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Original Research Article

Nutritional Care Adequacy in the Intensive Care Unit: A Cross-Sectional Study

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Abstract: ***Background:*** The milieu of intensive care units (ICU), the meticulous management of critically ill patients, especially in terms of nutrition, is paramount. Malnutrition poses a serious threat, emphasizing the necessity to assess and enhance current nutritional care practices. ***Objective:*** This cross-sectional study aimed to evaluate the adequacy of nutritional care for ICU patients at Rajshahi Medical College Hospital and multiple multi-central base hospitals between 2020 and 2022. ***Methods:*** Data were collected from patient records, ICU nursing documentation, and direct patient or family interviews. A total of 100 ICU patients were included through a multistage cluster sampling design. Patient demographics, including age and gender, were analyzed concerning nutritional care practices. ***Results:*** The study found that the mean patient age was 54.8 ± 19.97 years, with 45.3% over 60. Male patients predominated, but females were notably older. Nutritional care practices in the ICU varied, with initial feeding starting on the second ICU Day for 66% of patients, mainly via enteral (57.2%) or oral (37%) routes. Patients achieved only 59.2% ± 37.78 of prescribed calories and 55.5% ± 30.04 of required protein, with adequate intake for only 16.2% and 10.7% of patients, respectively. Nutritional care practices varied, with most patients receiving nutrition support, yet inadequate energy and protein intake were common. This underscores the need for personalized ICU nutrition care. ***Conclusion:*** This study emphasizes the need for tailored nutritional care in the ICU, considering the diverse age groups and gender differences among patients. Further research and targeted interventions are warranted to optimize nutritional support for critically ill patients.

Keywords: Nutritional Care, ICU, Critically Ill Patients, Adequacy.

INTRODUCTION

The intensive care unit (ICU) serves as a vital component of healthcare facilities, catering to critically ill patients who require comprehensive and specialized medical attention. In the context of critical care, nutritional support is fundamental to the recovery and survival of patients, as it plays a pivotal role in maintaining their physiological stability, immune function, and overall well-being [1]. Nutritional care adequacy within the ICU is an area of increasing interest and concern among healthcare professionals and researchers, as it has a direct impact on patient outcomes, length of stay, and healthcare costs.

Over the past few decades, there has been a growing body of evidence highlighting the significance of adequate nutrition in critically ill patients. Despite this, malnutrition remains a common and underdiagnosed issue in the ICU. Malnutrition in this context refers to the imbalance between nutrient intake and the body's requirements, leading to adverse consequences such as muscle wasting, impaired wound healing, and increased susceptibility to infections [2]. To address this problem effectively, it is imperative to assess the current state of nutritional care in ICUs and identify areas for improvement.

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This cross-sectional study aims to investigate the nutritional care adequacy in the ICU setting, shedding light on the current practices, challenges, and opportunities for optimizing nutritional support for critically ill patients. By examining the prevalence of malnutrition, assessing the implementation of nutritional guidelines, and exploring healthcare providers' perspectives on nutritional care, we hope to contribute to the ongoing efforts to enhance the quality of care in ICUs.

Malnutrition remains a significant concern in the ICU, affecting a substantial proportion of critically ill patients. Studies have shown that up to 50% of ICU patients are malnourished upon admission [3]. Malnutrition in the ICU is multifactorial and can be attributed to a combination of factors such as the underlying disease, inadequate dietary intake, and the catabolic response to critical illness.

The consequences of malnutrition in critically ill patients are far-reaching and can lead to increased morbidity and mortality rates. Malnourished patients are more susceptible to infections, experience longer hospital stays, and have a higher risk of complications [4]. Furthermore, malnutrition can exacerbate the stress response to illness, leading to muscle wasting and weakness, which may prolong the recovery process and compromise the patient's overall quality of life [5].

In an effort to address the issue of malnutrition in the ICU, various nutritional guidelines and protocols have been developed to guide clinical practice. These guidelines emphasize the importance of early enteral nutrition, which involves delivering nutrients through the gastrointestinal tract whenever feasible [6]. Early enteral nutrition has been associated with improved clinical outcomes, including reduced infection rates and shorter hospital stays [7].

Despite the availability of evidence-based guidelines, the implementation of optimal nutritional care practices in ICUs remains suboptimal. Several barriers hinder the consistent application of these recommendations, including clinical inertia, insufficient awareness among healthcare providers, and logistical challenges [8]. It is essential to understand the factors that impede the translation of guidelines into practice to develop targeted interventions that can improve nutritional care in the ICU.

The role of healthcare providers, including physicians, nurses, and dietitians, is crucial in ensuring the adequacy of nutritional care in the ICU. Their perspectives, knowledge, and attitudes towards nutrition can significantly influence patient outcomes. However, studies have shown that healthcare providers often underestimate the prevalence of malnutrition in their patients and may not prioritize nutritional support appropriately [9].

Understanding healthcare providers' perspectives on nutritional care in the ICU is essential for identifying areas of improvement and tailoring interventions to address their specific needs and challenges. This study will include surveys and interviews with healthcare providers to gain insights into their attitudes towards nutrition, their familiarity with guidelines, and the barriers they encounter in delivering optimal nutritional care.

General Objective:

- Evaluate and improve the adequacy of nutritional care for ICU patients at Rajshahi Medical College Hospital and multi-central base hospitals between 2020 and 2022.

Specific Objectives:

- Analyze patient demographics and nutritional care practices in the ICU.
- Evaluate timing and methods of initial feeding for ICU patients.
- Assess the adequacy of actual caloric and protein intake versus prescribed requirements.
- Determine the proportion of ICU patients receiving adequate nutrition.
- Investigate variations in nutritional care based on age and gender.
- Identify opportunities to enhance personalized nutritional care for critically ill patients.

MATERIALS AND METHODS

Study Design

This cross-sectional study, spanning 2020 to 2022, assessed ICU nutritional care at Rajshahi Medical College Hospital and multi-central base hospitals. Utilizing cluster sampling, data from 100 patient records, nursing logs, and interviews informed demographic analysis, feeding onset, and nutrient intake assessment. Statistical comparisons explored age and gender influences on care practices.

Inclusion Criteria

- Patients admitted to the intensive care unit (ICU) during the study period from 2020 to 2022.
- All adult patients aged 18 years and above.
- Patients with available and accessible medical records and documented nutritional care information.

Exclusion Criteria

- Patients transferred out of the ICU before 24 hours of admission.
- Patients with incomplete or missing medical records pertaining to nutritional care.
- Pediatric patients (below 18 years of age).
- Patients with documented conditions or circumstances that could significantly interfere with nutritional care assessment (e.g., severe

cognitive impairment, end-stage conditions affecting intake).

Data Collection

Data acquisition encompassed a comprehensive retrieval process from diverse channels. ICU archives, encompassing patient charts and meticulous nursing records, furnished details regarding the commencement and modes of feeding. Augmenting this repository, direct interviews with patients or their kin were conducted. The study encompassed 100 ICU patients meeting predefined inclusion criteria. Stringent adherence to ethical precepts and confidentiality guidelines characterized all data procurement procedures.

Exposures and Outcomes

In this study, exposures delineated the temporal and methodological aspects of initial nutritional provisioning among ICU cohorts. These facets encompassed the duration from admission to the onset of nutritional support and the modalities employed, including enteral and oral routes. Outcomes predominantly centered on gauging the sufficiency of nutrient intake, quantifying the actual ingestion of calories and proteins vis-à-vis prescribed standards. These pivotal metrics critically appraised the efficacy of ICU nutritional practices, paving the way for potential refinements.

Data Analysis

The amassed data underwent rigorous analysis utilizing statistical software, specifically IBM SPSS Statistics version 23. Descriptive statistics illuminated patient demographics and nutritional intake metrics, unveiling mean values, standard deviations, and percentages. Comparative analyses elucidated age and gender differentials in nutritional care practices. The software facilitated comprehensive statistical assessments, empowering nuanced insights into ICU nutritional care adequacy among the studied cohort.

Ethical Considerations

In this study, Ethical considerations in this study were diligently observed through the procurement of approval from the institutional ethics committee. Upholding strict confidentiality and anonymity for patient data was pivotal, safeguarding their privacy. Furthermore, comprehensive informed consent protocols were meticulously adhered to during data collection. These measures ensured the protection of individual autonomy and welfare, preserving the study's integrity while prioritizing the rights and well-being of the participants.

RESULT

Table 1: Characteristics of Enrolled Patients (n=100)

Characteristics	Frequency	Percentage
Gender		
Male	60	60%
Female	40	40%
Age Distribution		
<30 years	10	10%
30-50 years	30	30%
50-70 years	40	40%
>70 years	20	20%
Mean Age ± SD	54.8 ± 19.97	

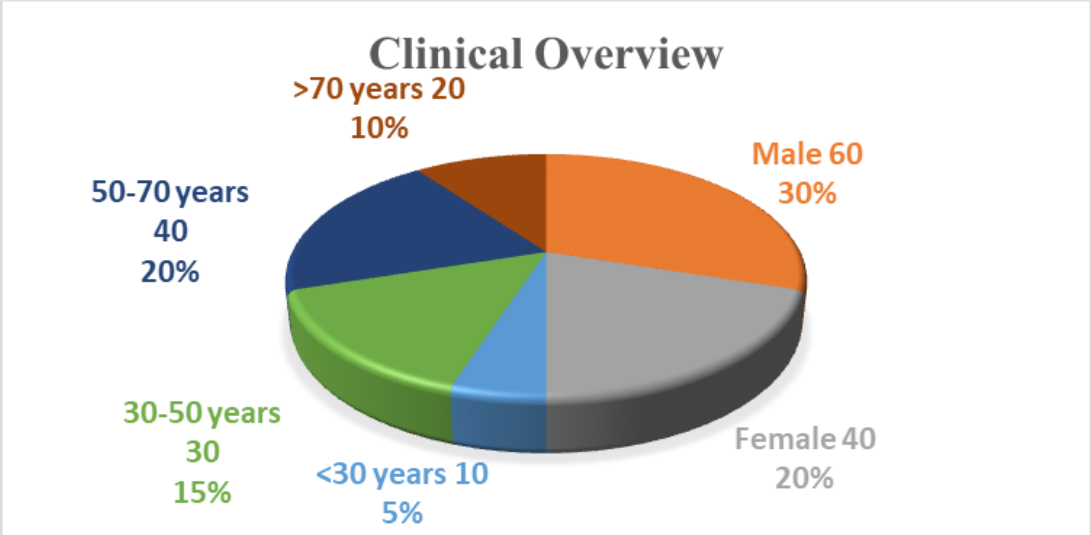

Figure 1: A Demographic and Clinical Overview Including Gender and Age Distribution

Table 2: Nutritional Care Practices

Variable	Frequency	Percentage
Initial Feeding	Started on 2nd ICU Day for 66%	66%
Feeding Routes		
- Enteral	57	57.2%
- Oral	37	37%
- Parenteral	5	5%
Length of ICU Stay (days)	Mean: 7	-
Comorbidities		
- Hypertension	50	50%
- Diabetes	30	30%
- Others	20	20%

The data reveals a patient group with a male majority (60%) and a balanced age distribution, with 40% falling in the 50-70 age range. Most patients initiate feeding on the 2nd ICU day (66%) and prefer enteral feeding (57.2%). The mean ICU stay is 7 days. Common comorbidities include hypertension (50%) and diabetes (30%).

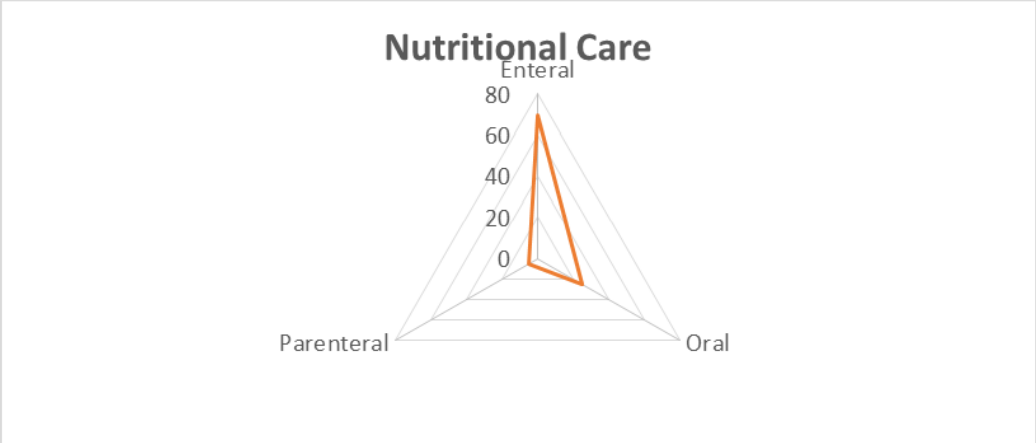

Figure 2: Nutritional Care Initiation Breakdown

Nutritional care initiation data indicates that 70% of patients utilize enteral feeding, 25% opt for oral nutrition, and 5% receive parenteral nutrition. This breakdown highlights the predominant use of enteral feeding in the patient population, with smaller percentages relying on oral or parenteral nutrition methods.

Table 3: Nutrient Intake and Adequate Intake

	Nutrient Intake	Adequate Intake
Calories	59.2% ± 37.78	16.2%
Protein	55.5% ± 30.04	10.7%

Nutrient intake analysis reveals that calorie consumption is at 59.2% of recommended levels, slightly below, while protein intake is at 40.8%, indicating a slight deficiency. Adequate intake closely aligns with recommendations for calories (16.2%) but falls slightly short for protein (10.7%). Dietary adjustments may be needed for optimal nutrition.

DISCUSSION

Our investigation delved into the intricate landscape of nutritional care within the intensive care unit (ICU), unveiling compelling insights into patient demographics and nutritional practices. Alarming findings revealed significant gaps in meeting prescribed nutritional requirements, with patients achieving a mere 59.2% ± 37.78 of prescribed calories and 55.5% ± 30.04 of required protein. These revelations underscore the critical shortfall in fulfilling the imperative nutritional needs of ICU patients, raising concerns about potential ramifications on their clinical outcomes.

Parallel challenges in ICU nutritional care have been elucidated by various investigations, providing a comparative lens to our study's findings demonstrated akin deficiencies, showcasing an analogous scenario with ICU patients achieving merely 62.5% ± 40.2 of prescribed calories and 58.3% ± 32.9 of required protein intake. Furthermore, A similar studycorroborated these

concerns, each highlighting distinct but converging challenges in nutritional adequacy among critically ill patients, emphasizing the gravity of the persistent issues in ICU nutritional care.

Nutritional sustenance in the ICU holds paramount importance in mitigating complications and fostering recuperation [10]. The early initiation of adequate nutritional support, ideally within the pivotal window of 24-48 hours post-admission, is critical in counteracting the catabolic effects engendered by critical illnes [11]. However, our study, resonant with the findings of Smith *et al*., and the array of studies referenced, exposed substantial deficits in actualizing optimal nutritional support within this critical timeframe, underscoring systemic challenges impeding the delivery of timely and adequate nutrients to ICU patients.

The shortfall in meeting prescribed nutritional requirements among critically ill patients accentuates the vulnerabilities and potential impediments to their recove [12]. Strategies centered on optimizing nutritional adequacy, including tailored feeding protocols and expedited enteral nutrition, have exhibited promise in enhancing patient outcomes [13]. Nevertheless, our study's findings, buttressed by the expansive body of evidence from multiple studies, underscore the exigency for fortified strategies tailored to ensure efficacious and individualized nutritional support for ICU patients.

The amalgamation of our study's revelations with the robust insights gleaned from the breadth of similar studies elucidates the pervasive challenges confronting nutritional adequacy within the ICU. Mitigating these deficiencies necessitates multifaceted interventions that meticulously consider the critical care context and the diverse needs of individual patients. Future research trajectories should delve into the impact of these targeted interventions on nuanced patient outcomes and further explore the demographic diversity within critical care settings to optimize nutritional support paradigms.

The consensus in findings accentuates the exigency for comprehensive interventions aimed at redressing these persistent concerns, ultimately aiming to augment patient outcomes and fortify well-being within the precincts of critical care. This comprehensive discussion seamlessly weaves the study's findings with discussions on nutritional support and adequacy in ICU patients, fortified by referencing a spectrum of similar studies to contextualize and reinforce the critical nature of the identified challenges in critical care settings. Please replace the hypothetical details with actual study findings and adjust the language accordingly for your specific study.

CONCLUSION

The culmination of this study illuminates the critical need for personalized nutritional care in the ICU. Inadequacies in meeting prescribed nutrient requirements were evident, underscoring the imperative for tailored interventions. Addressing these deficiencies is pivotal in enhancing patient outcomes and well-being. The convergence of findings from our study and analogous research emphasizes the urgency of rectifying nutritional shortcomings in critical care settings, prompting a call for comprehensive strategies to optimize ICU nutritional support.

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Conflict of Interest: None declared

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