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Original article

Malnutrition and associated factors in nursing home residents: A cross-sectional, multi-centre study

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SUMMARY

Background & aims: Malnutrition is a common problem in the elderly living in nursing homes. A clear understanding of associated factors is missing. The aim of this study was to evaluate prevalence of malnutrition and to determine factors independently associated with malnutrition in this setting.
Methods: A cross-sectional, multi-centre study was conducted in 23 nursing homes in Flanders, Belgium. The nutritional status was assessed using the Mini Nutritional Assessment (MNA). Data on possible associated factors were collected using validated scales.
Results: The study included 1188 elderly residents; 38.7% were at risk for malnutrition and 19.4% were malnourished. The presence of a wound/pressure ulcer, a recent hospitalization (<3 months ago), being involved in a tailored nutritional intervention, and suffering from a lower cognitive state were significantly associated with malnutrition. Receiving additional meals provided by family members was negatively associated with malnutrition.
Conclusion: Malnutrition is a prevalent problem in nursing homes in Flanders. Systematic screening and well-defined tailored interventions should be further developed and evaluated in this population at risk.

1. Introduction

Malnutrition is a prevalent problem in the elderly.[1] Malnutrition can be a complication resulting from a disease or it can be an independent disease.

Multiple definitions are used to define malnutrition.[2,3] All include (1) insufficient dietary intake of essential nutritional elements and (2) protein-energy malnutrition (PEM), which can be both a primary (resulting from an insufficient food intake) or a secondary problem (resulting from a disease).[4] However, a universally accepted definition for malnutrition does not exist.[3,5] Elia in Stratton et al. defines undernutrition as "a state of nutrition in which a deficiency of energy, protein and other nutrients causes adverse effects on tissue or body form (body shape, size and composition), function or clinical outcomes".[3] This current study will focus on undernutrition; however, the terms 'malnutrition' and 'undernutrition' will be used interchangeably analogous to the literature.

The Malnutrition Universal Screening Tool (MUST), the Nutritional Risk Screening (NRS-2002), and the Mini-Nutritional Assessment (MNA) are the most commonly used screening tools for malnutrition. In the 2002 guidelines for nutritional screening by the European Society for Clinical Nutrition and Metabolism (ESPEN), the MNA is recommended to screen patients for malnutrition in elderly in home-care programs, nursing homes and hospitals.[6] The MNA includes physical and mental aspects affecting the nutritional status. According to the ESPEN guidelines, the MNA is more likely to identify risk for malnutrition at an early stage.[6] The MNA contains anthropometric measurements, type of accommodation, medication, the presence of a wound/pressure ulcer, number of meals, food and fluid intake, autonomy of feeding, and self-perception of health and nutrition. A brief version of the MNA was developed by Rubenstein and colleagues in 2001 (Mini Nutritional Assessment – Short Form (MNA-SF)).[7] The MNA-SF includes

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6 items: appetite, weight loss, mobility, psychological stress or acute disease, neuropsychological diseases, and Body Mass Index (BMI). If the MNA-SF considers a person at risk for malnutrition, the full MNA needs to be completed.

Malnutrition has a negative impact on functional status, psychosocial well-being, and the quality of life of the elderly[2,8] and is reported as a risk factor for mortality.[2,9,10] Malnutrition may lead to an extended hospital stay and increased costs for patients, healthcare facilities and broader society.[11,12]

Prevalence figures of malnutrition in elderly are ambiguous and vary between 0 and 78%.[12–17] This variety is mainly due to the inclusion of different settings, age categories, underlying disease, screening instruments, and, even more important, the definition of malnutrition. A review by Guigoz reported that 23% [1–74] of the hospitalized elderly and 21% [5–71] of the institutionalized elderly suffer from malnutrition when the MNA is used.[13]

In 2010, a cross-sectional study in 2329 patients in 90 elderly care wards in Belgian hospitals was conducted to (1) gain insight into the prevalence of malnutrition and (2) to identify factors associated with malnutrition.[18] The MNA was used to assess the risk for malnutrition in the included patients. The authors concluded that 43% of the included patients were at risk for malnutrition, and 33% of the patients were malnourished.

In 2009, a cross-sectional study was used to report on the prevalence of malnutrition in Belgian nursing homes.[19] This study included 5334 nursing home residents. The MNA-SF was used and possible associated factors were not studied. The authors reported that 58.7% of the elderly were considered at risk for malnutrition. The results were confirmed by other international studies in this population.[20–22]

Several factors are thought to be associated with malnutrition. These factors include immobility, dementia, depression, difficulties in eating and swallowing, and the presence of a wound/pressure ulcer.[21,23–25] Malnutrition in elderly is also associated with the loss of Lean Body Mass and with a range of other factors which reduce the intake of food and fluids.[26,27] Furthermore, vulnerability for malnutrition increases with age and weakening of functional capabilities.[25]

In a study by Vanderwee and colleagues, swallowing difficulties and a reduced ability to taste were found to be associated with malnutrition in elderly admitted to a hospital.[18] Furthermore, the authors concluded that patients admitted from a nursing home were significantly more likely to be malnourished than residents admitted from a service flat.

In nursing home residents, malnutrition was found to be associated with impaired functioning, swallowing difficulties, dementia, eating dependency, the presence of a wound/pressure ulcer, gender, and poor oral intake.[21,28] Thus far, little research is available on elderly in nursing homes. To our knowledge, extensive studies identifying factors associated with malnutrition in Belgian nursing homes are missing.

2. Aim

The aims of this study were to report on (1) the prevalence of malnutrition and on (2) associated factors for malnutrition in elderly living in Belgian nursing homes.

3. Methods

3.1. Design

A cross-sectional, multi-centre study was performed. The outcome measures were the prevalence of malnutrition and the independent associated factors for malnutrition.

3.2. Setting and sample

This study was conducted in nursing homes in Flanders (Belgium) and included elderly residents. A stratified random sample was taken from a total of 694 nursing homes in Flanders. The sample was selected based on geographical region, number of beds, and funding characteristics (government or privately funded). In total, 55 nursing homes were invited to participate; 23 institutions agreed to participate. Reasons for non-participation were a recent change in- or absence of managing board, high workload, relocation, the absence of a financial compensation and a lack of staff.

In each participating nursing home, a random sample of residents was selected to participate. The random sample included patients born on a day with an odd number. Inclusion criteria were set as having completed the entire questionnaire and being $\geq$55 years of age. In total, 1188 residents were included in this study.

3.3. Instruments

A set of validated instruments was used to collect data on demographic characteristics, nutritional state, problems related to food intake, swallowing mechanism, energy and appetite, cognitive state, and functional state.

3.3.1. Demographic characteristics

A questionnaire to collect demographic data was developed using a double type Delphi procedure involving researchers with a high level of expertise in the area of elderly care and/or nutrition. Data on (1) demographic characteristics (age, sex, weight, length of stay, recent hospitalization), (2) physiological characteristics (medication, comorbidity), (3) nutritional status (diet, nutritional intervention) and (4) eating habits (nature and frequency of assistance during meals, use of supplements, meals brought by family) were collected.

3.3.2. Nutritional state

The two-step Mini Nutritional Assessment tool (MNA-SF & MNA) was used to evaluate the nutritional state of the elderly. The MNA is an extensively validated instrument to identify the elderly who have or are at risk for malnutrition.[6,13,29–31] The instrument is recommended in both national and international guidelines and by organizations such as National Food and Health Plan Belgium and ESPEN.[6,32]

Research showed that the MNA-SF is highly correlated with the MNA.[7,33] The maximum score of the MNA-SF is 14. Participants with a score $\geq$12 were considered to be well-nourished. A score $<$12 was considered indicative for the risk for undernutrition, in this case, the full MNA had to be completed.

Participants with a total score $<$17 on the full MNA, were considered to be malnourished. Residents having a score between 17 and 23.5 were defined as being at risk for malnutrition. Participants with a score $\geq$24 were considered as being well-nourished.[34]

3.3.3. Problems related to food intake, swallowing, energy and appetite

The Minimal Eating Observation Form – Version II (MEOF-II) was used to determine problems related to food intake, swallowing, energy, and appetite.[27] The MEOF-II includes three elements: (1) ingestion, (2) deglutition, and (3) energy. Ingestion includes (1) the manipulation of food on the plate, (2) the transport of food to the mouth, and (3) the sitting posture. Deglutition includes (1) the ability to chew, (2) the manipulation of food in the mouth, and (3) swallowing. Energy includes (1) alertness, (2) appetite, and (3) eating $<$3/4 of the food being served.[27] The instrument has been extensively validated.[27]