Malnutrition in geriatric rehabilitation: prevalence, patient outcomes and criterion validity of the Scored Patient-Generated Subjective Global Assessment (PG-SGA) and the Mini Nutritional Assessment (MNA)

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Malnutrition in geriatric rehabilitation
Prevalence, patient outcomes and criterion validity of the Scored Patient-Generated Subjective Global Assessment (PG-SGA) and the Mini Nutritional Assessment (MNA)

Skye Marshall
Dr. Adrienne Young, A/Prof. Judith Bauer, Prof. Elizabeth Isenring
“Food and nutrient intake is unable to meet protein, energy and nutrient requirements over time leading to a disruption of homeostasis in lean tissues, body weight and physical function.”


The MARRC Study: Malnutrition in the Rural Rehabilitation Community (Observational cohort: Aug 2013-Feb 2014)

In malnourished older adults admitted to rehabilitation:

1) Determine the criterion (concurrent and predictive) validity of nutrition assessment tools:
   • Scored Patient-Generated Subjective Global Assessment (PG-SGA)
   • Mini Nutritional Assessment (MNA) in diagnosing malnutrition;

1) Report the prevalence, health and aged care use, and mortality of rural malnourished older adults.
Methods

Participants:
- Rehabilitation inpatients in rural NSW
- n=57, 79 years, 49% female
- Live at home usually
- Usual care (0.15FTE dietitian)

<table>
<thead>
<tr>
<th>Methods of diagnosis at admission</th>
<th>1. ICD-10-AM Classification of malnutrition (yardstick)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Scored Patient-Generated Subjective Global Assessment (PG-SGA)</td>
</tr>
<tr>
<td></td>
<td>3. Mini Nutritional Assessment (MNA)</td>
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</table>

<table>
<thead>
<tr>
<th>Longitudinal outcomes at discharge</th>
<th>1. Discharge location (home/hospital/other)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Length of rehabilitation stay</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Longitudinal outcomes at 12 weeks post-discharge</th>
<th>1. Admission to residential aged care at 12 weeks post-discharge</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2. Mortality at 12 weeks post-discharge</td>
</tr>
<tr>
<td></td>
<td>3. Rehospitalisation length of stay at 12 weeks post-discharge</td>
</tr>
</tbody>
</table>
### Methods

| Methods of diagnosis at admission | 1. ICD-10-AM Classification of malnutrition (yardstick)  
2. Scored Patient-Generated Subjective Global Assessment (PG-SGA)  
3. Mini Nutritional Assessment (MNA) |

That’s a lot of acronyms Skye...
Criterion validity:

1) Concurrent validity: compared to accepted standard
   - ICD-10-AM (hospital coding for malnutrition)
   - Sensitivity and specificity (%)

2) Predictive validity
   - Health and aged care outcomes
   - Significant difference (t-test or chi-squared)

The International Statistical Classification of Diseases and Health Related Problems 10th Revision Australian Modification (sixth edition, ICD-10-AM) classifications for protein-energy malnutrition in adults

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>E43: Unspecified severe protein-energy malnutrition</td>
<td>In adults, BMI &lt;18.5 kg/m² or unintentional loss of weight (≥10%) with evidence of suboptimal intake resulting in severe loss of subcutaneous fat and/or severe muscle wasting</td>
</tr>
<tr>
<td>E44.0: Moderate protein-energy malnutrition</td>
<td>In adults, BMI &lt;18.5 kg/m² or unintentional loss of weight (5-9%) with evidence of suboptimal intake resulting in moderate loss of subcutaneous fat and/or moderate muscle wasting</td>
</tr>
<tr>
<td>E44.1: Mild protein-energy malnutrition</td>
<td>In adults, BMI &lt;18.5 kg/m² or unintentional loss of weight (5-9%) with evidence of suboptimal intake resulting in mild loss of subcutaneous fat and/or mild muscle wasting</td>
</tr>
</tbody>
</table>
Global rating (A, B, C) criterion validity in geriatric rehabilitation patients?

- Sensitivity 100%
- Specificity 87%
- Can predict
  - rehospitalisation LOS ($P=0.005$)
  - admission to RACF ($P=0.008$)
  - discharge location ($P=0.046$)

= STRONG CRITERION VALIDITY

Score ($\geq 7$) criterion validity in geriatric rehabilitation patients?

- Sensitivity 92%
- Specificity 84%
- ROC AUC 0.910±0.038
- Can predict
  - rehospitalisation LOS ($P=0.03$)
  - discharge location ($P=0.033$)

= STRONG CRITERION VALIDITY

The Scored PG-SGA

- Global rating:
  - A = Well-nourished
  - B = Moderately malnourished
  - C = Severely malnourished

- Score: $\geq 9$ in adult oncology patients

We recommend for use in geriatric rehabilitation
Categories’ criterion validity in geriatric rehabilitation patients?

- Sensitivity 58%
- Specificity 97%
- Can predict
  - rehospitalisation ($P=0.023$)
  - admission to RACF ($P=0.034$)
  - discharge location ($P=0.019$)

= MODERATE CRITERION VALIDITY

We recommend to use with caution in geriatric rehabilitation
## Prevalence and health outcomes

Malnutrition prevalence was 46% (ICD-10-AM)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Well-nourished (n=31)</th>
<th>Malnourished (n=26)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation LOS(^a) (days), median (IQR(^b))</td>
<td>23.0 (16.0-37.5)</td>
<td>22.0 (13.75-32.75)</td>
<td>NS</td>
</tr>
<tr>
<td>Rehospitalization LOS (days), median (IQR)(^c)</td>
<td>4.0 (1.0-14.75)</td>
<td>10.0 (7.0-36.0)</td>
<td>0.032</td>
</tr>
<tr>
<td>Rehospitalization incidence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Median (IQR)(^c)</td>
<td>2.0 (1.0-2.0)</td>
<td>1.0 (1.0-2.0)</td>
<td>NS</td>
</tr>
<tr>
<td>- Counts (%)</td>
<td>n=12 (38.7%)</td>
<td>n=11 (38.5%)</td>
<td></td>
</tr>
<tr>
<td>Discharge location, counts (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Home</td>
<td>n=27 (87.1%)</td>
<td>n=17 (65.4%)</td>
<td>0.052</td>
</tr>
<tr>
<td>- Other(^e)</td>
<td>n=4 (12.9%)</td>
<td>n=9 (34.6%)</td>
<td></td>
</tr>
<tr>
<td>Admitted to RACF(^g), counts (%)</td>
<td>n=4 (12.9%)</td>
<td>n=7 (26.9%)</td>
<td>NS</td>
</tr>
<tr>
<td>Mortality, counts (%)</td>
<td>n=0</td>
<td>n=3 (11.5%)</td>
<td>0.052</td>
</tr>
</tbody>
</table>
Limitations

- Generalisability
- Limitation in yardstick
- Smallish sample size
- Researcher bias
Malnutrition in geriatric rehabilitation

- Prevalence is too high
- Patients have poor outcomes in the long term
- Scored PG-SGA has strong validity
- MNA has moderate validity
Malnutrition in geriatric rehabilitation: Prevalence, patient outcomes, and criterion validity of the Scored Patient-Generated Subjective Global Assessment (PG-SGA) and the Mini Nutritional Assessment (MNA)

Suye Marshall, PhD; Adeline Young, PhD; Judith Baum, PhD; Elsbeth Haworth, PhD; APD

Introduction

There is strong evidence showing malnutrition is under-recognized and undertreated in the rehabilitation setting. Accurate identification and management of malnutrition is essential as patient outcomes may be affected and resources are used inefficiently. The Scored PG-SGA and MNA require evaluation of their validity in diagnosing malnutrition in rehabilitation. In addition, the prevalence of malnutrition and associated patient outcomes in older Australian populations have not been reported.

Methods

Participants were eligible if aged ≥65 years admitted to five public rehabilitation units in the same local health district in rural NSW. If they were community-living residents prior to admission and the five intake criteria were met, they were included in the longitudinal sample. Data were collected from August 2010 to February 2011. Malnutrition was assessed using the Scored PG-SGA and MNA by one researcher (A. Marshall) in both facilities within seven days of admission. The inter-rater reliability using the SCID-MINN was measured to establish inter-rater reliability (ICC). The Kappa statistic was calculated using Cohen’s Kappa and the sensitivity and specificity were calculated using the 2x2 contingency table.

Results

- Fifty-nine step five adults (65% of 90 years) were recruited.
- Malnutrition prevalence was 24% in the step five group, with 58% of patients meeting and 42% not meeting the five criteria for malnutrition.
- Malnutrition prevalence was also assessed against an MNA cut-off of ≥10.5, with 49% of patients meeting the five criteria for malnutrition.
- The Scored PG-SGA and MNA allow for strong predictive validity for inpatient malnutrition, as shown by ROC AUC and discharge location.

Conclusions

Malnutrition prevalence in the rural geriatric rehabilitation population is high and associated with increased health and aged care use. The Scored PG-SGA is suitable for nutritional assessment in geriatric rehabilitation. The MNA may be suitable for nutritional assessment in geriatric rehabilitation, but care should be taken to ensure all malnourished patients are identified.