Screening and Nutritional Assessment of Critically ILL Children in PICU Ain Shams University

Thesis

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Ahmed Mohamed Nasr Ahmed EL Gamal

List of Contents

List of Abbreviations

Abb.	Full term
AND	*Academy of Nutrition and Dietetics*
ASPEN	*American Society for Parenteral and Enteral Nutrition*
BMI	*Body mass index*
BP	*Blood pressure*
CBC	*Complete blood count*
CHD	*Congenital heart disease*
CRP	*C - reactive protein*
CRT	*Capillary refill time*
DRI	*Daily recommended intake*
EGP	*Endogenous glucose production*
EN	*Enteral feeding*
GH	*Growth hormone*
HR	*Heart rate*
IC	*Indirect calorimetry*
IL	*Interleukin*
MAC	*Midarm circumferences*
MCT	*Medium chain triglycerides*
MPS	*Muscle protein synthesis*
NG	*Nasogastric*
OG	*Orogastric*
PEM	*Protein-energy malnutrition*
PICU	*Pediatric intensive care unit*
PIM	*Pediatric Index of Mortality*
PT	*Prothrombin time*
REE	*Resting energy expenditure*

List of Abbreviations cont...

Abb.	Full term
RQ	*Respiratory quotient*
SGA	*Subjective global assessment*
T3	*Triiodothyronine*
TNF-alpha	*Tumor necrosis factor-alpha*
TPN	*Total parentral nutrition*
TSF	*Skin fold thickness*
TSH	*Thyroid-stimulating hormone*
TTR	*Transthyretin*
WHO	*World Health Organization*

List of Tables

Table No.	Title	Page No.

List of Tables cont...

List of Figures

List of Figures cont...

INTRODUCTION

Malnutrition is one of the most essential global health problems, affecting large numbers of children in developing countries. Globally, malnutrition is an underlying or associated cause in at least half of all childhood deaths. Under nutrition alone is responsible for more than one-third of child deaths globally, and accounts for 11 % of the global burden of disease. It is more prevalent in low and lower-middle income countries ***(Abdelaziz et al., 2015).***

Under nutrition could be primary (not consuming adequate calories, e.g., poverty, etc.,) or secondary (abnormal nutrient loss, due to diarrhea or chronic illness or increased energy expenditure) ***(Nangalu et al., 2016).***

An optimal nutritional approach cornerstone is to evaluate the nutritional status of any patient admitted to a pediatric intensive care unit (PICU), detect malnutrition, define nutritional goals, and adapt nutritional intakes. Under nutrition is common in critically ill children; with data indicating that between 15 and 24% has a poor nutritional status at PICU admission ***(Prince et al., 2014).***

Patients in a (PICU) with nutritional status inadequacies can experience unfavorable outcomes (i.e., mechanical ventilation - MV, mortality, longer length of stay and

infection); so, it is extremely important to assess the unit's nutritional profile ***(Costa et al., 2016).***

Anthropometric evaluation is a necessary tool for monitoring children's health and is an essential item when estimating a child's nutritional status and monitoring her growth and development ***(Cole, 2012).***

In a hospital setting, the evaluation aids to identify eating disorders, supports diagnosis and facilitates prognosis, making early and safe interventions possible ***(Sarni et al., 2009).***

Age-appropriate measurements of anthropometry consisting of weight, stature, and head circumference constitute an integral part of nutritional status assessment and remain vital for the safe and effective care of critically ill children in (PICU) ***(Vermilyea et al., 2013).***

Anthropometry measurements are also vital to calculate the correct dosage of medications and blood products, prescribe nutrient intake, and determine appropriate therapies and equipment needs for critically ill children ***(Maskin et al., 2010).***

Serial anthropometry measurements are crucial to understand fluctuations in fluid balance and body mass changes during the course of critical illness. Such serial measurements assume even greater importance in neonates, infants, and young children who also experience ongoing growth during and after their recovery from critical illness ***(Srinivasan et al., 2017).***

Prealbumin, also called transthyretin, is the precursor to albumin. Its half-life is 2 to 4 days, whereas albumin half-life is 20 to 22 days ***(Banks and Corbett, 2013).*** Measuring prealbumin can help clinicians detect short-term impairment of energy intake and the effectiveness of nutritional support efforts ***(Caccialanza et al., 2013).***

AIM OF THE WORK

The present study aimed to evaluate the anthropometric evaluation and laboratory assessment especially albumin and prealbumin in critically ill children in Ain-Shams university Pediatric Hospital PICU on admission and at discharge.

REVIEW OF LITERATURE

Malnutrition in Critically ill Pediatric Patients

Malnutrition definition

The World Health Organization (WHO) defines malnutrition as the cellular imbalance between the nutrients and energy supply and the body's demand for them to ensure growth, maintenance, and specific functions ***(Nangalu et al., 2016).***

A consensus statement by the Academy of Nutrition and Dietetics (AND) and the American Society for Parenteral and Enteral Nutrition (ASPEN) was published in 2012, which defined malnutrition as the presence of 2 or more of the following characteristics: insufficient energy intake, weight loss, muscle mass loss, loss of subcutaneous fat, localized or generalized fluid accumulation, or lowered functional status ***(White et al., 2012).***

Magnitude of the problem in pediatric intensive care unit (PICU)

The prevalence of malnutrition in hospitalized patients is a significant health care problem because it affects patient outcomes. Malnourished hospitalized patients have a higher rate of infectious and noninfectious complications, increased mortality, a longer length of hospital stay, and increased