Review

Malnutrition in the elderly: A narrative review

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ABSTRACT

The focus of nutrition is often on healthy diets and exercise to minimise the risk of developing lifestyle diseases such as cancer, diabetes and cardiovascular disease. However, during the shift into older years often the nutrition priorities change towards meeting increased nutrient needs with less energy requirements, and minimising lean muscle loss. There are several causes of general malnutrition in the elderly that lead to depletion of muscle including starvation (protein-energy malnutrition), sarcopenia and cachexia. The prevalence of protein-energy malnutrition increases with age and the number of comorbidities. A range of simple and validated screening tools can be used to identify malnutrition in older adults, e.g. MST, MNA-SF and 'MUST'. Older adults should be screened for nutritional issues at diagnosis, on admission to hospitals or care homes and during follow up at outpatient or General Practitioner clinics, at regular intervals depending on clinical status. Early identification and treatment of nutrition problems can lead to improved outcomes and better quality of life.

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1. Introduction

The world's population is rapidly ageing with estimates that in the first five decades of the 21st century the proportion of the world's population over 60 years will double from 11% to 22%. The expected increase in the absolute number of older adults will triple from 605 million to 2 billion over this period [1]. As the number of older people continues to rise, provision of improved healthcare to the elderly – both in hospital and in the community – is imperative. Often, the focus of nutrition in older adults is a healthy diet and exercise to minimise the risk of developing lifestyle diseases (such as cardiovascular disease, Type 2 diabetes mellitus). However, there is a large body of evidence to indicate that protein-energy malnutrition (PEM) is a common problem in this age group, including in the hospital, nursing home and community setting. Therefore, the purpose of this paper is to summarise the current literature regarding:

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Table 1
PEM prevalence in the acute care setting.

(Authors, Year)	Number of hospitals; Country	Total number of participants; age (years)	Number of elderly participants	Nutrition screening/assessment method; stage of nutrition assessment	Malnutrition risk or prevalence in elderly participants
Agarwal et al., 2012 [20]	56 hospitals; Australia and New Zealand	N = 3122; mean age: 65 ± 18 years	n = 1650	SGA; during hospital admission	60% of elderly participants (≥65 years) were malnourished
Imoberforf et al., 2009 [21]	Seven hospitals; Switzerland	N = 32,837; mean/median age not specified	Not specified	NRS-2002; on admission	Nutrition risk in 65–84 year old participants: 22%; Nutrition risk in participants aged >85 years: 28%
Pirlich et al., 2006 [22]	13 hospitals; Germany	N = 1886; mean age: 62 ± 17 years	n = 1109	SGA; during hospital admission	PEM prevalence in: 60–69years: 23%; 70–79 years: 35%; ≥80years: 55%
Correia and Campos, 2003 [23]	Hospitals from 13 countries in Latin America	N = 9348; mean age: 52 ± 17 years	Not specified	SGA; during hospital admission	PEM prevalence in participants aged >60 years: 53%
Waitzberg et al., 2001 [24]	25 hospitals; Brazil	N = 4000; mean age not specified	n = 1441 (age>60years)	SGA; during hospital admission	PEM prevalence in participants aged >60 years: 53%

NRS-2002, Nutrition Risk Screening 2002 [25]; PEM, protein-energy malnutrition; SGA, subjective global assessment [26].

- the prevalence,
- aetiology,
- identification, and
- effective nutritional management

of PEM in the elderly.

2. Causes of general malnutrition – starvation (PEM), sarcopenia, and cachexia

While there is no universally accepted definition of malnutrition, one of the most commonly used identifies malnutrition as "a state of nutrition in which a deficiency, or excess, of energy, protein and micronutrients causes measurable adverse effects on tissue/body form (body shape, size and composition) and function, and clinical outcome" [2]. However, in relation to under-nutrition, this definition does not take into account the aetiology of unintentional weight loss. Recent literature suggests that unintentional weight loss is comprised of three primary syndromes: starvation, sarcopenia and cachexia [3,4]. Furthermore, there is a level of complexity involved in that the unintentional weight loss may be a result of any two or three of those syndromes in combination [5]. The term malnutrition dominates the literature around unintentional weight loss and is likely to capture all unintentional weight loss as if it were one condition. Disentangling the primary aetiology is critical for implementation of appropriate nutrition support as responsiveness to dietary modifications differ. Even now there is uncertainty and confusion amongst dietitians, which is likely to be reflected amongst all clinicians [6].

Starvation is generally accepted to occur purely as a result of protein-energy deficiency and is synonymous with PEM [4,7]. The major factor that distinguishes starvation from other syndromes of unintentional weight loss is that it is reversed when adequate energy and protein intake is achieved (discussed further in Section 7) [7]. There are numerous nutrition screening tools to detect PEM (discussed further in Section 5) and these are increasingly becoming mandatory across the continuum of care but primarily in the acute care setting.

Results of recent attempts to provide, and agree upon, definitions and diagnostic criteria for sarcopenia indicate that it is a progressive loss of muscle mass that occurs with normal ageing although this area is still under investigation [8–10]. It is known to be associated with increased frailty, loss of strength, reduced physical function and diminished capacity for exercise, as a result of decreased muscle mass and alterations to muscle structure at the microscopic level which change the function of muscle in sarcopenia [11]. It is likely that effective interventions for the treatment of sarcopenia should be multi-disciplinary. Dietary management should provide adequate energy and protein intake however this alone would be unlikely to address weight loss as sarcopenia is thought to occur regardless of energy balance [12,13]. Recent evidence indicates that the most effective intervention thus far is a combination of nutrition and resistance training [14]. There are currently no screening tools for the detection of sarcopenia, and diagnosis is usually based on clinical judgement, although criteria have been proposed by at least one recent consensus paper [8]. Health professionals working with older adults with unintentional weight loss should be mindful that nutrition alone may not improve their condition.

Cachexia is mediated by pro-inflammatory cytokines and has long been associated with a number of chronic conditions such as cancers, HIV/AIDS, heart failure and chronic obstructive pulmonary disease (COPD). In 2008 a group of prominent researchers in the field came together to develop a consensus definition for cachexia which indicates that "cachexia is a complex metabolic syndrome associated with underlying illness and characterised by loss of muscle with or without loss of fat mass [15]. Furthermore, an expert group used the Delphi technique to define diagnostic criterion for cancer cachexia as weight loss greater than 5%, or weight loss greater than 2% in individuals already showing depletion according to current bodyweight and height (body-mass index, BMI; <20 kg/m^2) or skeletal muscle mass (sarcopenia) [16]. An agreement was made that the cachexia syndrome can develop progressively through various stages; precachexia to cachexia to refractory cachexia. Assessment for classification and clinical management should include: anorexia or reduced food intake, catabolic drive, muscle mass and strength, functional and psychosocial impairment [16]. Although there is little research into the condition there is evidence that geriatric cachexia also manifests in the elderly [17,18]. Evans et al. [15] were also clear in identifying cachexia as a separate syndrome from starvation and sarcopenia. There has been a considerable amount of research into