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Evaluation of Patient's Safety Measures in ICU and Surgical Theatre in Hospitals in Menoufia Governorate, Egypt

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ABSTRACT

Background: Patient safety is a very important concept not only for health authorities, but also for patients' satisfaction. With the effort of Ministry of Health and Population came the need for evaluation of implementation of the policies in hospitals. **Objectives**: This study aimed to evaluate patient safety measures in Menoufia Governorate hospitals regarding international patient safety goals and Egyptian health care accreditation standards.

Participants and methods: A cross sectional study conducted in four hospitals, Menoufia Governorate that were selected by stratified random sampling technique. During the study period each of the selected hospitals and departments was visited 15 times at regular intervals. The included departments were the critical departments (ICU, NICU and surgical theatre).

Results: Using Egyptian Healthcare Accreditation Program and International Accreditation Standards for Hospitals revealed that policies were 100% available in the studied hospitals. Awareness of organization and staff about safety standards was 60% in ICU department and 62.2% in NICU. Implementation of updated hand hygiene guidelines was 61.1% performed in ICU and 73.3% in NICU. While, discarding single use injection devices after use was 100% implemented. All documents and equipment needed for surgery are on hand, correct and functioning properly before the start of the surgical or invasive procedure was met in 62.2%.

Conclusion and recommendation: Despite of availability of policies in all hospital, implementation of patient safety measure till needs improvement, so, continuous orientation of staff, checking on work and continuous improvement are needed to achieve patient safety culture.

Keywords: Patient safety, Policies, Implementation, Safe surgery.

INTRODUCTION

According to the Institute of Medicine (IOM), patient safety is defined as "the prevention of harm to patients"; where harm is defined as "freedom from accidental or preventable injuries produced by medical care", which from this point of view focuses on three goals: to prevent errors, learn from errors and built on a culture of safety that involves health care professionals, organizations, and patients [(1,2)].

It can also be defined as "the absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with health care to an acceptable minimum" or "First, do no harm" as per **WHO, 2023**[(3)].

It can also be understood in a broader context to be "a framework of organized activities that create cultures, processes, procedures, behaviors, technologies and environments in health care that consistently and sustainably lower risks, reduce the occurrence of avoidable harm, make error less likely and reduce impact of harm when it does occur" [(3)].

Efforts were designed to maintain patient safety as Joint Commission International (JCI) Program is designed to create a culture of safety and quality within a health care facility and ensure that it strives to continuously improve patient care for patients. The International Patient Safety Goals (IPSGs) are fundamental to achieve high quality health care standards and the optimal level of patient's safety [(4)].

WHO efforts include for patient safety include:
1. Medication Without Harm, with the aim of reducing the level of severe avoidable harm. 2. the establishment of World Patient Safety Day to be observed annually by Member States on 17 September. The purpose of World Patient Safety Day is to promote patient safety by increasing public awareness and engagement, enhancing global understanding and working towards global solidarity and action, 3. Safe Surgery Saves Lives and Clean Care is Safer care [(3)].

Intensive care settings provide lifesaving care for critically ill patients; however, it is associated with significant risk for adverse events and serious errors with multiple interactions between multidisciplinary healthcare providers, patients and medical advice, with increasingly complex interface [(5)].

Despite the neonatal intensive care units (NICU) being a complex environment beholding premature babies or infants with preexisting condition that makes them more vulnerable to encountering long lasting effect from any error, a little attention is paid by healthcare system to patient safety in NICU [(6)].

Patient safety is a very important concept not only for health authorities, but also for patients' satisfaction. With the effort of Ministry of Health and population through the Egyptian Healthcare Accreditation Program came the need

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for evaluation for the actual presence of policies in hospitals and the implementation of those policies throughout the departments starting with ICU, NICU and surgical departments, especially as there are only few research papers in Egypt on this topic. Occurrence variance report is a core organizational tool for ongoing risk identification. Reporting provides complete facts about an incident or adverse event. In a successful incident reporting system, all incidents' outcomes and adverse events are reported **(Huber, 2010)** [7]

The objective of this study was to evaluate patient safety measures in Menoufia Governorate hospitals regarding international patient safety goals and Egyptian health care accreditation standards.

PARTICIPANTS AND METHODS

A cross sectional study, that was conducted during the period from January 1st, 2021, to 1st of July 2023.

Sampling and Method

Four hospitals in Menoufia Governorate were included, after they were selected by stratified random sampling technique as one from each hospitals categories, tertiary care hospitals, general hospitals, specialty hospitals and district hospitals. The included departments were the critical departments (ICU, NICU and surgical theatre).
During the study period (30 months) each of the selected hospitals and departments was visited at regular intervals (every two months) for total 15 visits (Figure 1).

The first visit: it was targeted to:

1- Check for the availability of policies and procedures regarding patient safety using Egyptian Healthcare Accreditation Program, which included: the availability of patient safety policy, continued healthcare staff education, preventive measures and medication safety policy, and international Accreditation Standards for Hospitals.
2- Check for the availability of policies and procedures regarding safe surgery using Egyptian Healthcare Accreditation Program, which included: operative and invasive procedures safety policies, with accurate documented patients' identification preoperatively and verification of all documents and equipment need for surgery, and marking of surgical site and accurate counting of instruments pre and post operatives, and International Accreditation Standards for Hospitals and Second Global Patient Safety challenge.

The subsequent visits: they were targeted to:

1- Filling check lists for the implementation of patient safety using Egyptian Healthcare Accreditation Program and International Accreditation Standards for Hospitals.
2- Filling check lists for the implementation of safe surgery using Egyptian Healthcare Accreditation Program including: checklist for all documents and equipment, accurate patient identification, marking site of operation preoperatively, and documented counting of sponges, needles and instruments pre and post procedure, and the International Accreditation Standards for Hospitals and Second Global Patient Safety challenge.

Throughout all the visits, the numbers of occurrence variance reported (OVR) were collected.

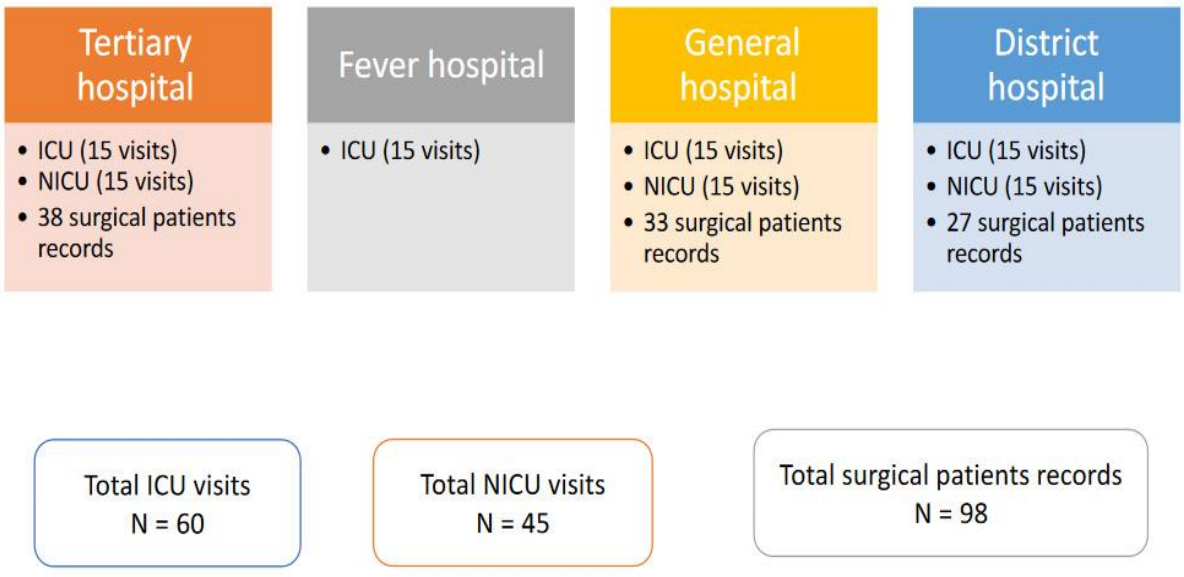

Figure 1: Number of visits of ICU and NICU and number of surgical patient records distributed on the studied hospitals.

Ethical consent:

This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Approval from Ethical Committee in the Faculty of Medicine, Menoufia University was obtained before the beginning of this study. An official letter from Ministry of Health and Population was directed to directors of the selected hospitals to ensure their cooperation and support during the application of the study.

Statistical analysis: The data were collected, tabulated, and analyzed using SPSS (Statistical Package for the Social Sciences) version 23.0 (SPSS Inc., Chicago, IL, USA). The qualitative data were represented in frequency and percent in the descriptive statistics performed in this work.

RESULTS: In the studied hospitals, the availability of policies related to patient's safety and policies for handling critical values and tests were met 100%, also, all these policies complied with the Egyptian and WHO recommendation (Table 1).

Table 1: Availability of general safety policy for patients in ICU departments (4 hospitals) and NICU (3 hospitals) in the different studied hospitals

Items		ICU		NICU	
		No	%	No	%
Availability of Policy related to patient's safety in the organization.	Met	4	100.0	3	100.0
	Not met	0	0.0	0	0.0
The Policy complies with Egyptian and WHO recommendations	Met	4	100.0	3	100.0
	Not met	0	0.0	0	0.0
Policy for handling critical values/tests	Met	4	100.0	3	100.0
	Not met	0	0.0	0	0.0

Awareness of organization and staff about WHO safety standards, posting patient's safety standard in all applicable areas, and implementation of updated hand hygiene guidelines were generally more than 60% in each of ICU and NICU. While, discarding single use injection devices after use was 100% implemented. Regarding read back verified process after taking verbal orders, it was met only in 23.3% and 17.8% of visits in ICU and NICU respectively. Presence and application of preventive system for catheter and intubation misconnection was met in more than 90% in eacah of ICU and NICU. Regarding critical event alarm system maintenance and testing, they were met in more than 80% in both of ICU and NICU. While a standardized approach for handover communication was implemented in 55% and 64.4% in ICU and NICU respectively (Table 2).

Table 2: Implementation of general safety policy for patients in ICU and NICU departments (15 visits /hospital) in the different studied hospitals

Items		ICU N = 60 visits		NICU N = 45 visits	
		No	%	No	%
Awareness of the organization and staff about the Egyptian and WHO patient safety recommendations	Met	36	60.0	28	62.2
	Not met	24	40.0	17	37.8
The patient safety standards and solutions are posted in all applicable areas	Met	40	66.7	29	64.4
	Not met	20	33.3	16	35.6
Updated Hand hygiene guidelines implementation	Met	37	61.1	33	73.3
	Not met	23	38.3	12	26.7
Single use injection device discard after usage	Met	59	98.3	45	100.0
	Not met	1	1.7	0	0.0
A read back verified process for taking verbal or telephone order for the reporting of critical test results	Met	14	23.3	8	17.8
	Not met	46	76.7	37	82.2
Catheter and intubation mis-connections preventive system	Met	55	91.7	43	95.6
	Not met	5	8.3	2	4.4
Identified risk for falling elimination or decrease preventive system	Met	35	53.3	---	---
	Not met	25	46.7		
Identified risk for pressure ulcer elimination or decrease preventive system	Met	47	78.3	---	----
	Not met	13	21.7		
Critical alarm system's preventive maintenance and testing	Met	49	81.7	38	84.4
	Not met	11	18.3	7	15.6
A standardized approach for hand over communications	Met	33	55.0	29	64.4
	Not met	27	45.0	16	35.6

In surgery, availability of policies and procedures for safe surgery as a part of patient safety in all studied hospitals. patient identification, verification of all documents and equipment needed in surgery and marking the site of surgery and counting sponge, needles and instruments pre and post operative, all these items were ensured in all studied hospitals (Table 3).

Table 3: Policy and procedures of safe surgery as a part of patient safety in the different studied hospitals (3 hospitals)

Items		Operative department	
		No	%
Policy and procedures for operative and invasive procedures safety	Met Not met	3 0	100.0 0.0
Accurate documented patient identification preoperatively	Met Not met	3 0	100.0 0.0
Process for verification of all documents and equipment needed for surgery or invasive procedures preoperatively	Met Not met	3 0	100.0 0.0
Marking of site of surgery preoperative	Met Not met	3 0	100.0 0.0
Verification of accurate counting of sponges, needles and instruments pre and post procedures	Met Not met	3 0	100.0 0.0

All documents and equipment needed for surgery are on hand, correct and functioning properly before the start of the surgical or invasive procedure was met in 62.2%. Patient identification, marking of the site of surgery, and counting of sponges, needles and instruments pre and post procedure were generally more than 60% (Table 4).

The follow up revealed that there were no OVRs reported during all visits except fever hospital in last 3 visits.

Table 4: Implementation of policies and procedures of safe surgery as a part of patient safety in the different studied hospitals

Items		Operative department	
		No	%
A process or checklist to verify that all documents and equipment needed for surgery are on hand, correct and functioning properly before the start of the surgical or invasive procedure.	Met Not met	61 37	62.2 37.8
Accurate documented patient identification preoperatively	Met Not met	62 36	63.3 36.7
The precise site where surgery is clearly marked by the physician with the involvement of the patient.	Met Not met	65 33	66.3 33.7
Documented counting of sponges, needles and instruments pre and post procedure.	Met Not met	68 30	69.4 30.6

DISCUSSION

Patient safety is fundamental to high quality patient care; hospitalization has its inherent complications. One of the most important areas in patient safety is making treatment and hospitalization free from side-effects **(8).**

The current work revealed that the availability of policies related to patient's safety and policies for handling critical values and tests were met in 100% of the studied hospitals, also, all these policies complied with the Egyptian and WHO recommendations. These findings denoted and ensured the full orientation and commitment of health managerial system by importance of these policies and procedures according to Egyptian ministry of health and according to Patient Safety Standards Surveyor's Guide for Hospitals (9,10)

Awareness of organization and staff about these safety standards was 60% met in ICU department and 62.2% in NICU, which is lower than the findings of **Al-Mandhari *et al.,*** (11) in which overall 85 % of the participants self-estimated awareness of the nine life-saving patient safety solutions.

Posting patient's safety standard in all applicable areas was documented in 66.7% and 64.4% of visits in ICU and NICU respectively**. Ali *et al.*** (12) revealed that patient safety culture among the staff of the University Hospital in Alexandria was 62.1%.

Implementation of updated hand hygiene guidelines was 61.1% performed in ICU and 73.3% in NICU. **Anwar and Elareed** (13)revealed that compliance rate with hand hygiene was 69% in NICU, 74.2% in pediatric ICU, and from 61.5 to 71.1% in other ICU rooms (chest, CCU, critical and surgery), which came in agreement with **AL-Mandhari *et al.*** (11) where hand hygiene measures were implemented with percentage of 68%. However, they came lower than that showed by the study of **Ojanperä *et al.*** **(14)** which was met in 88.5%. It is important to encourage ICU and NICU staff to show more commitment to hand hygiene practice to ensure patient safety, as adherence to hand hygiene practices contributes significantly to keeping patients safe and is more important than ever with the emerging threat of multidrug-resistant pathogens that are becoming difficult, if not impossible, to treat. There is undisputed evidence for the importance of hand hygiene to prevent infection. It is a simple and low-cost action that reduces the rates of acquisition of pathogens on hands significantly (15)**.**

While, discarding single use injection devices after use was 100% implemented, which is comparable to the results of **Ali and Eldessouki** **(16)** in which immediate disposal of used needles was 76.2% in observed injections, and different from the study of **Ismail *et al.*** (17)who found safe needle disposal in only 47.5% of the healthcare workers.

Regarding readback verified process for orders either verbal or by telephone, it was found to be met in less than quarter of the visits in both ICU and NICU departments (23.3 and 17.8%; respectively), which shows the need for education of the healthcare team of the strategy and its benefit in lowering medical errors as showed by the study of **Doorey *et al.*** (18) where the readback verified process increased to 50% and 70% after multiple educational setting and so further fewer medical errors.

Presence and application of preventive system for catheter and intubation misconnection was met in 91.7% in ICU and 95.6% in NICU. Implementation of preventive system for identification and elimination or decrease of risk of falling and pressure ulcer was met in 53.3% and 78.3% in ICU and NICU respectively. While regarding to critical event alarm system maintenance and testing, they were met in 81.7% in ICU and in 84.4% in ICU. A standardized approach for handover communication was implemented in 46.7% and 64.4% in ICU and NICU respectively, it is much lower in ICU staff and denoted relatively low values. These gaps in communication can cause serious break downs in the continuity of care, inappropriate treatment, and potential harm to the patient (19) **.**Lower findings were much higher than, **El-Sherbiny *et al.*** **(20)(**who found that communication openness was 17.9%, and higher than those found in the study of **Al-Mandhari *et al.*** **(11)** about preventive measures for catheter and intubation miscommunication, which were only in 26% met.

Regarding risk of fall decrease was 53.3% in ICU and approach for handover communication was 55% in ICU and 64.4% NICU, which are somehow similar to the finding of **Al-Mandhari *et al.*** **(11)** for handover communication with percentage of 50.1%.

This study documented that the policies for operative and invasive procedures safety (safe surgery), with accurate documented patients' identification preoperatively and verification of all documents and equipment needed for surgery, and marking of surgical site and accurate counting of instruments pre and post operatives were met with no difference among different hospitals with percentage of 100%

In the current study implementation of safe surgery policies in the form of having a checklist for all documents and equipment was met in 62.2%, which is comparable to the study conducted by **Gul *et al.*** **(21)** in which documentation of the surgical safety checklist in the patient file was done in 62.5%.

In regard to accurate patient identification and marking site of operation preoperatively were met with average among hospitals of 63.3% and 66.3%. Our findings agree with the finding of **Bergal *et al.*** **(22)** in which overall compliance rate was 68.2%

Implementation of process for counting sponges, needles and instruments pre and postoperative were met

by average percentage of 69.4% with no statistically significant difference among different hospitals, which comes in difference to what was found by the study of **Gul *et al.*[(21)]** where process for counting sponges, needles and instruments pre and postoperative was increased from 33.3% in the first audit to 100% in the second audit after educational session to healthcare staff.

The results revealed that there were no OVRs reported during all visits except fever hospital in last 3 visits, which can be explained by the implementation of provisional accreditation of healthcare facilities using the complete survey and assessment process by GAHAR surveyors to assess healthcare facilities compliance with GAHAR provisional accreditation requirements, which was approved in March 2023, so came the improvement since June 2023. This comes in agreement with statements of **King Khalid Hospital report [(23)]*which illustrated that*** It is important that management and staff in all departments cooperate to achieve safe, high-quality services to patients, where preventable incidents can be reduced to a minimum.

CONCLUSION

Patient safety is an important step in providing high-quality health care. Critical care services like ICU, NICU and operating rooms are of special importance. Despite of availability of policies and procedures in all hospital, the implementation of patient safety measure is still in need for improvement. Patient safety culture can be developed through increasing awareness of hospital staff, improvement of hand over communication and reading back of verbal orders. Hand hygiene and preventive measure for fall, also need advancement.

RECOMMENDATIONS

- Implementation of regular educational programs for healthcare workers through meetings, lectures and patient safety walk rounds.
- Continues monthly and quarterly monitoring and gathering of data.
- Rewards and commendations are given for the highest reporting department.
- Formulation and establishment a flow chart of the ideal process.
- Distribution the ideal flow chart after the approval from the team members.

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- **Conflicts of interests:** There was no conflicts of interests.

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