MMJ

Screening in-patients for risk of malnutrition

Abigail Marie Hili, Pierre Ellul

INTRODUCTION

Malnutrition is used to define an imbalance in nutrition and is seen in hospitalized patients. The aim of this study was to assess the risk of malnutrition in patients admitted to the acute medical wards. The 'Malnutrition universal screening tool', was used as a gold standard.

MATERIAL AND METHODS

Data was collected from adult patients from acute medical wards. The data collected included the identification number, age, gender, reason for admission, comorbidities, weight, height, unplanned weight loss in the last 3-6 months and the number of days of no nutritional intake. By means of the MUST, the overall risk of malnutrition score was obtained and its management was recorded.

RESULTS

Fifty patients were recruited and 18% were found to be at medium risk of malnutrition while 36% were found to be at high risk. Only 2% of such patients had a dietician referral and/or adherence to the guideline. Despite 58% of patients were found to have a Body Mass Index score of 0, 21% of these had a BMI score of >30kg/m^2, with 14% of which were admitted secondary to a cardiovascular or respiratory cause.

DISCUSSION

Skills and time are required to diagnose a patient with malnutrition. However, the MUST screening tool, enables this to be done quickly and appropriately. Moreover, implementation of mandatory nutritional screening on admission will allow an increase in dietician referrals and the correct management of this along with the patient's illness, leading to a faster recovery, shorter hospital stay and better long term prognosis.

Abigail Marie Hili* MD
Department of Medicine
Mater Dei Hospital
Msida, Malta
abigail-marie.hili@gov.mt

Pierre Ellul MD PhD FRCP MSc.
Gastroenterology and Internal Medicine
Department of Medicine
Mater Dei Hospital
Msida, Malta

*Corresponding author

Introduction

Malnutrition is commonly used to define an imbalance in nutrition, mostly seen in hospitalized patients at an approximate rate of 25-40%, as reported by European studies.[1] This broad term includes over-nutrition, mostly seen in developed worlds, to under-nutrition in developing countries, as well as in hospitals and residential care facilities in developed countries.[2-4] Malnutrition is related with a negative outcome in patients. Higher rates of infections, muscle loss, delayed wound healing and a longer stay in hospitals are seen in malnourished patients thus increasing the morbidity and mortality rates.[5-11]

In hospitalised patients, malnutrition is often a combination of disease-related cachexia, characterised by extreme loss in body weight, muscle and fat and inadequate nutrient intake.[12]

Obesity, measured by body mass index has become prevalent in both men and women worldwide, resulting in hazardous health implications. Obesity is influenced by genetic, environmental and behavioral factors[13] and more commonly it is associated with Type 2 diabetes mellitus,[14] cardiovascular disease,[15] obstructive sleep apnea,[16] osteoarthritis,[17] hepatobiliary disease[18,19] and a shortened life span.[20]

Originally, the Malnutrition Screening Tool (MST), a three-question tool which assessed recent appetite and weight loss in general medicine, surgical and oncological patients was designed to be used by non-nutrition-trained staff. This tool made use of a scoring system which identified patients at high risk of malnutrition and hence referred for further management by dieticians.[21-23]

Corresponding to the MST, the Malnutrition Universal Screening Tool (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 are useful to develop a care plan depending on the score obtained (Figure 1). The design of this tool allows for it to be used in multiple settings including hospitals, nursing homes, the community and can be easily used by all healthcare workers. The MUST, has been shown to give reliable results, however limitations include not being validated in children and renal patients or to be used to detect deficiencies or excessive vitamins and minerals intake.[24-26] The aim of this study was to assess the risk of malnutrition in patients admitted to the acute medical wards.
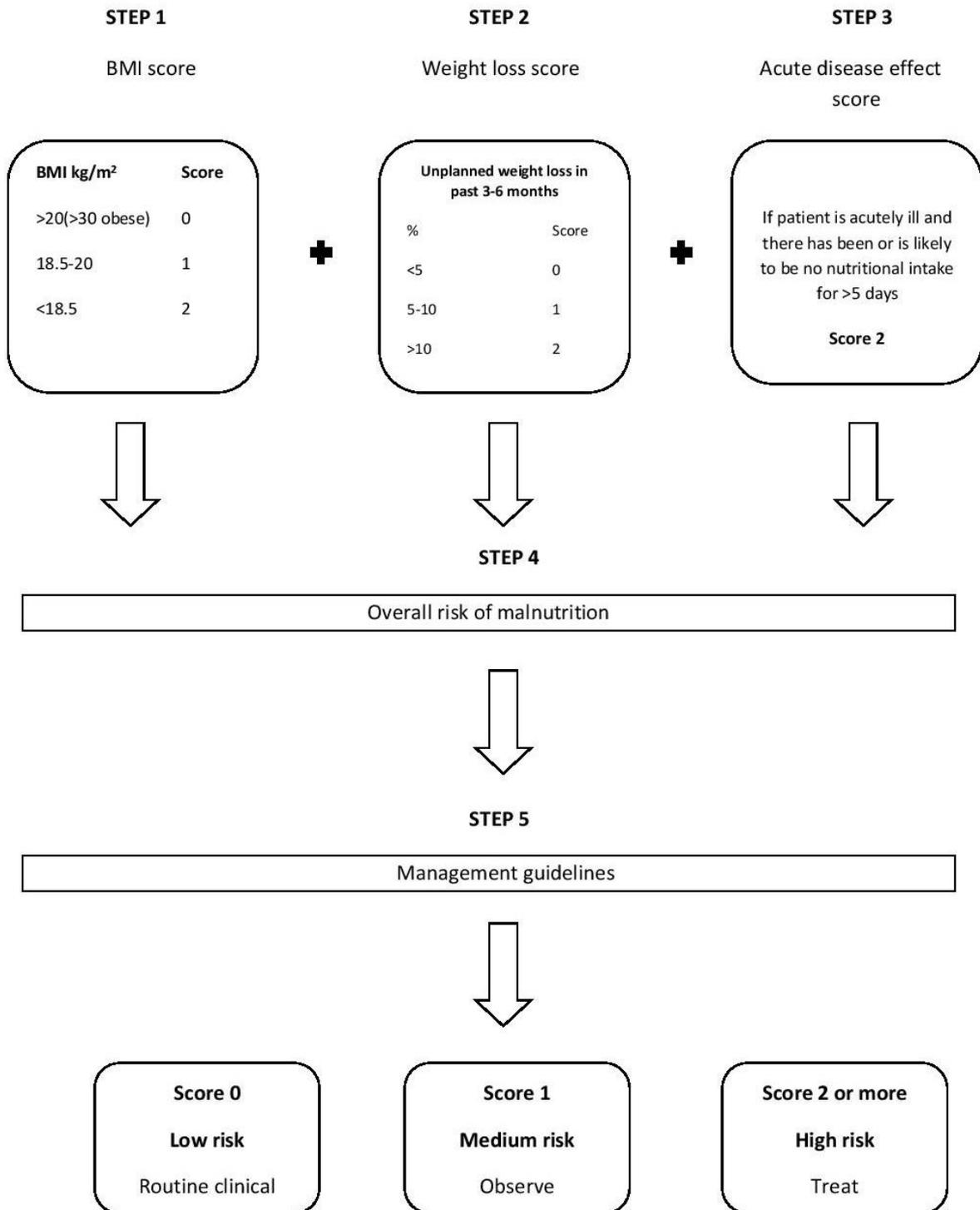
Materials and Methods

Adult patients (defined as above 16 years of age) admitted in the acute medical wards at Mater Dei Hospital between April and May 2019 were recruited. The identification number, gender, age and reason for admission were noted.

Patients diagnosed with an active cancer during the study were not included in the data collection, hence the terms anorexia, cachexia and sarcopenia were not used. The reason for this being that measurement of muscle is more complex and the ideal tests for measurement of sarcopenia are DEXA scanning and CT or MRI.[27] Furthermore, the MUST score, which is a standard validated tool, was used. Other exclusion criteria including the clinical evidence of fluid overload such as ascites, pleural effusions and lower limb oedema secondary to fluid overload.

Figure 1 Patient's risk of malnutrition and management pathway

STEP 1

BMI score

BMI kg/m²	Score
>20(>30 obese)	0
18.5-20	1
<18.5	2

STEP 2

Weight loss score

Unplanned weight loss in past 3-6 months

%	Score
<5	0
5-10	1
>10	2

STEP 3

Acute disease effect score

If patient is acutely ill and there has been or is likely to be no nutritional intake for >5 days

Score 2

STEP 4

Overall risk of malnutrition

STEP 5

Management guidelines

Score 0

Low risk

Routine clinical

Score 1

Medium risk

Observe

Score 2 or more

High risk

Treat

Patients had their weight and height measured as to measure their Body Mass Index (BMI). In those patients who were not able to get out of bed or stand up, they had the BMI calculated by measuring the mid upper arm circumference (MAUC).

The patient was asked to bend the left arm at the elbow at 90 degrees angle. The upper arm was held parallel to the side of the body and the distance between the acromion and the olecranon process was measured to obtain the mid-point. The circumference of the mid upper arm was then measured in centimeters at the mid-point obtained earlier. If MUAC is 23.5 cm, the BMI is likely to be <20 kg/m² and if the MUAC is 32.0 cm, the BMI is likely to be >30 kg/m².

Other data that was collected was:

- Unplanned weight loss. This was scored according to tables that were provided (Table 1). The patient is asked if he/she experienced any weight loss in the last 3-6 months, and if so by how much.

- Establish acute disease effect and score (Patients who are acutely ill or the likelihood/no nutritional intake for more than 5 days results in a score of 2)

- Documentation of dietary intake, referral to a dietician, repeat nutritional screening,

The patient's risk of malnutrition and management pathway were then assessed using the flow chart in Figure 1.

Table 1   Patient cohort and MUST Score

	Score of 0	Score of 1	Score of 2
Step 1 (BMI score) %	BMI >20 kg/m²	BMI 18.5-20 kg/m²	BMI < 18.5 kg/m²
	58%	36%	6%
Step 2 (weight loss score) %	<5%	5-10%	>10%
	68%	28%	4%
Step 3 (Acute disease score) %	90%	6%	4%
Overall Risk of Malnutrition (Addition of Steps 1-3)			
	Low Risk	Medium Risk	High Risk
Step 4	46%	18%	36%

Total number of patients recruited were 50. Their mean age was 73.04 year (range 34-92 years), the majority being female (66%).

Overall, 46% of patients were not at low risk of malnutrition, 18% were at medium risk of malnutrition and 36% were considered at high risk (Table 1).

Out of 54% of patients who were at medium or high risk of malnutrition only 2% had a dietician referral and/or adherence to the guideline.

More than half of the patients (58%) had a BMI assessment score of 0. However, it is important to note that 21% of these patients had a BMI score >30 kg/m^2 and 14% of which

were admitted with a cardiovascular or respiratory diagnosis.

All patients had at least 1 co-morbidity. Figure 2 outlines the number of co-morbidities that patients had, where more than a third of patients had more than 3 co-morbidities. The most common co-morbidities were Hypertension (42%), ischemic heart disease (22%), congestive heart failure (16%) and chronic obstructive pulmonary disease (COPD) (12%). Other co-morbidities included renal impairment and dementia.

The most common clinical indication for hospital admission were respiratory tract infections, presenting as pneumonias (24%), Infective asthma (2%) or COPD exacerbation (8%). The other clinical reasons for admissions are listed in table 2.

Figure 2   The number of co-morbidities
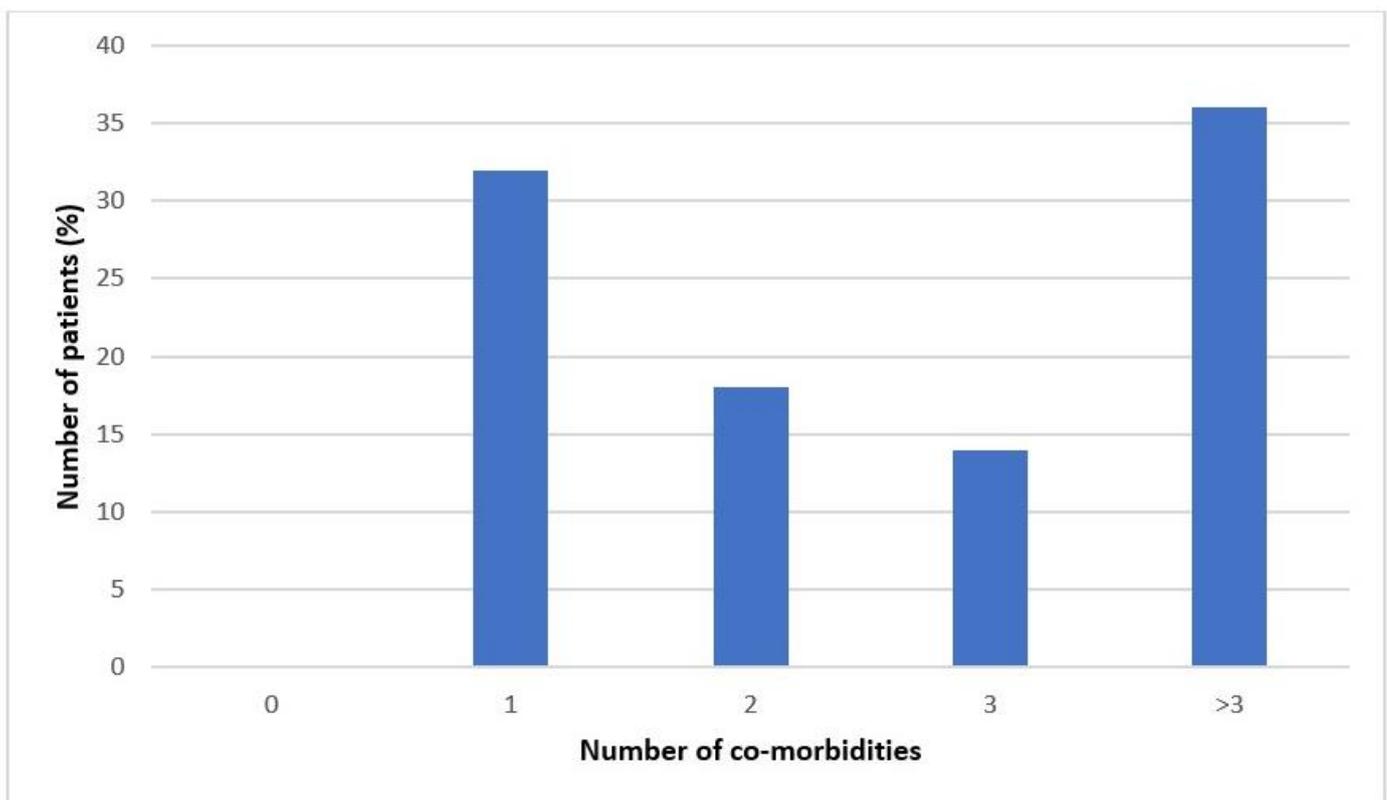
Table 2   Diagnoses with which patients were admitted to hospital

Diagnosis	%
Pneumonia	24
Chest pain	16
Fall	10
CHF exacerbation	10
Infective COPD exacerbation	8
UTI	6
Endocrine disorders/Uncontrolled diabetes	6
Thromboembolic events	4
Headache	4
Constipation	4
Confusion	4
Infective asthma exacerbation	2
Anemia	2

DISCUSSION

This analysis involved 50 patients and was carried at Mater Dei Hospital in Malta. The majority of patients (54%) in this study were found to be at risk of malnutrition, which according to the guidelines require observation and/or referral to the dietician for treatment. Unfortunately, only 2% of patients' malnutrition was treated as per guideline.

The presence of comorbidities is a known risk factor for malnutrition. Approximately a third of the patients (36%) of the patients were noted to have more than 3 comorbidities, thus demonstrating that approximately a third of the patients were chronically ill despite exclusion of patients with malignancy. A limitation in this study was the number of patients involved. However, considering the diagnosis, this is representative of the population.

Assessing the nutritional status of the patient requires skills and time. Patients are often referred to a dietician by the medical and nursing staff in view of this matter. This leaves little time for the dietician to screen other patients for malnutrition. Furthermore, malnourished patients in the acute setting are missed to be identified and are therefore not referred for nutrition assessment and optimisation.[28] This causes a window of missed opportunity to treat and prevent

consequences on both the patients and the healthcare system.

Unpleasant results of malnutrition include the increased risk of pressure ulcers, infections, delay in wound healing, alteration in thermoregulation and impairment of renal function.[2, 10, 11, 29] It also causes loss of muscle and fat mass, a reduction in the respiratory and cardiac function along with atrophy of visceral organs.[7,10,29] On a psychological level malnutrition causes fatigue and apathy which causes a delay in recovery. It has been reported in literatures that malnutrition increases the length of hospital stay and imposes further stress on the acute health care facilities. As malnourished patients have higher rates of infections pressure ulcers and are less independent, the need for a greater nursing care and medications increases.[30-33]

An important missed opportunity in screening patients for malnutrition on admission is referring obese patients for the management of weight loss. In this analysis, 21% of patients were found to have a BMI >30kg/m2, 14% of which required admission due to cardiovascular or respiratory disease. Obesity, an imbalance in nutrition due to over nutrition, is associated with an increase in multiple comorbidities which can involve multiple systems such as the cardiovascular, neurological, musculoskeletal and the reproductive system.

Obesity also imposes stress on the healthcare system through higher emergency room and doctor visits, admission to hospitals, investigations, medications and sick days. Limitations of this study include the relatively small sample. However, from routine clinical practice we believe that these results mirror the actual clinical occurrence and referrals.

In conclusion, the introduction of a simple tool, that does not take a long time to perform and that can be done jointly between the caring physician and an allied health care professional can result in both the identification and management of this common problem.

SUMMARY BOX

What is already known about this subject:

- Identification of malnutrition is fundamental for its treatment

- Many malnourished patients in the acute settings are not identified and hence not referred for assessment and treatment

- Malnutrition is known to cause impairment at the cellular, physical and psychological level. It also places additional stress on health care facilities with a longer hospital stay and increase in hospital costs

What are the new findings:

- Lack of use of the 'MUST' score in the referral and management of malnutrition

- A third of malnourished patients are chronically ill

- Lack of weight loss referral for obese patients is secondary due to lack of screening on admissions

REFERENCES

1. Barrazoni R. The "hidden" epidemics in EUROPE. 2nd Congress of Clinical Nutrition and Metabolic Care; 2017 April; Portorož, Slovenia.

2. Naber TH, Schermer T, deBree A, Nusteling K, Eggink L, Kruimel J.W, et al. Prevalence of malnutrition in nonsurgical hospitalized patients and its association with disease complications. Am. J.Clin. Nutr. 1997;66:1232-1239

3. Soeters PB, Reijven PLM, van Bokhorst-de van der Schueren MAE, Schols J.M.G.A, Halfens R.J.G. Meijers J.M.M, et al. A rational approach to nutritional assessment. Clin. Nutr. 2008;27:706-716.

4. Caruana M, Vassallo N. Nutrition: an important component of health among older adults. BDL publishing. Active and healthy ageing in Malta – gerontological and geriatric inquiries. Malta: 2018. p. 2011-221.

5. DiMaria-Ghalili RA. Changes in nutritional status and postoperative outcomes in elderly CABG patients. Biol. Res. Nurs. 2002,4:73-84.

6. Baldwin C, Parson, TJ. Dietary advice and nutrition supplements in the management of illness-related malnutrition: a systematic review. Clin. Nutr. 2004,23:1267-1279.

7. Chandra RK. Nutrition and the immune system: an introduction. Am. J. Clin. Nutr. 1997,66:460S-463S.

8. Mechanick JI. Practical aspects of nutrition support for wound healing patients. Am. J. Surg. 2004,188:52-56

9. Braunschweig C, Gomez S, Sheean PM. Impact of declines in nutritional status on outcomes in adult patients hospitalized for more than 7 days. J. Am. Diet. Assoc. 2000,100:1316-1322.

10. Holmes S. The effects of undernutrition in hospitalised patients. Nurs. Stand. 2007,22:35-38

11. Allison SP. Malnutrition, disease and outcome. Nutrition 2000,16:590-593.

12. Muscaritoli M, Anker SD, Argiles J, Aversa Z, Bauer JM, Biolo G, et al. Consensus definition of sarcopenia, cachexia and pre-cachexia: Joint document elaborated by Special Interest Groups (SIG) —cachexia-anorexia in chronic wasting diseases and nutrition in geriatrics. Clin. Nutr. 2010,29:154-159.

13. Barker L, Gout B, Gowe T. Hospital malnutrition: Prevalence, Identification and Impact on Patients and the Healthcare System. Int. J. Res. Public health 2011.

14. DeFronzo RA, Ferrannini E, Groop L, Henry RR, Herman WH, Holst JJ, et al. Type 2 diabetes mellitus. Nat Rev Dis Primers. 2015,1:15019.

15. Flint AJ, Hu FB, Glynn RJ, Caspard H, Manson JE, Willett WC, et al. Excess weight and the risk of incident coronary heart disease among men and women. Obesity (Silver Spring). 2010;18(2):377–383.

16. Coccagna G, Pollini A, Provini F. Cardiovascular disorders and obstructive sleep apnea syndrome. Clin Exp Hypertens. 2006;28(3–4):217–224.

17. Aune D, Navarro Rosenblatt DA, Chan DSM, Vingeliene S, Abar L, Vieira AR, et al. Anthropometric factors and endometrial cancer risk: a systematic review and dose-response meta-analysis of prospective studies. Ann Oncol. 2015;26(8):1635–1648.

18. Clark JM. The epidemiology of nonalcoholic fatty liver disease in adults. J Clin Gastroenterol. 2006;40(Suppl 1):S5–S10.

19. Felson DT, Anderson JJ, Naimark A, Walker AM, Meenan RF. Obesity and knee osteoarthritis. The Framingham Study. Ann Intern Med. 1988;109(1):18–24.

20. Sjöström L, Narbro K, Sjöström CD, Karason K, Larsson B, Wedel H, et al. Swedish Obese Subjects Study . Effects of bariatric surgery on mortality in Swedish obese subjects. N Engl J Med. 2007;357(8):741–752.

21. 37. Anthony, P.S. Nutrition screening tools for hospitalized patients. Nutr. Clin. Pract. 2008,23:373-382.

22. 38. Ferguson M, Bauer J, Gallagher B, Capra S, Christie DR, Mason BR. Validation of a malnutrition screening tool for patients receiving radiotherapy. Australas. Radiol. 1999;43:325-327.

23. 39. Ferguson M, Capra S, Bauer J, Banks M. Development of a validated and reliable malnutrition screening tool for adult acute hospital patients. Nutrition 1999;15:458-464.

24. Malnutrition Advisory Group (MAG): A Standing Comittee of the British Association for Parenteral and Enteral Nutrition (BAPEN) The MUST Explanitory Booklet. A guide to the Malnutrition Universal Screening Tool (MUST). November 2011.

25. Kyle UG, Pirlich M, Scheutz T, Luebke HJ, Lochs H, Pichard C. Prevalence of malnutrition in 1760 patients at hospital admission: a controlled population study of body composition. Clin. Nutr. 2003,22:473-481.

26. Baily R. Implementing nutrition screening. Nurs. Manag. (Harrow) 2006,13:20-24.

27. Rubbieri G, Mossello E, Di Bari M. Techniques for the diagnosis of sarcopenia .Clin Cases Miner Bone Metab. Sep-Dec 2014,11(3):181–184.

28. Ferguson M, Capra S. Nutrition screening practises in Australian hospitals. Aust. J. Nutr. Diet. 1998,55:157-159.

29. Kubrack C, Jensen L. Malnutrition in acute care patients. Int. J. Nurs. Stud. 2007,44: 1036-1054.

30. Middleton MH, Nazarenko G, Nivison-Smith I, Smerdely P. Prevalence of malnutrition and 12-month incidence of mortality in two Sydney teaching hospitals. Int. Med. J. 2001,31:455-461.

31. Pirlich M, Schutz, T, Norman K et al. The German hospital malnutrition study. Clin. Nutr. 2006,25:563-572.

32. Waitzberg DL, Caiaffa WT, Correia MITD. Hospital malnutrition: The Brazilian national survey (IBRANUTRI): a study of 4000 patients. Nutrition 2001,17:573-580.

33. Funk CL, Ayton CM. Improving malnutrition documentation enhances reimbursement. J. Am. Diet. Assoc. 1995,95:468-475.