Frequency of Malnutrition in Older Adults: A Multinational Perspective Using the Mini Nutritional Assessment

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OBJECTIVES: To provide pooled data on the prevalence of malnutrition in elderly people as evaluated using the Mini Nutritional Assessment (MNA).

DESIGN: Retrospective pooled analysis of previously published datasets.

SETTING: Hospital, rehabilitation, nursing home, community.

PARTICIPANTS: Four thousand five hundred seven people (75.2% female) with a mean age of 82.3.

MEASUREMENTS: The prevalence of malnutrition in the combined database and in the four settings was examined.

RESULTS: Twenty-four data sets with information on full MNA classification from researchers from 12 countries were submitted. In the combined database, the prevalence of malnutrition was 22.8%, with considerable differences between the settings (rehabilitation, 50.5%; hospital, 38.7%; nursing home, 13.8%; community, 5.8%). In the combined database, the “at risk” group had a prevalence of 46.2%. Consequently, approximately two-thirds of study participants were at nutritional risk or malnourished.

CONCLUSION: The MNA has gained worldwide acceptance and shows a high prevalence of malnutrition in different settings, except for the community. Because of its specific geriatric focus, the MNA should be recommended as the basis for nutritional evaluation in older people. J Am Geriatr Soc 58:1734–1738, 2010.

Key words: malnutrition; undernutrition; Mini Nutritional Assessment; elderly; nutritional screening

Malnutrition is one of the most relevant conditions that negatively affects the health of older people. The prevalence of malnutrition is generally high in older adults, but it is strongly dependent on the population studied. Previous publications reported a prevalence of malnutrition ranging from nonexistent in healthy, community-living “young old” persons to as high as 57% in residents of long-term care institutions. In the community, poor nutritional status is present before disease appears, as is risk of malnutrition. Therefore, a systematic and structured nutritional screening is recommended for early detection of malnutrition to counteract the decline of health status caused by deficiencies in macro- and micronutrients. The criterion standard for the diagnosis of malnutrition has not been established, although for older adults, efforts have been made to create a screening tool that includes factors associated with physical, social, and cognitive domains of older individuals. Since the Mini Nutritional Assessment (MNA) was first published in 1994, the MNA has been established as one of the most valid and most frequently used nutritional screening tools in older persons. The MNA is a recommended part of the comprehensive geriatric assessment and is an important research tool in geriatric medicine, with more than 400 scientific papers published about it. In addition, the MNA may be useful for teaching purposes in the context of nutritional care in older persons. Unlike many of the existing nutrition screening tools.

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available, the MNA was specifically designed and validated for use in older persons. It has been shown to perform well in diverse settings and across populations. The aim of the present study was to pool existing international data on the MNA from high-quality trials (published in peer-reviewed journals) in one large database and to provide information on the prevalence of malnutrition in older persons on a larger scale. All settings relevant for the care of older persons were included: community, nursing homes, acute care hospitals, and rehabilitation units.

METHODS

Data Collection and Database Setup

The present study is a retrospective pooled analysis. To identify eligible studies, a literature search was performed on PubMed. Because of ongoing changes in population demographics, studies published before 2000 were not included. Studies were selected if the MNA (preferably full form) was used and a clear definition of the setting was provided. Authors were contacted in writing and asked to submit their original data sets. All data sets were transmitted electronically in a structured format. Occasionally, data sets had to be revised before transmission to increase comprehensibility (e.g., translation into English) and to meet advisory board or ethics committee regulations on data transfer (e.g., deletion of patient names). Two members of the study group (RC and KMJ) reviewed each data set and appended it to the database. Setting allocation was made on the basis of setting description provided by the respective publications. In some cases, authors were contacted and asked to describe their patient collective to enable an adequate allocation. Only data from study participants aged 65 and older were entered into the database.

Ethics Approval and Statistical Analysis

The ethics committee of the University of Erlangen-Nuremberg approved the conceptual design. Statistical analysis was based on the combined database and on sub-sets of data, stratified for settings. Statistical analysis was performed using SAS (version 9.2, SAS Institute, Cary, NC).

RESULTS

Database Content

Investigators from all five continents agreed to participate and submitted 27 datasets including information on more than 6,000 study participants aged 65 and older. Because of the unavailability of the full MNA classification in several datasets, the effective sample size used in the following analyses was 4,507 (24 study files from 12 countries). This also included data from two theses (otherwise unpublished) and one previously unpublished study file that were acquired through personal contacts. Geographically, the data received covered study participants from all five continents, with a stronger focus on European populations (80.6% of study data).

The combined database provided information on 1,384 hospitalized patients from Belgium, Switzerland, Germany, Italy (unpublished data), and Sweden. Study files from 1,586 nursing home residents came from Switzerland, Germany, Spain, France, the Netherlands, the United States, and South Africa. Information on 964 community-dwelling study participants was available from Switzerland, France, Japan, Sweden, and South Africa. Data on 345 patients from geriatric rehabilitation were available from Australia, Italy, and the United States. Two hundred twenty-eight cases from Japan remained unclassified with regard to setting but were included in the prevalence analysis of the combined sample.

Demographic Characteristics and Prevalence of Malnutrition

The basic characteristics of the study population stratified for setting and sex are given in Table 1; 75.2% of study participants were female. The mean age of the study population was 82.3 ± 7.5. Women were older than men (82.7 vs 81.3). More than 60% of the study population was aged 80 and older. Age distribution differed between the settings. Nursing home residents were oldest, particularly women. The youngest population was the community-dwelling group. The differences in age distribution between acute care and geriatric rehabilitation were minor. The setting-specific distribution of MNA categories (well nourished, at risk, malnourished) in the combined database and the four examined settings is given in Figure 1. In the combined database, more than two-thirds of the study participants were classified as at risk of malnutrition (46.2%) or overtly malnourished (22.8%). The proportion of well-nourished older adults was particularly low in convalescent older persons in geriatric rehabilitation (8.5%) and in hospitalized elderly patients (14.0%). In those two settings, approximately 90% of study participants were malnourished or at risk of developing malnutrition. In the nursing home setting, only 32.9% of residents were well nourished. Although the level of malnutrition was low in the community setting, 31.9% of community-living elderly persons were at risk of malnutrition.

DISCUSSION

The database used for the present analysis was compiled from 24 data sets provided by researchers from all five continents. This is the largest database of information on nutrition screening in older adults from a range of residential settings. The information provides insight into the prevalence of malnutrition using the well-validated MNA tool in older populations with various degrees of dependence, from older persons living autonomously in the community to patients in geriatric hospitals and residents of long-term care institutions.

Overt malnutrition according to the MNA affected nearly one-quarter of the examined population, with the lowest prevalence reported in community-dwelling older adults and the highest prevalence in rehabilitation units. In the total sample, as well as in two out of four settings (hospital and nursing home), the largest proportion of older adults was classified as being at nutritional risk. Nutritional status deteriorates as dependence and care needs grow, following a sequence from community living to nursing home and hospital. Similar differences in the prevalence of malnutrition across settings have been described previously. Nevertheless, percentages given in original research papers sometimes differ substantially from one another. Here, pooled analyses help to smooth results to gain a clearer picture on a greater scale. The MNA may be regarded as a...
Table 1. Basic Characteristics of the Study Population (N = 4,507)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hospital</th>
<th>Nursing Home</th>
<th>Community</th>
<th>Rehabilitation</th>
<th>Combined Database</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Men</td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td>Age, mean ± SD</td>
<td>81.2 ± 7.1</td>
<td>82.9 ± 6.9</td>
<td>81.3 ± 8.3</td>
<td>85.1 ± 7.4</td>
<td>79.3 ± 7.2</td>
</tr>
<tr>
<td>Mini Nutritional Assessment score, median (IQR)</td>
<td>17.5 (8.3)</td>
<td>18.5 (8.0)</td>
<td>22.0 (5.0)</td>
<td>22.0 (5.5)</td>
<td>22.8 (5.3)</td>
</tr>
<tr>
<td>Malnourished, %</td>
<td>45.2</td>
<td>36.0</td>
<td>14.4</td>
<td>13.5</td>
<td>9.5</td>
</tr>
<tr>
<td>At risk, %</td>
<td>41.0</td>
<td>49.9</td>
<td>52.4</td>
<td>53.7</td>
<td>52.6</td>
</tr>
<tr>
<td>Well nourished, %</td>
<td>13.8</td>
<td>14.1</td>
<td>33.3</td>
<td>32.7</td>
<td>37.9</td>
</tr>
<tr>
<td>Body mass index, kg/m², mean ± SD</td>
<td>23.8 ± 4.3</td>
<td>24.4 ± 5.6</td>
<td>25.1 ± 5.1</td>
<td>26.3 ± 5.7</td>
<td>23.1 ± 4.0</td>
</tr>
<tr>
<td>Albumin, g/L, mean ± SD, n</td>
<td>36.1 ± 6.4</td>
<td>36.4 ± 6.4</td>
<td>38.7 ± 9.8</td>
<td>42.3 ± 8.7</td>
<td>39.0 ± 3.6</td>
</tr>
<tr>
<td>C-reactive protein, mg/dL, median (IQR), n</td>
<td>2.1 (5.4)</td>
<td>1.6 (4.5)</td>
<td>0.8 (1.3)</td>
<td>0.4 (1.0)</td>
<td>—</td>
</tr>
<tr>
<td>Triceps skin fold, mm, mean ± SD, n</td>
<td>11.0 ± 6.1</td>
<td>14.4 ± 7.9</td>
<td>14.9 ± 6.2</td>
<td>18.8 ± 8.0</td>
<td>20.5 ± 11.4</td>
</tr>
</tbody>
</table>

228 cases were unclassifiable regarding setting; 56 cases were unclassifiable regarding sex.
SD = standard deviation; IQR = interquartile range.
examined settings except for the community. Even though no tool, neither the MNA nor any other tool in use, can be regarded as the criterion standard for nutritional screening of older persons, MNA items specifically address relevant features of the aging population that allow for early detection of malnutrition risk and enable assessors to take immediate action. Therefore, performing the MNA as a screening test is strongly recommended as the basis for nutritional evaluation.

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Conflict of Interest: All authors are members of the MNA International Group and attended a workshop in Lausanne, Switzerland, in October 2008 that was fully funded by Nestlé. Bauer has been supported by a research grant from Nestlè Nutrition, Vevey, Switzerland. Bauer is a consultant to Nutricia and has received research grants from Nestlé and Nutricia. He has received honoraria for giving talks in collaboration with Nestlé and Abbott, and Fresenius. Sieber and Vellas are consultants to Nestlé and have received honoraria for giving talks in collaboration with Nestlé. Anthony is an employee of Nestec Ltd. Guigoz is an external advisor to Nestec Ltd.

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Sponsor’s Role: None.

REFERENCES

Figure 1. Setting-specific distribution of Mini Nutritional Assessment classification (combined sample includes 228 cases unclassified for setting).


