Nutritional risk screening tools for paediatric inpatients: an evaluation study

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INTRODUCTION:
Malnutrition is highly prevalent in hospitalized children and has been associated with adverse effects on both clinical outcomes in paediatric patients and the healthcare system1-3. Early identification of children at risk for malnutrition, with valid tools, could promote timely preventive or corrective nutritional interventions4,5. Several screening tools have been developed in recent years, but none has been accepted as a universal tool. Both Paediatric Yorkhill Malnutrition Score (PYMS) and Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP) have been developed and validated in the United Kingdom for hospitalized children6,7. This study aimed to evaluate the efficacy of the two aforementioned nutritional risk screening tools at hospital admission and to estimate the prevalence of nutritional risk in a sample of Greek paediatric inpatients.

METHOD - DESIGN:
• Sample
In this study 1506 paediatric patients (58.4% male), aged 1-16 years, who were admitted and hospitalized for at least 24 hours in paediatric and surgical wards at the two biggest paediatric hospitals in Athens, were included.
• Materials - methods
Patients’ gender, age, underlying disease and length of hospital stay were recorded. Body weight and height were measured in a standardized way and then plotted on the World Health Organization Growth Chart (WHO) or on the Hellenic growth charts (HGC) to determine underweight. Body Mass Index was also calculated. Nutritional screening was performed using two previously published tools: the Paediatric Yorkhill Malnutrition Score (PYMS) and the Screening Tool for the Assessment of Malnutrition in Paediatrics (STAMP). These tools were completed in two ways: a) based on the WHO criteria for underweight and b) based on the HGC criteria. In a random sub-sample (N=907) the dietitians of the hospitals categorized children in three categories of nutritional risk (low, medium, high) based on their clinical judgment. A combined index for malnutrition risk was also calculated according to the methodology published by Pablo et al. and was used as the reference method for testing PYMS and STAMP.
• Statistical analysis
Sensitivity, specificity, positive (PPV) and negative (NPV) predictive values of the screening tools were estimated, compared to results obtained from the combined index. Patients were classified as low nutritional risk vs. medium/high nutritional risk.

RESULTS:
As presented in Table 1, PYMS_HGC showed the highest agreement with the combined index (k=0.84), followed by PYMS-WHO (k=0.83). STAMP showed lower agreement (k=0.53 for STAMP-HGC and k=0.54 for STAMP-WHO). PYMS-HGC had the highest sensitivity (95.7%), high NPV (98.2%), specificity (92.4%) and PPV (83.4%). Prevalence of the high-moderate nutritional risk, based on the PYMS-HGC was 30.6%.

Table 1. Evaluation of malnutrition risk based on combined index and malnutrition risk screening tools PYMS and STAMP

<table>
<thead>
<tr>
<th></th>
<th>PYMS</th>
<th>STAMP</th>
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<tbody>
<tr>
<td></td>
<td>HGC</td>
<td>WHO</td>
</tr>
<tr>
<td>Sensitivity (%)</td>
<td>95.7</td>
<td>90.7</td>
</tr>
<tr>
<td>Specificity (%)</td>
<td>92.4</td>
<td>94</td>
</tr>
<tr>
<td>PPV (%)</td>
<td>83.4</td>
<td>85.7</td>
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<tr>
<td>NPV (%)</td>
<td>98.2</td>
<td>96.2</td>
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<tr>
<td>Kappa value</td>
<td>0.84</td>
<td>0.83</td>
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<tr>
<td>(95% CI)</td>
<td>(0.806 - 0.862)</td>
<td>(0.792 - 0.872)</td>
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</tbody>
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* Results divided into low and moderate-high risk of malnutrition

CONCLUSIONS:
The PYMS tool based on Hellenic Growth Charts, was evaluated as the most effective screening tool in identifying children at nutritional risk during hospital admission, and is suggested to be adopted in the daily clinical practice.

REFERENCES: