characteristics such as the hospital type since Tanta Main University Hospital is a large teaching university affiliated to the Ministry of Higher Education and Scientific Research that serves the Delta region with a capacity of around 1000 beds with different specialties and subspecialties. Comparatively, Itay Elbaroud General Hospital is affiliated to the Ministry of Health and Population in Elbehira Governorate, which has a limited bed capacity of around 300 beds and a limited scope of specialty. Further, the varying personal characteristics of IC nurses in each hospital.

This result was in the same line with **Zhao et al., (2019)** who stated that discrepancies between various settings may be attributed to the differences in IC nurses' characteristics, the number of married staff, age and years of experience. In this respect, **Danielsson et al., (2019)**, reported that younger nurses tend to report lower safety climate perception. Also, **Gurková, Dominika, Radka, & Katarína, (2020)** found that nurses in teaching hospitals reported a higher safety climate perception than nurses who worked in another hospital which was in agreement with the current study findings. This result was supported by **Luo, (2020)**; **Shahril Abu Hanifah & Ismail, (2020)** who reported that the differences in workplace environmental characteristics generally produce varying degrees of staff nurses' safety climate perception.

Concerning the safety climate levels, the present study revealed that only one-fifth of IC nurses at Tanta Main University Hospital had a high level of IC nurses' job satisfaction perception of the safety climate dimensions. This result could be explained by around one-third of the nurses disagreed with being proud

of working in the ICU and being a part of a large family and that the work schedule didn't respect their personal needs. This result was matched with **Ismail & Khalid, (2022)** who stated that job satisfaction had the highest response rate in all safety climate dimensions despite nurses being dissatisfied with their working conditions. Dissimilarly, **Tlili et al., (2022)** reported that nurses' perception of job satisfaction was low due to a lack of motivation.

The current study revealed that around half of IC nurses at Tanta University Main Hospital had a moderate perception level of teamwork in safety climate dimensions. Further, this dimension had the highest rank mean score among all safety climate dimensions in the same hospital. This result could be due to that the majority of IC nurses agreed that college support was introduced when needed and that hospital units worked well together to provide the best patient care indicating team collaboration. These findings were in agreement with **Ali et al., (2022)**; **Tlili et al., (2022)** who reported that teamwork climate had the highest rank mean score among the IC nurses and **Alqahtani & Evley, (2020)** who reported a moderate level of nurses' perceived teamwork of safety climate dimension. On the contrary, this result was dissimilar to **Kosydar-Bochenek et al., (2022)** who reported a high perception level of teamwork by IC nurses.

Based on the present study findings, about two-thirds of IC nurses at Tanta Main University Hospital as well as the majority of IC nurses at Itay Elbaroud General Hospital had a low level of safety climate perception regarding the handoff and transition of care and ranked the lowest mean score at both hospitals. This result could be explained by more than two-fifths of IC nurses at Tanta Main University Hospital and more than three-fifths of IC at Itay Elbaroud Hospital who disagreed that problems never occurred in the exchange of information

across the hospital units and patient information was secretly kept when transferring shift.

Also, could be due to the lack of standardized handoff tool. This result was in the same line with **Foda et al., (2020)**; **Saleh Aboufour & Subbarayalu, (2022)** who reported that nurses had a low perception level of safety climate regarding the handoff and transition of care and found that patient problems mostly occurred during shift exchange.

The present study revealed that IC nurses at Tanta University Main Hospital faced the highest mean score of performance limitations compared to those at Itay Elbaroud General Hospital and it revealed statistically significant differences between the two hospitals. This result reflects the extent of challenges faced by teaching hospitals that introduce medical care to a large number of patients in different subspecialties particularly in deficient working conditions due to the lack of resources and medical supplies as supported by **Safarani, Hamid, Pouran, & Mohammadreza, (2018)**. This result parallels **Mrayyan, Sami, & Hasan, (2021)** found that nurses at teaching hospitals had higher perceived workload and performance limitations than those in other hospitals. Conversely, this result was contradicted by **Mahmoud, & Sally, (2019)** who found no statistical differences between the Ministry of Health and teaching hospitals.

The findings of the current study showed that the equipment or tools limitations had the highest IC nurses' perception mean score of performance limitations at Tanta Main University Hospital compared to the mean score of IC nurses at Itay Elbaroud Hospital, they reported that it was the second rank of performance limitations. This result may be due to the majority of nurses at both hospitals reported that their performance was limited due to the isolation rooms not being well-stocked in the ICU. Further, the highest percentage of

nurses at Tanta Main University Hospital stated that they had to wait to use equipment that was being used by another nurse, lack of supplies in the central stock, and they wasted time in searching for equipment.

This result was confirmed by **Rajaeian & Masoudi Alavi, (2018); Ullah et al., (2023)** who found that more than two-thirds of nurses reported that their performance was limited because of a lack of supplies and time wasted in waiting to use equipment. The current result was mismatched with **Alsulami, Ashrf, & Nouf, (2022)** who found that the main barrier faced by nurses was the lack of management support.

The present study demonstrated that the task limitations had the highest mean score of IC nurses' perception of performance limitations at Itay Elbaroud Hospital compared to nurses at Tanta Main University Hospital who ranked it as a second performance limitations. This result was clarified by the highest percentage of nurses at both hospitals reporting that their time was wasted because of clerk work and stated that they were assigned to non-nursing tasks. Moreover, more than half of nurses at Tanta Main University Hospitals stated that they are spending time orienting new staff which could be understood in such a teaching hospital. These findings were approved by **Al Amri et al., (2019)** reported that clerical work frequently reported limiting nurses' performance. Also, **Poudyal, Kalpana, & Soni, (2023)** and **Keshk, Shereen, & Azza, (2012)** who investigated the performance limitations at Damanhur Teaching Hospital found that orienting new staff limited the nurses' performance. In contrast, **Rahman, Imdad, Naveed, & Afsar, (2024)** found that time wasted in meeting the patients' families' needs and answering their questions was the main limitation of nurses' performance

The result of the current study showed a statistically significant negative correlation

between the IC nurses' perception of safety work climate and performance limitations at Tanta University Main Hospital. However, the correlation was insignificant at Itay Elbaroud Hospital, but still negative. This result clarified the role of performance limitations on the increasing workload that is negatively reflected. This result was consistent with **Gurses & Carayon, (2009); Rahman et al., (2024)** found that performance limitations were positively associated with a workload which in turn negatively impacts the safety climate required for the provision of safe, quality patient care. This result was inconsistent with a study conducted in Saudi Arabia that explored the performance limitations and their effect on the safety climate in ICU and reported an insignificant positive correlation between all domains of performance obstacles and perceived safety climate **Abd El Salam, (2016)**.

Conclusion

Based on the findings of the present study it was concluded that; The perception levels of IC nurses' overall safety work climate at Tanta University and Itay Elbaroud hospitals were low. The highest-ranked performance limitations faced the IC nurses at both hospitals were regarding the task, and equipment or tool limitations. There was a statistically significant negative correlation at Tanta University Hospital, while there was no statistically significant negative correlation at Itay Hospital among IC nurses' perceived safety climate and performance limitations. There were statistically significant differences between both hospitals regarding the IC nurses' safety work climate and their perceived performance limitations.

Recommendations

For the hospital management:

- Conduct regular assessments of workplace safety climate to explore work-related

weaknesses and improvements in all safety dimensions.

- Develop strategies, protocols, and work systems that promote working conditions to create and foster a safe climate.
- Continuous updating of safety trends through planned training programs

For head nurses

- Raise nurses' awareness regarding safety climate and safety performance.
- Ensure workplace equality and fairness to avoid inequalities in assigning tasks.

For IC nurses:

- Communicate safety concerns to the managers.
- Collaborate with colleagues to enhance teamwork.
- Update knowledge regarding safety and quality improvement policies.

For the future nursing research:

- Explore the role of supportive leadership in improving perceived nurses' safety and safety performances.

References.

- Abd, G., Ahmed, E., A., & El-kom, S. (2016). Performance Obstacles in ICU and Their Effects on Patients' Safety at Selected Hospitals in Jazan Region , *Nursing, KSA*, 5(6), 26–36. <https://doi.org/10.9790/1959-0506022636>
- Al-Bsheish, M., bin Mustafa, M., Ismail, M., Jarrar, M., Meri, A., & Dauwed, M. (2019). Perceived management commitment and psychological empowerment: A study of intensive care unit nurses' safety. *Safety Science*, 118(May), 632–640. <https://doi.org/10.1016/j.ssci.2019.05.055>
- Al-Jumaili, A. A., Abbood, S. K., Abbas, A. N., Rafeel, H. M., Mohammed, F. R., & Ali, A. Z. (2021). Organization factors influencing nurse ability to prevent and detect adverse drug events in public hospitals using a patient safety model. *Saudi Pharmaceutical Journal*, 29(10), 1216–1222. <https://doi.org/10.1016/j.jsps.2021.09.003>
- Al-Mugheed, K. A., Bayraktar, N., Al-Mugheed, K. A., & Nursing, S. (2020). Patient safety attitudes among critical care nurses: A case study in North Cyprus. *International Journal of Health Planning and Management*, 35(4), 910–921. <https://doi.org/10.1002/hpm.2976>
- Al Amri, S. A., Dupo, Jonas, Al Kindi, M. M., Al Tobi, R. S., BaniOraba, S. M., Torrano, G., Mohammed Al Amri, F., & Al Aamri, F. I. (2019). The Extent of Non – Nursing Tasks and Their Impact on Quality Patient Care As Perceived By Nurses in Al Dakhliyah Governorate, Oman. *Saudi Journal of Nursing and Health Care*, 02(09), 308–313. <https://doi.org/10.36348/sjnhc.2019.v02i09.005>
- Al Nadabi, W., Faisal, M., & Mohammed, M. A. (2020). Patient safety culture in Oman: A national study. *Journal of Evaluation in Clinical Practice*, 26(5), 1406–1415. <https://doi.org/10.1111/jep.13322>
- Ali, H. M., Abdul-Aziz, A. M., Darwish, E. A. F., Swelem, M. S., & Sultan, E. A. (2022). Assessment of patient safety culture among the staff of the University Hospital for Gynecology and Obstetrics in Alexandria, Egypt. *Journal of the Egyptian Public Health Association*, 97(1). <https://doi.org/10.1186/s42506-022-00110-8>
- Aljohani, R., & Alsharqi, O. (2021). Assessment of factors affecting patient safety culture in Maternity and Children hospital in Makkah, Saudi Arabia. *Journal of Health Informatics in Developing Countries*, 15(2), 2021. <http://www.jhdc.org/>
- Alqahtani, A. S., & Evley, R. (2020). Application of Safety Attitudes Questionnaire (SAQ) in Adult Intensive Care Units: a cross-sectional study. *MedRxiv*, 2020.07.07.20114918.

- <https://www.medrxiv.org/content/10.1101/2020.07.07.20114918v1%0Ahttps://www.medrxiv.org/content/10.1101/2020.07.07.20114918v1.abstract>
- Alsulami, A., A'aqoulah, A., & Almutairi, N. (2022). Patient safety culture awareness among healthcare providers in a tertiary hospital in Riyadh, Saudi Arabia. *Frontiers in Public Health, 10*, 953393. <https://doi.org/10.3389/fpubh.2022.953393>
- Aziz Mamdouh, E., Shehata Mohamed, H., & Abdallah Abdelatif, D. (2020). Assessment of Nurses' Performance Regarding the Implementation of Patient Safety Measures in Intensive Care Units. *Egyptian Journal of Health Care, 11*(1), 82–100. <https://doi.org/10.21608/ejhc.2020.72596>
- Bae, S. H., Pen, M., Sinn, C., Kol, S., An, B., Yang, S. J., Rhee, H. yon, Ha, J., & Bae, S. (2022). Work hours and overtime of nurses working in Cambodian hospitals. *International Nursing Review, 69*(2), 150–158. <https://doi.org/10.1111/inr.12720>
- Berry, J. C., Davis, J. T., Bartman, T., Hafer, C. C., Lieb, L. M., Khan, N., & Brill, R. J. (2020). Improved Safety Culture and Teamwork Climate Are Associated with Decreases in Patient Harm and Hospital Mortality Across a Hospital System. *Journal of Patient Safety, 16*(2), 130–136. <https://doi.org/10.1097/PTS.0000000000000251>
- Burgess, A., van Diggele, C., Roberts, C., & Mellis, C. (2020). Feedback in the clinical setting. *BMC Medical Education, 20*(Suppl 2), 1–5. <https://doi.org/10.1186/s12909-020-02280-5>
- Danielsson, M., Rutberg, H., Årestedt, K., Nilsson, P., Rutberg, H., & Årestedt, K. (2019). A National Study of Patient Safety Culture in Hospitals in Sweden. *Journal of Patient Safety, 15*(4), 328–333. <https://doi.org/10.1097/PTS.0000000000000369>
- Foda, E. S. I., Ibrahim, A. G., Mohamed Ali, A. M., El-Menshaw, A. M., & Elweshahi, H. M. T. (2020). Assessment of patient safety culture perception among healthcare workers in intensive care units of Alexandria Main University Hospital, Egypt. *Alexandria Journal of Medicine, 56*(1), 173–180. <https://doi.org/10.1080/20905068.2020.1832648>
- Grosso, S., Tonet, S., Bernard, I., Corso, J., De Marchi, D., Dorigo, L., Funes, G., Lussu, M., Oppio, N., Pais dei Mori, L., & Palese, A. (2019). Non-nursing tasks as experienced by nurses: a descriptive qualitative study. *International Nursing Review, 66*(2), 259–268. <https://doi.org/10.1111/inr.12496>
- Gurková, E., Kalánková, D., Kurucová, R., & Žiaková, K. (2020). Assessment of patient safety climate by nurses in Slovak Public and private hospitals. *Journal of Nursing Management, 28*(7), 1644–1652. <https://doi.org/10.1111/jonm.13120>
- Gurses, A. P., & Carayon, P. (2009). Exploring performance obstacles of intensive care nurses. *Applied Ergonomics, 40*(3), 509–518. <https://doi.org/10.1016/J.APERGO.2008.09.003>
- Helen Burke. (2023). *Living and working in Europe 2022*. www.eurofound.europa.eu
- Hussein, Y. H. H., Eldeeb, S. M., Elshamy, R. A., & Eldin, R. M. B. (2022). Patient safety attitude among healthcare workers at different levels of healthcare in Sharqia Governorate, Egypt. *African Journal of Primary Health Care and Family Medicine, 14*(1), 1–7. <https://doi.org/10.4102/PHCFM.V14I1.3307>
- Ismail, A., & Khalid, S. N. M. (2022). Patient safety culture and its determinants among healthcare professionals at a cluster hospital in Malaysia: A cross-sectional study. *BMJ*

- Open*, 12(8), 1–11.
<https://doi.org/10.1136/bmjopen-2021-060546>
- Keshk, L. I., Qalawa, S. A., & Aly, A. A. (2012). Performance obstacles experiences among critical care nurses in Damam teaching hospital. *Life Science Journal*, 9(2), 1044–1054.
- Kosydar-Bochenek, J., Krupa, S., Religa, D., Friganović, A., Oomen, B., Brioni, E., Iordanou, S., Suchoparski, M., Knap, M., & Mędrzycka-Dąbrowska, W. (2022). The Perception of the Patient Safety Climate by Health Professionals during the COVID-19 Pandemic—International Research. *International Journal of Environmental Research and Public Health*, 19(15).
<https://doi.org/10.3390/ijerph19159712>
- Lu, L., Ko, Y. M., Chen, H. Y., Chueh, J. W., Chen, P. Y., & Cooper, C. L. (2022). Patient Safety and Staff Well-Being: Organizational Culture as a Resource. *International Journal of Environmental Research and Public Health*, 19(6), 1–14.
<https://doi.org/10.3390/ijerph19063722>
- Luo, T. (2020). Safety climate: Current status of the research and future prospects. *Journal of Safety Science and Resilience*, 1(2), 106–119.
<https://doi.org/10.1016/j.jnlssr.2020.09.001>
- Mahmoud, S., Khalifa, A., & Farghally, S. M. (2019). Nurses' Perception of Safety Culture, Medication Errors Occurrence and Reporting. *Journal of Nursing and Health Science*, 8(3), 8–15.
<https://doi.org/10.9790/1959-0803010815>
- Mousazadeh, S., Yektatalab, S., Momennasab, M., & Parvizy, S. (2019). Job satisfaction challenges of nurses in the intensive care unit: A qualitative study. *Risk Management and Healthcare Policy*, 12, 233–242.
<https://doi.org/10.2147/RMHP.S218112>
- Mrayyan, M. T., Al-Rawashdeh, S., & Al-Omari, H. (2021). Nurses' job stressors and social support behaviors: Comparing public, teaching, and private hospitals. *Nursing Forum*, 56(1), 74–82.
<https://doi.org/10.1111/nuf.12527>
- Noor Arzahan, I. S., Ismail, Z., & Yasin, S. M. (2022). Safety culture, safety climate, and safety performance in healthcare facilities: A systematic review. *Safety Science*, 147, 105624.
<https://doi.org/10.1016/J.SSCI.2021.105624>
- Noviyanti, L. W., Ahsan, A., & Sudartya, T. S. (2021). Exploring the relationship between nurses' communication satisfaction and patient safety culture. *Journal of Public Health Research*, 10(2), 317–320.
<https://doi.org/10.4081/jphr.2021.2225>
- Poudyal, S., Sharma, K., & KC, S. (2023). Performance Obstacles and Workload of Nurses Working in Critical Care Unit at Teaching Hospital. *Journal of Karnali Academy of Health Sciences*, 6(2), 85–88.
<https://doi.org/10.61814/jkaks.v6i2.813>
- Rahman, I., Ullah, I., Ullah, N., & Dad, A. (2024). Performance Obstacles Usually Experience by Critical Care Nurses. *Journal of Rehman Medical Institute*, 9(4), 13–18.
<https://doi.org/10.52442/jrmi.v9i4.559>
- Rajaeian, Z., & Masoudi Alavi, N. (2018). Barriers to Nursing Performance from the Perspective of Nurses Working in Intensive Care Units. *Critical Care Nursing*, 11(1), 1–6.
<https://doi.org/10.5812/ccn.64815>
- Rezaee, N., Ghaljeh, M., & Salar, A. (2020). Barriers to Providing High-Quality Nursing Care in Intensive Care Units: A Qualitative Study. *Medical - Surgical Nursing Journal*, 9(3).
<https://doi.org/10.5812/msnj.110265>
- Safarani, S., Ravaghi, H., Raeissi, P., & Maleki, M. (2018). Challenges and Opportunities Faced by Teaching Hospitals in the Perception of Stakeholders and Hospital System Managers. *Education in Medicine Journal*, 10(4).
- Saleh Aboufour, M. A., & Subbarayalu, A. V.

- (2022). Perceptions of patient safety culture among healthcare professionals in Ministry of Health hospitals in Eastern Province of Saudi Arabia. *Informatics in Medicine Unlocked*, 28, 100858. <https://doi.org/10.1016/j.imu.2022.100858>
- Sania, Raja, ., Ali, S., & Ali, J. (2022). Impact of Educational Training on Nurses to improve knowledge about Practices Regarding Patients Safety after Cardiac Catheterization. *Pakistan Journal of Health Sciences*, 140–144. <https://doi.org/10.54393/pjhs.v3i06.303>
- Sexton, J. B., Helmreich, R. L., Neilands, T. B., Rowan, K., Vella, K., Boyden, J., Roberts, P. R., & Thomas, E. J. (2006). The Safety Attitudes Questionnaire: Psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research*, 6, 1–10. <https://doi.org/10.1186/1472-6963-6-44>
- Shahril Abu Hanifah, M., & Ismail, N. (2020). Fatigue and its associated risk factors: a survey of electronics manufacturing shift workers in Malaysia. *Fatigue: Biomedicine, Health and Behavior*, 8(1), 49–59. <https://doi.org/10.1080/21641846.2020.1739806>
- Sorra, J., Gray, L., Streagle, S., Famolaro, T., Yount, N., & Behm, J. (2018). Hospital survey on patient safety culture: user's guide. In *Agency of Healthcare Research in Quality*. www.ahrq.gov
- Teuma Custo, P., Teuma Custo, R., & Buttigieg, S. (2019). The relationship between safety climate and performance in intensive care units: the mediating role of managerial safety practices and priority of safety. *Frontiers in Public Health*, 7, 302.
- Tlili, M. A., Aouicha, W., Sahli, J., Ben Cheikh, A., Mtiraoui, A., Ajmi, T., Zedini, C., Chelbi, S., Ben Rejeb, M., & Mallouli, M. (2022). Assessing patient safety culture in 15 intensive care units: a mixed-methods study. *BMC Health Services Research*, 22(1), 1–9. <https://doi.org/10.1186/s12913-022-07665-4>
- Ullah, I., Ali, S., Hussain, R., Hussain, A., Iqbal, M., Rafsoon, ., & Sultan, A. (2023). Factors Affecting Nurses Performance Working in Intensive Care Units at Tertiary Care Hospitals Peshawar. *Pakistan Journal of Health Sciences*, 72–76. <https://doi.org/10.54393/pjhs.v4i06.829>
- Ulusoy, S., Çelik, Z., Santiago, T. H. R., Turrini, R. N. T., Arya, A., Buchman, S., Gagnon, B., Downar, J., Enchanted Manor, Just, W. I., To, G., To, G., To, G., To, G., In, G., van der Sluijs, A. F., van Slobbe-Bijlsma, E. R., Chick, S. E., Vroom, M. B., ... Vlaar, A. P. J. (2022). The Silent Cry of Healthcare Workers: A Cross-Sectional Study on Levels and Determinants of Burnout among Healthcare Workers after First Year of the Pandemic in Turkey. *Psychiatry and Clinical Psychopharmacology*, 32(1), 63–71. <https://doi.org/10.5152/pcp.2022.21248>
- WHO. (2020). Operational Framework for Primary Health Care. In *World Health Organization*. <https://www.who.int/publications/i/item/9789240017832>
- Wibowo, S., Christian, M., Sunarno, S., & Yuniarto, Y. (2022). Determinants of Stress Recognition and Job Satisfaction in Hospitals for Health Professionals in Indonesia. *JIEMS (Journal of Industrial Engineering and Management Systems)*, 15(1), 26–34. <https://doi.org/10.30813/jiems.v15i1.3601>
- World Health Organization. (2021). Towards eliminating avoidable harm health care. In *Global patient safety action plan 2021–2030*. <https://www.who.int/teams/integrated-health-services/patient-safety/policy/global-patient-safety-action-plan>

- Yetti, K., Dewi, N. A., Wigiarti, S. H., & Warashati, D. (2021). Nursing handover in the Indonesian hospital context: Structure, process, and barriers. *Belitung Nursing Journal*, 7(2), 113–117. <https://doi.org/10.33546/bnj.1293>
- Zhao, C., Chang, Q., Zhang, X., Wu, Q., Wu, N., He, J., & Zhao, Y. (2019). Evaluation of safety attitudes of hospitals and the effects of demographic factors on safety attitudes: a psychometric validation of the safety attitudes and safety climate questionnaire. *BMC Health Services Research*, 19(1). <https://doi.org/10.1186/s12913-019-4682-0>