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## Short Communication

# Pilot investigation shows high sensitivity and specificity using an Abridged Subjective Global Assessment without physical examination in a tertiary hospital; pertinence for use amongst those without COVID-19 when physical distancing required during the pandemic

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## SUMMARY

**Background:** Completing malnutrition assessments when physically distant has been an immediate challenge during the COVID-19 pandemic. Even during periods of physical distancing, continuing nutrition assessments amongst those without COVID-19 is vital given that high malnutrition prevalence exists in clinical settings. The investigation aim was to assess the reliability of utilising the validated Subjective Global Assessment (SGA) tool, without compared to with physical examination.

**Methodology:** Original paper-based SGA documentation from a hospital-wide audit was reassessed by a blinded experienced clinician using history alone without reviewing documented physical examination. Participants included adults admitted to a tertiary hospital with no maternity or obstetric services. Those terminally ill, undergoing end-of-life palliative care, with disordered eating or admitted to emergency or intensive care units were excluded. McNemar's test assessed paired categorical data. Cohen's kappa coefficient assessed inter- and intra-rater reliability. Sensitivity, specificity, positive and negative predictive values were completed.

**Results:** There was no significant difference in malnutrition identification ( $p < 0.454$ ) with 97% (473/489) of assessments identical. High sensitivity (87.2%, 68/78), specificity (98.9%, 405/411), positive (91.9%, 68/74) and negative (97.6%, 405/415) predictive values were evident. High inter- and intra-rater reliability was confirmed (kappa values 0.875 and 0.987).

**Conclusion:** The Abridged-SGA utilising the four key factors of the SGA history identified many malnourished amongst those without COVID-19 who otherwise would not be identified when physical distancing is required due to the pandemic. It did not overestimate malnutrition. Until alternative means of assessing physical parameters remotely are validated, the pragmatic value of practitioners' judgement when utilising the Abridged-SGA was confirmed.

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## 1. Background

The negative impact of poor nutritional status on health outcomes following COVID-19 infections has been previously highlighted [1]. However, amongst those without COVID-19 the pandemic also presents significant risks when malnutrition assessments are not completed due to physical distancing. Continuing nutrition assessments is vital given high malnutrition prevalence (up to 70%) across

acute, rehabilitation and residential aged care settings [2] and considering malnutrition's negative impacts upon wound healing, complications, length of stay, mortality, re-admissions and healthcare costs [3].

This pilot study investigated the reliability of malnutrition assessments undertaken utilising the validated Subjective Global Assessment (SGA) tool amongst those without COVID-19 prior to

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the pandemic, re-assessed without inclusion of the physical examination parameters.

## 2. Method

Prior to COVID-19, hospital-wide malnutrition audits of admissions aged  $\geq 18$  years had been completed utilising SGA providing an overall rating of well-nourished (SGA-A), moderately malnourished (SGA-B) or severely malnourished (SGA-C) [4]. People admitted to the tertiary teaching hospital were excluded if terminally ill, undergoing end-of-life palliative care, admitted for disordered eating or admitted to the emergency department or intensive care unit. No paediatric, maternity or obstetrics services are offered. The audit was granted exemption from full ethics review.

Paper-based SGA documentation from the hospital-wide audit prior to COVID-19 was reassessed several years later by a blinded experienced clinician using SGA history alone without referring to the documented physical examination of fat or muscle stores. SGA-B and SGA-C were grouped as malnourished as it was not possible to confirm SGA-C (severely malnourished) without physical examination findings. Consequently, the four key features of the SGA history considered included i) weight loss during the past six months and two weeks, ii) dietary intake compared to usual, including the duration and degree of suboptimal intakes including liquid diets, iii) some or all of gastrointestinal symptoms (anorexia, diarrhoea, nausea, vomiting) occurring for more than two weeks, iv) functional capacity from full capacity to bed ridden [4]. High inter-rater reliability of departmental staff was previously established [5] with the re-assessment of the audit documentation undertaken by the blinded experienced practitioner nominated in this publication as an exemplar.

The blinded assessments of the pre-COVID-19 paper-based SGA audit documentation using SGA history alone, without referring to the documented physical examination, were repeated 10 days later by the same individual. Cohen's kappa coefficient assessed inter- and intra-rater reliability.

The repeated paired categorical variable of nutritional status of the initial audit completed in person and subsequent paper-based assessment using history alone were assessed using McNemar's test. Statistical significance was considered at  $p < 0.05$  using SPSS for Windows, release 22.0 (Statistical Package for the Social Sciences; SPSS Inc., Chicago, IL, USA). Sensitivity, specificity, positive and negative predictive values were assessed. Categorical data is presented as counts and percentages.

## 3. Results

No significant difference was found between the initial malnutrition identification using the full SGA and subsequent assessment utilising SGA history alone ( $p < 0.454$ ). High sensitivity (87.2%, 68/78), specificity (98.9%, 405/411), positive (91.9%, 68/74) and negative (97.6%, 405/415) predictive values were evident. High inter-rater (97%, 473/489) and intra-rater reliability (99%, 485/489) with Kappa co-efficients of 0.875 and 0.967 respectively indicated almost perfect agreement.

Of the 489 initial assessments undertaken, all three severely malnourished (SGA-C) individuals were identified as malnourished upon the re-audit, which excluded consideration of physical examination parameters. Of 78 people assessed as malnourished in the initial audit, 68 (87% of those malnourished) were identified as malnourished without physical examination.

Overall, 96.7% (473/489) of assessments were identical. Of the 16 (3.3%) with variation in assessments, 10 (2.0%) initially assessed as SGA-B were re-assessed as SGA A and six (1.2%) initially assessed as SGA-A were re-assessed as SGA B. Physical examinations would

have impacted the nutritional assessments for 5 (1.0%) and 4 (0.8%) individuals respectively. If suitable validated physical examinations existed for application when physically distant, malnutrition identification would have increased to 94% (68 plus 5/78). Of 411 assessed as well-nourished in the initial audit, 405 (99%) were identified as well-nourished without physical examination.

## 4. Discussion

The Abridged-SGA demonstrated high agreement when completed without the ability to perform a physical examination amongst those without COVID-19. Models of practice have changed during the pandemic with many services more routinely using telehealth. The pilot Abridged-SGA findings offer evidence of the value of continuing nutritional assessments amongst those without COVID-19 enabling the identification of many malnourished during unprecedented times when people are not physically in the room. Alternative validated means for determining fat and muscle loss when not physically present would have further enhance some assessments. With the challenges of health service provision during a global pandemic, it is vital to not lose sight of the many individuals requiring nutritional assessment and ongoing support "remotely".

The malnutrition prevalence amongst those without COVID-19 was not overstated allaying any potential concerns regarding consequences for coding or costing considerations. Reassuringly, all those severely malnourished were identified without physical examination. Although no gold standard for assessing nutritional status exists, tools are validated for use amongst the general adult population [4] and older adults [6]. This investigation utilised the SGA [4] as an easy to administer, valid and reliable tool with good intra- and inter-rater reliability applicable to adult of all ages, consequently offering continuity of care across healthcare settings including hospital, residential or aged care. Study results reflect the subjective global assessment approach(4) which weights subscales more towards the history (60%) than the physical examination (40%) [7].

Study strengths include the audit being conducted in the real clinical setting of a tertiary hospital with practitioners of varied experience and completed in a department where high inter-rater reliability had been confirmed [5]. Completing assessments without physical examination in duplicate provides additional confidence when high intra-rater reliability agreement was confirmed. The investigation incorporated adults within general acute and rehabilitation care setting enabling finding to be extrapolated to many similar health services.

One study limitation is that the agreement is potentially lower and results more conservative than when assessments are completed speaking directly with individuals which enables clarification of SGA history. Whether the findings can be extrapolated to different levels of professional experience would need to be confirmed. As advised by Detsky et al. [4] and confirmed by Steenson et al. [5] ongoing training is needed to optimise inter-rater reliability.

Implementation of the best evidence into practice is fundamental for optimising care and should be actively supported [8] especially during a global pandemic. The RE-AIM framework for implementation addresses factors related to success, including Reach, Effectiveness, Adoption, Implementation and Maintenance [9]. Applying these principals to nutritional care, the Reach from these findings is broad as nutritional status evaluation is a key component for assessment. The effectiveness of assessing for malnutrition, even when physical examination is not possible, is apparent from the findings, with considerable benefits from treating malnutrition previously established [10]. The final implementation framework components of Adoption, Implementation and Maintenance remain

part of ongoing practice, local change management and continuous quality improvement within care provision.

Completing nutrition assessments amongst those without COVID-19 remains vital for preventing and treating malnutrition. With 97% of the SGA nutritional assessments remaining identical when physical examination was excluded, results support that there is value in practitioners continuing to document SGA history when physical distancing is required amongst those without COVID-19. The findings support that the Abridged-SGA did not overestimate malnutrition and that identifying malnutrition was possible for many individuals without COVID-19 who otherwise would not be identified when physical distancing occurs. Until alternative means of assessing physical parameters remotely are validated, the pragmatic value of practitioners' judgement when utilising the Abridged-SGA was confirmed.

#### Authorship declaration

AV completed the data re-assessment, analysis and completion of the manuscript. The content in this manuscript has not been published elsewhere.

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#### Transparency declaration

The author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported. The reporting of this work is compliant with STROBE guidelines. The author affirms that no important aspects of the study have been omitted and that any discrepancies from the study as planned have been explained.

#### Declaration of competing interest

No conflicts of interest are declared.

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