BMC Geriatrics

RESEARCH Open Access

What is the level of nutrition care provided to older adults attending emergency departments? A scoping review

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Abstract

Background Older adults often experience adverse health outcomes including malnutrition following discharge from emergency departments (ED). Discharge to community care is a transitionary time where nutritional vulnerability could be mitigated with the instigation of targeted nutrition care pathways in ED settings.

Aims and objectives This scoping review aimed to establish and describe the level of nutrition care provided to older adults admitted and subsequently discharged from EDs.

Research design Systematic searches of nine academic and grey literature databases (Medline (Ovid), Pubmed, CINAHL Complete (EBSCOhost), EMBASE, Cochrane Library and Scopus), grey literature sources (DART-Europe E-theses portal, Open Grey, and Trip Medical database) and four websites (Google, Google Scholar, NICE and LENUS) for relevant professional and organisational publications of research, policy, practice, and guidelines between January 2011 to 2023 were completed. Eligible studies included a population of older adults (≥ 65 years) with an ED attendance and subsequent community discharge, and where nutrition screening had identified malnutrition. Data were extracted on the level of nutrition and dietetic care initiated for older adults in the ED according to the Nutrition Care Process Model and summarised descriptively.

Results Overall, 22 studies were included in the review. Nutrition status was screened on admission to the ED using validated tools: Mini Nutritional Assessment-Short Form ($n=13$), Malnutrition Universal Screening Tool ($n=2$), Short Nutritional Assessment Questionnaire ($n=2$), NRS-2002 ($n=1$) and the Mini Nutritional Assessment – Full Form ($n=1$). A full nutrition assessment was reported by 5 studies. Only one study referred to documentation of malnutrition in healthcare records. Subsequent nutrition intervention after discharge from the ED for older adults was not described in any study.

Conclusion While there is evidence to support malnutrition screening is taking place in EDs, there is a lack of information about subsequent nutrition care including assessment and therapy interventions. This points to the need for comprehensive exploration of nutrition care pathways, practice, policy, and research to inform models of integrated care for older persons.

Keywords Malnutrition, Older adults, Emergency department, Nutrition care, Care pathways

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Introduction

Older adults represent a population cohort at a heightened risk of malnutrition and dehydration due to the ageing process and effects on physiological health. A wide range of age-related physiological changes increase malnutrition and dehydration risk [1, 2]. The likelihood of living with a chronic disease, comorbidities and the ensuing pharmacological management also impacts the prevalence of frailty and sarcopenia among this population [3–6]. Disease-related malnutrition is well recognised for having poor outcomes related to the health trajectory of an individual [7, 8]. Nutrition care as a human right has been brought to the fore by international movements to embed appropriate and timely care for all patients across health settings [7]. Thus, supporting adequate nutrition including adequate amounts of food and fluid to prevent and treat malnutrition and dehydration is an important public health concern [9].

Older adults present to emergency departments (ED) in larger numbers and more frequently than their younger counterparts [10–12]. In Ireland, an increase was observed in the proportion of older adults who visited the ED at least once in the year previous from 15 to 18%. For older adults with frailty, the proportion with at least one overnight hospital admission increased (from 23 to 31%) while the average number of nights spent in hospital more than doubled (from 2.7 nights to 6.5 nights) [12, 13]

Awareness and identification of the prevalence of malnutrition among older adults is an important first step to initiate nutrition care [8, 14]. Malnutrition has previously been identified among those presenting to ED through targeted screening or as part of comprehensive geriatric assessment [13, 15]. Early identification of malnutrition is key to having a significant impact on the adverse physiological consequences on body composition [16]. Therefore, older adults discharged from the ED while experiencing malnutrition should prompt the initiation of a care pathway to mitigate further health deterioration resulting in hospital readmission and poor health outcomes [6, 13, 15, 17].

Nutrition care can be framed by the Nutrition Care Process Model (NCPM) that describes a systematic approach to identify, assess, diagnose, manage, and evaluate individualized care [18, 19]. This process has been adopted by national dietetic associations to provide a standardised approach to clinical nutrition and dietetic practice and provide nutrition care [20]. It includes a process to provide baseline information and a common language towards augmenting nutrition care across health settings [19].

The purpose of this scoping review is to explore the breadth of grey and published literature to provide a holistic synthesis of evidence and identify research gaps and focus for future studies. This will allow a description of the level of nutrition care provided to manage malnutrition among older adults attending the ED and subsequently discharged to community care. This information will inform the future examination of nutrition care pathways across transitions of care from point of entry (identification of risk for malnutrition) of the nutrition care process. We also intend that the findings will inform research to explore nutrition interventions aimed at managing malnutrition among older adults living with frailty who are discharged from the acute setting. The research question for this scoping review is:

What is the level of nutrition care provided to older adults attending emergency departments?

Methods

A protocol for this scoping review was previously published using the methodology framework proposed by the Joanna Briggs Institute (JBI) [21, 22]. Specifically, we are interested in current practices related to nutrition care that are initiated by the identification of malnutrition risk among older adults in the ED. The Nutrition Care Process model provides a framework to map levels of nutrition and dietetic care and describe the care process. A nutrition diagnosis is different from a medical diagnosis. It involves identifying and labeling malnutrition, a responsibility handled by nutrition and dietetics professionals. They treat malnutrition through intervention, monitoring, and evaluating nutrition care [18].

Search strategy and eligibility criteria

Search terms were developed using the mnemonic PCC (population, concept and context) [22]. The population consisted of older adults (aged over 65 years) who were admitted to an ED and subsequently discharged. The concept of interest was nutrition focused screening and level of nutrition care initiated within the ED index visit (not a hospital/in-patient ward) or up to 72 h post discharge to home. The context for nutrition care included the process of nutrition screening, assessment, diagnosis, nutrition-specific interventions, monitoring and/or evaluation in EDs in developed countries and published within the last 10 years to reflect current practice. The search strategy was refined after consultation with a specialist librarian (LD). The identified keywords and index terms (Table 1), were adapted for each database and information source.

Two researchers (AG, CS) searched electronic databases (Medline (Ovid), Pubmed, CINAHL Complete (EBSCOhost), EMBASE, Cochrane Libraryand Scopus), grey literature sources (DART-Europe E-theses portal, Open Grey, and Trip Medical database) and websites (Google, Google Scholar, NICE and LENUS) for relevant professional and organisational publications of research, policy, practice and guidelines in June 2022 and updated

Table 1 Search terms of inclusion criteria according to PCC (population, concept, and context) mnemonic for CINAHL Complete (EBSCOhost) [22]

Database search terms
Participants:
Older adults or elderly or geriatric* or aging or senior* or ageing or older people or older person*
Concept:
Nutrition* N2 (screen* or malnutrition or status or assess*)
Context
ED or ER or emergency department or emergency room or accident & emergency or a&e or a & e or Casualty department pr triage in the emergency department or triage or triage system or trauma cent* or emergency services or A&E or A & E

in June 2023. The reference list of included sources of evidence were screened for additional studies. As internet searching using Google.com displays results listed by relevance for the given search terms [23, 24], the first 20 results yielded by the search string were reviewed. Publications occuring in the ten year period (2011 to 2021) were considered as current and relevant.

Citation management

Following the search, all identified citations were collated and uploaded into EndNote X8 and duplicates removed. The screening process was carried out using Rayyan open access screening software [25]. Study selection began with screening of titles and abstracts by three reviewers (AG, CS and RG), independently, using the pre-specified inclusion and exclusion criteria. The screening process was pilot tested on a random sample of 20 titles and abstracts to verify that the criteria were applied consistently by each reviewer. Studies which did not meet the inclusion criteria were excluded. Subsequently, the full text of selected citations was assessed in detail against the inclusion criteria by two independent reviewers (AG and CS). Reasons for exclusion following a full-text review were recorded according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis extension for scoping reviews (PRISMA-ScR) [26].

Data extraction

An adapted data extraction tool from the template provided by the JBI methodology guidance for scoping reviews [22] was developed and tested to determine its practicality. Key information was extracted from included studies to a table charting the level of nutrition and dietetic care initiated for older adults in the ED according to the Nutrition Care Process Model. As part of this process, three reviewers (AG, CS, RG) independently charted the data from three of the retrieved articles to ensure agreement of the data extracted and collated. CS subsequently completed the data charting and AG checked the extracted data for accuracy. Where more than one article was published from a single study, care was taken not to double-count findings so that the study, rather than the articles, is the unit of interest [27]. The data extracted included study characteristics, context, participant demographics, detail of malnutrition screening, assessment, nutrition diagnosis and intervention. All extracted data were classified according to the nutrition care process model to describe the level of nutrition care provided [18, 19, 28]. Data was collated using Microsoft Excel Version 2111 (supplementary file 1).

A critical appraisal of methodological quality or risk of bias of included studies was not conducted as the purpose of this scoping review is to describe and map

current level of nutrition care among older adults attending and subsequently discharged from an ED from data that spans the evidence hierarchy [22].

Results

A total of 2247 citations were retrieved. After duplicates were removed, 1740 citations were screened at the title and abstract stage for inclusion (Fig. 1). Subsequently, 83 full-text articles were assessed for eligibility for inclusion; of these, 22 articles describing 19 individual studies were included in this review. From the grey literature, following the title and document review, none of the documents met the criteria for inclusion in this study (Fig. 1). Reasons for exclusion at full text screening included ineligible participants (based on age; $n=24$), wrong setting (e.g. nutrition screening did not take place in ED; $N=20$), wrong reported outcome (e.g. nutrition findings not reported; $n=12$), duplicate article ($n=2$), wrong publication type ($n=2$) and wrong study design ($n=1$).

Characteristics of included studies

Included studies were conducted in thirteen countries including Spain ($n=2$) [29, 30], Ireland ($n=3$) [13, 31–36], USA ($n=2$) [37, 38], Netherlands ($n=2$) [39, 40], Belgium ($n=1$) [41], Turkey ($n=1$) [42], Switzerland ($n=1$) [43], UK ($n=1$) [44], France ($n=1$) [45], Taiwan ($n=1$) [46], Finland ($n=1$) [47], Portugal ($n=1$) [48] and Denmark ($n=1$) [49] (Table 2). Most articles described studies that were observational in design: $n=11$ prospective cohort study; $n=5$ cross-sectional; $n=1$ retrospective; $n=3$ secondary analysis. One article described a secondary analysis from an interventional study design (randomised controlled trial) [13]. The majority of the included articles (15/22) were published in the last five years (Table 2).

The number of participants included in the studies ranged from 44 to 749 older adults [29, 31]. The age range of participants, derived from reported mean/median values, was 75 to 84 years. While five studies did not report a mean age, they have only included participants>65 years [34, 35, 37, 38, 48]. The majority of participants were female (50–62%) [13, 29–32, 37, 38, 40, 41, 43–48], four studies had predominately male (51.5–59.4%) [39,

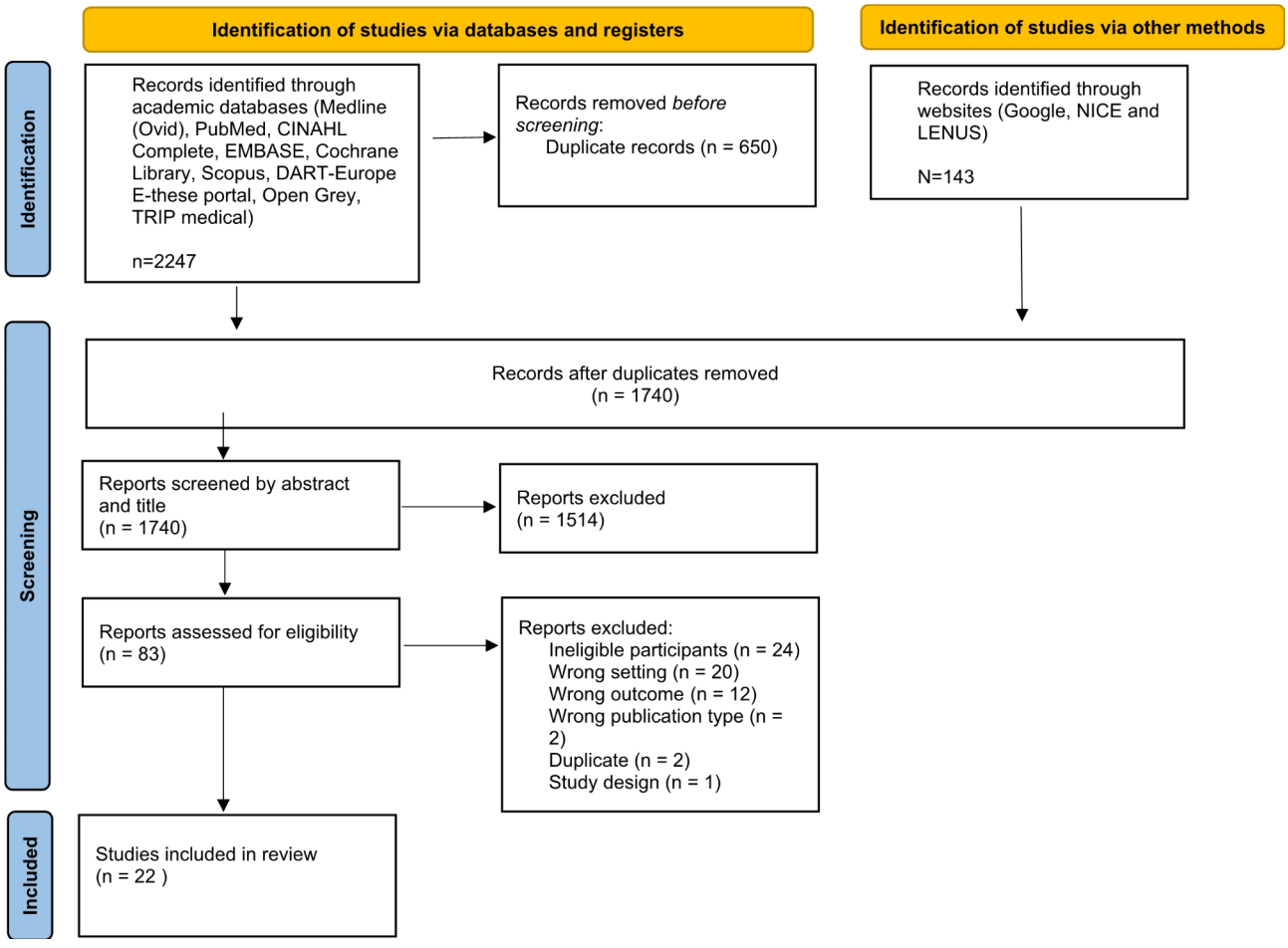

Fig. 1 PRISMA flow diagram of the study selection based on inclusion and exclusion criteria

Table 2 Summary of included studies regarding study characteristics, risk of malnutrition, demographics, and clinical profile

Lead Author, Year, Country	Study Design	Study objective	*N*	Demographic (Sex, age: mean (SD)y/ median (IQR)y)	Role of person(s) Screening nutrition status in ED	Nutrition Care Process Model				Prevalence*
						Screening	Assessment	Diagnosis	Intervention	
Martin-Sanchez et al. 2019 [29] Spain	Prospective, multicentre cohort study	Determine the impact of risk of malnutrition on 30-day mortality risk among older patients who attended in ED for AHF.	749	%F: 55.8 Age: 85 ± 6y	Trained investigator	Y MNA-SF	N	NR	NR	79.3% patients were classified as being at risk of malnutrition.
Jiménez et al. 2019 [30] Spain	Cross-sectional	Assess the prevalence of undernutrition and related risk factors in a sample of older adults who presented at the emergency room (ER) of a university hospital in Spain.	288	%F: 50 Age: 81.06 ± 6.56y	Trained investigator	Y MNA-SF	Y MNA-FF	NR	NR	14.9% of the patients were malnourished; 54.5% were at risk for malnutrition
Brady, D. et al. 2019 [31] (conference abstract) Ireland	Cross sectional	Integrate screening of sarcopenia, frailty and malnutrition, to help identify those most vulnerable in the ED setting.	44	%F: 57 Age: 83 (75–94)y	Interdisciplinary Gerontological ED team	Y MNA-SF	Y Clinical dietetic assessment	NR	NR	25% were malnourished; 88% were at risk of malnutrition
Burks, C. E. et al. 2017 [37] USA	Cross sectional, multi-centre	Identify modifiable risk factors associated with malnutrition in older patients.	252	%F: 51 Age: NS	Trained investigators	Y MNA-SF	NR	NR	NR	12.3% were malnourished; 36% were at risk of malnutrition
Calf et al. 2019 [39] The Netherlands	Prospective observational study	Examine the clinical judgment of physicians and nurses in assessing vulnerability compared to a nationwide applied screening tool applied in hospitals to detect vulnerability.	196	%F: 48.5 Age: 72.5 (68.0–78.0)y	Trained investigator	Y SNAQ	NR	NR	NR	NR
Deschodt et al. 2015 [41] Belgium	Prospective cohort study	Compare the characteristics of older patients admitted, and discharged from the ED and determine independent predictors for ED readmission.	442	%F: 60.4 Age: 83.6 ± 4.8y	Trained investigator	Y MNA-SF	NR	NR	NR	22.6% were malnourished; 51.8% were at risk of malnutrition
Nalbur. et al. 2014 [42] Turkey	Prospective cohort study	Evaluate the nutritional status of patients over the age of 65 admitted to ED with the MNA form and examine the relationship with sociodemographic variables.	204	%F: 45.6 Age: 75.48 ± 7.51 y	Trained investigator	Y MNA-SF	Y MNA-FF	NR	NR	20.6% were malnourished; 18.6% were at risk of malnutrition
Elias et al. 2021 [44] England	Prospective cohort study	Determine the clinical characteristics and frailty burden of a cohort in a 'Same Day Emergency Care' (SDEC) designed around the needs of older patients.	533	%F: 59 Age: 75.0 ± 17.5y	Nursing staff	Y MUST	NR	NR	NR	20% were at risk of malnutrition

Table 2 (continued)

Lead Author, Year, Country	Study Design	Study objective	*N*	Demographic (Sex, age: mean (SD)y/ median (IQR)y)	Role of person(s) Screening nutrition status in ED	Nutrition Care Process Model				Prevalence*
						Screening	Assessment	Diagnosis	Intervention	
O'Caoimh et al. 2019 [32] Ireland**	Prospective cohort study	Examine the predictive validity of the 'Surprise Question' for death and these important healthcare outcomes in an older cohort of patients presenting to ED.	265	%F: 54 Age: 78 (74–83) y	MDT frailty team	Y MNA-SF	NR	NR	NR	Median score of 11 (9–13) for the total population identifying risk of malnutrition
Gaffney et al. 2022 [33] Ireland**	Secondary analysis, Prospective cohort study	Examine the predictive validity of the 'Surprise Question' for death and important healthcare outcomes in an older cohort of patients presenting to ED.	*191*	*%F: 55* *Age: 79 (74–83)y*	*MDT Frailty team*	*Y* *MNA-SF*	*NR*	*NR*	*NR*	*Median score of 11 (8–13) for the total population identifying risk of malnutrition*
Gentile et al. 2013 [45] France	Prospective cohort study	Investigation of risk factors for short-term mortality in a geriatric population within three months of their ED visit.	164	%F: 58.6 Age: 83.9 ± 5.4 y	Geriatric physician	Y MNA-SF	NR	NR	NR	29.3% were malnourished
Griffin et al. 2020 [13] Ireland	Secondary analysis, Randomised controlled trial	Determine the prevalence and factors associated with malnutrition on admission and with adverse outcomes among older adults attending an Irish ED.	353	%F: 59.2 Age: 79.6 ± 7y	Health and social care team in the ED	Y MNA-SF	NR	NR	NR	7.6% were malnourished, 28.0% were at risk of malnutrition.
Lin et al. 2021 [46] Taiwan	Before-after study	Evaluate CGA screening in older ED during a 12-month preintervention period.	358	%F: 57 Age: 82 (79–87)y	External trained case manager	Y MNA-SF	NR	NR	Y A caring programme involving the creation of individual care plans according to CGA.	Median score of 11 (9–12) for the total population identifying risk of malnutrition
Muldoon et al. 2017 [34] Ireland**	Prospective cohort study (conference abstract)	Pilot programme was to improve the experience of the 'frail older person' in the ED and onward patient flow	738	%F: NS Age: NS	Frail Elderly Team	Y MUST	Y Clinical dietetic assessment	NR	Y Rehabilitation and discharge pathways identified from the initial assessment.	31% of those referred to the Dietitian were at high risk of malnutrition

Table 2 (continued)

Lead Author, Year, Country	Study Design	Study objective	*N*	Demographic (Sex, age: mean (SD)y/ median (IQR)y)	Role of person(s) Screening nutrition status in ED	Nutrition Care Process Model				Prevalence*
						Screening	Assessment	Diagnosis	Intervention	
Pereira et al. 2015 [38] USA	Cross-sectional study	Estimate the prevalence of malnutrition among older patients presenting to an ED and identify subgroups at increased risk.	138	%F: 56.5 Age: NS	Trained investigator	Y MNA-SF	N	N Among the 22 patients with malnutrition, no information was identified in either the physician or nurse records to indicate recognition of the problem of malnutrition.	NR	15.8% were malnourished
Rarek et al. 2021 [43] Switzerland	Prospective cohort study	Evaluate the longterm relationship between CGA and health-related quality of life in older patients admitted to the ED.	165	%F: 40.6 Age: 80 (77.5–84) y	NR	Y MNA-SF	NR	NR	NR	NR
Saario et al. 2021 [47] Finland	Observational study	Assess if the emergency medical services can identify patients with nutritional risk, falls risk, and cognitive impairment by using simple screening tools and to assess the prevalence of risks and rate they are reported to the ED.	488	%F: 62 Age: 82.8 ± 5.4 y	Emergency Medical staff	Y Modified NRS-2002	NR	Y	NR	17% were at risk of malnutrition
Schuijt et al. 2020 [40] The Netherlands	Prospective cohort study	Investigate if the Dutch Safety Management Program screener predicts outcomes in older patients in the ED.	249	%F: 61 Age: 80 (75–86)y	Trained investigator	Y SNAQ	N	NR	NR	Overall, median SNAQ score 1 (0–3) indicating no risk of malnutrition
Stapleton 2017 [33] Ireland**	Prospective cohort (conference abstract)	Develop referral criteria to the Dietitian within the Frail Elderly Team.	136	%F: NR Age: NR	Registered dietitian	*Y* *MUST*	*Y* *Clinical dietetic assessment*	NR	Y Dietetic intervention	31% of those referred to the Dietitian were at high risk of malnutrition
Tavenier et al. 2021 [49] Denmark	Secondary analysis, Prospective cohort study	Investigate whether biomarker (GDF15) levels during acute illness predicted worsening of health measures between admission and 30 days after discharge in older patients acutely admitted to the ED.	52	%F: 48.1 Age: 74.8 (70-6-81.8)y	NR	Y MNA-SF	NR	NR	NR	Median score of 11 (8–12) for the total population identifying risk of malnutrition

Table 2 (continued)

Lead Author, Year, Country	Study Design	Study objective	*N*	Demographic (Sex, age: mean (SD)y/ median (IQR)y)	Role of person(s) Screening nutrition status in ED	Nutrition Care Process Model				Prevalence*
						Screening	Assessment	Diagnosis	Intervention	
Pulido et al. 2022 [48] Portugal	Cross sectional study	Identify frequent users' (≥ 3 admissions/year) associated factors in an ED, using a CGA, of patients over 65 years of age.	426	%F: 53.8% Age: 79.3 ± 7.92 y	ED Team (Medic, ED nurse and/or Social Worker)	Y MNA-FF	Y MNA-FF	NR	NR	63.1% (n 269) were malnourished or had a malnutrition risk
O'Caoimh 2023 [36] Ireland**	Secondary analysis, Observational Diagnostic accuracy	Investigate the predictive validity of the RISC in detecting a selection of adverse outcomes among older people attending ED.	*193*	*%F 55 Age: 79 (83 – 74 = ± 9) years*	*Consultant Geriatrician*	*Y MNA-SF*	*N*	*NR*	*NR*	*Median MNA-SF score was 11 ± 5. Among those who are frail MNA-SF is 9, significantly lower than non-frail score of 12 (p < 0.001).*

N = count; F = Female; NR = Not reported; y = years; SD = standard deviation; IQR = Inter quartile range; OR = Odds ration; MNA-SF = Mini Nutritional Assessment-Short Form; AHF = Acute Heart Failure; MNA-FF = Mini Nutritional Assessment-Full Form; SNAQ = Short Nutritional Assessment Questionnaire; MUST = Malnutrition Universal Screening Tool; NRS-2002 = Nutrition Risk Screening 2002; CGA = Comprehensive Geriatric Assessment; ED = Emergency Department

*Where available, prevalence of malnutrition is provided from nutrition assessment findings. Otherwise, prevalence based on malnutrition screening is presented

**Articles report on the same study. Care was taken not to double-count findings from Gaffney 2022 (italicised) and O'Caoimh 2023 (italicised) in analysis so that the study, rather than the reports, is the unit of interest [24]

42, 43, 49], and in three studies, sex is not reported [33, 35, 38].

Nutritional screening

Malnutrition status was screened in each included study on admission to the ED using different tools (Table 2), including the Mini Nutritional Assessment-Short Form (MNA-SF) ($n=13$) [50], Mini Nutrition Assessment -Full Form (MNA-FF) ($n=1$) [51], Malnutrition Universal Screening Tool (MUST) ($n=2$) [52], the Simplified Nutritional Appetite Questionnaire (SNAQ) ($n=2$) [53] the Nutrition Risk Screening 2002 (NRS-2002) ($n=1$) [54].

According to malnutrition tool scores, 16–88% [13, 35, 38, 42, 47] of older adults were at risk of malnutrition and 6–29% [13, 38, 45]were malnourished.

Using the MNA-SF criterion of a score < 12 to identify risk of malnutrition, prevalence rates ranged from 28 to 88% [31, 42]. Some studies only reported a median score for the population studied. Where this occurred the median MNA-SF scores for the total sample was 11 [32, 33, 46, 49]. One study did not report malnutrition status; the MNA-SF score attributed to an overall Comprehensive Geriatric Assessment (CGA)-based Multidimensional Prognostic Index in older patients admitted to the emergency department (ED) [43].

Using MUST criterion of a score > 0, prevalence of risk of malnutrition was reported as 46% [44]. The other study did not provide a score but stated that 31% of those referred to dietetic services were at high risk of malnutrition [33]. The modified NRS-2002 found a prevalence of 16% of older adults admitted to ED at nutritional risk [47]. The prevalence of malnutrition risk using the SNAQ tool was not reported in one study [39], while Schuijt et al. reported a risk of malnutrition (score ≥ 2) among frail patients ($n=168$ (67%)) in the ED whereas no risk was found when only the total sample was considered (median score 1, IQR 0–3; $n=249$) [40].

Nutrition screening was completed by trained investigators/research assistants/case manager ($n=9$), a healthcare professional member of the gerontological ED team ($n=5$, including Frailty Teams), ED Nurses/EMS ($n=3$) or not reported ($n=2$; Table 2). Malnutrition screening was included as a component of a CGA in 9 of the included studies [32, 34, 35, 40, 41, 43, 45, 46, 48]. Otherwise, it was carried out as a specific purpose of the study to investigate nutritional status.

Nutrition assessment

A full nutrition assessment following malnutrition screening was reported in 5 studies [30, 31, 33, 35, 42, 48]. This included nutritional assessment completed by a dietitian ($n=2$; Table 2).

Seven studies reported that older adults identified as malnourished or at risk of malnutrition were discharged home, with rates ranging from 4–50%.[13, 30, 37, 38, 41, 44, 45]. These studies did not report a full nutrition assessment or describe a dietetic intervention.

Factors associated with malnutrition.

Factors reported to contribute to risk of malnutrition and malnutrition included functional dependence [13, 29, 30, 37, 44] severity of the acute episode related to ED admission [29], chronic diseases [30], anxiety and depressive syndromes [28, 37] polypharmacy [30, 37], assisted living [37], food insecurity [37], poor oral health [37], lack of transportation [37], frailty [13, 34, 44], and hospitalisation [15, 37, 45].

Nutrition diagnosis, intervention, monitoring, and evaluation

A nutrition diagnosis was not reported in any of the included studies.

In relation to the documentation by healthcare professionals, one study made a reference to malnutrition in healthcare records. Pereria et al. 2015 conducted an independent review of physician and nursing records kept on patients with an MNA-SF score of 7 or lower. They screened for a positive response to a single-item question about malnutrition. This question is a standard prompt in the triage nursing note. They also looked for any other information in the records indicating a diagnosis or treatment for malnutrition. Among the malnourished patients, the single-item assessment either failed to identify malnutrition or was not completed. Furthermore, no other evidence of recognition of malnutrition was found in the medical record for any of these patients [38]. Moreover, among these 22 patients (16% of total sample) identified as malnourished. According to the health records analysed in the study, five participants ($n=5$) had a prior diagnosis of malnutrition [38].

Another retrospective study revealed that among 81 patients identified as being at nutritional risk during pre-hospital transport to the ED, this information was recorded in health records in only 64% ($n=52$) of cases [47].

Nutrition intervention, monitoring and evaluation in response to identified risk of malnutrition was not described in any study.

Referral to/from nutrition care pathways supporting transitionary care for older adults

One study reported that 31% of referrals of older adults aged > 75 years from the ED to dietetic services were at high risk of malnutrition but detail on subsequent dietetic support is not described [35]. Two studies describe the development of care plans individualised to the CGA that may have included dietetic intervention where relevant [34, 46].

Discussion

This scoping review indicates that there is a gap in the literature relating to the nutrition assessment and dietetic intervention and care planning to mitigate the health risks of being malnourished among older adults who are discharged from ED to community care. Despite the prevalence of malnutrition among older adults admitted to EDs, reported nutrition care is limited to screening.

There is a lack of evidence to support that a full nutrition assessment is instigated following positive nutrition screening of malnutrition risk to evaluate individual nutrition status that would lead to a diagnosis [16, 55]. Furthermore, only 9/19 studies reported that screening was carried out as part of a CGA indicating that nutrition care may not be considered as integral to a holistic approach to older adult care and is of low priority. Early recognition of nutritional disorders in older adults is very important in terms of preventing a decline in quality of life, progressive physical decline, and hospital readmissions [6, 7, 15, 16, 42]. A wide range in the prevalence of malnutrition and risk of malnutrition among older adults in the ED was observed. This is most likely related to the use of different diagnostic criteria, type of malnutrition, presence of comorbidities, and screening tools [56].

Documentation and recognition of malnutrition in healthcare records were limited. Only one study reported reviewing physician and nursing records for malnourished patients, and it found that the assessment of malnutrition was often missed or not completed [38]. Seven studies reported that malnourished participants were discharged home from the ED without a description of having received a full nutrition assessment or intervention. It has previously been reported in exploratory research that providing clear nutrition care recommendations are successful in managing malnutrition during the transitionary time from hospital to home among older adults [57, 58]. Therefore, the importance of routine screening should be recognised and referral to a nutrition care pathway with therapeutic input from a nutrition and dietetic professional should be encouraged for those at risk of malnutrition [56–58].

Details about subsequent nutrition intervention and management were not provided in any study. A systematic and standardized approach to nutrition care instigated upon a positive screening result is required to ensure high quality nutrition care and an individualised approach [7, 18, 19]. When malnutrition is diagnosed, an individual nutritional care plan should be established by a nutrition specialist (e.g., dietitian, expert clinician) in consultation with a multidisciplinary team, and monitored regularly [13, 8, 18, 19, 59]. Due consideration of modifiable risk factors of malnutrition must be addressed, or intervention strategies will be limited. For example, the oral health and dentition of older adults has been shown to impact dietary intake and nutrition status leading to malnutrition [37, 38, 60]. Standardised nutritional management may also contribute to reduced healthcare costs [7, 61]. Adequate and timely implementation of nutritional support has been linked with favourable outcomes such as a decrease in length of hospital stay, reduced mortality, and reductions in the rate of severe complications, as well as improvements in quality of life and functional status [6, 7, 15, 17].

Different tools were used to screen for malnutrition status upon admission to the ED, including the MNA-SF, MUST, SNAQ, NRS-2002, and the MNA-FF. The MNA-SF was the most reported tool. While this tool was specifically developed to screen for malnutrition among older adults and has been extensively reviewed in clinical research and practice, it has not yet been validated in the ED [62]. Nonetheless, it has been reported a feasible screening tool in this setting given the short time (3–5 min) it takes to administer and the objective, comprehensive information that it collects [38, 56].

A significant gap exists between the clinical practice of assessing nutritional status in the emergency department and evidence-based guidelines [9, 63]. Recent best practice clinical guidelines on nutrition issued by the European Society for Parenteral and Enteral Nutrition (ESPEN) recommends that nutritional interventions are delivered as part of a multidisciplinary team [9], which was reiterated in a recent review on malnutrition in older adults [63]. Top barriers identified by ED staff from the current literature are being too busy, the lack of a standardised protocol, and insufficient teamwork [64]. Furthermore, only 19.7% of respondents engage in discussions about nutritional needs with a broader team, highlighting a lack of interdisciplinary coordination [65]. Studies show that ED healthcare professionals often lack sufficient nutrition knowledge and awareness, with staff training focusing more on resuscitation training [64, 66]. In addition, ED staff may believe malnutrition originates in community (where the older adults live), rendering the identification of risk as the responsibility of primary and community healthcare staff [64].

Best practice guidelines recommend that hospitals should have nutritional steering committees to oversee nutrition and hydration care, including guideline implementation and audits [9, 63]. In Ireland, a lack of regular audits in hospitals, highlight the need for effective nutrition steering committees to improve care [67]. Future research should focus on developing and evaluating interventions that address barriers to implementation and support of optimal nutritional care in the ED.

Strengths

The study conducted a comprehensive search and screening process following JBI methodology for scoping

reviews, resulting in a selection of 22 articles for inclusion. The included studies were conducted in ED settings across 13 countries and three continents, providing a global representation of nutrition care in the ED of developed countries. Most of the studies were observational in design thus providing a good description of the current practice of nutrition care in ED settings. Nonetheless, the published evidence is lacking in terms of nutrition intervention considering that malnutrition has long been recognised among older adults. The volume of research in the area is increasing with almost half of the articles (10/22) being published since 2020.

Limitations

As this scoping review aims to map the body of literature in a topic area, a critical appraisal of the individual studies was not performed and the risk of bias is not reported [68]. Additionally, there is always the possibility that the search strategy may have missed some relevant studies. While our review included any article published in any language, our search was conducted using only English terms. Finally, we used chronological age ≥ 65 years as an inclusion criterion to ensure that all participants were older adults, rather than a mean age ≥ 65 years that will also have excluded some relevant studies.

As mentioned previously, there is an agreement between the assessment of malnutrition and low-intake dehydration in a population of older hospitalised patients [1, 2, 9, 69]. However, we did not specifically use key search terms to identify dehydration among this population. This omission represents a limitation in our scoping search, as it restricts our understanding of a holistic nutrition care approach by potentially overlooking relevant studies on dehydration.

The search strategy employed in this study may have overlooked some relevant studies. Despite the inclusion of several key studies, it is possible that the search terms used were not comprehensive enough to capture all pertinent literature. This limitation suggests that additional studies relevant to nutrition support in EDs, particularly those published under different terminology or in less accessible databases, may have been missed. Consequently, future reviews could benefit from broader search terms and strategies to ensure a more complete representation of the available evidence.

Conclusion

Malnutrition has been established as a modifiable risk factor affecting quality of life, physical functioning and healthcare utilisation among the older adult population. Nonetheless, this scoping review has shown that nutrition care is not routinely provided in a healthcare setting frequented by older adults presenting with non-acute needs. Overall, the need for further exploratory research following routine nutritional screening in ED settings is indicated. This will provide a foundational evidence base to inform the development of interventions and care pathways to address malnutrition and dehydration among older adults presenting to the ED. This scoping review highlights significant gaps in the literature regarding nutrition assessment and dietetic interventions for older adults discharged from ED to community care. Despite the high prevalence of malnutrition among older adults in the ED, current care practices are largely limited to screening, with comprehensive nutrition assessments and interventions often overlooked.

This highlights the necessity for a comprehensive examination of nutrition care pathways, clinical practices, policies, and research to inform the development of integrated care models for older adults. Particular emphasis should be placed on the transition from EDs to the post-acute setting, where malnutrition often goes unrecognised.

The review emphasises the need for systematic, standardised approaches to nutrition care, beginning with early screening and followed by individualised nutrition plans led by specialists. Addressing malnutrition with timely interventions could improve patient outcomes, reduce hospital stays, and lower healthcare costs. Future research should focus on developing targeted strategies to overcome barriers and promote optimal nutritional care for older adults in the ED setting.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12877-024-05478-0.

Supplementary Material 1

Author contributions

All authors contributed to the development of the research question. A.G., C.S. and R.G performed the data searching and analysis. A.G. and C.S. wrote the main manuscript text. All authors reviewed the manuscript.

Funding

AG was supported by Seed Funding awarded by the Faculty for Education and Health Sciences, University of Limerick. MC and RG were supported by the Health Research Board (HRB) of Ireland (Health Research Board, Grattan House 67–72 Lower Mount Street, Dublin 2, D02 H638) through the HRB Collaborative Doctoral Awards under Grant CDA-2018-005 ("Right Care" Programme). The funders have had no influence in the development of the research question or methodological approach reported in this manuscript. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Data availability

The datasets generated and/or analysed during the current study are available in the OSF repository DOI 10.17605/OSF.IO/CXARF, https://osf.io/cxarf/.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Received: 19 April 2024 / Accepted: 16 October 2024
Published online: 07 November 2024

References

1. Hooper L, Bunn D, Jimoh FO, Fairweather-Tait SJ. Water-loss dehydration and aging. Mech Ageing Dev. 2014 Mar-Apr;136–137:50 – 8.
2. El-Sharkawy AM, Sahota O, Maughan RJ, Lobo DN. The pathophysiology of fluid and electrolyte balance in the older adult surgical patient. Clin Nutr. 2014;33(1):6–13. Epub 2013 Nov 22. PMID: 24308897.
3. Shlisky J, Bloom DE, Beaudreault AR, et al. Nutritional considerations for healthy aging and reduction in age-related chronic disease. Adv Nutr. 2017;8(1):17.
4. Tittikpina NK, Issa A-r, Yerima M, et al. Aging and nutrition: theories, consequences, and impact of nutrients. Curr Pharmacol Rep. 2019;5(4):232–43.
5. Host A, McMahon A-T, Walton K, Charlton K. Factors influencing food choice for independently living older people—a systematic literature review. J Nutr Gerontol Geriatr. 2016;35(2):67–94.
6. Starr KNP, McDonald SR, Bales CW. Nutritional vulnerability in older adults: a continuum of concerns. Curr Nutr Rep. 2015;4(2):176–84. https://doi.org/10.1007/s13668-015-0118-6. /06/01 2015.
7. Cardenas D, Correia MITD, Ochoa JB, et al. Clinical nutrition and human rights. An international position paper. Clin Nutr. 2021;40(6):4029–36.
8. Holdoway A, Page F, Bauer J, Dervan N, Maier AB. Individualised Nutritional Care for Disease-related malnutrition: improving outcomes by focusing on what matters to patients. Nutrients Aug. 2022;27(17). https://doi.org/10.3390/nu14173534.
9. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, Kiesswetter E, Maggio M, Raynaud-Simon A, Sieber CC, Sobotka L, van Asselt D, Wirth R, Bischoff SC. ESPEN guideline on clinical nutrition and hydration in geriatrics. Clin Nutr. 2019;38(1):10–47. Epub 2018 Jun 18. PMID: 30005900.
10. van Tiel S, Rood PP, Bertoli-Avella AM, et al. Systematic review of frequent users of emergency departments in non-US hospitals: state of the art. Eur J Emerg Med Oct. 2015;22(5):306–15. https://doi.org/10.1097/mej.0000000000000242.
11. Morley C, Unwin M, Peterson GM, Stankovich J, Kinsman L. Emergency department crowding: a systematic review of causes, consequences and solutions. PLoS ONE. 2018;13(8):e0203316. https://doi.org/10.1371/journal.pone.0203316.
12. Roe L, Thomas S, Trépel D, Normand C. Trends in healthcare cover and healthcare use for older adults in Ireland during the austerity years of 2009–2016. 2018:151. Wellbeing and Health in Ireland's over 50s 2009–2016.
13. Griffin A, O'Neill A, O'Connor M, et al. The prevalence of malnutrition and impact on patient outcomes among older adults presenting at an Irish emergency department: a secondary analysis of the OPTI-MEND trial. BMC Geriatr. 2020;20:455. https://doi.org/10.1186/s12877-020-01852-w.
14. Serón-Arbeloa C, Labarta-Monzón L, Puzo-Foncillas J, Mallor-Bonet T, Lafita-López A, Bueno-Vidales N, Montoro-Huguet M. Malnutrition screening and assessment. Nutrients. 2022;14(12):2392. https://doi.org/10.3390/nu14122392.
15. Vivanti A, Isenring E, Baumann S, et al. Emergency department malnutrition screening and support model improves outcomes in a pilot randomised controlled trial. Emerg Med J. 2015;32(3):180. https://doi.org/10.1136/emermed-2013-202965.
16. Cederholm T, Jensen G, Correia M, et al. GLIM criteria for the diagnosis of malnutrition–A consensus report from the global clinical nutrition community. J cachexia Sarcopenia Muscle. 2019;10(1):207–17.
17. Umegaki H, Asai A, Kanda S, et al. Factors associated with unexpected admissions and mortality among low-functioning older patients receiving home medical care. Article Geriatr Gerontol Int. 2017;17(10):1623–7. https://doi.org/10.1111/ggi.12943.
18. Swan WI, Vivanti A, Hakel-Smith NA, et al. Nutrition care process and model update: toward realizing people-centered care and outcomes management. J Acad Nutr Dietetics. 2017;117(12):2003–14.
19. Swan WI, Pertel DG, Hotson B, et al. Nutrition care process (NCP) update part 2: developing and using the NCP terminology to demonstrate efficacy of nutrition care and related outcomes. J Acad Nutr Dietetics. 2019;119(5):840–55.
20. Lövestam E, Steiber A, Vivanti A, et al. Use of the nutrition care process and nutrition care process terminology in an international cohort reported by an online survey tool. J Acad Nutr Dietetics. 2019;119(2):225–41.
21. Griffin A, Cerenay S, Ryan L, et al. What is the level of nutrition care provided to older adults attending emergency departments? A scoping review protocol. HRB Open Res. 2022;5:7.
22. Peters MD, Marnie C, Tricco AC, et al. Updated methodological guidance for the conduct of scoping reviews. JBI Evid Synthesis. 2020;18(10):2119–26.
23. Adams J, Hillier-Brown FC, Moore HJ, et al. Searching and synthesising 'grey literature'and 'grey information'in public health: critical reflections on three case studies. Syst Reviews. 2016;5(1):1–11.
24. Piasecki J, Waligora M, Dranseika V. Google search as an additional source in systematic reviews. Sci Eng Ethics. 2018;24(2):809–10.
25. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app for systematic reviews. Syst Reviews. 2016;5(1):210. https://doi.org/10.1186/s13643-016-0384-4. 12/05 2016.
26. Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018;169(7):467–73.
27. Li THJ, Deeks JJ,Chapter 5: Collecting data. Cochrane;, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors. Cochrane Handbook for Systematic Reviews of Interventions version 63 (updated February 2022).
28. Harfield SG, Davy C, McArthur A, Munn Z, Brown A, Brown N. Characteristics of indigenous primary health care service delivery models: a systematic scoping review. Globalization Health. 2018;14(1):1–11.
29. Martín-Sánchez FJ, Triana FC, Rossello X, et al. Effect of risk of malnutrition on 30-day mortality among older patients with acute heart failure in Emergency Departments. Eur J Intern Med. 2019;65:69–77.
30. Jiménez CB, Ovalle HF, Moreno MM, de la Fuente RA, de Luis Román D. Undernutrition measured by the Mini Nutritional Assessment (MNA) test and related risk factors in older adults under hospital emergency care. Nutrition. 2019;66:142–6.
31. Brady D, Boyle O, Kelly L, et al. 172 Sarcopenia, Frailty and Malnutrition in the older adults in the Emergency Department setting. Volume 48. Age & Ageing; 2019.
32. O'Caoimh R, Costello M, Small C, et al. Comparison of Frailty Screening instruments in the Emergency Department. Int J Environ Res Public Health. 2019;16(19). https://doi.org/10.3390/ijerph16193626.
33. Gaffney L, Jonsson A, Judge C, Costello M, O'Donnell J, O'Caoimh R. Using the Surprise question to Predict Frailty and Healthcare outcomes among older adults attending the Emergency Department. Int J Environ Res Public Health. 2022;19(3):1709.
34. Muldoon N, Stapleton C, Kane J et al. Frail Elderly Pilot Programme Connolly Hospital Blanchardstown 2016. Int J Integr Care. 2017;17(5).
35. Stapleton C. Role of the Dietitian within the Frail Elderly Pilot in Connolly Hospital Blanchardstown from February to June 2016. Int J Integr Care (IJIC). 2017;17.
36. O'Caoimh R. Validation of the risk instrument for screening in the community (RISC) among older adults in the emergency department. Int J Environ Res Public Health. 2023;20(4):3734.
37. Burks CE, Jones CW, Braz VA, et al. Risk factors for malnutrition among older adults in the emergency department: a multicenter study. J Am Geriatr Soc. 2017;65(8):1741–7.
38. Pereira GF, Bulik CM, Weaver MA, Holland WC, Platts-Mills TF. Malnutrition among cognitively intact, noncritically ill older adults in the emergency department. Ann Emerg Med. 2015;65(1):85–91.
39. Calf AH, Lubbers S, van den Berg AA, et al. Clinical impression for identification of vulnerable older patients in the emergency department. Eur J Emerg Med. 2020;27(2):137–41.

40. Schuijt H, Oud F, Bruns E, et al. Does the Dutch Safety Management Program predict adverse outcomes for older patients in the emergency department? Neth J Med. 2020;78(5):244–50.
41. Deschodt M, Devriendt E, Sabbe M, et al. Characteristics of older adults admitted to the emergency department (ED) and their risk factors for ED readmission based on comprehensive geriatric assessment: a prospective cohort study. BMC Geriatr. 2015;15(1):1–10.
42. Nalbur İH, Sayhan MB, Oğuz S, Sayhan ES, Hüseyin S. Nutritional Situation Assessment of 65 Years Old Patient who Applicate to Emergency Department Acil Servise Başvuran 65 Yaş Üzeri Hastalarda Nütrisyonel Durumun Değerlendirilmesi.
43. Rarek MP, Meyer AM, Pickert L, et al. The prognostic signature of health-related quality of life in older patients admitted to the emergency department: a 6-month follow-up study. Aging Clin Exp Res. 2021;33(8):2203–11.
44. Elias TC, Bowen J, Hassanzadeh R, Lasserson DS, Pendlebury ST. Factors associated with admission to bed-based care: observational prospective cohort study in a multidisciplinary same day emergency care unit (SDEC). BMC Geriatr. 2021;21(1):1–13.
45. Gentile S, Lacroix O, Durand A, et al. Malnutrition: a highly predictive risk factor of short-term mortality in elderly presenting to the emergency department. J Nutr Health Aging. 2013;17(4):290–4.
46. Lin C-F, Lin P-C, Hu S-Y, et al. Comprehensive Geriatric Assessment and Clinical outcomes in the older people at the Emergency Department. Int J Environ Res Public Health. 2021;18(11):6164.
47. Saario EL, Mäkinen MT, Jämsen ER, Nikander P, Castrén MK. Screening of community-dwelling older patients by the emergency medical services: an observational retrospective registry study. Int Emerg Nurs. 2021;59:101078.
48. Pulido I, Nunes C, Botelho A, et al. Comprehensive geriatric assessment of older patients and associated factors of admission to Emergency Departments in pre-covid 19 Era–A Portuguese study. Rev Esp Geriatr Gerontol. 2022;57(5):250–6.
49. Tavenier J, Rasmussen LJH, Andersen AL, et al. Association of GDF15 with inflammation and physical function during aging and recovery after acute hospitalization: a longitudinal study of older patients and age-matched controls. Journals Gerontology: Ser A. 2021;76(6):964–74.
50. Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: developing the short-form Mini Nutritional Assessment (MNA-SF). J Geront. 2001;56A:M366–377.
51. Vellas B, Villars H, Abellan G, et al. Overview of the MNA® - its History and challenges. J Nutr Health Aging. 2006;10:456–65.
52. Elia M. The MUST Report. Nutritional screening of adults: a multidisciplinary responsibility. Development and Use of the Malnutrition Universal Screening Tool ('MUST') for adults. BAPEN; redditch, UK: 2003. Chairman of MAG and Editor advancing Clinical Nutrition, a Standing Committee of BAPEN.
53. Wilson M-MG, Thomas DR, Rubenstein LZ, Chibnall JT, Anderson S, Baxi A, Diebold MR, Morley JE. Appetite Assessment: simple appetite questionnaire predicts weight loss in Community-Dwelling adults and nursing home residents. Am J Clin Nutr. 2005;82:1074–81. https://doi.org/10.1093/ajcn/82.5.1074.
54. Kondrup J, Rasmussen HH, Hamberg O, Stanga Z. Nutritional risk screening (NRS 2002): a new method based on an analysis of controlled clinical trials. Clin Nutr. 2003;22:321–36.
55. Correia MITD. Nutrition screening vs nutrition assessment: what's the difference? Nutr Clin Pract. 2018;33(1):62–72.
56. Norman K, Haß U, Pirlich M. Malnutrition in older adults-recent advances and remaining challenges. Nutrients Aug. 2021;12(8). https://doi.org/10.3390/nu13082764.
57. Laur C, Curtis L, Dubin J, et al. Nutrition Care after Discharge from Hospital: an exploratory analysis from the more-2-Eat study. Healthcare. 2018;6(1). https://doi.org/10.3390/healthcare6010009.
58. Beck AM, Kjær S, Hansen BS, Storm RL, Thal-Jantzen K, Bitz C. Follow-up home visits with registered dietitians have a positive effect on the functional and nutritional status of geriatric medical patients after discharge: a randomized controlled trial. Clin Rehabil. 2013;27(6):483–93.
59. Ji T, Zhang L, Han R, et al. Management of Malnutrition based on Multidisciplinary Team decision-making in Chinese older adults (3 M study): a prospective, Multicenter, Randomized, controlled Study Protocol. Front Nutr. 2022;9:851590. https://doi.org/10.3389/fnut.2022.851590.
60. O'Keeffe M, Kelly M, O'Herlihy E, et al. Potentially modifiable determinants of malnutrition in older adults: a systematic review. Clin Nutr. 2019;38(6):2477–98.
61. Reber E, Gomes F, Vasiloglou MF, Schuetz P, Stanga Z. Nutritional Risk Screening and Assessment. J Clin Med Jul. 2019;20(7). https://doi.org/10.3390/jcm8071065.
62. Guigoz Y, Vellas B. Nutritional assessment in older adults: MNA® 25 years of a screening tool & a reference standard for care and research; what next? J Nutr Health Aging. 2021;25:528–83.
63. Dent E, Wright OR, Woo J, Hoogendijk E. O. Malnutrition in older adults. Lancet. 2023;401(10380):951–66.
64. Lyu Y, Chen G, Shen L, Liu Y, Gao F, He X, Crilly J. Knowledge, attitudes, clinical practice and perceived barriers with nutrition support among physicians and nurses in the emergency department: a national cross-sectional survey. Int Emerg Nurs. 2021;55:100973.
65. Lindorff-Larsen K, Rasmussen HH, Kondrup J, Staun M, Ladefoged K, Group TS. N. Management and perception of hospital undernutrition—A positive change among Danish doctors and nurses. Clin Nutr. 2007;26(3):371–8.
66. Mowe M, Bosaeus I, Rasmussen HH, Kondrup J, Unosson M, Rothenberg E, Irtun Ø. Insufficient nutritional knowledge among health care workers? Clin Nutr. 2008;27(2):196–202.
67. Health Information and Quality Authority (HIQA). https://www.hiqa.ie/reports-and-publications/key-reports-and-investigations/report-review-nutrition-and-hydration-care
68. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. Int J Soc Res Methodol. 2005;8(1):19–3270.
69. Bech CB, Svendsen JA, Knudsen AW, Munk T, Beck AM. The association between malnutrition and dehydration in older adults admitted to a geriatric unit: an observational study. Clin Nutr ESPEN. 2023;57:598–605. https://doi.org/10.1016/j.clnesp.2023.08.011.

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