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Assessment of Intensive Care Unit Nurses' Practices Regarding Parenteral Nutrition Administration: A Cross-Sectional Study

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Annotation: Background.

Parenteral nutrition (PN) is mandatory for unconscious ICU patients with no nutritional intake by mouth or enteric tube. Nursing effectiveness and safety precautions were continually complied with to deliver PG safely without any complication. The standard of nursing practice in many settings, especially developing countries, is insufficiently researched and poorly developed.

Objective.

The aims of this study were to assess the practices of intensive care unit (ICU) nurses in administering parenteral nutrition (PN) to unconscious patients, to determine the relationship between their practices, demographic and employment characteristics and to identify any practices needing intervention.

Methods.

A cross-sectional descriptive study was performed at the ICU of Hilla Teaching Hospital from 9 September 2024 to 21 February 2025. A purposive sample of 120 nurses participated. An observational checklist with 23 items related PN procedures, was used to collect data. The test was reliable (Cronbach's $\alpha = 0.84$). Statistical analysis was performed using SPSS version 26..

Results:

Before the procedure, the practices mean score was 45. It shows poor performance. Most remarkably, in hand hygiene (1.06), patient identification (1.18), and allergy assessment (1.33). Post-treatment practices had better outcomes with a general mean of 1.73 which is fair. There was a significant correlation between the experience of working in practice and the ICU (p value = 0.024 and R = 0.202) and the shift type (p value = 0.041 and R = –0.175). The analysis also shows a significant impact of gender (p = 0.041) on the practice score. Likewise, education level and special training were not significant.

Conclusion:

Nurses in the ICU did not adhere to pre-procedural PN protocols in a way that was sufficient. They complied with post-procedural tasks to a greater extent. Performance was highly influenced by experience and shift timing. To improve quality of practise and safety of patients, training, policy revision and distribution of workload are recommended.

Keywords: Parenteral nutrition, ICU nursing, unconscious patients, clinical practice, cross-sectional study, nursing competence, Iraq.

1.1 Introduction

Parenteral nutrition (PN) is a life-saving therapy in critically ill patients who have an indication against and/or failed gastrointestinal feeding. In the ICUs, numerous patients are unconscious due to either traumatic brain injury, sepsis or major surgery. Therefore, they are unable to meet their nutritional needs orally or enterally. Parenteral nutrition is the only way to give nutrients, fluids, electrolytes and medicines by vein (ESPEN, 2021).

Patients who have no awareness of their surroundings and cannot respond to stimuli in critical care face high metabolic demands. At the same time, their inability to oral feeding makes them very susceptible to malnutrition, infection, delayed wound healing, and death (Wischmeyer et al., 2022). To stop this from happening, PN has to be given carefully after the protocols.

Nurses in ICUs have a pivotal role in the management of PN which includes patient assessment, preparation of infusion solutions, maintenance of asterile technique during catheter handling, monitoring of complications like catheter related infection and communicating with physicians and dietitians. The safety and efficacy of PN therapy is directly impacted by their insights and technology (Zaloga et al., 2023).

Even if there is increasing emphasis within critical care guidelines on nutrition therapy, studies keep reporting gaps in nurses knowledge and clinical performance about PN (Mehta et al., 2021).

The gaps are often due to low educational level and/or training, unavailability of local guidelines and high workload in the ICU setting.

Also, it is now advised to give PN as early as 24–48 hours of ICU admission for patients unable to be fed enterally. Receiving PN treatment in timely manner plays an important role in achieving desired health outcomes. Such treatment reduces incidence of infections. Moreover, it normalizes immune function as well as shortens length of stay (Singer et al., 2019).

Theoretical knowledge and practical competencies can be acquired by ICU nurses only if they have reasonable knowledge and award-winning nurses do have..

1.2 Importance of the Study

When administered at the right time parenteral nutrition can be life-saving but it is a complex and high-risk intervention. Improper practices can lead to sepsis, metabolic problems, liver dysfunction, and catheter-related bloodstream infections. According to Heyland et al. (2020), the nurse's role includes monitoring the site of central venous access, infusion rates, preventing contamination, and detecting early signs of adverse events in a timely manner.

In countries like Iraq, no studies have previously assessed PN practices of ICU nurses. It is important to identify their knowledge and performance, in order to inform training programs and evidence-based policy-making, and ultimately the quality of care given to the unconscious patient.

The actual practice of nurses in administering PN their conformance to protocol and the factors affecting nurse competency a system used was. We can also find areas where intervention or policy reinforces require.

1.3. Objectives

1-Assess nurses' practices regarding unconscious patients' nutrition.

2- Identify the demographical characteristics of studied population.

3- Find out the relations between practices' of nurses and their demographical and employment characteristics.

METHODOLOGY:

Design of the study: A descriptive (cross-sectional) design study was conducted form the period 9th September 2024 - 21 February 2025 in ICU at Hilla teaching hospital

Study Sample: The purposive (non-probability) sample (120) nurses was selected.

Study instrument: A constructed questionnaire was prepared and modified after a thorough review of the relevant literature. This questionnaire covers three parts:

Part I: the demographic data included: age\years, gender, educational level, marital status, experience years.

Part II: the Employment data included: experience years, experience years in ICU and special training

Part II: This section deals with " Nurses' Practices in Administering Parenteral Nutrition: Cross-Sectional Analysis is composed of (23) items.

Reliability: the reliability of the items was based on the internal consistency of the checklist was assessed by calculating Cronbach Alpha which was=0,84

Data collection: - An observational checklist used to collect data was carried out 9th September 2024 - 21 February 2025. To determine whether the objectives of the study were met, the current study data were analyzed by using **SPSS**, version **26.**

RESULTS:

Table 1: Distribution of Demographic Characteristics of the Study Sample (n = 120)

Demographic Data	Rating and Intervals	Frequency	Percent (%)
Age	20–30 years	66	55.0
	31–40 years	34	28.3
	41–50 years	20	16.7
	Total	**120**	**100.0**
Sex	Male	62	51.7
	Female	58	48.3
	Total	**120**	**100.0**
Marital Status	Married	74	61.7
	Single	46	38.3
	Total	**120**	**100.0**
Educational Qualification	Secondary School Nursing	23	19.2
	Diploma in Nursing	51	42.5
	Bachelor's in Nursing	45	37.5
	Postgraduate in Nursing	1	0.8
	Total	**120**	**100.0**
Residency	Rural	75	62.5
	Urban	45	37.5
	Total	**120**	**100.0**

Table 2: Distribution of Employment Characteristics of the Study Sample (N = 120)

Employment Characteristics	Rating and Intervals	Frequency	Percent (%)
Years of Employment	≤ 5 years	77	64.2%
	6–10 years	27	22.5%
	11–15 years	8	6.7%
	16–20 years	8	6.6%
	Total	**120**	**100.0%**
Years of Employment in ICU	≤ 5 years	105	87.5%
	6–10 years	7	5.8%
	11–15 years	5	4.2%
	16–20 years	3	2.5%
	Total	**120**	**100.0%**
Working Shift	Morning	86	71.7%
	Evening	34	28.3%
	Total	**120**	**100.0%**
Special Courses	No	91	75.8%
	Yes	29	24.2%
	Total	**120**	**100.0%**

Table 3: Assessment of Nursing Practice Regarding Parenteral Nutritional Therapy within intensive care unit(pre-procedure).

Items	Never		Sometimes		Always		Mean	St.d	Level
	F	%	F	%	F	%			
Assessment of Nutritional Requirements	**58**	**48.3%**	**54**	**45.0%**	**8**	**6.7%**	**1.58**	**0.612**	**Fair**

□ Nutrition Prescribed by a Dietitian	**74**	**61.7%**	**22**	**18.3%**	**24**	**20.0%**	**1.58**	**0.805**	**Fair**
□ Calculation of Caloric Needs for Each Patient	**77**	**64.2%**	**16**	**13.3%**	**27**	**22.5%**	**1.58**	**0.835**	**Fair**
□ Selection of Food Types Based on Patient's Specific Requirements	**59**	**49.2%**	**44**	**36.7%**	**17**	**14.2%**	**1.66**	**0.720**	**Fair**
□ Preparation of the Feeding Solution Bag	**50**	**41.7%**	**35**	**29.2%**	**35**	**29.2%**	**1.88**	**0.839**	**Fair**
□ Preparation of the Administration Set	**63**	**52.5%**	**44**	**36.7%**	**13**	**10.8%**	**1.59**	**0.685**	**Fair**
□ Preparation of Alcohol Swab	**82**	**68.3%**	**22**	**18.3%**	**16**	**13.3%**	**1.46**	**0.724**	**Poor**
□ Preparation of Dressing Kit	**114**	**95.0%**	**6**	**5.0%**	**0**	**0.0%**	**1.05**	**0.215**	**Poor**
□ Hand Hygiene Practices	**112**	**93.3%**	**8**	**6.7%**	**0**	**0.0%**	**1.06**	**0.246**	**Poor**
□ Patient Identification Process	**106**	**88.3%**	**8**	**6.7%**	**6**	**5.0%**	**1.18**	**0.509**	**Poor**
□ Ensuring Patient Privacy	**74**	**61.7%**	**34**	**28.3%**	**12**	**10.0%**	**1.49**	**0.679**	**Poor**
□ Verification of Type and Quantity of Solution	**69**	**57.5%**	**46**	**38.3%**	**5**	**4.2%**	**1.46**	**0.576**	**Poor**
□ Inspection of Feeding Solution Bag	**88**	**73.3%**	**10**	**8.3%**	**22**	**18.3%**	**1.53**	**1.161**	**Poor**
□ Assessment for Potential Food Allergies	**90**	**75.0%**	**20**	**16.7%**	**10**	**8.3%**	**1.33**	**0.619**	**Poor**
General mean and standard deviation							**1.45**	**0.658**	**Poor**

Poor level 1-1.69 fair level 1.7-2.39 good level 2.4-3

Table 4: Assessment of Nursing Practice Regarding Parenteral Nutritional Therapy within intensive care unit(post-procedure).

Items	Never (F)	Never (%)	Sometimes (F)	Sometimes (%)	Always (F)	Always (%)	Mean	St.D	Level
Don sterile gloves	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Prepare the TPN admixture	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Examine the bag for tears or leaks	89	74.2	10	8.3	21	17.5	1.43	0.776	Fair
Inspect the solution for cloudiness or color changes	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Aseptically connect tubing to the correct IV line	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Dispose of the used nutrition bag appropriately	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Remove and discard gloves after the procedure	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Perform thorough hand hygiene post-procedure	45	37.5	55	45.8	20	16.7	1.79	0.63	Fair
Monitor the patient closely for any adverse reactions	71	59.2	18	15.0	31	25.8	1.66	0.861	Fair
General mean and standard deviation							1.73	0.671	Fair

Poor level 1-1.69 fair level 1.7-2.39 good level 2.4-3

Table 5: Correlation Between Overall Practices of the Nurses and Their Demographical Characteristics

No	Parameter	R	p.value
1	**Overall practice** / **Age**	.101	.261[c]
2	**Overall practice** / **Sex**	-.175	.041
3	**Overall practice** / **Educational Qualification**	-.143	.103

Table 6: Correlation Between Overall Practices of The Nurses and Their Employment Characteristics

No	Parameter	R	p.value
1	**Overall practice** / **Years of employment in ICU**	.202	.024
2	**Overall practice** / **Working shift**	-.175	.041
3	**Overall practice** / **Special training**	-.143	.103

Discussion

This chapter explains and discusses the getting of the assessment of nurses' practices regarding parenteral nutritional therapy (PNT) on unconscious patients in intensive care units (ICUs). The results link to current literature while reflecting both demographic and employment characteristics as influencing factors of nursing.

1 Demographic Profile of Participants

Most of the participants were 20–30 years old (55%). The next most common were 31–40 years old (28.3%). A relatively young workforce may impact clinical experience and decision making. The results of this study revealed that similar to the outcomes of Hashem et al. (2021), younger nurses are generally more passionate although they lack hands-on experience of complex procedures like PNT.

The study found that there were a comparable number of males and females with a slight female predominance; the gender imbalance was therefore small. In some studies, gender impacted practice non-significantly, however, according to our data (Table 5), a statistically significant association exists between sex and level of practice ($p = 0.041$), with males slightly outperforming females. This might show the different roles in the ICU setting and different levels of comfort when it comes to the technology, Alshammari et al (2022) support this.

Most respondents possessed diplomas (42.5%) or bachelor's degrees (37.5%). Interestingly, just 0.8% had postgraduate training. Not having a higher level of knowledge may lead to a lesser understanding of the biochemical and physiological of PNT. The literature indicates that the higher one's level of education, the better the practice outcome will be. Following the guidelines and thinking critically in the ICU are important elements (Mekonnen et al., 2021).

2 Employment Characteristics and Their Impact on Practice

Most participants have an ICU experience of 5 years or less (87.5%). Table 6 shows the years of ICU experience significantly correlated positively with the overall practice ($p = 0.024$, $R = 0.202$). According to Zhang et al. (2023), experience improves procedural accuracy, patient safe, and the ability to manage parenteral nutrition with confidence.

On the contrary, working shifts showed a negative correlation ($p = 0.041$, $R = -0.175$), which means that nurses on shifts are less consistently in practice. As per Said and Ali (2021), fatigue, dysregulation of circadian rhythms, and a low level of staffing impact clinical performance in shift work.

Another major factor that proved significant was that training which only 24.2% has undergone. According to Nassar et al., (2022), although training may not reach statistical significance ($p = .103$), but it does enhance clinical skills, reduce errors and motivate guideline-based care in nutrition therapy.

3. Nursing Practice: Pre-Procedure, During, and Post-Procedure

Pre-Procedure Practices (Table 3)

According to the figures, the general mean for pre-procedural practices was 1.45 which shows poor performance. Hand hygiene (mean = 1.06), patient ID (1.18) and allergy check (1.33) were among the lowest tasks. The risk of infection and other adverse events is increased when patients are poorly prepared. According to a recent study done by Patel et al. (2021), the compliance of basic pre-procedure safety checks in critical care is remarkably low in many developing countries due to high workloads and bad supervision.

Post-Procedure Practices (Table 4)

Post-procedural practices, on the other hand, improved with an overall mean of 1.73 which is fair. Nurses stitched glove removal, tube connection and waste disposal better than HSAs and CMS. The upgrades may result from repeated training on infection control and exposure to similar procedures. Despite this, there remained significant variability in the monitoring of patients for adverse reactions (mean = 1.66) which could lead to complications being missed. El-Sayed et al. (2023) emphasize the importance of using a structured post-care checklist to ensure consistency when observing critical care nutrition.

4. Overall Practice Evaluation and Correlations

Pre-procedure practices are overall significantly weaker than post-procedure practices. This difference might show that it is a view taken by the nutritionist who gets the job done. ICU experience is positively correlated with practice level; hence, hands-on knowledge is important. There is a negative correlation found with working shifts; hence, the need to re-look at various working shifts with less supervision.

Furthermore, the observation that trained nurses exhibited improved practice (though not significantly so) corroborates global recommendations of ESPEN and ASPEN on making regular competency-based training on ICU nutrition a norm (Singer et al., 2021).

Results of the study show that there is inadequate compliance with essential pre-procedural safety protocols, particularly hand hygiene, patient identification and feeding solutions verification. These were some instances where a patient could have easily been harmed or killed. On the other hand, the post-procedural task showed moderate compliance, suggesting that nurses are usually familiar with routine procedural steps yet failed to deliver comprehensive and standardized medication. Moreover, the significant impact on nurses' knowledge and practice about parenteral nutrition was due to lack of specific training, lower level of formal education and less ICU experience. These factors cause inconsistent care and may impair clinical outcomes. So, the institution's goals must facilitate ongoing professional development, and management must address shift-based workload imbalances so that all staff can maintain a high standard of practice on all shifts.

Conclusion

The findings of this research indicate that the pre-procedural adherence of ICU nurses in the provision of parenteral nutrition is generally poor and is due to practices like hygiene practice,

solution note, and patient match. After the procedure, doctors aren't following the guidelines properly, and to ensure the medication and the procedure is safe for the patients, doctors need to implement these guidelines more strictly. Limited clinical training, lower educational qualifications and inadequate experience in ICU have significantly associated with weaker nursing practices. Additionally, outside factors like working shifts impacted performance after that highlighting difficulties with system consistency and patient safety.

Recommendations

In light of the above findings, hospitals are advised to carry out certain interventions such as in-service training and competency-based workshops on parenteral nutrition. We must offer nurses better learning opportunities to upgrade their qualifications. Also, management must fix the difference in workload between shifts by changing nurse-to-patients ratio and fixing the equal task division during all shifts.

To buttress compliance with evidence-based practices in nutrition care in the ICU, institutional policies must enforce assessment and monitoring mechanisms.

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