Assessment of Nurses' Performance regarding Pediatric Patients' Safety at Pediatric Health Care Settings

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Abstract

Background: Pediatric hematology-oncology patients are at high risk of harm associated with health care, resulting in a need to prevent these occurrences when possible. Care of pediatric oncology patients requires well-educated and trained nurses to provide safe and high- quality care. **Aim:** Assess nurses' performance regarding pediatric patients' safety at pediatric health care settings. **Design:** A descriptive design. **Setting:** The current study was conducted at pediatric health care setting, National Cancer Institute affiliated to Cairo University. **Subject:** A convenience sample composed of 36 nurses who working at the previously mentioned setting. **Tools:** The data were collected through two tools: **Tool I:** A structured interview questionnaire that include two parts. **Part I:** To gather data related to characteristics of nurses. **Part II:** To assess nurses' knowledge regarding pediatric patients' safety at pediatric health care settings. **Tool II:** Observational checklists to assess nurses' practices about pediatric patient' safety. **Results:** the mean age of the studied nurses was 32.3±9.1 years, more than half of them were females, and less than two thirds were graduated from nursing technical institute. The majority of the studied nurses had unsatisfactory total knowledge about pediatric patients' safety and less than three fifths of them had incompetent total practices regarding pediatric patient' safety. **Conclusion:** The current study concluded that more than two thirds of the studied nurses had unsatisfactory total performance regarding pediatric patient safety at pediatric health care settings. **Recommendation:** Periodical assessment for pediatric oncology nurses' performance regarding pediatric patients' safety.

Keywords: Nurses, Performance, Pediatric Patients' Safety, Pediatric Health Care Setting

Introduction:

Patient safety is a very important subject that aims to reduce medical error-related mortality and negative health outcomes. Having a strong safety culture ensures learning from mistakes, providing document safety and improving patient safety. Monitoring, reporting, analyzing and improving events that threaten the safety of patients and employees, and providing diagnosis, treatment, care and other services without harming the patient is the basic responsibility of healthcare providers especially nurses (**Aydemir & Koç, 2023**).

Patient safety is 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. Therefore, the pediatric patient safety

remains a critical priority for all health care team caring children who are suffered from cancer. Multidisciplinary team must practice patient safety principles and support safety of culture to improve safety for all pediatric patients **(Parzianello et al., 2024)**.

Pediatric nurses play a crucial role in improving the safety and quality of pediatric patient care. Safe and effective care dependent on the knowledge, skills, and behaviors of nurses and how those nurses cooperate and communicate in the work environment. Moreover, pediatric nurses play an important role in pediatric patients' safety by monitoring the children for clinical deterioration, detecting errors, understanding care processes, and performing tasks to ensure pediatric patients receive high-quality care in different pediatric healthcare settings (**El-Sayed & Bayoumi, 2020**).

Pediatric nurses are considered the back bone of the health care system in the management of children with cancer. However, the lack of nurses with pediatric oncology education and skills has been identified as a major challenge. Care of pediatric oncology patients requires well-educated and trained nurses to provide safe and high quality care. The unsatisfactory nurses' knowledge and practice related to patient safety measures may be a reason of ineffective patient healthcare, long patient staying in hospital and increase mortality (**Mamdouh et al., 2020**).

Significance of the Study:

There is increasing interest worldwide in medical errors and their negative effect on pediatric health. An Egyptian study conducted in Benha University Hospital, reported that types of errors included medication errors (10.5% of total errors), errors in daily routine procedures (17% of total errors), errors in invasive procedures (27% of total errors), errors in nutrition (1.7% of total errors), environmental errors (2.8% of total errors), infection control errors (11.7% of total errors), and nosocomial infection (3.1% of total errors) (**El-Shazly et al., 2017**).

Patient safety is a construct that implies behavior intended to minimize the risk of harm to pediatric patients through both system effectiveness and individual performance designed to avoid injuries to pediatric patients from the care that is intend to help them. Patient safety was identified as an essential structure to improve patient outcomes. Poor patient safety practices may result in disability, injury, poor prognosis, or even death. **(Donaghy, et al., 2018)**.

The Aim of the Study:

The aim of this study was to assess nurses' performance regarding pediatric patients' safety at pediatric healthcare settings.

Research Questions:

-What is the nurses' knowledge regarding pediatric patients' safety at pediatric health care settings?

-What is the nurses' practice regarding pediatric patients' safety at pediatric health care settings?

-Is there a relation between nurses' knowledge and practice regarding pediatric patients' safety and their characteristics?

Subject and Methods

The methodology of this study was presented under the following four designs:

I: Technical Design
II: Operational Design
III: Administrative Design
IV: Statistical Design

I: Technical Design

It included research design, setting, subject and tools of data collection.

A. Research Design:

A descriptive design was utilized to conduct the study.

B. Research Settings:

This study was conducted in pediatric health care settings/ oncology units (2 units) in National Cancer Institute affiliated to Cairo University, Egypt. One unit for free treatment and the other for insurance treatment. Each unit is consisted of five rooms where each room included 5 rooms.

C. Research Subjects:

A Convenient sample composed of all nurses (36 nurses) who working at the previously mentioned settings regardless their characteristics (age, level of education and years of experiences). The total number of staff in the free unit was 18 and 18 in the insurance unit.

D. Tools for Data Collection:

Tool I: A structured interview questionnaire was designed by the researcher after reviewing related literature, and it was written in simple Arabic language and composed of the following parts:

Part I: Concerned with characteristics of nurses namely; age, gender, educational level, marital status, years of experience and attendance training programs related to child safety at pediatric health care settings (6 questions).

Part II: Concerned with nurses' knowledge regarding pediatric patients' safety at pediatric health care settings. It consisted of 40 questions (MCQ) related to pediatric patients' safety include (definition of pediatric patients' safety, sources of patients' harm, factors affecting patients' safety and international patient safety goals), identification band, effective communication, medication safety, safe surgery, infection control precautions, falling, fire hazard and electricity hazard.

Scoring system for nurses' knowledge:

According to study subjects' answers for each question, the total score of all questions (40 questions) that equal 100%. The nurses' answers checked with a key model answer, each correct answer was scored "one" and wrong answer was scored "zero". Accordingly, their total knowledge was categorized into satisfactory knowledge (score > 80%) either or unsatisfactory knowledge (score ≤ 80%).

Tool II: Observational checklists Observational checklists were adapted from **Wilkinson et al., (2016); Pickering & Marsden, (2015); OSCE, (2023); OSCE, (2020); CDC, (2020); and Alyan et al., (2014);** to assess the actual practices of the studied nurses regarding pediatric patient safety at pediatric health care settings; it included procedures of hand washing (5 steps), wound care (11 steps), medication administration (11 steps),

blood transfusion (12 steps), personal protective equipment (5 steps), fall prevention (8 steps) and documentation (6 steps).

Scoring system for the observational checklists:

The steps of each practice was distributed as done or not done. Each correct step done by the nurse was given (1) score and incorrect done or not done was given (0) score. The total practice scores were 58. The scores were summed up and converted into percent score. According to the total score of practices of each subject, it was classified into 2 categories, competent practice (≥ 85 %) and incompetent practice (<85 %).

II: Operational Design:

Included preparatory phase, and content validity and reliability, pilot study, field work and ethical considerations.

Preparatory phase:

It included reviewing of related literature and theoretical knowledge of various aspects of the study using articles, periodicals, books and internet to get acquainted with the research problem and to develop the study tools.

Validity:

The content validity of the study tools were tested through a panel of three professors from Faculty of Nursing, Ain Shams University to ensure its applicability and understanding, accuracy, clarity and comprehensiveness.

Reliability:

Reliability of the tools were tested by using Cronbach's Alpha test (0.80) for the questionnaire sheet, and (0.85) for the observational checklists. Reliability examined after the pilot study and the necessary modifications were done accordingly.

III: Administrative design

An official permission was obtained from the Dean of Faculty of Nursing, Ain Shams University, to the Institutional Review Board (IRB) of The National Cancer Institute and adminstrators of the study setting.

Ethical considerations:

The ethical considerations in the study ensured that all the gathered data was used for research purposes only, the study sample was informed about the purpose and expected outcomes of the study and they were assured that the study is harmless and their participation is voluntary and they have the right to withdraw from the study at any time and without giving any reason. They were assured also that anonymity and confidentiality were guaranteed.

Exploratory phase:

A pilot study was carried out on 10% (4 nurses) of the total study sample. The result of the data obtained from the pilot study helped in removing some repeated questions related to knowledge to avoid duplication of questions and then all nurses involved in the pilot study were included in the study sample as no radical modifications were done in the study tools.

Field Work

The actual fieldwork was carried out on the firstal November 2023 to the end January 2024, over three months period. The researcher was available at the study settings four days per week in the morning shifts from 9 a.m. to 3 p.m.

The data was collected from the study subject using the previously mentioned tools to assess nurses'

knowledge regarding pediatric patients' safety at pediatric health care settings. The researcher explained the aim of the study and the components of the tools, as well as their approval to participate in the study, were obtained. The questionnaire was distributed to the nurses to be self administered in the presence of the researcher. It took 15-20 minutes to fill out the questionnaire and the researcher observed nurses' practice using observational checklists and it took 15-20 minutes.

IV: Statistical Design

Data collected from the studied sample were revised and coded. Data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) software version 20. The obtained data were organized, tabulated, analyzed and represented in tables and graphs as required. Data were presented using qualitative statistics in the form of frequencies, percentages, means ($\bar{x}$), standard deviation (SD), chi-square (X^2) and correlation coefficient (r).

Results:

Table (1) shows that less than two fifths (38.9%) of the studied nurses' age ranged from 22 to less than 27 years with $\bar{x} \pm$ SD (32.3±9.1 years old) and more than half (52.8%) of them were females. Regarding to the educational level of the studied nurses, less than two thirds (63.9%) were graduated from nursing technical institute. The same table indicates that more than half (55.5%) of the studied nurses were married and less than two fifths (38.9%) of them had experience less than 5 years with $\bar{x} \pm$ SD 10.2±9.1years.

Figure (1) highlights that less than three quarters (72.2%) of the studied nurses did not attend any previous training program about pediatric patient safety.

Table and **Figure (2)** revealed that more than three quarters (77.8%) of the studied nurses had unsatisfactory total knowledge regarding pediatric patients' safety compared with less than one quarter (22.2%) reported satisfactory total knowledge at pediatric health care settings.

Table and **Figure (3)** represented that more than three fifths (61.1%) of the studied nurses had incompetent total practice at pediatric health care settings while the rest of them had competent total practice.

Table and **Figure (4)** showed that more than two thirds of the studied nurses had unsatisfactory total performance regarding pediatric patient safety at pediatric health care settings with no statistical significance in studied nurses' performance at $p< 0.05$.

Table (5) illustrates that there is no statistically significant correlation between total score of nurses' knowledge and practices regarding pediatric patient' safety at PHCS.

Table (1): Distribution of the studied nurses regarding to their characteristics (n=36).

Items	No	%
Age (years):		
22 < 27	**14**	**38.9**
27<32	8	22.2
32<37	5	13.9
37<42	4	11.1
≥42	5	13.9
$\bar{x}$ ± SD	**32.3±9.1**	
Gender:		
Female	**19**	**52.8**
Male	17	47.2
Educational level:		
Nursing school	9	25
Nursing technical institute	**23**	**63.9**
University	4	11.1
Marital status:		
Married	**20**	**55.5**
Single	14	38.9
Divorced	2	5.6
Years of experience (years):		
< 5	**14**	**38.9**
5<10	8	22.2
10<15	5	13.9
15<20	3	8.3
≥20	6	16.7
$\bar{x}$ ± SD	**10.2±9.1**	

Figure (1): Distribution of the studied nurses according to their attendance of previous training programs about pediatric patient safety (n=36).

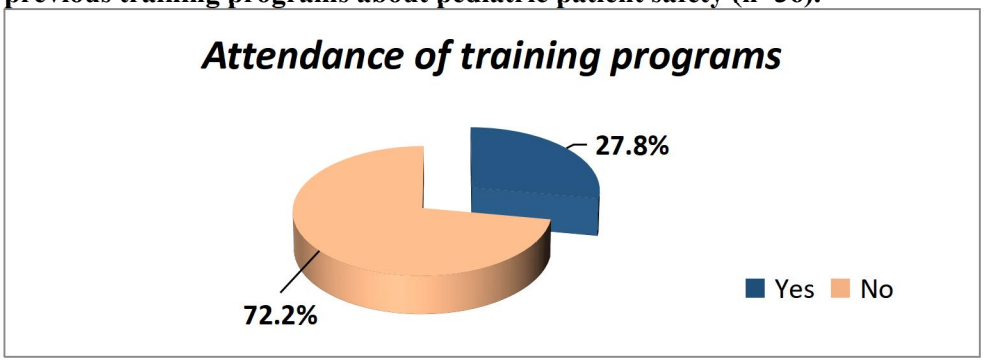

Table (2): Distribution of the studied nurses regarding to their total knowledge about pediatric patients' safety at PHCS (n=36).

Total knowledge	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	P-value
Pediatric patients' safety	8	**22.2**	28	**77.8**	11.7	0.000*
Identification band	11	30.6	25	69.4	7.1	0.006*
Effective communication	5	13.9	31	86.1	13.5	0.000*
Medication safety	8	22.2	28	77.8	14.9	0.000*
Safe surgery	7	19.4	29	80.6	11.3	0.000*
Infection control precautions	10	27.8	26	75	10.3	0.000*
Falling	6	16.7	30	83.3	15.1	0.000*
Fire hazard	6	16.7	30	83.3	14.6	0.000*
Electricity hazard	5	13.9	31	86.1	12.6	0.000*
Total	8	**22.2**	28	**77.8**	12.4	0.000*

Figure (2): Distribution of the studied nurses regarding to their total knowledge about pediatric patients' safety at pediatric health care settings (n=36).

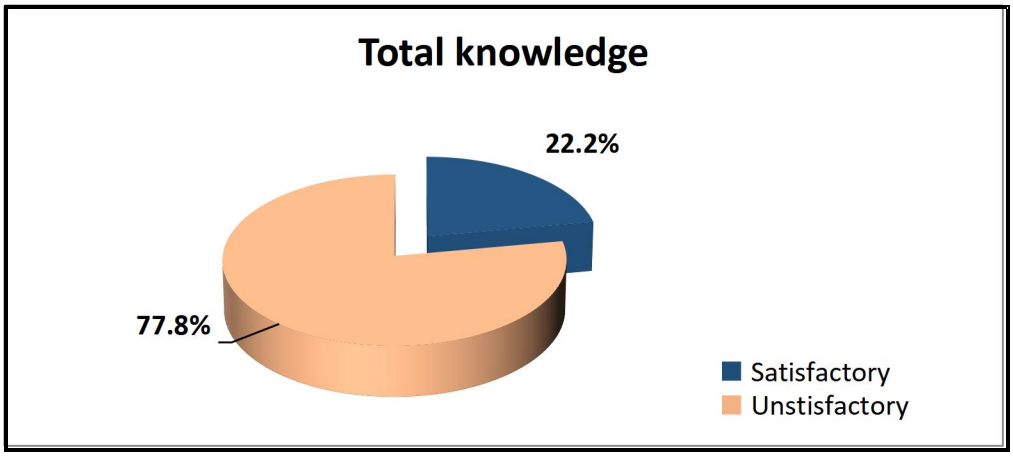

Table (3): Distribution of the studied nurses' total practices regarding hand washing, wound care, medication administration, blood transfusion, personal protective equipment, fall prevention and documentation at pediatric health care settings (n=36).

Safety in nurses' practice regarding	Competent		Incompetent		Test of significance	
	No	%	No	%	X^2	p-value
Hand washing	21	58.3	15	41.7	1.65	0.199
Wound care	21	58.3	15	41.7	4.90	0.027*
Medication administration	13	36.1	23	63.9	6.10	0.014*
Blood transfusion	13	36.1	23	63.9	4.41	0.036*
Personal protective equipment	18	50	18	50	9.76	0.002*
Fall prevention	9	25	27	75	9.00	0.003*
Documentation	9	25	27	75	6.74	0.009*
Total	14	**38.9**	22	**61.1**	6.08	0.001*

Figure (3): Distribution of the studied nurses according to their total practice at pediatric health care settings (n=36).

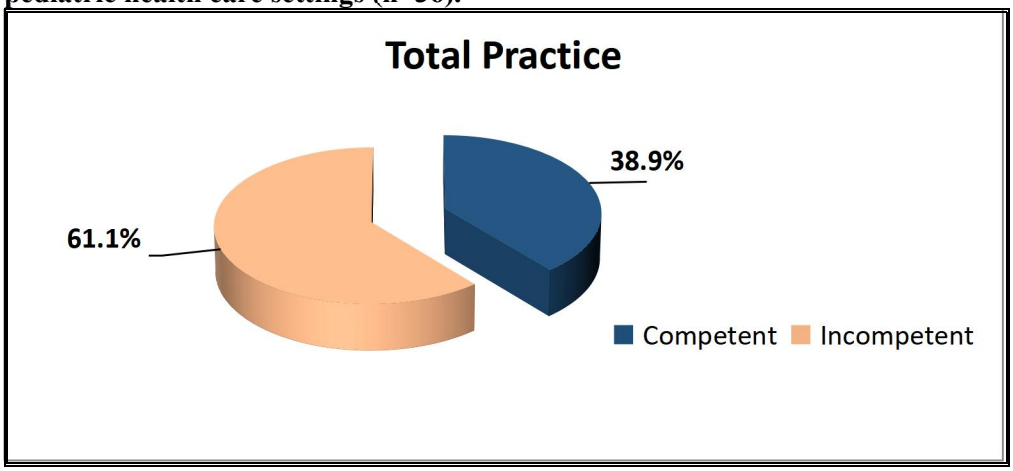

Table (4): Distribution of the studied nurses according to their total performance regarding pediatric patients' safety at pediatric health care settings (n=36).

Item	Knowledge				Practice				Test of significance	
	Satisfactory		Unsatisfactory		Competent		Incompetent		X^2	p-value
	No	%	No	%	No	%	No	%		
Total	8	22.2	28	77.8	14	38.9	22	61.1	1.64	0.2

*significant at p-value<0.05

Figure (4): Distribution of the studied nurses according to their total performance regarding pediatric patients' safety at pediatric health care settings (n=36).

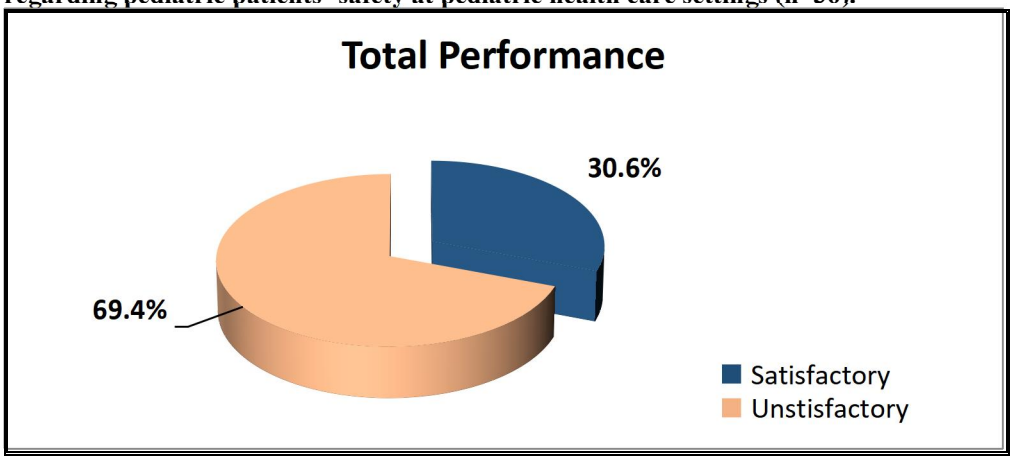

Table (5):Correlation between Nurses' total knowledge and total practice

Variable	Nurses' total Knowledge	
	r	P
Nurses' total Practice	0.1	0.52

r-Pearson Correlation Coefficient.

p-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant

Discussion:

The care of children with cancer is a highly specialized field which requires well-educated, trained and dedicated nurses to provide high-quality care. As such, nurses working in pediatric oncology settings need to be well prepared to perform their roles with confidence for successful team coordination and positive patient outcomes. However, the lack of nurses with pediatric oncology education and skills has been identified as a major challenge to the implementation of evidence-informed oncology nursing care (**Majamanda et al., 2023**).

Based on the results of the current study, less than two fifths of the studied nurses' age ranged from 22 to less than 27 years with $\bar{x}$ ± SD 32.3±9.1 years old. These findings were incongruent with the study done by ***Bayoumi and El-Nagger., (2020)*** about "Effectiveness of Implementing Evidence Based Practices Guidelines regarding Blood Transfusion on Quality of Nursing Care and Patients' Safety in Pediatric Units" including 95 pediatric nurses at Ain Shams University Hospitals and reported that more than two fifths of the studied nurses aged 25 to less than 30 and their mean age was 30.99 ± 6.12 years. This finding may be due to the appointment of new staff is usually from the newly graduated nurses each year in the hospital.

The current study results clarified that more than half of nurses were females. These results were in an agreement with results of ***Mohamed (2021),*** who studied "Pediatric Nurses' Perception regarding the Relation between Patient Safety Culture and Work Environment" involving 65 pediatric nurses working in pediatric units at Zagazig University Hospitals and found that all the studied nurses in the study were females. This might be due to the greater fraction of the nurses in Egypt were females and also related to the studying of nursing in the Egyptian universities was exclusive for females only till few years ago.

Regarding to the educational level of nurses, the results of current study revealed that less than to two thirds of the studied nurses were graduated from nursing technical institute. This finding was contradicted by ***Mohamed and Abdalla (2022),*** who conducted a study about " Effectiveness of Nursing Guidelines on Nurses' Performance regarding High Alert Medications at Neonatal Intensive Care Units " including 80 nurses at Ain Shams University Hospitals and mentioned that half of the nurses had a technical nursing degree. This might be due to that a lot of bedside nurses in the hospital were graduated from technical nursing institute affiliated to National Cancer Institute, Cairo University.

It was evident from the current study that near to two fifths of the studied nurses had experience less than 5 years with $\bar{x}$ ± SD 10.2±9.1years. The current study result was supported by the Egyptian study held by ***Soliman et al., (2018)*** who studied "Impact of Educational Program on Nursing Care for Children suffering from Wilms' Tumor" in Children Cancer Hospital (57357) including 60 staff nurses and found that more than two thirds of nurses had 1-5 years with mean score 5.78±4.74 years of experience in caring for children suffering from cancer. This result probably due to the young age of the studied nurses.

Findings of the current study highlights that less than three quarters of the studied nurses did not attend any previous training program about pediatric patient safety. In the same field, a study made in Egypt by ***Ali et al. (2019)*** who carried out a study about "Nurses' Knowledge, Practices and Attitudes about Children Safety Measures" at Minia University on 45 nurses and found that the majourity of the studied nurses didn't receive training programs related to children safety. From the researcher point of view, this result might be due to that, the hospitals are not offering continuous training and education for their nursing staff in addition to increasing workload.

As regards to the studied nurses total knowledge about pediatric patients' safety, the results of the current study indicated that more than three quarters of the studied nurses had unsatisfactory total knowledge regarding pediatric patients' safety compared with less than one quarter reported satisfactory total knowledge at pediatric health care settings. The present finding supported by ***Adly et al., (2020)*** who conducted a study about "Assessment of Nurses' Knowledge and Practices regarding the Application of Safety Standard Precautions in Pediatric Critical Care", who reported two thirds of the study nurses had unsatisfactory total knowledge regarding the application of safety standard precautions in pediatric critical care.

In addition, this study was in an accordance ***Mady et al. (2017)*** who studied "Assessment of the Dimensional Application of International Safety Goals for Children in Hospitals" at Ain Shams University Hospitals and Health Insurance Hospital in Nasr city on 100 nurses, who reported that more than half of studied sample have poor knowledge regarding patient safety, and more than one third has average knowledge, while the rest of them have good knowledge regarding patient safety. These findings might be due to the fact that there were, all the studied nurses didn't attained any training courses regarding pediatric patients' safety.

It was evident from the current results of the study's that more than three fifths of the studied nurses had incompetent total practice regarding pediatric patient' safety. These findings were supported by the results of the study done by ***Ali et al., (2019)*** and showed that the majority of the studied nurses have unsatisfactory practices related to children safety. This may due to heavy workload and lack of motivation for nurses to update their pracrice. The researcher beliefs that, incompetent nursing practices may be due to the majority of the studied nurses had unsatisfactory knowledge regarding pediatric patients' safety. In addition to absence of training courses to improve the practical nursing skills provided to pediatric nurses.

In assessing the studied nurses total performance regarding pediatric patient' safety at PHCS, the findings of the current study represented that, there was no statistical significant difference between the studied nurses' total knowledge and practice. This results was agreed with ***Shahzeydi et al., (2023)*** who studied " Evaluation of Nurses' Knowledge and Performance regarding Preparation and Injection of Intravenous Drugs in Pediatric Wards in Iran ", and reported that the mean knowledge and pharmacological performance of nurses working in pediatric wards in different areas of the principles of medicine were not at the desired level, and this can affect children adversely. From the research's point of view, the findings of the present study may be attributed to several factors, including the staff shortage, work overload and a lack of knowledge about pediatric patient safety as a result of a lack of training programs.

Regarding to correlation between nurses' total knowledge and total practices, findings of the current study revealed that, there is no statistically significant correlation between total of nurses' knowledge and practices regarding pediatric patient' safety at PHCS. This finding was disagreed with ***El-Fadel et al., (2022)*** who studied "Nurses' Knowledge and Practices regarding Care of Children Undergoing Vascular Access and its Related Complications" and found that there was a positive statistical correlation between total level of nurses' knowledge and practice towards care for children undergoing Vascular access devices. From the researcher's point of view, unsatisfactory level of knowledge is associated with uncompetent level of nurses' practice.

Conclusion:

Based on the results of the current study, it can be concluded that more than two thirds of the studied nurses had unsatisfactory total performance regarding pediatric patient safety at pediatric health care settings. There was no statistically significant correlation between nurses' total knowledge and their total practices.

Recommendation:

In the ligh of the study findings, the following recommendations are suggested:

- Periodical assessment for pediatric oncology nurses' performance regarding pediatric patients' safety.
- Continuous supervision and evaluation is needed during application of any practice that affect pediatric patient safety.
- Designing and implementaing education programs to improve nurses' knowledge and practices about pediatric patient safety.
- Replicate conducting the study for better generalization of the study resultes.

References:

Adly, R., Ismail, S., & Saleh, S. (2020). Assessment of Nurses' Knowledge and Practices regarding the Application of Safety Standard Precautions in Pediatric Critical Care. *International Journal of Novel Research in Healthcare and Nursing*, 7(3): 524-543.

Ali, H., Abed-El-kreem, H., & Abolwafa, N. (2019). Nurses' Knowledge, Practices and Attitudes about Children Safety Measures. *Minia Scientific Nursing Journal*,

6(1): 90-100. Doi: 10.21608/msnj.2019.187806

Alyan, R. H. A., Ouda, W. E., & Mosbah, A. N. (2014). Effect of Nursing Intervention on Child Safety at Pediatric Health Care Settings. [Unpublished doctoral dissertation]. Faculty of Nursing, Ein Shams University, Cairo, Egypt.

Aydemir, A., & Koç, Z. (2023). Factors affecting Patient Safety Culture and Attitudes in Emergency Nurses. *East Mediterr Health J,* 29(3): 195-204. https://doi.org/10.26719/emhj.23.026

Bayoumi, O., & El-Nagger, N. (2020). Effectiveness of Implementing Evidence based Practices Guidelines regarding Blood Transfusion on Quality of Nursing Care and Patients' Safety in Pediatric Units. *Journal of Nursing Education and Practice,* 10(10): 33-45. DOI: https://doi.org/10.5430/jnep.v10n10p33

Centers for Disease Control and Prevention (CDC). (2020). Checklist for personal protective equipment. Available at https://wtcs.pressbooks.pub/nursingskills/chapter/4-7-checklist-for-personal-protective-equipment-ppe/ Accessed at 9/4/2023.

Donaghy, C., Doherty, R., & Irwin, T. (2018). "Patient Safety: A Culture of Openness and Supporting Staff Surgery" (Oxford) 2018, 36, 509–514.

El-Fadel, R. A., Ouda, W. E., Said, K. M., & Abd El- Aziz, S. M. (2022). Nurses' Knowledge and Practices regarding Care of Children Undergoing Vascular Access and its Related Complications. *Journal of Nursing Science Benha University,* 3(1): 981-995. Doi: 10.21608/jnsbu.2022.215877

El-Sayed, Z., & Bayoumi, O. (2020). Enhancement of Pediatric Patients' Safety Culture: Effect of Implementing, a Guideline Plan on Pediatric Nurses' Performance. *IOSR Journal of Nursing and Health Science*, 9(1): 56-66.

El-Shazly, A. N., Al-Azzouny, M. A., Soliman, D. R., Abed, N. T., & Attia, S. S. (2017). Medical Errors in Neonatal Intensive Care Unit at Benha University Hospital, Egypt. *Eastern Mediterranean Health Journal,* 23(1): 44-50.

Mady, H ., El-Rafy , S., & Tantawi, H. (2017). Assessment of the Dimensional Application of International Safety Goals for Children in Hospitals. *Egyptian Journal of Health Care,* 8(2): 329-350. Doi: 10.21608/ejhc.2017.23421

Majamanda, M. D., Chisoni, F., Selemani, A., Kearns, I., & Maree, J. (2023). Paediatric Oncology Oursing Education and Training Programmes: A Scoping Review Protocol. *BMJ Open,* 13(10):e070694. Doi: 10.1136/bmjopen-2022-070694.

Mamdouh, E. A., Mohamed, H. S., & Abdelatief, D. A. (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. Doi: 10.21608/ejhc.2020.72596

Mohamed, H., & Abdalla, S. (2022). Effectiveness of Nursing Guidelines on Nurses' Performance Regarding High Alert Medications at Neonatal Intensive Care Units. *Evidence-Based Nursing Research*, *4*(2):54-63. https://doi.org/10.47104/ebnrojs3.v4i2.241

Mohamed, S. M. M. (2021). Pediatric Nurses' Perception Regarding the Relation between Patient Safety Culture and Work Environment**.** *Egyptian Journal of Health Care,* 12(2): 1954-1963. Doi: 10.21608/ejhc.2021.303292

Observed Structured Clinical Examination (OSCE). (2020). Blood Transfusion Checklist. Available at https://geekymedics.com/wp-content/uploads/2020/10/OSCE-Checklist-Blood-Transfusion.pdf**.** Accessed at 12/5/2023

Observed Structured Clinical Examination (OSCE). (2023). Administering Intravenous (IV) Medication. Available at https://geekymedics.com/administering-intravenous-iv-medication-osce-guide/. Accessed at 23/4/2023.

Parzianello, A., Fornasier, G., Kiren, V., Pigato, F., Orzetti, S., Zamagni, G., Arbo, A., Baldo, P., Rossi, P., & Rabusin, M., et al. (2024). Improving Drug Safety in Pediatric and Young Adult Patients with Hemato-Oncological Diseases: A Prospective Study of Active Pharmacovigilance. *Pharmaceuticals,* 17: 106. https://doi.org/10.3390/ph17010106

Pickering, D. & Marsden, J. (2015). Techniques for Aseptic Dressing and

Procedures. *Community Eye Health,* 28(89): 17.

Shahzeydi, A., Kalhor, F., Khaksar, S., Sabzghabaee, A. M., Joonbakhsh, F., & Ajoodanian, N. (2023). Evaluation of nurses' knowledge and performance regarding preparation and injection of intravenous drugs in pediatric wards in Iran. *BMC Pediatr,* 23(1):531. Doi: 10.1186/s12887-023-04336-z.

Soliman, E., Al-Sharkawi, S., Younes, A., & Mahmoud, F. (2018). Impact of Educational Program on Nursing Care for Children Suffering from Wilms' Tumor. *Egyptian Journal of Health Care*, 9(2): 161-175. Doi: 10.21608/ejhc.2018.15528

Wilkinson, J. M., Treas, L. S., Barneft, K. L., & Smith, M. H. (2016). Procedure Checklists for Fundamentals of Nursing. 3rd edition. F. A. Davis Company, Wilkinson & Treas. Philadelphia. Pp: 83-84.