

Use of self-administered Malnutrition Universal Screening Tool (MUST) is *not* a valid means of identifying inpatients at risk for malnutrition on the Clinical Teaching Unit.

Adam Rahman, MD, MSc. (Epid), FRCPC^{1,2,3}, Erin Spicer, MD¹

Abstract

Background:

Evidence exists validating self-administration of the *Malnutrition Universal Screening Tool* (MUST) to screen for risk of malnutrition among outpatients, but the validity of self-screening by inpatients has not yet been demonstrated. The goal of this study was to determine the validity of self-screening with the MUST as a means of identifying inpatients at risk for malnutrition.

Methods:

Audits of all patients admitted to the London Health Sciences clinical teaching units (CTU) were conducted over a 5-day period in 2015. Patients eligible for participation provided signed consent. Patients screened themselves using the MUST before the health care provider (HCP) (who was blind to the patient's self-screen results) did. Each participant completed an ease-of-use questionnaire.

Results:

125 hospitalized patients were considered for enrolment, of which 65.6% (82/125) were excluded on the basis of a cognitive impairment or a physical impediment that prohibited informed consent or safe participation, respectively. A total of 17 inpatients (13.6%) were enrolled, ten of who completed the MUST and generated a risk score. Agreement between self-screening and HCP-screening was 70%.

Conclusion:

Owing to the cognitive and physical impairments among the CTU population, self-screening using MUST is neither a practical nor safe means of identifying those at risk for malnutrition.

Introduction

The negative impacts of malnutrition on hospitalized patients have been well documented across 40 years of literature (1-5). Despite this evidence, malnutrition continues to be overlooked, under-diagnosed, and largely untreated leading to malnutrition rates ranging from 20-60% (1,4,6-10). A recent Canadian study found malnutrition rates of 57% amongst inpatients admitted to the London Health Sciences Centre (LHSC) clinical teaching units (CTUs), and of these patients 4% had been screened for malnutrition (6).

Screening tools, such as the *Malnutrition Universal Screening Tool* (MUST), can generate scores that correspond with low, medium, or high risk for malnutrition (11,12). The MUST has been validated to detect malnutrition in inpatient and outpatient settings, as well as being a reliable predictor of length-of-stay and mortality in elderly patients (13,14).

Given the time constraints on healthcare providers (HCP), empowering patients to screen themselves for malnutrition is an appealing proposition. Previous work has demonstrated the efficacy of patients self-administering the MUST to screen for malnutrition in a variety of outpatient environments (13,15). The goal of this study was to determine the validity of self-screening with the MUST as a means of identifying inpatients at risk for malnutrition on the acute medicine unit.

CLINICAL RELEVANCY STATEMENT

- **We attempt to determine if patients admitted to hospital can determine their own nutritional risk score using the Malnutrition Universal Screening Tool.**
- **Cognitive and physical impairments made self-directed screening impractical**

Methods

Ethics approval was granted by the Schulich School of Medicine and Dentistry Research Ethics Board.

Patients admitted to the Clinical Teaching Unit (CTU) either at University Hospital or Victoria Hospital in London, Ontario) for >24 hours were considered for participation (one team was audited each day over a five day period). Patients were excluded from participation if they were <18 years old, pregnant, unable to read or comprehend English, unable to provide informed consent, either physically or mentally unable to safely complete the MUST, or had undergone surgery during admission. Patients could participate with the assistance of a non-hospital caregiver. Enrolled participants provided written consent.

Participants screened themselves using the MUST according to the protocol previously published by Sandhu et al. (2015)(15). A paper copy

AUTHOR CONFLICT OF INTEREST STATEMENT AND INFORMATION

- **The author declares no conflict of interest**
- ¹Department of Medicine, Division of Gastroenterology, Western University, London, Ontario, Canada. ²Lawson Health Research Institute, London, Ontario, Canada. ³Program of Experimental Medicine, Western University Department of Medicine.
- **Corresponding Author**
Adam Rahman, MD MSc (EPID) FRCPC, Assistant Professor of Medicine, Division of Gastroenterology, Western University
adam.rahman@sjhc.london.on.ca, 268 Grosvenor St. London, Ontario, N6A 4V2, Room B0-689, St. Joseph's Health Centre
- © Rahman et. al. This is an open access journal distributed under the terms of the Creative Commons License BY NC

of MUST instructions (15) was provided along with simplified BMI and weight-loss tables based on the MUST template, and an ease-of-use questionnaire ranking the MUST as being very easy, easy, neither easy nor difficult, difficult, or very difficult (16). The time required to complete the MUST was recorded using a digital timer.

Results

Study population

This study screened 125 inpatients (62.4% female) admitted to five CTUs in London, Ontario. Of these inpatients, 65.6% (82/125) were ineligible for inclusion (5% had more than one reason for exclusion), and 21 were eligible but refused to participate. The care-teams for eight eligible patients requested exemption for compassionate reasons. Enrolled participants represented 39.5% (17/43) of eligible patients and 13.6% (17/125) of the inpatient population (Figure 1). The mean age of all inpatients was 66 years (52.8% >70 years), excluded patients was 72.6 years (61.3% >70 years) and enrolled patients was 54 years (23.5% >70 years).

Self-screening versus HCP-screening

Ten of the seventeen patients enrolled in the study completed the MUST and generated a risk score. Using two risk categories of MUST scores (low, and medium + high), agreement between completed self-screening and HCP-screening was 70%. Given the low number of patients who completed the MUST, no associations between self-screening and patient factors were established. HCP-screening of the seven patients who did not complete the MUST found five were high-risk for malnutrition.

Ease-of-use and time to self-screen

There was no association between patients' ability to complete the MUST and its perceived ease-of-use. Patients completed the MUST in a mean time of 8.6 (± 2.5) minutes; those who could not complete it stopped at 11.8 (± 5.6) minutes. Regardless of completion status or time required to complete the MUST, patients who ranked the tool as 'difficult or very difficult' cited the reason being "[the] tables were hard to use."

Discussion

Contrary to the success of self-screening in outpatient populations, the major finding of this study is patients admitted to the CTU are not able, or not willing, to participate in self-screening for malnutrition using the MUST. The small number of patients who were eligible and able to complete the MUST is this study's obvious limitation as it precludes conclusions about associations between patient factors and self-screening, or about the agreement between self-screening and HCP-screening; nonetheless, some important observations were made. The majority of inpatients were ineligible on the basis of cognitive and/or physical disabilities that precluded them giving informed consent or participating safely. It can be inferred that patients with significant enough language barriers, dementia, or delirium to render them incapable of providing consent would also have difficulty completing the MUST's multi-step process. Patients who are non-mobile at baseline or deemed by hospital staff to be at high risk for falls should not screen themselves given the risk for harm.

Interestingly, patients' perception of the tool's ease-of-use did not correlate with either their ability to complete the MUST, or the accuracy of the generated score. Reasons for not completing the MUST were not specifically tracked; however, the commonest voiced concern on the ease-of-use questionnaire was that font was too small to read." A further observation is that inpatients required approximately double the time to complete the MUST than those in outpatient studies (13). This delay may reflect comprehension difficulties and/or physical challenges that were not captured by the exclusion criteria. Several potential explanations exist for why inpatient self-screening

failed where outpatient self-screening succeeded; first, outpatients are more likely to be ambulatory, which simplifies self-weighing. Second, in outpatient trials by Mitchell (2014) and Cawood (2012), the average age of participants (43 and 55 years, respectively) was significantly younger than the average CTU inpatient (66 years; range 19-98 years) (13,15). Given that age itself is a risk factor for the cognitive and physical barriers to self-screening, inpatient screening must be tailored to a more functionally limited population.

Conclusion

This study hoped to marry the sensitivity of the MUST with the ease of self-screening to identify medicine inpatients at risk for malnutrition, but the cognitive and physical impairments among this population preclude self-screening from being practical or safe.

References

1. Barker LA, Gout BS, Crowe TC. Hospital malnutrition: Prevalence, identification and impact on patients and the healthcare system. *Int J Environ Res Public Health*. 2011;8(2):514-27.
2. Butterworth CE. Malnutrition in the Hospital. *JAMA*. 1974;230(6):879. doi:10.1001/jama.1974.03240060049034.
3. Gallagher-Allred CR, Voss AC, Finn SC, McCamish MA. Malnutrition and clinical outcomes. *J Am Diet Assoc*. 1996;96(4):361-6.
4. Naber TH, Schermer T, deBree A, et al. Prevalence of malnutrition in nonsurgical hospitalized patients and its association with disease complications. *Am J Clin Nutr*. 1997;66(5):1232-9.
5. Scrimshaw NS, SanGiovanni JP. Synergism of nutrition, infection and immunity: An overview. *Am J Clin Nutr*. 1997;66(2):464S-477S.
6. Mitchell MA, Duerksen DR, Rahman A. Are housestaff identifying malnourished hospitalized medicine patients? *Appl Physiol Nutr Metab*. 2014;39(10):1192-5. doi: 10.1139/apnm-2014-0133.
7. Wyszynski DF, Perman M, and Crivelli A. Prevalence of hospital malnutrition in Argentina: preliminary results of a population-based study. *Nutrition*. 2003;19(2):115-9.
8. Banks M, Bauer J, Graves N, Ash S. Malnutrition and pressure ulcer risk in adults in Australian health care facilities. *Nutrition*. 2007;27:896-901.
9. Pirlich M, Schutz T, Norman K, et al. The German hospital malnutrition study. *Clin Nutr*. 2006;25(4):563-72.
10. Waitzberg DL, Caiaffa WT, Correia MI. Hospital malnutrition: the Brazilian national survey (IBRANUTRI): a study of 4000 patients. *Nutrition*. 2001;17(7-8):573-80.
11. Malnutrition Advisory Group (MAG): A Standing Committee of the British Association for Parenteral and Enteral Nutrition (BAPEN). The MUST explanatory booklet: A guide to the malnutrition universal screening tool (MUST) (online). Available at: <http://www.bapen.org.uk/screening-for-malnutrition/must/must-toolkit/the-must-explanatory-booklet>. Accessed March 30, 2014.
12. Anthony PS. Nutrition screening tools for hospitalized patients. *Nutr Clin Pract*. 2008;23(4):373-82. Doi: 10.1177/0884533608321130.
13. Cawood AL, Elia M, Sharp SK, Stratton RJ. Malnutrition self-screening by using MUST in hospital outpatients: validity, reliability, and ease of use. *Am J Clin Nutr*. 2012;96(5):1000-7. Doi: 10.3924/ajcn.112.037853.
14. Stratton RJ, King CL, Stroud MA, Jackson AA, Elia M. 'Malnutrition universal screening tool' predicts mortality and length of stay in acutely ill elderly. *Br J Nutr*. 2006;95(2):325-30.
15. Sandhu A, Mosil M, Yan B, et al. Self-screening for malnutrition risk in outpatient inflammatory bowel disease patients using the Malnutrition Universal Screening Tool (MUST). *JPEN*. 2015. pii: 0148607114566656. [Epub ahead of print].

16. British Association for Parenteral and Enteral Nutrition (BAPEN). Malnutrition universal screening tool (online). Available at: www.bapen.org.uk/screening-for-malnutrition/must/must-app.