RESEARCH PAPER

Identifying older people at risk of malnutrition and treatment in the community: prevalence and concurrent validation of the Patients Association Nutrition Checklist with 'MUST'

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Abstract

Background: Despite policy guidance and quality standards, the majority of older adults with or at risk of malnutrition living in the community still remain under-detected and under-treated by health and social care professionals. The present study aimed to evaluate the concurrent validity of the Patients Association Nutrition Checklist against the 'Malnutrition Universal Screening Tool' ('MUST').

Methods: This cross-sectional study involved 312 older adults recruited from 21 lunch and social groups. All participants were screened as per standard methodology for 'MUST'. For the Patients Association Nutrition Checklist, they provided information about signs of unintentional weight loss in the past 3–6 months, experiencing loss of appetite or interest in eating. Chance-corrected agreement (κ) was assessed.

Results: Mean (SD) age of participants was 79.6 (8.3) years and body mass index was 27.8 (5.6) kg m^{-2}. The majority ($n = 197$; 63%) were living alone. Using 'MUST', the overall prevalence of malnutrition was 9.9% ($n = 31$) comprising 6.7% at medium risk and 3.2% at high risk. There were 21.8% of participants ($n = 68$) rated at risk of overall malnutrition by the Patients Association Nutrition Checklist. Moderate agreement was observed between the two tools ($\kappa = 0.47$, $P < 0.001$).

Conclusions: The Patients Association Nutrition Checklist has potential for early identification of malnutrition risk, attributed to unintentional weight loss and appetite changes with signposting to basic dietary advice and appropriate support. Further work is required to understand how this tool could be effectively used by stakeholders including volunteers, community workers and home care staff.

Introduction

With an ageing population across Europe [1], older adults over 65 years living in the community are at risk of malnutrition (as undernutrition) which stems from inter-related medical (disease-related), physical and social factors [2]. Currently, it is estimated that one in 10 people aged over 65 years in the UK are poorly nourished or at risk of malnutrition, equating to around one million older people [3]. Malnutrition is costly [4] and has many negative consequences that not only affect the individual, but also impose an enormous strain on healthcare resources as a result of delayed recovery from illness, increased need for health care provision at home, more frequent visits by nurses and a greater number of hospital admissions [5,6]. Malnutrition can be prevented by tackling both its causes and consequences

through screening and early intervention, and the benefits of treating malnutrition far outweigh the costs [7].

Many national and international guidelines recommend undertaking a simple nutrition screening procedure to identify those who are at risk [8–13]. Various nutrition screening tools have been validated to detect the risk of developing malnutrition in older adults [14]. Validated tools for use in community-living older adults include the 'Malnutrition Universal Screening Tool' ('MUST') [15], the Mini Nutritional Assessment Short Form (MNA-SF) [16], and the Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN II) [17]. The purpose of screening tools is to identify risk factors that may lead to the development of malnutrition and the need for further assessment [18].

Despite these different tools, malnutrition still remains under-detected and under-treated, with less focus on using validated tools for community-dwelling adults compared to screening in hospital settings [14]. Healthcare staff providing care and treatment within community settings who already review and manage older people are in a prime position to perform routine nutrition screening as part of practice [19]. Yet there remain constraints for identifying and treating malnutrition. The barriers faced by staff that impact on the incorporation of nutrition screening in their practice include limited time to screen and treat, low-prioritisation of nutrition, organisational culture, ease and acceptability of the 'MUST' screening tool, lack of knowledge and skills, improving communication between care settings [19,20]. Thus, there is a need to consider other approaches that could support and enable the identification of malnutrition. If older people could reliably be identified by a simple valid tool to highlight 'clinical concern', the tool could act as a prompt to screen using a validated screening tool such as the 'MUST' which would conform with National Institute of Health and Clinical Excellence clinical guidance [10]. As such, the tool could also have the potential to identify older people at risk earlier, help reduce growing health and social care costs and improve the quality of life for older people.

In recent years, the Patients Association has raised concerns about malnutrition in the UK and identified the need for a less 'clinical tool' which can be used in many settings to help encourage conversations about weight and nutrition and lead people towards established tools and guidance. In 2015, the Patients Association undertook a project working with the Malnutrition Pathway (Managing Adult Malnutrition in the Community) with an aim to produce a simple nutrition checklist for health and social care professionals to use with patients/carers and one for patients/carers [21]

Developed by the Patients Association with Dietitians, the early checklist was launched in December 2016 following extensive testing and modification with patients, relatives and with clinicians and volunteers working with older people [22]. Staff involved in the pilots said that the Patients Association Nutrition Checklist was simple and easy for anyone to use, was effective because it did not require devices for measuring weight and height or the ability to calculate percentages and has the benefit to start an informal conversation with people to identify risk and signposting as appropriate.

Working in collaboration with the Patients Association, the Wessex Academic Health Science Network Nutrition in Older People programme further developed this early version. They adapted it for use by people with care responsibilities including volunteers, community workers and home care staff to raise awareness and identify the risk of malnutrition with signposting to appropriate guidance and support for nutrition. It is primarily intended for people over 65 living in the community and has been pilot tested with several health, social care and voluntary sector providers. The final version was published in 2018 [22].

The present study aimed to investigate the concurrent validity of the Patients Association Nutrition Checklist against 'MUST' to assess whether the same people can be identified as malnourished. Concurrent validity involves comparison of the tool with another validated criterion measure and is assessed by kappa (κ), a chance-corrected measure or agreement. The 'MUST' was chosen because it is the most widely used validated screening tool by healthcare professionals to screen adults for malnutrition in the UK [23].

Materials and methods

Study design and participants

This cross-sectional study was conducted in community centres across Southern England between January and May 2018. Participants were excluded if they were <65 years, non-English speaking or unable to give informed consent. The Research and Ethics Committees of Bournemouth University and University of Southampton gave approval. Written informed consent was obtained from all the participants.

Nutrition screening tools

The 'MUST' [13] is designed for use across care and community settings and consists of a body mass index (BMI) category (BMI < 20 kg m^{-2} indicates at risk), a weight loss category (unintentional weight loss during the past 3–6 months; i.e. >5% indicates at risk) and an acute

disease effect score. A total score of one indicates medium risk (i.e. BMI 18.5–20 kg m^{-2} or unplanned weight loss 5%–10%) and a score of two or more is indicative of high malnutrition risk (i.e. either BMI < 18.5 kg m^{-2}, unplanned weight loss of >10% or BMI 18.5–20 kg m^{-2} and unplanned weight loss of 5%–10%). Height was measured to the nearest 0.1 cm using a portable, free-standing stadiometer (Seca Leicester stadiometer; Seca, Hamburg, Germany), in accordance with standard methodology [13]. Body weight was measured to the nearest 0.1 kg (calibrated SECA class III digital weighing scales were used and calibrated at the start of the study). BMI (kg m^{-2}) was calculated and scored from weight (kg) divided by the square of height (m^2) to determine BMI. Where weight and height were unable to be measured, mid upper-arm circumference was measured (using a tape measure) to provide a general indication of BMI score. Where height could not be measured, ulna length was measured using a tape measure.

The Patients Association Nutrition Checklist has two parts [22]. Section A has four key questions to focus discussions around weight loss (self-reported) and nutrition and aims to identify whether someone is 'at risk' of undernutrition. Section B consists of additional focussed questions on nutrition and eating and provides clear advice and signposting to appropriate support for older people living in the community. The four key questions (from Section A) were validated against 'MUST'.

Investigators and training

Two trained researchers (AA and AG) collected the nutrition screening data. One of the trained researchers was a registered dietitian (AA) and the other researcher (AG) has experience of working with older people in the community. The researchers administered the screening using both tools on the same occasion. The participants were asked to answer questions from Part A of the Patients Association Nutrition Checklist and were then screened using 'MUST'. Any of the participants identified to be at medium or high risk of malnutrition were provided with the Older People's Essential Nutrition leaflet [24] and advice to visit their general practitioner or practice nurse to discuss their screening result further. A measure of health-related quality of life was assessed using EQ-5D-3L [25].

Test–retest reliability of the Patients Association Nutrition Checklist

The test–retest reliability of the Patients Association Nutrition Checklist was assessed in a group of participants from the same community centres across Southern England as the main study between June and July 2019.

The same exclusion criteria were used as the main study and all of the participants provided their written informed consent to participate in the study. The assessment using the Patients Association Nutrition Checklist was carried out at the beginning of the session and repeated either at the end of the session or at the next one they attended no more than 1 week later.

Statistical analysis

All analyses were carried out using SPSS, version 23.0 (IBM Corp., Armonk, NY, USA). Normally distributed continuous variables were presented as the mean (SD), whereas categorical variables are absolute and relative (%) frequencies. $P < 0.05$ (two-sided) was considered statistically significant. Kappa was used to determine the levels of agreement and chance-corrected agreement (κ) between 'MUST' and the Patients Association Nutrition Checklist. The following ranges of agreement (κ) were used: fair 0.21–0.4, moderate 0.41–0.6, substantive 0.61–0.8, and 0.81–1.00, almost perfect [26]. Power calculations suggested that, for an assumed malnutrition prevalence of 15%, a sample size of at least 300 people was needed to detect a chance-corrected agreement of κ = 0.90 with 80% power [confidence interval (CI) = 0.95, CI width 0.1] [27].

Results

Study population

The present study involved 312 participants from 21 lunch and social groups across Dorset ($n = 140$) and Hampshire ($n = 172$). Table 1 shows the demographic and anthropometric characteristics. Most (74.7%) of the participants were women and the mean (SD) age was 79.6 (8.3) years (range 65–84 years). There was an almost three-fold range in BMI (15.1–53.4 kg m^{-2}) and a mean (SD) BMI of 27.8 (5.6) kg m^{-2}. Participants were also asked to rate their

Table 1 Characteristics of the study participants ($n = 312$)

Variable	Mean (SD)	Range
Age	79.6 (8.6)	65–98
Female % ($n = 233$)	74.7	
Male % ($n = 79$)	25.3	
Weight (kg)	75.5 (55.5)	35.7–133.0
Height (m)	1.6 (0.1)	1.40–1.9
Body mass index	27.8 (5.6)	15.1–53.4
Wellbeing (1–10)	7.6 (1.7)	
Living status		
Alone % ($n = 200$)	64.1	
Other % (e.g. warden assisted) ($n = 4$)	1.3	
With Family % ($n = 23$)	7.4	
With Partner % ($n = 85$)	27.2	

wellbeing on a scale of 1–10, with 1 being their worst health score and 10 being their best health score. The mean (SD) wellbeing score using EQ-5D-3L was 7.6 (1.7) and the majority ($n = 200$; 64.1%) of participants were living alone, with the rest living with partner (27.2%), family (7.4%) and other (e.g. warden-assisted) (1.3%).

Prevalence of malnutrition using 'MUST'

The overall prevalence of malnutrition using 'MUST' was 9.9% ($n = 31$), comprising 6.7% at medium risk and 3.2% at high risk (Table 2). Of these participants 42% ($n = 13$) scored at step 1 BMI. The majority (69%, $n = 9$) scored 1 and 31% ($n = 4$) scored 2. There were 71% ($n = 22$) of participants who scored at step 2 for unintentional weight loss. There were 68% ($n = 15$) who scored 1 and 32% ($n = 7$) who scored 2.

Prevalence of malnutrition using Patients Association Nutrition Checklist

There were 21.8% of participants ($n = 68$) rated at risk of malnutrition by the Patients Association Nutrition Checklist (Table 3). Of these, 34% ($n = 23$) scored 'Yes' or 'Don't know' on question 1 (concerns about being underweight or need nutritional advice) and 44% ($n = 30$) scored 'Yes' or 'Don't know' on question 2 (loss of weight unintentionally in the past 3–6 months), 54% ($n = 37$) scored 'Yes' or 'Don't know' on question 3 (clothes or rings have become loose recently), and 56% ($n = 38$) scored 'Yes' or 'Don't know' on question 4 (recent loss of appetite and interest in eating). There were seven participants who answered 'don't know' to at least one question. Of these, three answered 'yes' to at least one other question of the four. There were only two participants (0.6%) who answered 'don't know' to question 1, seven

Table 2 Assessment of malnutrition using 'MUST'

	n (%)
MUST malnutrition risk	
Overall prevalence	31 (9.9)
Medium risk = 1 (observe)	21 (6.7)
High risk = 2 (treat)	10 (3.2)
Step 1 BMI (kg m^{-2})	
Overall prevalence	13 (42)
Score of 1 only (18.5–20)	9 (69)
Score of 2 only (<18.5)	4 (31)
Step 2 unintentional weight loss	
Overall prevalence	22 (71)
Score of 1 only (5–10)	15 (68)
Score of 2 only (>10)	7 (32)

There were no step 3 acute disease scores. BMI, body mass index; 'MUST', Malnutrition Universal Screening Tool.

Table 3 Overall prevalence of malnutrition using Patients Association Nutrition Checklist: number of participants who answered 'yes' or 'don't know' to each question

	n (%)
Patients Association Nutrition Checklist malnutrition risk	
Overall prevalence	68 (21.8)
Scored yes to question 1: Concerns about being underweight or need nutritional advice	23 (34)
Scored yes or 'don't know' to question 2: Loss of weight unintentionally in past 3–6 months	30 (44)
Scored yes to question 3: Clothes or rings have become loss recently	37 (54)
Scored yes to question 4: Recent loss of appetite and interest in eating	38 (56)

participants (2.2%) who answered 'don't know' to question 2, and only one participant (0.3%) who answered 'don't know' to question 4. None of the participants answered 'don't know' to question 3.

Concurrent validity of the 'MUST' with the Patients Association Nutrition Checklist

The 'MUST' and Patients Association Nutrition Checklist showed a moderate level of agreement beyond chance within the range 0.41 to 0.60 ($\kappa = 0.47$ SE = 0.064; $P < 0.001$). Overall, there were 37 participants (11.9%) who were identified at risk using Patients Association Nutrition Checklist but were not identified for 'MUST' (Table 4). There were four discrepancies (12.9%) for the categorisation between 'MUST' and Patients Association Nutrition Checklist. On further exploration of the data, the reasons for the discrepancy were attributed to participants having no change in weight and that they had always been slim. Their 'MUST' scores were 1 and attributed to low BMI ranging from 18.7 to 19.9 kg m^{-2}.

Test–retest reliability of the Patients Association Nutrition Checklist

The test–retest reliability of the Patients Association Nutrition Checklist was conducted in 68 participants. The

Table 4 Cross-tabulation of malnutrition risk according to 'MUST' and Patients Association Nutrition Checklist

	n (%)
'MUST'	
No risk	281 (90.1)
At risk	31 (9.9)
Patients Association Nutrition Checklist	
No risk	244 (78.2)
At risk	68 (21.8)

overall test-retest reliability beyond chance was within the range 0.81–1.00, which indicates 'almost perfect' agreement ($\kappa = 0.90$ SE = 0.059; $P < 0.001$). For question 1, agreement beyond chance was within the range 0.81–1.00, which indicates 'almost perfect' agreement ($\kappa = 0.90$, SE = 0.098; $P < 0.001$). For question 2, agreement beyond chance was within the range 0.61–0.80, which indicates substantial agreement: ($\kappa = 0.68$ SE = 0.098; $P < 0.001$). For question 3, agreement beyond chance was within range of 0.81–1.00, which indicates 'almost perfect' agreement ($\kappa = 0.83$ SE = 0.095; $P < 0.001$). For question 4, agreement beyond chance was within the range 0.61–0.80, which indicates substantial agreement ($\kappa = 0.78$ SE = 0.123; $P < 0.001$).

Discussion

The present study has shown that the Patients Association Nutrition Checklist has moderate concurrent validity compared to 'MUST'. This level of agreement is consistent with malnutrition risk between 'MUST' and other tools in the same individuals [21].

Using 'MUST', the prevalence of malnutrition risk was 9.9% in this group of people living in the community, which compares favourably with measures of the prevalence of people at risk or having malnutrition of 10% in the community using 'MUST' [3]. However, there were 37 (11.9%) more people identified at risk using the Patients Association Nutrition Checklist compared to 'MUST'. The reasons for this could be attributed to identifying people in the earlier stages of weight loss and with appetite changes. The number of participants who were unable to recall whether they had experienced weight loss (2%) or who had reported loss of appetite (0.3%) was only very small. However, from the test–retest validation study, it was evident that the question asking whether participants lost a lot of weight unintentionally in the past 3–6 months did not show as strong chance agreement compared to the other questions (which was substantial or almost perfect), although the agreement was still acceptable.

Although 'MUST' has been extensively validated in hospitals, few studies have tested the validity of 'MUST' in community-dwelling older adults [14]. Other tools for screening malnutrition in the community have been validated such as SCREEN 11 with the purpose of screening for general nutritional status as well as a screening tool [17]. However, the Patients Association Nutrition Checklist was developed in response to the need for a new approach for the early identification of malnutrition risk, to elicit a conversation and that could be used by people with wider responsibility for nutrition that might include volunteers, community workers and home care staff people. Given the barriers to using already validated screening tools in the community [19,20], the Patients Association Nutrition Checklist offers opportunity to provide a way to identify 'clinical concern' for malnutrition risk at an early stage and/or lead to an indication of the need for 'MUST' screening in accordance with NICE by health and social care professionals [10,11].

Strengths and limitations

The Patients Association Nutrition Checklist is reliant on the participant's ability to recall weight loss, and who can report their appetite. Despite this, the number of people who were unable to provide this information in this study was very small. Almost all of the individuals who were approached and met the inclusion criteria agreed to participate in the study. However, we did not record details or the reasons for those who declined. We excluded people who were overtly not interested or overtly confused. A limitation of the test–retest reliability of the Patients Association Nutrition Checklist is the short time between the first and second assessment, which could have overestimated reliability because the participants might have remembered their previous score.

Conclusions

The Patients Association Nutrition Checklist not only demonstrates acceptable agreement compared to 'MUST' but also its potential for early identification of malnutrition risk in the community, which includes signposting to basic dietary advice and appropriate health and social care support within the tool. Further research is needed to understand how the Patients Association Nutrition Checklist could be effectively applied, including its ease of use by those other than health and social care staff, such as volunteers, community workers and home care staff.

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Conflict of interests, source of funding and authorship

AG and JM analysed the data. JM, AA, KW and AG interpreted the data and contributed to the writing of the manuscript. JM had overall responsibility for the final content. All authors critically reviewed the manuscript and approved the final version submitted for publication.

Transparency declaration

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

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