Effect of Guidelines regarding Patients' Safety on Nurses' Performance in Hemodialysis Unit at Benha University Hospital

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Abstract

Background: Patients' safety guidelines in dialysis Settings should be applied which are Guidelines regarding patients' safety on nurses' performance in the hemodialysis unit at Benha University Hospital. **Aim of the study:** Was to evaluate effect of guidelines regarding patients' safety on nurses' performance in Hemodialysis Unit at Benha University Hospital. **Design:** Quasi-experimental research (pre/post) design was utilized to conduct the aim of this study. **Setting:** The study was conducted in Hemodialysis Unit at Benha University Hospital. **Sample:** all available nurses (60) from both sexes who are working at the previous mentioned setting. **Tools:** Three tools are used; **Tool I:** Nurses' structured interviewing questionnaire, **Tool II:** An Observational checklist for patients' safety measures in dialysis unit, and **Tool II:** Safety Attitude Questionnaire. **Results:** There was statistical significant differences between nurses' knowledge 13.3% of the studied nurses had satisfactory level of total knowledge before implementation of guidelines. While improved to 90.0% after implementation of guidelines, concerning nurses' practices regarding patients' safety, 16.7% of the studied nurses were competent before implementation of guidelines, while improved to 86.7% after implementation of guidelines and 30.0% of the studied nurses had positive attitude before implementation of guidelines, while improved to 91.7% after implementation of guidelines. **Conclusions:** Implementing of the guidelines had significant improvement in nurses knowledge, practices and had a positive attitude than pre guidelines implementation. **Recommendations:** Continuous evaluation of nurses in hemodialysis units as a method of forcing self-maturation trough education and gaining new knowledge related to their working field.

Key words: Guidelines, Hemodialysis Unit, nurses' performance, patients' safety.

Introduction

Dialysis is a treatment for the individuals whose kidneys are failing. There are two types of dialysis, hemodialysis and peritoneal dialysis, that both perform normal kidney functions, filtering waste and excess fluid from the blood. It is a form of renal replacement therapy, where the kidney's role of filtration of the blood is supplemented by artificial equipment, which removes excess water, solutes, and toxins. Dialysis ensures maintenance of homeostasis in people experiencing a rapid loss of kidney function (**Harsvardhan et al., 2023).**

Hemodialysis (HD) is the greatest public method of dialysis. The HD is the process of removing metabolic waste and water from blood by a semipermeable membrane by a machine. This machine is often referred to as a synthetic kidney**.** Although effective hemodialysis and it gives patients hope for life indefinitely, there are many adverse events that may be life-threatening during it. Keeping patient's safety in the dialysis environment is a major concern for the

patients and nurses. Therefore, improving the safety culture in the dialysis units is a prerequisite for reducing errors **(Amer et al., 2022).**

The international patient safety goals (IPSG) have become a critical method by that the joint commission international promotes and enforces major changes in patient safety. IPSG were established to assist health care organizations to address specific areas of concern regarding patient safety, that include; 1st goal: Identifying patient correctly, 2nd goal: Improving effective communication among health care givers, 3rd goal: Improving the safety of high alert medications, 4th goal: Ensuring correct site, correct procedure and correct patient surgery, 5th goal: Reducing the risk of healthcare associated infections and finally 6th goal: Reducing the risk of patient harm resulting from falls **(Hadad et al., 2021).**

Hemodialysis treatment facilities are complex and involve multiple care providers, advanced technologies, and multiple patients with extensive comorbidities. Water quality, dialyzer reuse, infection control, intradialytic hypotension, vascular access complications, medication errors, and miscommunications among staff members and with patients are examples of potential safety risk areas in hemodialysis units. Patient safety is an important foundation of high-quality care, and fostering a culture of safety in hemodialysis units is an essential requirement for minimizing patient risks for harm, preventing or reducing errors, and improving the quality of care rendered **(Hassan et al., 2020).**

Hemodialysis (HD) units are not similar to other hospital sections, the probability of infection transmission to patients is more by

extended blood exposures, and they receive care from more than nurse during the same session. So, it is important application of infection control measures as; hand hygiene in each one of its opportunities at Hemodialysis unit. Infections in the dialysis units can be reduced by strict adherence to Infection Control measures as aseptic technique, disinfection procedures, equipment maintenance and proper monitoring of all procedures in which microbial contamination may occur **(Goma et al., 2021).**

Nurses are the cornerstone of managing HD patients safely in health care settings. Nurses need to ensure they provide a high standard of hemodialysis practice by delivering safe and effective patient care in a supportive and comfortable environment. They have an essential role in breaking the chain of infection through compliance with infection prevention and control practices. Unfortunately, sometimes nurses utilize optional approaches of the infection prevention and control practices. Constant training programs must be made by the health care settings to apply evidence based practices to prevent and control infection **(Abdel Monem et al., 2022).**

Significance of the study

World Health Organization (WHO) reported about 1,400,000 from worldwide had healthcare associated infections and 40% from this number occurred in developed countries reported that, annually about 74 from each millions of Egyptian population had renal failure in its end stage. While, documented that, about 264 per million of renal patients underlying dialysis. Egyptian Health Survey showed that about 10% from Hemodialysis patients at high risk of

infections as HCV infection **(Gamal et al., 2021).**

Aim of the study:

This study aimed to evaluate effect of guidelines regarding patients' safety on nurses' performance in the hemodialysis unit at Benha University Hospital.

Research hypotheses:

- H1- Nurse's knowledge percentage scores regarding patients' safety in hemodialysis unit could be improved after implementing guidelines than before.
- H2- Nurses' practice percentage scores regarding patients' safety in hemodialysis unit could be improved after implementing guidelines than before.
- H3- Nurse's attitude percentage scores regarding patients' safety in hemodialysis unit could be changed after implementing guidelines than before.

Subject and Methods

Research design:

Quasi-experimental research pre/ post design was utilized to conduct the current study. This design is aimed to evaluate interventions but that do not use randomization. Similar to randomized trials, quasi-experiments aim to demonstrate causality between an intervention and an outcome. **(Maciejewski, 2020).**

Setting:

The study was conducted in hemodialysis unit at Benha University Hospital. It locates in the second floor of the medical building. The dialysis unit include 35 beds and divided into two rooms: one for patients with positive virus C that contain 13 beds and the others for negative virus C patients. Also, the unit contain five rooms divided into one room for catheter insertion, two rooms for supplies store, one room for nurses'

supervisor and one room for headmaster of the unit.

Subjects:

Convenience sample of all available nurses (60) from both sexes who are working at the previous mentioned setting during the time of the data collection and agreed to participate in this study.

Tools of data collection:

Three tools were used to conduct the study
Tool I: Nurses' structured interviewing questionnaire: this tool was designed by the researcher after reviewing the related and recent literature such as **New et al., (2019), Jung & Roh, (2020) and Mohamed et al., (2021)** to assess nurses' knowledge regarding patients' safety in hemodialysis unit and it is presented in simple Arabic items related to different aspects. It is consisted of two parts:

Part I:- Nurses' personal data: This part was aimed to identify nurses' personal data consisted of their age, gender, qualification, marital status, years of experience and training courses related to patients' safety in hemodialysis unit.

Part II:- Nurses' knowledge assessment: This part is divided into knowledge related to patient' safety measures in hemodialysis unit, nursing management regarding hemodialysis and standard precautions for infection control. This part is designed into multiple choice questions. It contain 50 questions which is divided as:

- Nurses' knowledge regarding patients' safety measures. (11 questions).
- General knowledge regarding hemodialysis. (15 questions).
- Nursing management before, during and after hemodialysis session. (16 questions).
- Nurses' knowledge regarding infection control measures. (8 questions).

Effect of Guidelines regarding Patients' Safety on Nurses' Performance in Hemodialysis Unit at Benha University Hospital

Scoring system for knowledge:

The score distributed as: each correct answer was given one mark and each incorrect answer was given 0 Total knowledge scores=50 degree (100 %) that divided into the followings:

- ≥ 85% (42-50 score) graded as satisfactory level of knowledge.
- < 85% (0-42 score) graded as unsatisfactory level of knowledge.

Tool II: Nurses' Observational checklist for patients' safety measures in dialysis unit: It is designed by the researcher after reviewing related literature as **Chandak et al., (2016), Lessa et al., (2018) Alshammari et al., (2020) and Odom et al., (2021).** This tool aimed to assess the nurses' practices regarding patients' safety measures in hemodialysis unit. It included three parts:

1. **Safety measures in the dialysis sessions which included:**
- Pre session safety checks. (10 steps).
- The role of the nurse during dialysis session. (7 steps).
- The role of the nurse in post dialysis session. (7 steps).
2. **Arteriovenous fistula care (before, during and after hemodialysis). (16 steps).**
3. **Central venous catheter care. (21 steps).**

Scoring system:

The score of practice ranged from (0) to (1), each statement scored as following: (1) if done and (0) if not done. The total score of practice of 61 degree was classified into two level:

- The total practice were consider competent if the score of the total practice ≥ (52) degree.

- The total practices were considered incompetent if the score of the total practice < (52) degree.

Tool III:- Safety Attitude Questionnaire (SAQ): The Safety Attitude Questionnaire (SAQ) sheet was adapted from **Sexton et al., (2000)** and used to measure nurses' safety attitude regarding safety measures in hemodialysis unit. It included six domains:

- Teamwork domain (6 items).
- Safety climate domain (5 items).
- Job satisfaction domain (6 items).
- Stress recognition domain (4 items).
- Perception of management domain (4 items).
- Working conditions domain (4 items).

Scoring system:

Scoring system was using a Likert scale to score (disagree=0, Neutral=1, Agree=2). The total score= 58. The score of the items was summed up and the total divided by the researcher, giving a mean score for the part. These scores were converted into percent score. The attitude was considered as:

- Positive attitude if the score of total attitudes ≥ (60%) ≥ 33degree
- Negative attitude if it is < (60%) <33degrees.

Content validity:

Content validity of suggested tools was done a jury of five experts in Medical Surgical Nursing in Faculty of Nursing Benha University; three assistant professor and two lecturer to determine whether the included items are clear and suitable to achieve the aim of the current study.

Reliability of tools:

Testing the reliability of the tools through Alpha Cronbach reliability analysis. Tool I = 0.834 , Tool II = 0.801 and Tool III =0.791.

Ethical consideration:

Permission to carry out the study was obtained from responsible authorities in the Faculty of Nursing at Benha University and hospital administration personnel. The research approval was approved by Scientific Ethics Committee in the Faculty of Nursing Benha University. An official permission obtained from medical director of Benha University Hospital and head nurse of Hemodialysis Unit at Benha University Hospital Oral and written consent was obtained from the studied nurses in order to participate in the study. The aim of the study was explained to all nurses, and they were reassured that all information will be confidential and should be written within anonymity form and it will be used only for their benefit and for the research purpose. The studied nurses also informed that they are allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time without any reasons giving. The research tool will not cause any harm for participants.

Field work:

Preparatory phase:

• Before conducting the study, an exploratory visit was done to the dialysis unit at Benha University Hospital in order to estimate total number of nurses and suitable time for collecting data.

• An interview was conducted with head nurses of the previous mentioned setting to inform them about the purpose of the study, and request their assistance to facilitate the work.

• Interviewing the nurses before starting data collection was conducted to establish a good communication with them, explain the aim and nature of the study was done for them.

Assessment phase:

• Data was collected from the beginning of March 2022 to the end of Mai 2022 at morning and afternoon shifts three days/week (Saturday, Monday and Wednesday). Assessment of the nurses' practical skills through observational checklists (tool II) were done by the researcher.

• After assessing nurses' practice the researcher started to assess the nurses' knowledge through structured interviewing questionnaire (Tool I) was given to each nurse to fill it and time required for completion of the questionnaire was 15 minutes.

• After assessing nurses' knowledge the researcher started to assess the nurses' attitude through safety attitude questionnaire (Tool III) was given to each nurse and time required for completion it was 10 minutes.

Implementation phase:

• After gathering the initial information and determining the deficits of nursing staff in hemodialysis unit from pre-guidelines assessment, informs staff nurses about guidelines.

• The educational booklet was discussed with nurses by the researcher individually. The total number of nurses examined was 60, split into small groups (6 groups). Each group had 10 nurses. Each group of nurses selected the most convenient hour, which was the most appropriate time throughout the day for nurses. The researcher participated three days/weak from 3 p.m. to 5 p.m. For four sessions, the researcher met each group. Two theoretical sessions and two practice sessions. Each session lasted from 30 to 45 minutes, including the discussion time. Each session began with a short review of

what was delivered during the previous session, then the goals of the new themes, taking into account the use of simple language to further the education of all nurses.

- Teaching techniques included group discussion, instructions and example during sessions. The nurses offer questions to rectify any misunderstandings at the conclusion of each session.

Evaluation phase:

The post test for nurses' knowledge, practice and attitude was done by using the same tools of the pretest to determine the effect of implementation of the protocol. This was done immediately after the intervention. posttest take one month.

Statistical Analysis:

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation). Qualitative variables were compared using qui square test (x2) as the test of significance, and paired (t) test was used to compare between quantitative variables. Correlation coefficient test (r) was used to test the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.01$. No statistical significance difference was considered when $p > 0.05$.

Results:

Table (1) shows that, 50.0% of the studied nurses were aged between 30-<40 years old with mean age of 31.08±6.93 years; females were more prevalent and constituted 83.3% of the studied nurses. Also, 55.0% of them had technical institute of nursing. Moreover, 75.0% of them were married. Furthermore, 40.0% of studied nurses had years of experience in hemodialysis unit between 5-<10 years with mean experience of 6.75±4.90 years. In addition, 6.7% of studied nurses attended training courses related to patient safety in the dialysis unit, 75.0% of them attended one course.

Figure (1) shows that, 13.3% of the studied nurses had satisfactory level of total knowledge about patients' safety in hemodialysis unit before implementation of guidelines. While improved to 90.0% after implementation of guidelines.

Figure (2) shows that, 16.7% of the studied nurses were competent regarding patients' safety in hemodialysis unit before implementation of guidelines, while improved to 86.7% after implementation of guidelines.

Figure (3) shows that, 30.0% of the studied nurses had positive attitude regarding patients' safety in hemodialysis unit before implementation of guidelines, while improved to 91.7% after implementation of guidelines.

Table (2) shows that, there were high significant statistical positive correlation between total nurses' knowledge, practice and their attitude regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines at = p< 0.001.

Zeinab Eldemerdash Soliman1, Sabah Said Mohammed, and Ola Ahmed Mahmoud

Table (1): Frequency distribution of the studied nurses according to their Personal data (n=60).

| Personal data of the studied nurses	No.	%
Age (years)		
20-<30	24	40.0
30-<40	30	50.0
≥ 40	6	10.0
Mean ±SD	**31.08±6.93**	
Gender		
Male	10	16.7
Female	50	83.3
Qualification		
Nursing Diploma	12	20.0
Technical Institute of Nursing	33	55.0
Bachelor of Nursing	13	21.7
Postgraduate studies	2	3.3
Marital status		
Single	11	18.3
Married	45	75.0
Widowed	3	5.0
Divorced	1	1.7
Number of years of work experience in hemodialysis unit		
<5 yrs.	18	30.0
5-<10 yrs.	24	40.0
10-<15 yrs.	12	20.0
≥ 15 yrs.	6	10.0
Mean ±SD	**6.75±4.90**	
Attending training courses related to patient safety in the dialysis unit		
Yes	**4**	**6.7**
No	56	93.3
If yes, how many training courses were attended? (n=4).		
One	3	75.0
Two	1	25.0
Three	0	0.0
More than three	0	0.0

Effect of Guidelines regarding Patients' Safety on Nurses' Performance in Hemodialysis Unit at Benha University Hospital
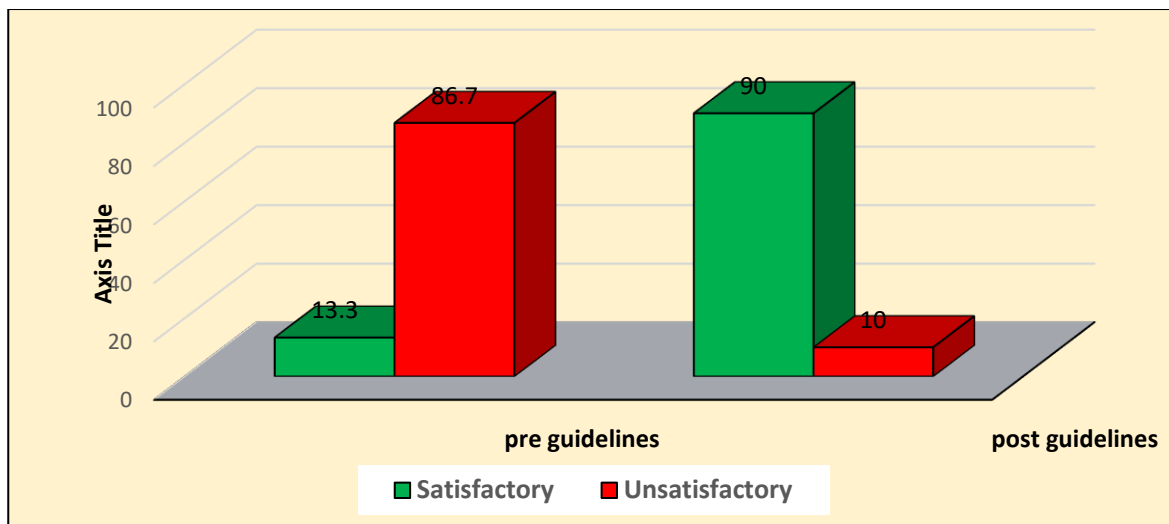
Figure (1): Percentage distribution of total nurses' knowledge regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines (n=60).
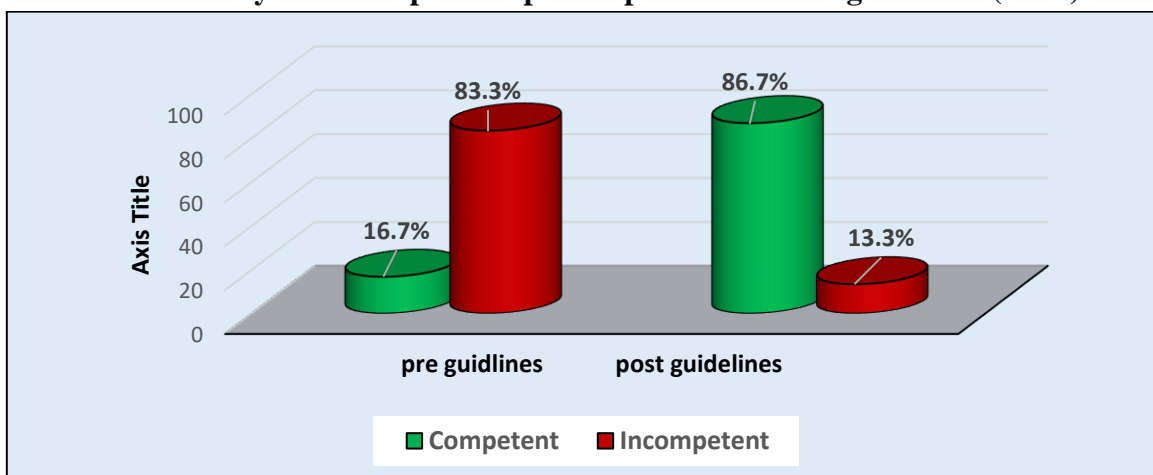
Figure (2): Percentage distribution of total nurses' practices regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines (n=60).
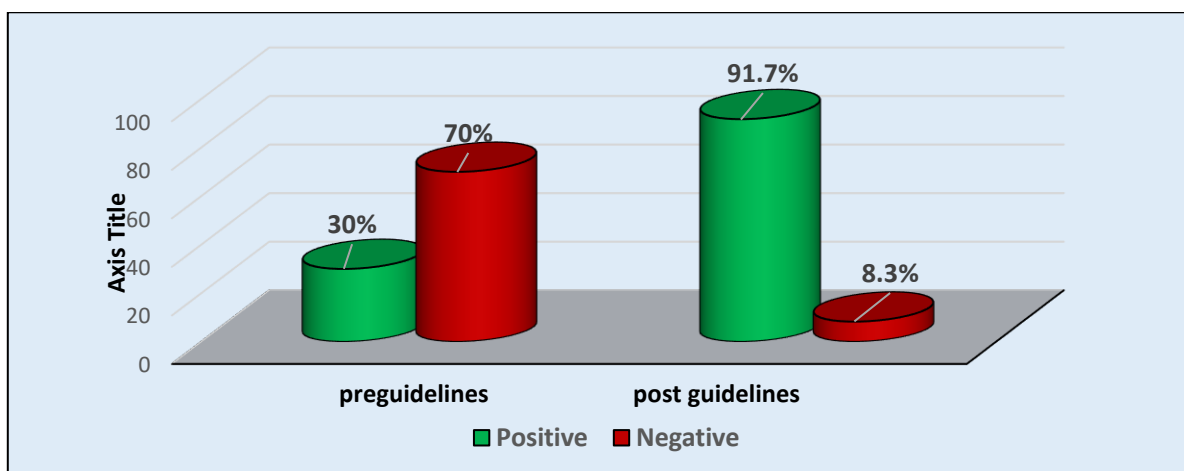
Figure (3): Percentage distribution of total nurses' attitude regarding patients' safety in hemodialysis unit at pre bend post implementation of guidelines (n=60).

Zeinab Eldemerdash Soliman1, Sabah Said Mohammed, and Ola Ahmed Mahmoud

Table (2): Correlation between total nurses' performance regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines (n=60).

Variables		Total nurses' knowledge	
		Pre	Post
Total nurses' practice	**r**		
	p		
Total nurses' attitude	**r**	0.989	0.933
	p	0.000**	0.000**

Discussion

Patient safety is the keystone of a high quality of healthcare. Much of work defining patient safety and practices that stop harm have focused on undesirable outcomes of care, such as morbidity and mortality. Nurses are essential to the surveillance and coordination that reduce such adverse outcomes. Multiple safety risks are readily apparent in dialysis units such as water quality, infection control, inadequate hand hygiene, and faulty machine and equipment disinfection. So improving the culture of safety in dialysis units is an essential requirement for minimizing patient risks for harm, preventing or reducing errors, and improving the quality of care rendered **(Albreiki et al., 2023).**

The results of the present study revealed that half of the studied nurses were aged between 30-<40 years old with mean age of 31.08±6.93 SD that mean standard deviation years. Regarding gender of the studied nurses, the current study revealed that females were more prevalent and constituted most of the studied nurses. Additionally, the current study showed that more than half of the studied nurses them had technical institute of nursing. Moreover three quarters of them were married. Regarding years of experience of the

nurse, the present study illustrated that more than one third of the studied nurses had years of experience in hemodialysis unit between 5-<10 years with mean experience of 6.75±4.90 years Concerning attendance of training courses related to patient safety in the dialysis unit of the studied nurses, the findings of the current study revealed that the minority of the studied nurses attended training courses related to patient safety in the dialysis unit, three quarters of them who attended had one course.

Regarding years of experience of the studied nurse, the present study illustrated that more than one third of the studied nurses had years of experience in hemodialysis unit between 5-<10 years with mean experience of 6.75±4.90 years. This finding may be due to most of the studied nurses were recently graduated. This result is in the same line with **Narouz & Hanafy (2019)** in their study entitled" Effect of an instructional program about selected patient safety guidelines on nurses' knowledge and self-reported practice at a government hospital-Egypt" and his results showed that less than half of the nurses had experience ranged from 5- <10. The point of the researcher view is this result may be due to more than half of the studied nurses had no training before starting to work in hemodialysis unit of nursing may don't have enough information about all items of

care needed to the patient on hemodialysis and the educational guidelines was effective in improving their level of knowledge.

This result agrees with **Saleh et al., (2018)** who studied "Nurses compliance to standards of nursing care for hemodialysis patients: Educational and training intervention" and demonstrated that one quarter of the studied nurses reported low knowledge to nursing care for hemodialysis patients, while they reported good level of knowledge after the educational and training intervention.

Regarding total nurses' knowledge regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines, the current study results illustrated that the minority of the studied nurses had satisfactory total level of knowledge about patients' safety measures in hemodialysis unit and nursing care before implementation of guidelines. While improved to the majority of them after implementation of guidelines with a highly statistically significant difference. Also support the first hypothesis. From the researcher point of view, this result may be attributed to lack of awareness of the studied nurses about all aspects of safety measures which increased in the post- test of the educational guidelines that indicates it was effective in improving level of knowledge among the studied nurses.

This result is similar with the result of study performed by **El-Aziz et al., (2018**) who stated that the mean score of total knowledge was increased post guidelines implementation than before. Also, these findings are in harmony with **Ismail & Ismail (2020)** who studied "Effectiveness of developed patients safety guidelines on nurses performance and patients' outcomes

at hemodialysis and intensive care units " and found that most of the nurses had improved knowledge score level regarding all safety measures at their units in the post-test compared to the pre-test.

Regarding to total nurses' practices regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines, the present study found that the minority of the studied nurses were competent regarding patients' safety in hemodialysis unit before implementation of guidelines, while improved to most of them after implementation of guidelines. This result support the second research hypothesis. This study result reflects the success of the educational guidelines attributed to the effectiveness of the used materials that contained many information that made nurses aware of all the details about nursing practice needed for hemodialysis patients. When the information has improved, their practice become better.

This finding is matching with **El-Aziz et al., (2018)** which affirmed that there was an obvious improvement performance regarding patient safety in hemodialysis among nurses between pre versus post-test I and between pre versus post-test II due to the effectiveness of teaching methods provided to them.

According total nurses' attitude regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines, the present study revealed that more than one quarter of the studied nurses had positive attitude regarding patients' safety in hemodialysis unit before implementation of guidelines, while improved to the majority of them after implemention of guidelines. This result supported the third research

hypothesis. This result may be attributed to post educational guidelines provided to the studied nurses helped them to improve their perception regarding different aspects of their work condition in hemodialysis units. This result is congruent with the study achieved by **Abdelwahab et al., (2019)** who found that most of the studied nurses had satisfactory level attitude of nurses at hemodialysis units post education program.

Concerning correlation between total nurses' knowledge, practice and their attitude regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines, the present study illustrated that there were high significant statistical positive correlation between total nurses' knowledge, practice and their attitude regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines.

From the researchers' point of view, this association is explained by the improvement in knowledge reflected in the improvement in practice and attitude. Also, mean when the studied nurses had sufficient knowledge they can practice well and have a good perception. Consequently, this reflected the success of educational guidelines and their positive effect. These results suggested that skills may be easily enhanced, particularly if they were connected with their relevant scientific base of knowledge.

This result is supported with a study performed by **Ahmed et al., (2019)** who conducted a study about "The effect of educational program about infection control precautions for nurses in hemodialysis units" concluded that there were statistical significant differences between nurses' knowledge, and their attitude and practices at pre and post- program

Conclusion:

The studied nurses had positive attitude regarding patients' safety in hemodialysis unit. At post implementation of guidelines there was statistically significant relation between total nurses' knowledge, practice and attitude of studied nurses and all their personal data except gender, education level and attendance training courses related to patients' safety in the dialysis unit. There was highly significant positive correlation between nurses' knowledge, practice and their attitude regarding patients' safety in hemodialysis unit at pre and post implementation of guidelines at $(P = < 0.01)$.

Recommendations:

- Insure the adherence of nurses in hemodialysis units to developed through , booklet of patient safety guidelines available for each nurse,

- Refreshment of training courses regarding patient safety obligatory to nursing staff.

- Continuous evaluation of nurses in hemodialysis units as a method of forcing self-maturation trough education and gaining new knowledge related to their working field.

- Apply the guidelines other places and with a large sample to enhance and confirm the current results.

- Follow up on nurses' and other health team suggestions with of the hemodialysis units.

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تأثير الإرشادات المتعلقة بسلامة المرضى على أداء التمريض في وحدة غسيل الكلى بمستشفي بنها الجامعي

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تعتبر سلامة المرضى مسألة ذات اهتمام متزايد وعنصرًا أساسيًا في جودة الرعاية الصحية. يطالب المرضى والمهنيون الصحيون برعاية صحية آمنة وفعالة وفعالة. تهدف هذه الدراسة إلى تقييم تأثير المبادئ التوجيهية المتعلقة بسلامة المرضى على أداء الممرضين في وحدة غسيل الكلى في مستشفى بنها الجامعي. تم استخدام تصميم البحث شبه التجريبي لتحقيق هدف هذه الدراسة أجريت الدراسة بوحدة غسيل الكلى بمستشفى بنها الجامعي. تم استخدام عينة ملائمة من جميع الممرضين المتاحين (60) من كلا الجنسين الذين يعملون في البيئة المذكورة أعلاه خلال وقت جمع البيانات ووافقوا على المشاركة في هذه الدراسة. قد اسفرت النتائج ان تبين أن 13.3٪ من الممرضات الذين شملتهم الدراسة كان لديهم مستوى مرض من المعرفة الإجمالية حول سلامة المرضى في وحدة غسيل الكلى قبل تنفيذها. بينما تحسنت إلى 90.0% بعد تنفيذ الارشادات. وفيما يتعلق بممارسات التمريض الإجمالية فيما يتعلق بسلامة المرضى في وحدة غسيل الكلى قبل وبعد تطبيق الارشادات، أظهرت أن 16.7% من العينه كن أكفاء فيما يتعلق بسلامة المرضى في وحدة غسيل الكلى قبل تطبيق ارشادات سلامه المريض، في حين تحسنت إلى 86.7% بعد التنفيذ. وفيما يتعلق باتجاه التمريض فيما يتعلق بسلامة المرضى في وحدة غسيل الكلى قبل وبعد تنفيذ الارشادات، فقد أظهرت أن 30.0% من الممرضات الذين شملتهم الدراسة كان لديهم موقف إيجابي بشأن سلامة المرضى في وحدة غسيل الكلى قبل تطبيق الارشادات، في حين تحسنت إلى 91.7%. بعد تنفيذها. كانت هناك علاقة إيجابية ذات دلالة إحصائية عالية بين إجمالي معرفة الممرضين وممارستهم ومواقفهم فيما يتعلق بسلامة المرضى في وحدة غسيل الكلى عند تنفيذ الارشادات. وقد اوصت الدراسه بالتقييم الفعال لأداء الممرضات وتجديد الدورات التدريبية المتعلقة بسلامة المرضى الإلزامية لطاقم التمريض