Predictive value of Malnutrition Universal Screening Tool (MUST) in Critically Ill Elderly Patients

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Radwa Magdy Abd Elkader

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Abstract:

Background*:* Globally, the elderly population is steadily growing because of continual improvement of the standards of living and medical technology. As the population ages the proportion elderly patients entering intensive care unit (ICU) is increasing**.** A recent large retrospective analysis found a yearly increase of 5.6% in very elderly ICU admission rates. ***Aim:*** To know predictive value of MUST in comparison to NUTRIC (Nutrition Risk in Critically Ill Score) score in critically ill elderly patients in Geriatric intensive care units. ***Material and method:*** Ninety patients were recruited from GICU of Ain Shams University Hospitals and followed up in a prospective study till death or discharge from GICU from October 2017 till June 2018 ***Results***: In the current study it was found that the NUTRIC and modified NUTRIC scores are superior to MUST score in prediction of mortality and mechanical ventilation ***Conclusion:*** Based on discriminative abilities, the NUTRIC and modified NUTRIC scores are superior to MUST score in prediction of mortality and mechanical ventilation. The NUTRIC and Modified NUTRIC score may be helpful in guiding clinicians in providing adequate nutritional support for high risk group to reduce hospital malnutrition.

Keywords:

ICU admission; elderly; NUTRIC; MUST

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List of Abbreviations

A.S.P.E.N.	American Society for Parenteral and Enteral Nutrition
AD	Alzheimer's disease
AND	Academy of Nutrition and Dietetics
APACHE II	Acute Physiologic and Chronic Health Evaluation II
BMI	Body mass index
CCK	Cholecystokinin
CHF	Congestive heart failure
COPD	Chronic obstructive pulmonary disease
CRF	Corticotropin releasing factor
DETERMINE	Disease, **E**ating poorly, **T**ooth loss, **E**conomic hardship, **R**educed social contact, **M**ultiple medications, **I**nvoluntary weight loss or gain, **N**eed for assistance and **E**lderly age
EN	Enteral nutrition
ESPEN	The European Society of Clinical Nutrition and Metabolism
FFQ	Food frequency questionnaire
GERD	Gastroesophageal reflux disease
GI	Gastrointestinal tract
GICU	Geriatric intensive care unit
GNRI	Geriatric Nutritional Risk Index
H	Height
ICU	Intensive care unit
IL	Interleukin
KH	Knee height
LOS	length of Hospital stay
MNA	Mini Nutritional Assessment
MNA-SF	Mini Nutritional Assessment-short form
mRNA	Micro RNA
mNUTRIC	Modified nutrition risk in critically ill score
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NPO	Nothing by mouth
NRS 2002	Nutritional Risk Screening 2002
NUTRIC	Nutrition Risk in Critically Ill Score

PMR	Predicted mortality risk
SCREEN II	Seniors in the Community: Risk Evaluation for Eating and Nutrition
SD	Standard deviation
SGA	Subjective Global Assessment
SIRS	systemic inflammatory response syndrome
SNAQ	Short Nutritional Assessment Questionnaire
SOFA	Sequential organ failure assessment score
TNF-α	Tumor necrosis factor alpha
WHI	Waist–hip index
y	Year

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Introduction

Globally, the elderly population is steadily growing with the increased average life span due to continual improvement of the standards of living and the development of medical technology ***(Kevin and David, 2005)***. As the population ages the proportion of very elderly intensive care unit (ICU) patients is increasing ***(Dreiher et al., 2012)*.** A large retrospective analysis found a yearly increase of 5.6% in very elderly ICU admission rates (***Bagshaw et al., 2009).***

The elderly population represents a vulnerable group at risk of nutritional deficiencies, because aging is associated with physical and physiological impairment and psychosocial as well as economical difficulty, all of which can all play a role in nutritional inadequacy (***Ahmed and Haboubi, 2010).***

Malnutrition may refer to both deficiencies (such as protein, calorie, vitamin, mineral, etc.) and excesses (e.g., obesity and hyper vitaminosis). Malnutrition appears when there is mismatch between intake and demand of aging body (***Reuben, 2007)***.

The prevalence of nutritional risk has been described as up to 80% when screening for protein-energy malnutrition among elderly hospitalized patients. The number varies depending on population and setting ***(Ruxton et al., 2008).*** Elderly patients admitted to the ICU are an exceptionally vulnerable patient population. Often

these patients have several conditions that impede oral intake and impair nutritional status. When coupled with an acute disease process, it is likely that elderly patients requiring ICU admission are at exceptional risk for nutritional decline; however, there is a paucity of data that has specifically explored the prevalence of malnutrition in this particular population (***Covinsky et al., 2002)***.

Malnutrition is an important predictor of morbidity and mortality, and has been associated with increased risk of complications, prolonged hospital stays and readmission rate, and hence, increase medical costs.The identification and treatment of malnutrition earlier can lead to improved outcomes and better quality of life (***Ahmed and Haboubi, 2010)***.

Therefore, the development of appropriate tools to assess the degree of malnutrition in patients is essential. Therefore, hospitals should screen each patient's nutritional status to identify malnutrition upon admission to the hospital, and try to manage nutritional problems to improve outcomes and better quality of life. To accomplish this, hospitals employ nutritional screening or assessment tools. An effective nutritional screening tool must be practical and needs to be quick and simple and accurately identify patients with possible malnutrition to allow the efficient targeting of resources for nutritional assessment (***Elia and Stratton, 2012)***.

A number of tools employing a variety of criteria are used to identify nutrition risk, including clinical diagnosis,

laboratory data, physical examination, anthropometric data, food/nutrient intake, and functional assessment. These indicators were primarily validated in outpatients or a general hospitalized population; they were not specifically designed for use in the ICU ***(Van Bokhorst et al., 2014).***

Heyland et al., previously proposed a novel scoring tool, the nutrition risk in critically ill (NUTRIC) score, which is the first nutritional risk assessment tool developed and validated specifically for ICU patients. The final composite score accurately identified those patients who had higher mortality rates or survivors with longer lengths of stay. In addition, there was an interaction between mortality, nutritional intake and NUTRIC score suggesting that those with higher NUTRIC scores (6 or more) benefited the most from increasing nutritional intake (***Heyland et al., 2011)***.

Interleukin 6 acts as a pro inflammatory cytokine and anti-inflammatory myokine. It stimulates the inflammatory and autoimmune processes in many diseases such as diabetes, atherosclerosis, depression, rheumatoid arthritis and Alzheimer's disease (***Dowati et al., 2010; Swardfager et al., 2010)***.

The NUTRIC score is easy to calculate as it contains variables that are mostly easy to obtain in the critical care setting, with the exception of IL-6 levels which is not commonly measured. In practice, many units are using the NUTRIC score without the IL-6 level (modified NUTRIC score) (***Labarere, 2014; Heyland et al., 2011).***

Malnutrition universal screening tool (MUST) is another nutrition risk screening tool that does not involve invasive procedures. It was developed by the Multi-disciplinary Malnutrition Advisory Group of the British Association for Parenteral & Enteral Nutrition (BAPEN) of the United Kingdom for adults under all healthcare settings and patient groups ***(Stratton et al., 2006).*** It is particularly sensitive for recognition of protein energy under nutrition in hospitalized patients. MUST is a five step screening tool to identify adults who are malnourished, at risk of malnutrition, under nutrition or obese. It also includes management guidelines which can be used to develop a care plan. It is for use in hospitals, community, care homes and other care settings. It is a short tool, less time consuming and can be used by all care workers (***Scott, 2008).***

Therefore, the purpose of the present study was to know predictive value of MUST in comparison with NUTRIC score in critically ill elderly patients in ICU because it is a short tool, less time consuming, more practical and can be used by all care workers.

Aim of the work

To know predictive value of MUST in comparison to NUTRIC score in critically ill elderly patients in Geriatric intensive care units.

Aging and Malnutrition

Globally, the elderly population is steadily growing. Improvement of life span is attributed to improvement of the standards of living and medical technology ***(Kevin and David, 2005)***.

Over the previous decades, the importance of nutritional status in the elderly population has increasingly been recognized in different morbid conditions such as cancer, heart disease, and dementia ***(Ministry of Home Affairs, 2010).*** Besides, Elderly patients admitted to the intensive care unit (ICU) are an incredibly vulnerable patient population. These patients often have many conditions that impede oral intake and impair nutritional status. When combined with an acute disease process, it is likely that elderly patients requiring ICU admission are at risk for nutritional decline ***(Sheean et al., 2010.)***

Definition of malnutrition:

In general, there is no clear definition or gold standard method for identifying under nutrition ***(Cederholm et al., 2015).***Moreover, the terms 'under nutrition' and 'malnutrition' are frequently used interchangeably in relevant literature, although malnutrition includes both under nutrition and over nutrition imbalances ***(Meijers et al., 2013).***