COMPARATIVE ANALYSIS OF QUESTIONNAIRES EXPLORING NUTRITIONAL STATUS AND RISK OF MALNUTRITION IN THE ELDERLY LIVING IN RESIDENTIAL CARE

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Summary

Aim. Our aim was to compare different validated questionnaires that measure nutritional status and risk of malnutrition in the institutionalized elderly, matching these with data of the body mass index (BMI) and to evaluate comparatively the usefulness of these measurement methods.

Material and methods. 104 elderly volunteers (N = 104, aged 50-94, median age: 78.3) living in social institutions were investigated for risk of malnutrition comparing five different questionnaires – SNAQ, NSI, MNA, MUST, SCREEN II. Data processing was performed using Microsoft Excel version 2003 and SPSS Statistics version 17.0.

Results. SNAQ, MUST and especially MNA showed a significant correlation with BMI, so these questionnaires can be primarily recommended for measuring elderly malnutrition. Two of them, MUST and SNAQ, filtered nearly the same subgroup of “no risk of malnutrition” cases. On the other hand, the use of NSI and SCREEN II can be queried because their results did not correlate well with BMI and they identified more cases to be threatened by malnutrition than the other questionnaires listed above.

Conclusions. Concordance of the results by using SNAQ, MUST and MNA indicate that they are the best methods to estimate nutritional status and risk of malnutrition in the elderly. However, MNA is a more complex survey with more questions and therefore it requires more time to be filled out.

On the other hand, NSI and SCREEN II seem to be less appropriate for measuring the risk of malnutrition at least in the Hungarian institutionalized elderly.

Key words: elderly, nutritional status, BMI, malnutrition screening tools, questionnaires

INTRODUCTION

In the elderly, adequate nutritional status is of key importance to maintaining health and quality of life. However, monitoring of nutritional status in the elderly is often neglected or performed too late and malnutrition may develop with serious consequences. Therefore, evaluation of the nutritional status and habits of the elderly and screening for malnutrition is an important task of clinical gerontology.

Data from numerous validated surveys performed in different countries by different are available (1-3) but a comparative evaluation of the different questionnaires used regarding their ability to evaluate the nutritional status and habits is lacking.

AIMS

We aimed to examine in a comparative manner the usefulness of different validated questionnaires to measure the nutritional status and risk of malnutrition in elderly home residents as well as to match the recorded data against the body mass index in order to assess similarity and divergence of the different validated questionnaires.

MATERIAL AND METHODS

The survey was performed in four elderly homes of Budapest in August 2011. 104 elderly subjects volunteered for the study. Age groups were classified according to the WHO classification (4). All participants filled out all 5 questionnaires with the assistance of a registered dietician. The five validated questionnaires can be found as below:

SNAQ (http://www.slu.edu/readstory/newslink/6349),
NSI (http://www.mnaging.org/pdf/dynh.pdf),
MNA (http://www.mna-elderly.com/mna_forms.html),
MUST (http://amnutrition.hu/downloads/upload/20091051403522008130112428must.pdf),
SCREEN II (with permission of Dr. Heather Keller, creator of the questionnaire).
Body mass index (BMI) of the participants was calculated from the actual body mass and height.

Data processing was performed using Microsoft Excel version 2003 and SPSS Statistics version 17.0. For statistics we used frequency rows to arrange the numerical data, when we were in need of sorting the numbers by quantitative criteria. Correlation of one or two variables, and frequency distribution of combined data were examined with the help of cross tables. We tested the existence of a relation between two qualitative variables with examination of separateeness. The intensity of the existing relation was analysed with the Cramer indicator. All statistical tests were performed at the significance level of 5%.

Data collection and processing were performed with permission of the ethical committee (TUKEB number: 186/2011), taking into consideration the laws of anonymity and the protection of data.

RESULTS

Categorisation of the questionnaires according to their results (rate of risk and no risk of malnutrition in the elderly).

According to their results, the five surveys could be grouped into three main categories, indicating the state of elderly nutrition (fig. 1).

1. The MUST and the SNAQ questionnaires gave similar results. They filtered nearly the same numbers of cases with risk of malnutrition as well as those with no threat, and therefore they were put into one category.

2. The NSI and the SCREEN II questionnaires rated far more persons in the group of malnutrition risk than the previous questionnaires, but the results were nearly equal; therefore they were also put into one category.

3. Results with MNA were intermediate so it was not classified in category 1 or 2 (fig. 1).

Further evaluation of the questionnaires with similar results

Using MUST and SNAQ 69.2% of the participants were put into the same category. This may be explained by the similarity of the questionnaires itself: they include relatively few questions, so their completion requires only a few minutes. There is a difference that SNAQ consists of questions about appetite and culinary habits as well, while MUST requires also body mass and height measurements. Statistically, the difference between the outcomes of the two surveys is significant but the significance is rather weak (p = 0.040; C = 0.202) (tab. 1).

Table 1. Comparison of the results of SNAQ and MUST (N = 104).

<table>
<thead>
<tr>
<th></th>
<th>MUST</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No risk (persons)</td>
<td>Risk (persons)</td>
</tr>
<tr>
<td>SNAQ</td>
<td>61</td>
<td>15</td>
</tr>
<tr>
<td>Risk (persons)</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Total (persons)</td>
<td>78</td>
<td>26</td>
</tr>
</tbody>
</table>

* p = 0.040 versus the risk categories

By comparison of NSI and SCREEN II, it can be seen that as compared to the previous surveys, they classified fewer people, 57 (only 54.8%), in the same category. In the case of a further 24 persons only a slight difference can be observed, while 6 persons were placed into a completely opposite group based on the surveys (tab. 2). There is a significant difference between the outcomes of NSI and SCREEN II (p = 0.00; C = 0.350).

Filling out NSI requires 4-5 minutes, while with SCREEN II it takes about 5-10 minutes; however, they ended in similar results (tab. 2).

Table 2. Comparison of the results of NSI and SCREEN II (N = 104).

<table>
<thead>
<tr>
<th></th>
<th>SCREEN II</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Risk (persons)</td>
<td>Risk (persons)</td>
</tr>
<tr>
<td>NSI</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Good (persons)</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Moderate nutritional risk (persons)</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>High nutritional risk (persons)</td>
<td>15</td>
<td>24</td>
</tr>
</tbody>
</table>

*p = 0.00 versus the lower risk categories

Comparison of surveys of the longest and shortest completion time

Comparing MUST, which has the fewest questions with the shortest completion time, and MNA, which has the most questions with the longest completion time, it was found that these questionnaires put 63 persons (60.5%) into the same group. The two methods were mostly the same in case of no risk of malnutrition. Although the two surveys classified 25 persons (24%) into
Comparative analysis of questionnaires exploring nutritional status and risk of malnutrition in the elderly living in residential care

**Table 3. Comparison of the results of MUST and MNA (N = 104).**

<table>
<thead>
<tr>
<th>MUST</th>
<th>MNA</th>
<th>Total (persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal nutritional status (persons)</td>
<td>At risk of malnutrition (persons)</td>
</tr>
<tr>
<td>Low risk (persons)</td>
<td>*56</td>
<td>0</td>
</tr>
<tr>
<td>Medium risk (persons)</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>High risk (persons)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total (persons):</td>
<td>66</td>
<td>5</td>
</tr>
</tbody>
</table>

*p = 0.00 versus the higher risk categories

**Table 4. Comparison of the results of MNA and BMI (N = 104).**

<table>
<thead>
<tr>
<th>BMI classification 1 (kg/m²)</th>
<th>Underweight (&lt; 18.5) (persons)</th>
<th>Normal (18.5-24.99) (persons)</th>
<th>Overweight (≥ 25) (persons)</th>
<th>Obese (≥ 30) (persons)</th>
<th>Total (persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNA categories</td>
<td>Normal nutritional status (persons)</td>
<td>*27</td>
<td>19</td>
<td>19</td>
<td>66</td>
</tr>
<tr>
<td>At risk of malnutrition (persons)</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Malnourished (persons)</td>
<td>4</td>
<td>9</td>
<td>11</td>
<td>9</td>
<td>33</td>
</tr>
<tr>
<td>Total (persons):</td>
<td>9</td>
<td>37</td>
<td>30</td>
<td>28</td>
<td>104</td>
</tr>
</tbody>
</table>

*p = 0.00 versus the other categories

We can state that SNAQ and BMI classified 79 persons (76%) similarly. There is significance between their results, which is slightly less than moderate (p = 0.023; C = 0.303).

**DISCUSSION**

The measurement of nutritional status is the basis of geriatric service (5, 6). Since the number of elderly is continuously growing, fast and reliable methods are needed which allow one to screen the elderly who are undernourished or at risk of malnutrition in order to implement intervention (7). For this purpose, validated questionnaire methods are often used among the elderly; according to the literature, ten different ones exist (1, 2). Those remarkable domestic (8-11) and foreign (12-15) examinations, which measured the nutritional status and the risk of malnutrition of the elderly, used different methods; thus – apart from some exceptions – their results cannot be compared entirely. Therefore the screening methods themselves need to be compared and analysed. In 2011, a study compared five different questionnaires (MUST, SNAQ, NRS2002, MST and MNA-SF) with the help of inpatients (16). In our present investigation we analysed the screening tools of SNAQ, NSI, MNA, MUST and SCREEN II, with the participation of elderly subjects.

**CONCLUSIONS**

In the course of our research, we found three methods – SNAQ, MUST, MNA – equally good to be used for evaluating the nutritional status and the risk of malnutri-
tion of Hungarian elderly people. Only the results of these surveys correlate with the BMI values. The result of the MNA showed the closest relation from among them. The MUST and the SNAQ screened nearly the same amount of cases that have no malnutrition risk. Both questionnaires have a fast completion time; therefore the decision about which to use is always influenced by aspects of the examination.

On the basis of the outcomes, the use of NSI and SCREEN II for filtering malnutrition risk of Hungarian elderly is only worth considering, while they categorized the examined people into the group of malnutrition risk in a higher ratio than the other methods. Moreover, their results differed much more from BMI values.

References

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Received: 22.08.2012
Accepted: 10.09.2012