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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)

| 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) |
|-----------------------------------|--------------------------------------------------------------------------------------------------|
| Longitudinal outcomes at discharge | 1. Discharge location (home/hospital/other)  
2. Length of rehabilitation stay |
| Longitudinal outcomes at 12 weeks post-discharge | 1. Admission to residential aged care at 12 weeks post-discharge  
2. Mortality at 12 weeks post-discharge  
3. Rehospitalisation length of stay at 12 weeks post-discharge |
## Methods

<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>
</tr>
</tbody>
</table>

That’s a lot of acronyms Skye...
Methods

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 (≥7) criterion validity in geriatric rehabilitation patients?

- Sensitivity 92%
- Specificity 84%
- ROC AUC $0.910\pm0.038$
- Can predict
  - rehospitalisation LOS ($P=0.03$)
  - discharge location ($P=0.033$)

= STRONG CRITERION VALIDITY

We recommend for use in geriatric rehabilitation

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

- Score: ≥9 in adult oncology patients
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
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)

Saye Marshall, APD; Adrienne Young, PhD, APD; Judith Baum, PhD, APD; Elizabeth Honnor, 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 limited if resources and opportunities are not provided. 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 rural Australian public hospitals has not been reported.

Methods

Participants were eligible if receiving inpatient rehabilitation services in a rural hospital between July 2014 and February 2015. A final sample size of 171 was set and a total of 184 patient records were collected from eight rural hospitals. Malnutrition assessment using the Scored-PG-SGA and MNA was conducted by the same researcher using standard operating procedures. Data was collected by two researchers from August 2014 to February 2015. Nutritional assessment was performed using the Scored-PG-SGA and MNA (n=171). The MNA and Scored-PG-SGA were performed by the same researcher. Both tools were piloted and modified to improve reliability and validity. Data were then collected by two researchers from August 2014 to February 2015. Malnutrition was defined as a score of 3 or greater on the MNA and a score of 15 or less on the Scored-PG-SGA.

Results

Fifty-seven patients (33% of eligible patients) were excluded due to a lack of nutritional data. Malnutrition prevalence was 26%. Malnutrition prevalence was 26% (95% CI 18-33%), with 32 (18%), 13 (7%), and 21 (12%) patients classified as malnutrition risk, mild, and severe, respectively. Malnutrition prevalence was found to be significantly higher (p<0.05) between the two groups. The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05). The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05).

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 nutrition assessment in geriatric rehabilitation. The MNA may be suitable for nutrition assessment in geriatric rehabilitation, but care should be taken to ensure all malnourished patients are identified.

THERAPEUTIC AND PSYCHOSOCIAL CONSEQUENCES

Malnutrition is significant and diverse. In health care facilities, malnutrition increases mortality and incidence of complications. Overall, it leads to increased treatment costs and length of stay. Common symptoms of malnutrition, such as confusion, fatigue, and weakness, are often attributed to other conditions, leading to frequent misdiagnosis and under-recognition of malnutrition. There is strong evidence showing malnutrition is under-recognized and under-diagnosed in the rehabilitation setting, despite a high prevalence (30-50%). In addition, the prevalence of malnutrition is high, and associated with increased health and aged care use. The Scored-PG-SGA and MNA were found to have a high correlation (r=0.70, p<0.05).