PREVALENCE OF MALNUTRITION IN PATIENTS ADMITTED IN INTENSIVE CARE UNIT

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ABSTRACT

BACKGROUND

WHO defines malnutrition as underweight is a serious public health problem that has been linked to a substantial increase in the risk of mortality and morbidity. Critically ill patients admitted in ICU will require approximately 25 kcal/kg to 50 kcal/kg of nutrition depending on the severity of disease and length of stay in ICU. Most of the deaths after prolonged ICU stay occur due to indirect causes or hospital-acquired causes, one among is malnutrition, which led to catabolism, loss of lean body mass and increased risk of infection.

MATERIALS AND METHODS

Patients were assessed irrespective of age, sex and comorbid diseases and diagnosis using SGA score within 24 hours of admission into MICU.

RESULTS

Male are little older in well-nourished group and almost comparable in moderately nourished group. Severely malnourished group seen in only male patients with mean age of 95.16. In females, moderately malnourished group are older than well-nourished group. Male patients shows that more moderately malnourished (54%) patients when compared to well-nourished patients. Female patients also showed more moderately malnourished (57.89%) patients were observed compared to well-nourished (42.10%) patients. Overall, diabetes and hypertension are the comorbidities, which is associated with moderately and severely malnourished patients.

CONCLUSION

Most of the patients admitted to ICU has pre-existing malnourishment, which is seen in both gender group. This shows that one need to concentrate more on nutritional aspect for the better and speedy recovery of the patients.

KEYWORDS

Malnutrition, ICU, SGA, Well-Nourished, Enteral Nutrition.

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BACKGROUND

Advancement in healthcare has led to increased chances of survival. WHO states that malnutrition is linked to a substantial increase in the risk of mortality and morbidity.[1]

Prevalence of malnutrition in a tertiary care hospital is as high as 50%.[2,3] Malnutrition is consistently associated with adverse clinical outcomes including increased morbidity, mortality and length of hospital stay as well as reduced quality of life[4] and also increased healthcare cost. Critically ill patients admitted in ICU will require approximately 25 kcal/kg to 50 kcal/kg of nutrition depending on the severity of disease and length of stay in ICU.[5] Anorexia, depression, gastrointestinal symptoms, therapeutic restrictions and other medical/surgical factors contribute to aggravation of malnutrition.

Most of the deaths after prolonged ICU stay occur due to indirect causes or hospital-acquired causes, one among them is malnutrition, which led to catabolism, loss of lean body mass[6] and increased risk of infection. Muscle wasting in the critically ill patients with a reduction in muscle fibre cross-sectional area of 3-4% per day.[7]In the first couple of weeks, there is 35-50% decline in respiratory and skeletal muscle function, but cardiac muscles are preserved. Tumour Necrosis Factor-alpha (TNF-α) was known as cachexin. TNF-α along with other cytokines release within few hours of critical illness. These cytokines induce anorexia and reduced intake, which led to all complications, which was considered to be a protective mechanism in earlier days, which proved out to be determinantal in overall outcome by further studies, which emphasised on nutrition.[8]

Usually, due to various reasons like patients in shock, severe ARDS, route of administration of nutrition patients in ICU may not meet the required calories, which may further add on to the existing malnutrition. So, assessment of existing nutritional status on admission to ICU is very

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important, so that titration of nutritional requirement of the patient can be done accordingly to meet the nutritional requirement of the patient. Nutrition societies across the world recommend many nutrition screening tools to assess malnutrition in hospitalised patients, such as the Mini-Nutritional Assessment (MNS) tool[9] and Subjective Global Assessment (SGA), etc.

This study assessed the prevalence of nutritional status of the patients admitted in a tertiary care ICU.

MATERIALS AND METHODS

After getting institute ethical committee approval, patients who were admitted in Medical Intensive Care Unit (MICU) were assessed for nutritional status during admission into MICU over a period of one month.

Patients were assessed irrespective of age, sex and comorbid diseases and diagnosis using SGA score within 24 hours of admission into MICU.

In dietary history variables like vegetarian/non-vegetarian, food allergies, food frequency, 24-hours recall of diet, adequacy of diet for past 2 weeks and any prolonged starvation for past 2 weeks is also noted. Gastrointestinal functions like nausea, vomiting, diarrhoea and their severity are also noted. Patient's functional capacities, which includes mobility, doing day-to-day activity are also noted.

Alteration in body weight over past 6 months is noted and any percentage of weight loss is calculated to determine the severity of malnutrition.

In physical examination, muscle mass and muscle wasting, presence of oedema are also assessed.

On the basis of medical history, past dietary intake and physical examination as mentioned in SGA patients were assessed and ranked as given.

A -Well-nourished.

B - Moderately malnourished.

C - Severely malnourished.

RESULTS

Simple statistical principles of average and mean were employed in this study.

When comparing the age, male are little older in well-nourished group and almost comparable in moderately nourished group. Severely malnourished group seen in only male patients with mean age of 95.16. In male patients, age is comparable in well-nourished and moderately-nourished groups, but in females moderately malnourished group are older than well-nourished group (Table 1). In our study, mean age of males is 53.80 and of females is 77.37.

	Males (Years ± SD)	**Females (Years ± SD)**
Well-Nourished (A)	51.93±13.13	37.25±6.76
Moderately-Malnourished (B)	51.66±22.98	60.63±18.03
Severely-Malnourished (C)	95.16±12.33	

Table 1. Distribution of ICU Patients According to Nutrition Status and Age

	Well-Nourished (A)	**Moderately-Malnourished (B)**	**Severely-Malnourished (C)**	**Total (%)**
Male (%)	16 (32)	27 (54)	7 (14)	50
Female (%)	8 (42.10)	11 (57.89)		19
Total	**24 (34.79)**	**38 (55.09)**	**7 (10.14)**	**69**

Table 2. Distribution of ICU Patients According to Nutrition Status and Sex

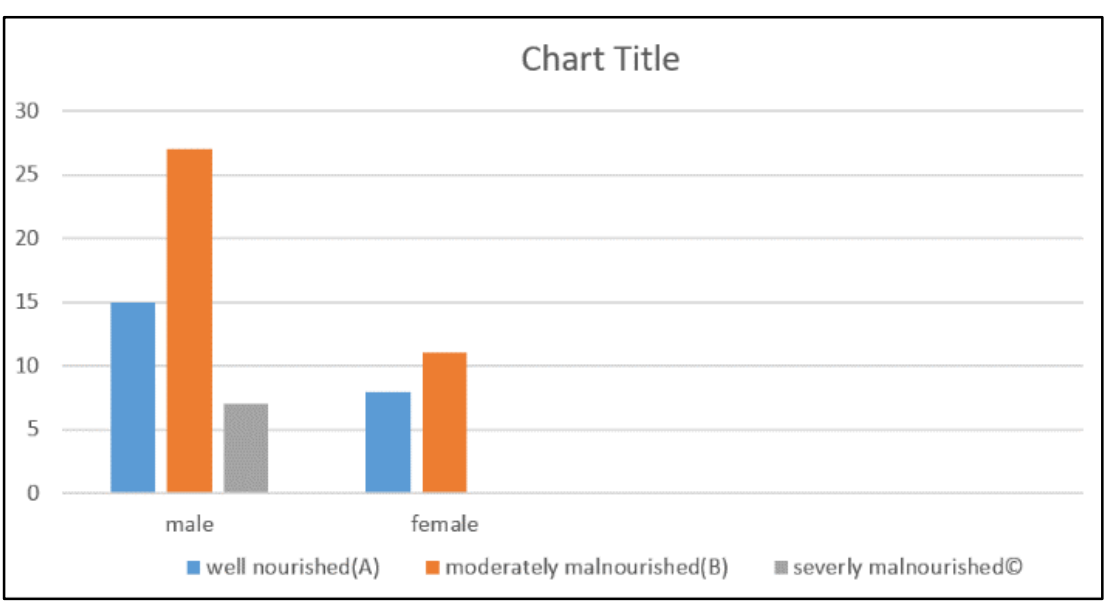

Figure 1. Distribution of ICU Patients According to Nutrition Status and Sex

The nutritional status in male patients shows that more moderately malnourished (54%) patients when compared to well-nourished patients (32%), 14% of patients were severely malnourished. In female, patients also showed more moderately malnourished (57.89%) patients were observed compared to well-nourished (42.10%) patients. 72.46% of patients in our observation were male patients. (Table 2 and Figure 1).

Table 3 summarises about the nutritional status and associated comorbidities. Overall, diabetes and hypertension are the comorbidities, which is associated with moderately and severely malnourished patients. Diabetes mellitus is the common comorbid disease seen in severely malnourished patients. It is also observed that cancer patients and tuberculosis patients are severely malnourished (Figure 2).

	Well-Nourished (A) N=24 (%)	**Moderately-Malnourished (B) N=38 (%)**	**Severely-Malnourished (C) N=7 (%)**
Hypertension	8 (33.33)	11 (28.94)	2 (28.57)
Diabetes mellitus	5 (20.83)	14 (36.84)	3 (42.85)
COPD	1 (4.16)	4 (10.52)	2 (28.57)
Chronic liver disease	1 (4.16)	8 (21.05)	0 (0)
Cancer	0 (0)	2 (5.26)	2 (28.57)
Tuberculosis	0 (0)	2 (5.26)	1 (14.28)
Chronic kidney disease	1 (4.16)	4 (10.52)	0 (0)
Ischaemic heart disease	2 (8.30)	6 (15.78)	0 (0)
Others	1 (4.16)	6 (15.78)	0 (0)

Table 3. Distribution of ICU Patients According to Overall Nutrition Status and Comorbidity

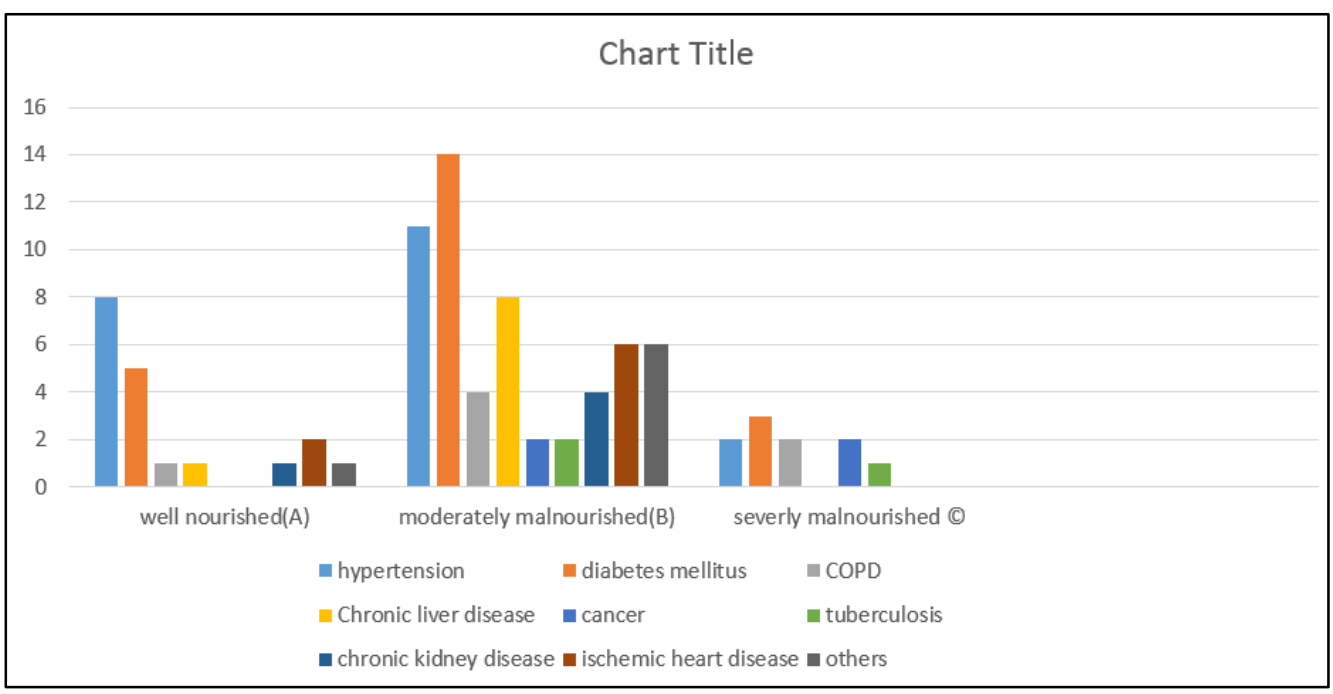

Figure 2. Distribution of ICU Patients According to Overall Nutrition Status and Comorbidity

DISCUSSION

Our study is a single center study, which was carried out for short period with minimum number of patients. In our study, we were able to find that severely malnourished patients were old-aged patients and male patients are older patients when compared to female patients. In the study by Moraiset al, patients were around 60 years old showed that older patients are more malnourished than younger patients.[10]

Our study had more male patients than female patients. So there was a strong association of male sex with malnutrition, however its prevalent in both the sexes.

Considering associated co morbidities, we were able to identify hypertension and diabetes mellitus are the two common comorbidities in malnourished groups. Diabetes mellitus was however seem to be specifically associated with moderate and severe malnutrition and accounts for most common comorbid disease in both groups. If we see with disease-specific grading of malnourishment, we were able to observe that cancer patients followed by tuberculosis patients are severely malnourished. Overall, diabetes mellitus accounts for more malnourished patients maybe because of it being the most common comorbidity followed by hypertension. Nutritional needs to be met by

calculating Basal Energy Expenditure (BEE) by either simple formula- BEE (kcal/day) = 25 x body weight in kilograms. BEE is adjusted to stress level as mild stress = BEE x 1.2, moderate stress = BEE x 1.4, severe stress = BEE x 1.6, which is much easier in daily practice.[11]

Harris Benedict equation can also be used to calculate BEE-

1. Males - BEE = 66.47 + (13.75 x weight) + (5 x height) - (6.76 x age).
2. Females - BEE = 655.1 + (9.56 x weight) + (1.8 x height) - (4.68 x age).

Substrate calculation should also be done accordingly.[11]

a. Carbohydrates - They should provide approximately 70% of caloric requirements.
b. Proteins - Protein requirements are higher than normal in critically ill patients due to hypercatabolism, protein requirement=1.2 to 1.6 g/kg/day.
c. Lipids - 30% of daily energy requirement should be provided by lipids.
d. Fluids - Fluid requirement is estimated to be 30 mL/kg of body weight + replacement for abnormal losses.
e. Vitamins.

How to feed these patients also pays a major role in maintaining the nutrition to these critically-ill patients. According to ASPEN and ESPEN guidelines, enteral feeding scores over parenteral feeding even in haemodynamically unstable very critically ill patients. Because enteral feeding maintains normal route of feeding so that the gut function is maintained, which helps in preventing translocation of bacteria, so that there is less chance of acquired infection like VAP. For ICU patients who are haemodynamically stable and have a functioning gastrointestinal (GI) tract, early enteral feeding (within 24-48 hours of arrival in the ICU) has become a recommended standard of care. Experts identify these early hours as a window of opportunity to provide nutrition that maintains gut barrier function and support immune responses.[12,13] Lot of recent studies have shown that supplemental parental nutrition can help to give adequate nutritional requirement if not meet with enteral nutrition alone. These studies have also shown there is no difference in infective complication when compared to enteral or parenteral nutrition.[14] But, in country like ours, parental nutrition should be used with caution because of awareness of infection control is less except in tertiary care hospital, so in such setting enteral nutrition should be optimised to give adequate nutrition. One of the landmark study showed that glycaemic control is better in patients receiving early EN or PN.[15]

Malnutrition among hospitalised adults is a global problem.[16] Malnutrition impacts significantly on the healthcare system. Malnourished patients have higher complication rates (including infections and organ failure), slower recovery and higher rates of psychosocial difficulties. Because of slower recovery and high complication, cost of the treatment also goes up, which is a big concern in a country like India. So, timely intervention about regarding the nutritional status of the patient will help in reduce cost, number of hospital days and mortality.[17]

CONCLUSION

Based on our findings we could conclude that most of the patients admitted to ICU has preexisting malnourishment, which is seen in both gender group. This shows the importance of nutritional aspect for the speedy recovery of the patients. Each institute should have their own protocol for the nutritional assessment and specific nutritional management for all groups of patients. Being a small study both with respect to duration number of subjects observed, a big multicenter randomised study may be needed to recommend specific strategies.

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