Proceedings of the Nutrition Society (2022), **81**, 41–48 doi:10.1017/S0029665121003670
 First published online 6 October 2021

The Nutrition Society Irish Section Conference 2021 was held virtually on 22–24 June 2021

Conference on Nutrition, health and ageing – translating science into practice Symposium three: Strategies to improve nutrient status; current opinion and implications for nutrition policy

Advances in knowledge of screening practices and their use in clinical practice to prevent malnutrition

Sarah Browne[1,2], Aisling Geraghty[1,2] and Clare Corish[1,2]*
[1]*School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin, Republic of Ireland*
[2]*UCD Institute of Food and Health, University College Dublin, Dublin, Republic of Ireland*

Malnutrition is common among older adults and is associated with a progressive decline in overall health and increased mortality. With a rapidly ageing population, the detection, prevention and management of malnutrition require urgent attention within health service planning and delivery. Routine screening for malnutrition among older adults in community settings, which addresses aetiological as well as phenotypic factors, is considered an important step for prevention and early intervention. The aim of this review is to summarise current malnutrition screening literature and highlight research that seeks to understand and address community-based approaches to malnutrition screening and management. Key healthcare professionals (HCPs) that encounter community-dwelling older adults include general practitioners (GPs), community-based nurses, community pharmacists and a range of other health and social care professionals including dietitians, physiotherapists, speech and language therapists, and occupational therapists. The key barriers to implementing screening in primary care include lack of knowledge about malnutrition among non-dietetic HCPs, lack of resources allocated to managing malnutrition, lack of access to dietetic services, and poor GP knowledge about oral nutritional supplement prescribing. In addition, older adults have poor insight into the clinical condition and the associated negative health implications. Investment in education among HCPs and public awareness is required, as well as accompanying resources to successfully implement malnutrition screening programmes for community-dwelling older adults.

Malnutrition screening: Nutrition: Primary healthcare: Older adults

Defining malnutrition and its prevalence

Protein energy malnutrition, referred to as malnutrition in this review, occurs when intake or uptake of energy and/or protein is lower than that required by the body for weight maintenance and physiological functioning. The delivery of sufficient energy and/or protein can be compromised by inadequate consumption, nutrient assimilation disorders, and higher energy and/or protein requirements influenced by the disease process, including inflammatory conditions within the body[(1)].

Risk factors for malnutrition can be multi-faceted and include nutritional, functional, psychosocial, disease burden, age- and sex-related aetiologies. Poor appetite, hospitalisation, poor self-reported health and increasing age have recently been summarised from available

Abbreviations: GPs, general practitioners; GLIM, global leadership initiative on malnutrition; HCPs, healthcare professionals; ONSPres study, oral nutritional supplement prescribing malnutrition research study.

***Corresponding author:** Clare Corish, email clare.corish@ucd.ie

literature as the strongest predictors of malnutrition[2]. Older adults are at an increased risk of malnutrition owing to the physiological, functional and psychosocial changes that occur with ageing[1,3]. If left untreated, malnutrition leads to a progressive decline in overall health and reduced physical and cognitive function, eventually leading to longer hospital stays, increased likelihood of readmission to hospital, loss of independence, reduced quality of life and increased mortality[4,5]. These consequences also incur significant financial repercussions for the health care service, with the annual cost associated with malnutrition in Europe estimated to represent 2–10 % of health care budgets[6–9]. With those aged 65 years and older estimated to account for 31·3 % of the European population in 2100, compared to 20·6 % in 2020[10], the burden of malnutrition is expected to rise considerably and requires a detection and prevention approach to its management.

Current estimates of malnutrition prevalence are inexact owing to heterogeneity in assessment criteria, screening tools and diagnostic criteria applied within prevalence studies, with as many as 48 screening tools in use[1,11]. It is important to acknowledge the interchangeable terminologies used within prevalence studies so that 'malnutrition risk' and 'malnourished' are not always clearly differentiated and the quality of published studies is varied[11]. Notwithstanding these challenges, it is accepted that there is considerable variation in malnutrition prevalence between settings with 5–10 % in older adults living at home, 20 % living in residential care settings, 40 % in hospital care settings and 50 % in rehabilitation settings estimated to be malnourished[12]. European estimates indicate the number of individuals at risk of malnutrition in the community is 8·5 %[13] and international syntheses estimate 5·8 %[12].

Screening tools and diagnostic criteria

A recent review of prevalence studies of community-dwelling older adults, including residents of nursing homes and rehabilitation facilities, examined BMI <20 kg/m^2, weight loss or a combination of both for the purposes of assessing malnutrition prevalence using uniform definitions[14]. For low BMI, the highest prevalence was reported from nursing home settings and among women in all settings, and BMI decreased with increasing age of the sample. The weight loss criterion showed no clear pattern of occurrence across settings. Combining criteria definitions resulted in the lowest prevalence, whereas identifying malnutrition risk using any of the criteria increased prevalence. The importance of using age-specific cut-offs for defining low BMI among older adults was highlighted by this work as the general cut-off of BMI <20 kg/m^2 is likely to underestimate malnutrition risk[14].

Studies using screening tools or diagnostic consensus criteria including the mini-nutritional assessment[15], American Society for Parenteral and Enteral Nutrition/ Academy of Nutrition and Dietetics[16] and European Society for Clinical Nutrition and Metabolism[17] observe much higher prevalence of malnutrition compared to that reported by Wolters *et al.*[14] using BMI, weight loss and decreased food intake[12,18]. The commonly used mini-nutritional assessment-short form integrates the assessment of food intake, weight loss, mobility, disease state, neuropsychological problems and BMI into one composite score, is specifically designed for use in older adults and is commonly used in practice[19]. The American Society for Parenteral and Enteral Nutrition/ Academy of Nutrition and Dietetics consensus criteria first expanded upon the role of the inflammatory response in malnutrition risk and recommends the assessment of the severity of the acute disease state, weight loss, change in food intake and the integration of a nutrition-focused physical examination for loss of fat and/or muscle mass, and presence of oedema[16]. The European Society for Clinical Nutrition and Metabolism consensus statement later incorporated aetiology-based malnutrition diagnoses to include disease-related malnutrition with and without inflammation as well as malnutrition without disease with underlying psychological, socio-economic or hunger-related causes[17].

The developments in aetiology-based malnutrition assessment criteria in the past decade have been welcome and international consensus was called for to enhance and standardise detection and reporting. The global leadership initiative on malnutrition (GLIM) published in 2019 delivered a global consensus for the diagnosis of malnutrition, which identified screening, using a validated malnutrition screening tool, as the first step in identification[1]. The GLIM specifies that both aetiological criteria (reduced food intake, assimilation issues and/or disease burden and inflammatory processes) and phenotypic criteria (weight loss over time, BMI and reduced muscle mass) be used to determine malnutrition risk status. Muscle wastage, an independent risk factor for frailty and loss of independence, is not quantified well in current malnutrition screening literature. The European Society for Clinical Nutrition and Metabolism previously recommended the use of the mini-nutritional assessment for assessing malnutrition in older adults in all settings[20]; however, this recommendation needs to be considered in light of the recent focus on aetiological factors. Research is required now to apply the proposed GLIM criteria in validation studies for malnutrition diagnosis in diverse settings, diagnoses, sex and age groups[21]. Published work is now emerging with studies examining validation in different populations[22–26] and more developments are expected in the coming years.

Implementing screening for malnutrition in community settings

While GLIM delivered an essential consensus and roadmap for the identification and diagnosis of malnutrition, significant challenges exist in implementing widespread malnutrition screening in practice. In hospital settings, it is recommended that malnutrition should be screened for on a weekly basis[20]. It is estimated in the UK that almost 25 % of patients admitted to hospital from

https://doi.org/10.1017/S0029665121003670 Published online by Cambridge University Press

home are at risk of malnutrition, indicating that community-based malnutrition screening is warranted[27]. The National Institute for Health and Care Excellence recommends annual screening for malnutrition among community-dwelling older adults (>75 years) with a primary care healthcare provider or with their general practitioner (GP)[28]. Primary care non-dietetic healthcare professionals (HCPs) that encounter older people at risk of malnutrition include GPs, community-based nurses, pharmacists, physiotherapists, occupational therapists and speech and language therapists[29–32]. GPs, community nurses or pharmacists are often the first point of contact for patients or their families with nutritional or weight loss concerns[29,31–35]. There are opportunities, therefore, to implement systematic community-based screening for the identification of malnutrition risk and malnutrition for the purpose of early intervention and treatment.

Malnutrition awareness among healthcare professionals in primary care

The oral nutritional supplement prescribing malnutrition research study (ONSPres study) addressed some key gaps in terms of identifying barriers to malnutrition identification, management and ONS prescribing in primary care in Ireland. Fig. 1 summarises the research undertaken within the ONSPres study from 2018 to 2021. The present paper will draw from the recent study, integrating learning from the wider literature and other jurisdictions.

Barriers to detecting malnutrition among community-dwelling older adults

Lack of awareness and knowledge

There is evidence to indicate that non-dietetic HCPs are not well-informed about malnutrition in community settings. In Ireland, GPs report poor understanding of malnutrition as a clinical condition and little background in nutrition education for treating the condition. GPs lack time and given their role in coordinating the often-complex healthcare needs of older patients, they do not currently prioritise malnutrition screening[31]. A lack of time and knowledge are common barriers in the literature[36–38]. However, selecting the correct patient groups to screen, and remembering to screen are two factors that were also central in a cross-sectional survey of 493 GPs in France[39]. GP responsibilities for managing multiple clinical conditions during a brief consultation must be acknowledged and it is understandable that a clinical screening tool which is not integrated into other assessments is forgotten or fails to be prioritised. In the ONSPres study, other non-dietetic HCPs, while aware of malnutrition, also reported a lack of competence in screening for and discussing malnutrition in practice[32]. One of the outcomes of poor malnutrition screening practices is the presentation of patients with more severe malnutrition; this was clearly highlighted by HCPs working in community care in Ireland[32]. Patients with a malnutrition diagnosis have reported that weight loss was first noticed by themselves, a carer or family member[40]; however, their awareness about the clinical condition and understanding of nutrition interventions needed is poor[40–43]. It is unknown how long older adults live with undetected weight loss and malnutrition, and HCPs believe that until functional limitations associated with weight loss or frailty are apparent, older adults will not seek support[32]. There is certainly evidence to support this, and carers can be more concerned about weight loss as a sign of something wrong than patients themselves[40,41]. Recent reviews have highlighted that older adults do not always associate poor appetite or weight loss with poor health, and may dislike being screened for malnutrition or being asked about dietary behaviours[44,45].

One novel and important finding from the ONSPres study, which has not been widely reported in the literature previously, is the stigma associated with the term 'malnutrition' among older adults[40]. Patients associated the term with famine, war, neglect, poverty and self-blame. Although non-dietetic HCPs are not confident in discussing malnutrition with patients, they reported being aware of the stigma and dietitians find alternative language in practice, focusing their communication with patients on weight loss and nutrients needs. While there is literature on stigma associated with many conditions such as obesity, mental health, cancer and epilepsy, there is little in the literature on health communications associated with malnutrition. These findings may be unique to Ireland, given our relatively recent history of famine, civil war and poverty, although it would be interesting to investigate if stigma exists elsewhere. It certainly indicates the need for public awareness campaigns about malnutrition and the potential to educate more widely on the benefits of screening among community-dwelling older adults.

Lack of resources in primary care

Resource limitations have been identified by HCPs as a barrier to identify and manage patients with malnutrition in Ireland and other countries[31,32,44]. Where dietetic services are limited in primary care, GPs report prioritising other conditions such as obesity when referring to a dietitian[31]. Other HCPs including dietitians, speech and language therapists, occupational therapists, physiotherapists, community nurses and community pharmacists highlighted the limitations of dietetic services in their primary care areas or lack of awareness about how to access dietetic services[32]. HCPs shared across a primary care network consisting of multiple primary care teams results in service limitations which is common in practise. This structure, with multiple locations, also presents communication challenges and difficulty accessing GPs[32,46]. Primary care teams and networks are being prioritised in future models of health in Ireland[47,48] and GP participation in teams and networks is viewed as particularly important for effective teamworking and healthcare delivery[49]. In Ireland, multiple working locations for HCPs mean that team members are not meeting in person, which can be a barrier

https://doi.org/10.1017/S0029665121003670 Published online by Cambridge University Press

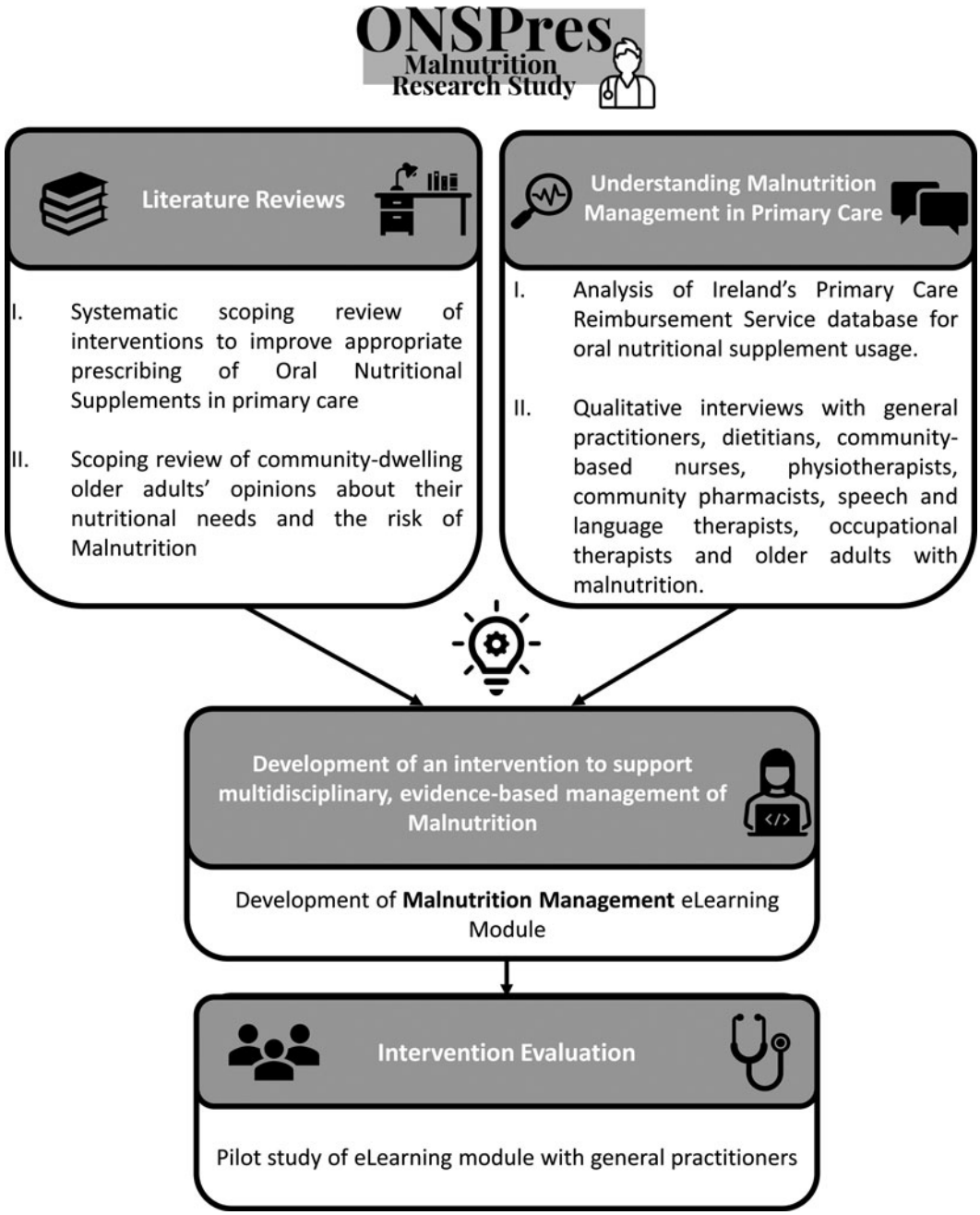

Fig. 1. A summary of the work package flow within the ONSPres malnutrition research study between 2018 and 2021, investigating the barriers and facilitators of malnutrition screening and management among community-dwelling older adults.

to effective communication in primary care[46,50]. As the primary care model develops, it is important, therefore, to integrate malnutrition screening and care pathways in a sustainable way. One outcome of primary care service limitations is that the benefits of nutritional interventions initiated in tertiary settings can be lost upon discharge to the community[51]. Patients in the ONSPres study reported no contact with community dietitians after discharge from hospital and they were unable to convey a clear understanding of nutritional interventions in place[43]. This is consistent with HCP accounts of insufficient resources to provide dietetic care for patients with malnutrition in the community[31,32].

ONS prescribing

Although GPs are the key prescribers of ONS in Ireland, they report a lack of knowledge about the range available and how to select appropriate products for patients' needs[31]. As described earlier, GPs do not routinely screen for malnutrition; therefore, ONS prescribing is

https://doi.org/10.1017/S0029665121003670 Published online by Cambridge University Press

not led by screening risk or evidence in most cases. GPs tend to continue approving ONS prescriptions initiated in hospital without monitoring for effectiveness and compliance[31,32]. Although ONS are a potentially effective intervention for malnutrition, there are greater benefits when dietitians are involved in selecting the appropriate product, providing patient-centred counselling on their use and monitoring older adults which include better adherence to recommendations, improved cost inefficiencies, as well as improved patient outcomes by reducing hospital readmission[7,52–55]. In addition, patient-centred dietary counselling that accounts for the health, social and economic needs of the patient is an essential aspect of the nutrition care plan[1,56].

Previous research has shown that social factors, such as living alone, limited shopping and cooking independence, contribute to long-term use of ONS among community-dwelling adults[37]. A recent analysis of ONS prescribing in Ireland found that older age, being female and polypharmacy were predictors of long-term use; however, younger age and central nervous system drugs were associated with greater volumes dispensed[57]. Social factors associated with malnutrition and ONS usage include living alone, limited shopping and/or cooking independence, frailty, drug addiction and poor social support[37,52,58]. The difficulty with prescribing ONS in isolation without further nutritional assessment is that underlying social factors are not addressed. The multidisciplinary team involved in older adult care in the community, however, is well placed to identify solutions to social issues that are contributing to malnutrition once they are identified. This type of information has been shared in previous education interventions in primary care and improves knowledge and awareness among HCPs[52].

A finding from the ONSPres study that has not been widely reported is the potential conflict of interest arising from dietitians working with commercial ONS companies assessing patients in private nursing home facilities[32]. This service may be unique to the Irish setting, although industry representatives are active in ONS promotion among HCPs in most healthcare settings. In 2010, an Irish study reported that 'visits from sales representatives' were a common source of malnutrition information for GPs and community-based nurses[52]. Some GPs and HCPs view commercial input as a barrier to prescribing ONS based on the potentially biased source of the recommendation[31,32]; therefore, it is important that unbiased education, training and continuous professional development on malnutrition are available to all HCPs working with older adults.

Interventions and solutions

A successful malnutrition education programme with community-based HCPs in Ireland was demonstrated by Kennelly *et al.*, whereby public health nurses, primary care practices (GPs and practice nurses) and private nursing homes (staff nurses) in one county took part in malnutrition screening and management education led by community dietitians[52]. Malnutrition screening and knowledge improved after education and training, and most HCPs had implemented and were confident in using the malnutrition universal screening tool[59] and providing first-line dietary advice at 6 months follow-up[52]. Despite the strong evidence base to support malnutrition screening and care pathways[1], there has been a lack of development in implementing screening more widely in primary care. It is well documented that nutrition is under-developed in medical education programmes[60], despite documented interest and will from students and medical professionals[61,62].

Online learning can improve accessibility to continuous professional development training for HCPs and may be an efficacious route to widespread malnutrition screening and management education. Literature reviews[45,54] and findings from the ONSPres study were used to design an e-learning module that was recently evaluated by 31 GPs in Ireland[63]. The interactive e-learning module was approximately 60–90 min in duration and, as well as malnutrition education and providing resources, the content included case-based examples to teach the application of screening tools. Case studies required participants to calculate weight loss, malnutrition risk scores and approaches to treatment and follow-up. The online module was well received by GPs and knowledge and case-based practice improved from baseline immediately and 6 weeks after training[63]. GPs were chosen for participation in the e-learning module pilot study as they are licensed prescribers of ONS in Ireland; however, there are plans to make the module available to other HCPs working with older adults in primary care.

Professional education and learning will improve knowledge, awareness and ideally increase screening for malnutrition among HCPs. However, this will not address the resource barriers to malnutrition management that have been outlined. When older adults are screened regularly, care pathways that include dietetic referral systems for full nutritional assessment are required in primary care. Older adults at 'low risk' or 'moderate risk' of malnutrition, with uncomplicated healthcare needs, can often be managed without direct dietetic care and resources, including a malnutrition support toolkit, that are widely available via the health service to assist HCPs in providing first-line advice.

Conclusions

This review highlights the developments in assessment and screening for malnutrition over the past decade. Future work will focus on validating malnutrition diagnostic tools using the GLIM criteria. The barriers to identifying and treating malnutrition among older adults in primary care are described. The solutions to address knowledge and awareness deficits among HCPs and community-dwelling older adults are multi-pronged and include education and training for HCPs and public awareness campaigns aimed at older adults themselves and their carers. Resource deficits will require firm commitments from health services to prioritise the timely identification of malnutrition among our ageing

https://doi.org/10.1017/S0029665121003670 Published online by Cambridge University Press

populations and effective communication structures within primary care. Finally, investment in community nutrition and dietetics services for older adults will enhance nutrition skills within the multidisciplinary team in primary care and ensure the sustainability of evidence-based care pathways for malnutrition identification and management.

Acknowledgements

The authors acknowledge the Health Research Board (HRB) for funding the ONSPres Study. The HRB supports excellent research that improves people's health, patient care and health service delivery. The HRB aims to ensure that new knowledge is created and then used in policy and practice. In doing so, the HRB supports health system innovation and creates new enterprise opportunities. The authors wish to acknowledge participants within the ONSPres study, study partners and collaborators and the wider research team, including post-doctoral researchers Dr Patricia Dominguez-Castro and Dr Ciara Reynolds.

Financial Support

This work was supported by a grant from the Health Research Board in Ireland (grant number: RCQPS-2017-4).

Conflict of Interest

None.

Authorship

The authors had sole responsibility for all aspects of preparation of this paper.

References

1. Cederholm T, Jensen GL, Correia M *et al.* (2019) GLIM criteria for the diagnosis of malnutrition – a consensus report from the global clinical nutrition community. *Clin Nutr* **38**(1), 1–9.
2. Roberts S, Collins P & Rattray M (2021) Identifying and managing malnutrition, frailty and sarcopenia in the community: a narrative review. *Nutrients* **13**, 2316.
3. de van der Schueren MA, Wijnhoven HA, Kruizenga HM *et al.* (2016) A critical appraisal of nutritional intervention studies in malnourished, community dwelling older persons. *Clin Nutr* **35**, 1008–1014.
4. Evans C (2005) Malnutrition in the elderly: a multifactorial failure to thrive. *Perm J* **9**, 38–41.
5. Pryke R & Lopez B (2013) Managing malnutrition in the community: we will all gain from finding and feeding the frail. *Br J Gen Pract* **63**, 233–234.
6. Rice N & Normand C (2012) The cost associated with disease-related malnutrition in Ireland. *Public Health Nutr* **15**, 1966–1972.
7. Freijer K, Nuijten MJ & Schols JM (2012) The budget impact of oral nutritional supplements for disease related malnutrition in elderly in the community setting. *Front Pharmacol* **3**, 78.
8. Khalatbari-Soltani S & Marques-Vidal P (2015) The economic cost of hospital malnutrition in Europe; a narrative review. *Clin Nutr ESPEN* **10**, e89–e94.
9. Elia M (2015) *The Cost of Malnutrition in England and Potential Cost Savings from Nutritional Interventions*. England: National Institute for Health Research.
10. Population Structure and Ageing (2021) Available at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Population_structure_and_ageing#The_share_of_elderly_people_continues_to_increase (accessed July 2021).
11. Power L, de van der Schueren MAE, Leij-Halfwerk S *et al.* (2019) Development and application of a scoring system to rate malnutrition screening tools used in older adults in community and healthcare settings – a MaNuEL study. *Clin Nutr* **38**, 1807–1819.
12. Kaiser MJ, Bauer JM, Rämsch C *et al.* (2010) Frequency of malnutrition in older adults: a multinational perspective using the mini nutritional assessment. *J Am Geriatr Soc* **58**, 1734–1738.
13. Leij-Halfwerk S, Verwijs MH, van Houdt S *et al.* (2019) Prevalence of protein-energy malnutrition risk in European older adults in community, residential and hospital settings, according to 22 malnutrition screening tools validated for use in adults >/=65 years: a systematic review and meta-analysis. *Maturitas* **126**, 80–89.
14. Wolters M, Volkert D, Streicher M *et al.* (2019) Prevalence of malnutrition using harmonized definitions in older adults from different settings – a MaNuEL study. *Clin Nutr* **38**, 2389–2398.
15. Guigoz Y & Vellas B (1999) The mini nutritional assessment (MNA) for grading the nutritional state of elderly patients: presentation of the MNA, history and validation. *Nestle Nutr Workshop Ser Clin Perform Programme* **1**, 3–11, discussion-2.
16. White JV, Guenter P, Jensen G *et al.* (2012) Consensus statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition. *J Parenter Enteral Nutr* **36**, 275–283.
17. Cederholm T, Barazzoni R, Austin P *et al.* (2017) ESPEN guidelines on definitions and terminology of clinical nutrition. *Clin Nutr* **36**, 49–64.
18. Sánchez-Rodríguez D, Marco E, Schott AM *et al.* (2019) Malnutrition according to ESPEN definition predicts long-term mortality in general older population: findings from the EPIDOS study-Toulouse cohort. *Clin Nutr* **38**, 2652–2658.
19. Guigoz Y & Vellas B (2021) Nutritional assessment in older adults: MNA® 25 years of a screening tool and a reference standard for care and research; what next? *J Nutr Health Aging* **25**, 528–583.
20. Kondrup J, Allison SP, Elia M *et al.* (2003) ESPEN guidelines for nutrition screening 2002. *Clin Nutr* **22**, 415–421.
21. Keller H, de van der Schueren MAE, Jensen GL *et al.* (2020) Global leadership initiative on malnutrition (GLIM): guidance on validation of the operational criteria for the diagnosis of protein-energy malnutrition in adults. *JPEN J Parenter Enteral Nutr* **44**, 992–1003.
22. Yin L, Liu J, Lin X *et al.* (2021) Nutritional features-based clustering analysis as a feasible approach for early identification of malnutrition in patients with cancer. *Eur J Clin Nutr* **75**, 1291–1301.
23. Theilla M, Rattanachaiwong S, Kagan I *et al.* (2021) Validation of GLIM malnutrition criteria for diagnosis of malnutrition in ICU patients: an observational study. *Clin Nutr* **40**, 3578–3584.

24. Shahbazi S, Hajimohammadebrahim-Ketabforoush M, Vahdat Shariatpanahi M *et al.* (2021) The validity of the global leadership initiative on malnutrition criteria for diagnosing malnutrition in critically ill patients with COVID-19: a prospective cohort study. *Clin Nutr ESPEN* **43**, 377–382.
25. Lengelé L, Bruyère O, Beaudart C *et al.* (2021) Malnutrition, assessed by the global leadership initiative on malnutrition (GLIM) criteria but not by the mini nutritional assessment (MNA), predicts the incidence of sarcopenia over a 5-year in the SarcoPhAge cohort. *Aging Clin Exp Res* **33**, 1507–1517.
26. Sanchez-Rodriguez D, Locquet M, Reginster J-Y *et al.* (2020) Mortality in malnourished older adults diagnosed by ESPEN and GLIM criteria in the SarcoPhAge study. *J Cachexia Sarcopenia Muscle* **11**, 1200–1211.
27. Russell CA & Elia M (2010) Malnutrition in the UK: where does it begin? *Proc Nutr Soc* **69**, 465–469.
28. National Institute for Clinical Excellence (2006) *Nutrition Support for Adults: Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition*. London, UK: National Institute for Clinical Excellence.
29. Douglas PL, McCarthy H, McCotter LE *et al.* (2019) Nutrition education and community pharmacy: a first exploration of current attitudes and practices in Northern Ireland. *Pharmacy (Basel)* **7**, 7.
30. Tagliaferri S, Lauretani F, Pela G *et al.* (2019) The risk of dysphagia is associated with malnutrition and poor functional outcomes in a large population of outpatient older individuals. *Clin Nutr* **38**, 2684–2689.
31. Dominguez Castro P, Reynolds CM, Kennelly S *et al.* (2020) General practitioners' views on malnutrition management and oral nutritional supplementation prescription in the community: a qualitative study. *Clin Nutr ESPEN* **36**, 116–127.
32. Browne S, Kelly L, Geraghty AA *et al.* (2021) Healthcare professionals' perceptions of malnutrition management and oral nutritional supplement prescribing in the community: a qualitative study. *Clin Nutr ESPEN* **44**, 415–423.
33. Green SM, James EP, Latter S *et al.* (2014) Barriers and facilitators to screening for malnutrition by community nurses: a qualitative study. *J Hum Nutr Diet* **27**, 88–95.
34. Hamirudin AH, Charlton K, Walton K *et al.* (2013) 'We are all time poor' – is routine nutrition screening of older patients feasible? *Aust Fam Physician* **42**, 321–326.
35. Winter JE, McNaughton SA & Nowson CA (2016) Older adults' attitudes to food and nutrition: a qualitative study. *J Aging Res Clin Practice* **5**, 114–119.
36. Loane D, Flanagan G, Siún A *et al.* (2004) Nutrition in the community – an exploratory study of oral nutritional supplements in a health board area in Ireland. *J Hum Nutr Diet* **17**, 257–266.
37. Kennelly S, Kennedy NP, Rughoobur GF *et al.* (2009) The use of oral nutritional supplements in an Irish community setting. *J Hum Nutr Diet* **22**, 511–520.
38. Murphy J, Mayor A & Forde E (2018) Identifying and treating older patients with malnutrition in primary care: the MUST screening tool. *Br J Gen Pract* **68**, 344–345.
39. Gaboreau Y, Imbert P, Jacquet JP *et al.* (2013) What are key factors influencing malnutrition screening in community-dwelling elderly populations by general practitioners? A large cross-sectional survey in two areas of France. *Eur J Clin Nutr* **67**, 1193–1199.
40. Reynolds CME, Dominguez Castro P, Geraghty AA *et al.* (2021) 'It takes a village': a qualitative study on malnutrition and oral nutritional supplements with older adults in Ireland. *Eur J Public Health*, 1–7. doi: 10.1093/eurpub/ckab099.
41. Avgerinou C, Bhanu C, Walters K *et al.* (2019) Exploring the views and dietary practices of older people at risk of malnutrition and their carers: a qualitative study. *Nutrients* **11**, 27.
42. Payne L, Harris P, Ghio D *et al.* (2020) Beliefs about inevitable decline among home-living older adults at risk of malnutrition: a qualitative study. *J Hum Nutr Diet* **33**, 841–851.
43. Geraghty AA, Browne S, Reynolds CME *et al.* (2021) Malnutrition: a misunderstood diagnosis by primary care health care professionals and community-dwelling older adults in Ireland. *J Acad Nutr Diet*. S2212-2672(21)00346-4. doi: 10.1016/j.jand.2021.05.021.
44. Harris PS, Payne L, Morrison L *et al.* (2019) Barriers and facilitators to screening and treating malnutrition in older adults living in the community: a mixed-methods synthesis. *BMC Fam Pract* **20**, 100.
45. Castro PD, Reynolds CME, Kennelly S *et al.* (2020) An investigation of community-dwelling older adults' opinions about their nutritional needs and risk of malnutrition; a scoping review. *Clin Nutr* **40**, 2936–2945.
46. Bodenheimer T, Ghorob A, Willard-Grace R *et al.* (2014) The 10 building blocks of high-performing primary care. *Ann Fam Med* **12**, 166–171.
47. Richard L, Furler J, Densley K *et al.* (2016) Equity of access to primary healthcare for vulnerable populations: the IMPACT international online survey of innovations. *Int J Equity Health* **15**, 64.
48. Oireachtas Committee (2017) *Oireachtas Committee on the Future of Healthcare Sláintecare Report*. Dublin: Government Publications.
49. Tierney E, O'Sullivan M, Hickey L *et al.* (2016) Do primary care professionals agree about progress with implementation of primary care teams: results from a cross sectional study. *BMC Fam Pract* **17**, 163.
50. Oandasan IF, Gotlib Conn L, Lingard L *et al.* (2009) The impact of space and time on interprofessional teamwork in Canadian primary health care settings: implications for health care reform. *Prim Health Care Res Dev* **10**, 151–162.
51. Kaegi-Braun N, Mueller M, Schuetz P *et al.* (2021) Evaluation of nutritional support and In-hospital mortality in patients With malnutrition. *JAMA Network Open* **4**, e2033433-e.
52. Kennelly S, Kennedy NP, Rughoobur GF *et al.* (2010) An evaluation of a community dietetics intervention on the management of malnutrition for healthcare professionals. *J Hum Nutr Diet* **23**, 567–574.
53. Stratton RJ, Hebuterne X & Elia M (2013) A systematic review and meta-analysis of the impact of oral nutritional supplements on hospital readmissions. *Ageing Res Rev* **12**, 884–897.
54. Cadogan CA, Dharamshi R, Fitzgerald S *et al.* (2020) A systematic scoping review of interventions to improve appropriate prescribing of oral nutritional supplements in primary care. *Clin Nutr* **39**, 654–663.
55. Liljeberg E, Andersson A, Blom Malmberg K *et al.* (2019) High adherence to oral nutrition supplements prescribed by dietitians: a cross-sectional study on hospital outpatients. *Nutr Clin Pract* **34**, 887–898.
56. Reinders I, Volkert D, de Groot L *et al.* (2019) Effectiveness of nutritional interventions in older adults at risk of malnutrition across different health care settings: pooled analyses of individual participant data from nine randomized controlled trials. *Clin Nutr* **38**, 1797–1806.
57. Dominguez Castro P, Reynolds C, Bizzaro MG *et al.* (2021) Characteristics and the determinants of high

https://doi.org/10.1017/S0029665121003670 Published online by Cambridge University Press

volume dispensing in long-term oral nutritional supplement users in primary care. *BJGP Open* **5**, BJGPO. 2020.0131.
58. Gall MJ, Harmer JE & Wanstall HJ (2001) Prescribing of oral nutritional supplements in primary care: can guidelines supported by education improve prescribing practice? *Clin Nutr* **20**, 511–515.
59. Elia M (2003) The 'MUST' report. Nutritional screening of adults: a multidisciplinary responsibility: British Association for Parenteral and Enteral Nutrition (BAPEN).
60. Crowley J, Ball L & Hiddink GJ (2019) Nutrition in medical education: a systematic review. *Lancet Planet Health* **3**, e379–ee89.
61. Mogre V, Stevens FCJ, Aryee PA *et al.* (2019) Future doctors' perspectives on health professionals' responsibility regarding nutrition care and why doctors should learn about nutrition: a qualitative study. *Education for Health (Abingdon, England)* **32**, 91–94.
62. Mogre V, Stevens FCJ, Aryee PA *et al.* (2018) Why nutrition education is inadequate in the medical curriculum: a qualitative study of students' perspectives on barriers and strategies. *BMC Med Educ* **18**, 26.
63. Geraghty AA, Castro PD, Reynolds CME *et al.* (2021) Evaluation of an online malnutrition management education module for general practitioners: the ONSPres project. *Proc Nutr Soc* **80**, E87.

https://doi.org/10.1017/S0029665121003670 Published online by Cambridge University Press