SCREENING FOR MALNUTRITION IN NURSING HOME RESIDENTS: COMPARISON OF DIFFERENT RISK MARKERS AND THEIR ASSOCIATION TO FUNCTIONAL IMPAIRMENT

I. STANGE1, K. POESCHL2, P. STEHLE2, C.C. SIEBER1, D. VOLKERT1

1. Institute for Biomedicine of Aging (IBA), Friedrich-Alexander Universitat Erlangen-Nurnberg, Nurnberg, Germany; 2. Department of Nutrition and Food Sciences (IEL)- Nutritional Physiology, University of Bonn, Germany. Corresponding author: Inken Stange, Institute for Biomedicine of Aging (IBA), Friedrich-Alexander-Universitat Erlangen-Nurnberg, Heimrichstr. 58, D-90419 Nurnberg, Germany, Tel. +49 911 3000 5 21, Fax. + 49 911 3000 5 25, E-mail: inken.stange@gmx.de

Abstract: Objectives: To identify nursing home residents with malnutrition or at risk of malnutrition by using different markers, determine if the Mini Nutritional Assessment (MNA®) is able to identify all residents at risk according to single risk markers and explore the relation between risk markers and functional impairment. Design: Cross-sectional study. Setting: Six German nursing homes. Participants: 286 residents (86±7y, 89% female). Measurements: Screening for malnutrition or its risk included low BMI (≤22 kg/m²), recent weight loss (WL), low food intake (LI) as single risk markers and MNA (<24 points, p.) as composite marker. Prevalence of single nutritional risk markers in different MNA categories was compared by cross-tables. Mental (cognition, mood) and physical function (mobility) were assessed by interviewing nursing staff and association of impaired status to nutritional risk markers determined by Chi² test. Results: 32.9% of residents had a low BMI, 11.9% WL and 21.3% LI. 60.2% were categorized malnourished (18.2%) or at risk of malnutrition (42.0%) by MNA. 64% presented at least one of these nutritional risk markers. Of those classified malnourished by MNA, 96.2% also showed low BMI, WL or LI. In contrast, eleven residents (9.6%) considered well-nourished by MNA presented single risk markers (9 low BMI, 2 WL). Cognitive impairment, depressive symptoms and immobility was present in 59.0%, 20.8% and 25.5%, respectively. Functional impairment, and in particular severe impairment, was to a higher proportion present in residents at nutritional risk independent of the chosen marker (MNA<24 p., low BMI, WL, LI). Conclusion: The high prevalence of nutritional risk highlights the importance of regular screening of nursing home residents. The MNA identified nearly all residents with low BMI, WL and LI. The close association between nutritional risk and functional impairment requires increased awareness for nutritional problems especially in functionally impaired residents, to early initiate nutritional measures and thus, prevent further nutritional and functional deterioration.

Key words: Screening, malnutrition, nursing home, functionality, nutritional risk, MNA.

Introduction

Screening for malnutrition in nursing homes is a crucial first step to early identify affected residents and those at risk that should be followed by nutritional assessment and initiation of appropriate nutritional treatment (1-3). Despite the detrimental effects of malnutrition (4, 5), guidelines (6-8) and proven efficacy of oral nutritional supplements (ONS) (9), this is, however, not always common practice. Consequences of malnutrition include adverse health effects like infections, complications, prolonged hospital stays and mortality, but also loss of independency and quality of life (1, 10, 11). Besides, the costs resulting from malnutrition (12) may lead to considerable economic burden for nursing homes, enhanced by the rising demand of an aging population (13).

Lack of regular nutritional screening might reflect uncertainty about how to identify elderly subjects in need of nutritional support in daily routine (6). Low BMI, weight loss and low food intake are regarded key elements for diagnosis of malnutrition or nutritional risk, indicating the need for in-depth nutritional assessment (14-16). Although consideration of these easily identifiable single markers in isolation can be misleading, they are often used as stand-alone parameters to judge nutritional status (3, 15, 17). Alternatively, the Mini Nutritional Assessment (MNA®) represents a composite screening tool specifically designed and recommended for older people. It evaluates nutritional markers and general health aspects, but also includes psychological and functional items contributing to malnutrition development. Distinguishing between malnourished and those at risk, it is of preventive use allowing early intervention (18, 19). However, it is not known if the relatively complex MNA identifies all nursing home residents showing one or more of the above mentioned single markers of malnutrition, requiring intervention if present. To date, debate about the best way to identify elderly persons at nutritional risk is ongoing (6, 15, 17).

Apart from nutritional problems, older people often suffer from functional decline. The MNA links functional impairment to nutritional risk, but data on the presence of both physical and mental impairment in nursing home residents with or without nutritional risk is limited and research on this association required (20).

Both lack of consensus on screening methodology and limited knowledge on the relation between nutritional risk and functional impairment are not only relevant for nursing practice, but also for future nutrition intervention trials and their interpretation, as comparability is limited and functional...
impairment is commonly regarded an exclusion criterion.

Thus, the objectives of the study were (i) to identify nursing home residents with malnutrition or at risk of malnutrition using different markers, (ii) to determine if the MNA is able to identify all residents at risk according to other markers and (iii) to explore the relation between risk markers and functional impairment.

Methods

Study design

This cross-sectional study forms part of an intervention trial investigating the effects of oral nutritional supplements (ONS) on nutritional and functional status in nursing home residents with malnutrition or at risk of malnutrition.

All residents from six nursing homes in Nuremberg and Fuert, Germany, meeting the following inclusion criteria, or their legal proxies, were asked for written informed consent: age >65 years, long-term care, no end-stage disease, no hospital stay, no tube-feeding, no dialysis or intolerance to ONS.

Ethical approval was obtained from the ethics committee of the Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany. Between March and December 2009 trained research staff assessed residents’ characteristics, nutritional and functional status in cooperation with the responsible qualified nurses.

Residents’ characteristics

Information on gender, age, care level according to the German nursing insurance system (0= <45, 1= 45-<120, 2= 120-<240, 3= ≥240 min need of basic care/day), eating dependency during meal times (independent, partly dependent, completely dependent) and current provision of nutritional support, either ONS or home-made snacks, were collected from residents’ files.

Nutritional risk

Screening for malnutrition included the following nutritional risk markers:

- Body mass index (BMI) was calculated as weight (kg)/height² (m²) using height and current weight from residents’ files, with BMI ≤22 kg/m² defined as low.
- Weight loss (WL) was considered if it was unintended and amounting >5% in the last 3 or >10% in the last 6 months, calculated from weight history of routine documentation.
- Low intake (LI) was reported by nursing staff, if food intake was involuntarily remarkable low during the last week.
- MNA® (Mini Nutritional Assessment) was completed in personal interviews with nurses. Weighted answers of this standardized 18-item-questionnaire covering anthropometry, global assessment, dietary patterns and subjective assessment sum up to a maximum score of 30 points (p.). A total score ≥24 p. indicates normal nutritional status, 17-23.5 p. risk of malnutrition and <17 p. malnutrition.

Functional status

Cognitive impairment and depressive mood (mental function) were assessed in standardized interviews with the responsible nurses who subjectively classified into no, moderate or severe impairment.

Mobility impairment (physical function) was regarded absent if residents were able to move independently ≥3m with or without walking aid (including wheelchair), moderate if independent movement was not possible (immobile sitting) and severe if bedridden.

Data analysis and statistics

The statistical analysis was performed using SPSS (19.0). Categorical variables are presented as absolute numbers and percentages, continuous variables as mean and standard deviation (SD). Cross-tables are used to compare prevalence of low BMI, WL and LI in different MNA categories. Chi-square tests were performed to identify differences in the distribution of residents’ characteristics between residents with and without nutritional risk and to investigate associations between nutritional and functional status. P-values <0.05 were considered statistically significant.

Results

Residents’ characteristics

From a total of 565 nursing home residents, 31 did not meet inclusion criteria. Informed consent was obtained for 286 residents (participation rate 53.6%). Mean age of participants was 86±6.8 years, 88.8% were female. Eighty percent required ≥45 minutes basic care daily and 49.3% were eating-dependent. Mean BMI was 24.8±4.6 kg/m². General characteristics, stratified for presence of nutritional risk, are summarized in table 1. Residents at risk were more often female (p<0.05), in higher need of care (p<0.001) and more dependent during mealtimes (p<0.001). Twenty-five residents (13.7%) at nutritional risk received oral nutritional support.

Comparison of MNA and single nutritional risk markers

Almost all (96.2%) residents classified malnourished by MNA also showed at least one single risk marker; 84.6% BMI ≤22 kg/m² and 73.1% LI. This correspondence was less pronounced in the group at risk of malnutrition (MNA 17-23.5 p.), with low BMI, LI or WL present in 51.7%. Eleven (9.6%) residents classified well-nourished by MNA yet showed a...