

# Environmental, Care, and Dietary Factors that Hinder Oral Feeding in Hospitalized Older People: An Integrative Review

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**Maria Helena Lenardt**

<https://orcid.org/0000-0001-8309-4003>  
Universidade Federal do Paraná, Brazil  
curitiba.helena@gmail.com

**José Baudilio Belzarez Guedez**

<http://orcid.org/0000-0002-8042-0317>  
Universidade Federal do Paraná, Brazil  
josebelzarez@gmail.com

✉ **João Alberto Martins Rodrigues**

<https://orcid.org/0000-0002-5708-3148>  
Universidade Federal do Paraná, Brazil  
morgadinho70@hotmail.com

**Clovis Cechinel**

<https://orcid.org/0000-0002-9981-3655>  
Universidade Federal do Paraná, Brazil  
cechinelc@hotmail.com

**Larissa Teleginski Wardenski**

<https://orcid.org/0000-0001-7092-8814>  
Universidade Federal do Paraná, Brazil  
larissateleginski97@outlook.com

**Daiane Maria da Silva Marques**

<https://orcid.org/0000-0002-7168-4839>  
Universidade Federal do Paraná, Brazil  
daianems.marques@gmail.com

Received: 09/10/2025

Sent to peers: 10/12/2025

Approved by peers: 29/06/2026

Accepted: 07/07/2026

**DOI: 10.5294/aqui.2026.26.3.7**

**Para citar este artículo / To reference this article / Para citar este artigo**

Lenardt MH, Guedez JBB, Rodrigues JAM, Cechinel C, Wardenski LT, Marques DMS. Environmental, care, and dietary factors that hinder oral feeding in hospitalized older people: An integrative review. *Aquichan*. 2026;26(3):e2637. DOI: <https://doi.org/10.5294/aqui.2026.26.3.7>

**Theme:** Care processes and practices

**Contribution to the nursing field:** The results of this review have significant implications for nursing practice, as they identify environmental, care, and dietary choice factors that influence oral feeding in hospitalized older people. These findings provide subsidies for the planning and management of strategies aimed at improving the quality of nutritional care, including the protection and supervision of mealtimes, the early identification of patients who need assistance during meals, coordination with the multidisciplinary team to reduce interruptions, and the adaptation of care to dietary preferences whenever clinically possible. Implementing these strategies can promote dietary acceptance, preserve older people's autonomy, optimize food intake, and contribute to the prevention of malnutrition and a safer recovery during hospitalization.

## Abstract

**Introduction:** Oral feeding in hospitalized older people is often compromised by environmental, care, and dietary choice factors, which are still overlooked in clinical practice. Recognizing these determinants is essential for supporting effective interventions. The nursing team is responsible for assessing food acceptance, assisting during meals, and communicating the identified needs and difficulties to the nutrition team. **Objective:** To identify environmental, care, and dietary choice factors that hinder oral feeding in hospitalized older people. **Materials and Methods:** An integrative literature review was conducted in compliance with the adapted PRISMA guidelines. Searches were performed during June 2024 in the MEDLINE, Virtual Health Library, Embase, CINAHL, Web of Science, and Scopus databases. Observational and intervention studies with hospitalized older people ( $\geq 60$  years) were included, with no restrictions on language or date; case reports, letters, abstracts, theses, dissertations, monographs, and reviews were excluded. The studies were classified according to the hierarchical level of evidence established by the Oxford Centre for Evidence-Based Medicine. **Results:** A total of 640 studies were found, of which 32 were included in the final sample. The main factors that compromised nutrition were the lack of a dining room, reduced privacy, interruptions during meals, insufficient professional assistance, and inadequate meal schedules or food options, all of which are factors associated with lower caloric intake and an increased risk of malnutrition. **Conclusion:** The environmental, care, and dietary factors that interfere with oral feeding among hospitalized older people are multifactorial. Notable factors included inadequate infrastructure and inappropriate meal schedules, as well as a shortage of personnel to assist with feeding. These conditions compromise food intake, increasing the risk of food and nutritional insecurity in this population.

### Keywords (Source: MeSH)

Nurses Improving Care for Health System Elders; Elderly Nutrition; Review; Food Assistance; Energy Intake.

## 4 Factores ambientales, asistenciales y alimentarios que dificultan la alimentación oral de adultos mayores hospitalizados: una revisión integrativa

### Resumen

**Introducción:** La alimentación oral de adultos mayores hospitalizados suele verse comprometida por factores ambientales, asistenciales y relacionados con las preferencias alimentarias, que aún están infravalorados en la práctica clínica. Reconocer estos determinantes es esencial para apoyar intervenciones efectivas. El equipo de enfermería es responsable de evaluar la aceptación de alimentos, asistir durante las comidas y comunicar las necesidades y dificultades identificadas al equipo de nutrición. **Objetivo:** identificar factores ambientales, asistenciales y relacionados con las elecciones alimentarias que dificultan la alimentación oral de adultos mayores hospitalizados. **Materiales y método:** Se realizó una revisión integrativa de la literatura según las recomendaciones adaptadas de PRISMA. Las búsquedas se realizaron en junio de 2024 en las bases de datos MEDLINE, Biblioteca Virtual en Salud (BVS), Embase, CINAHL, Web of Science y Scopus. Se incluyeron estudios observacionales y de intervención con adultos mayores hospitalizados ( $\geq 60$  años), sin restricciones de idioma ni fecha, y se excluyeron reportes de casos, cartas, resúmenes, tesis, monografías y revisiones. Los estudios fueron clasificados según la jerarquía de evidencia del Oxford Centre for Evidence-Based Medicine. **Resultados:** Se identificaron 640 estudios, de los cuales 32 constituyeron la muestra final. Los principales factores que comprometieron la alimentación fueron la ausencia de un comedor, la reducción de la privacidad, las interrupciones durante las comidas, la insuficiencia de ayuda profesional y la inadecuación de los horarios u opciones alimentarias, factores asociados a una menor ingesta calórica y un mayor riesgo de desnutrición. **Conclusión:** Los factores ambientales, asistenciales y alimentarios que interfieren con la alimentación oral de ancianos hospitalizados son multifactoriales. Se destacaron la insuficiencia de infraestructura y la inadecuación de los horarios de las comidas, así como la limitación de personal para la asistencia durante la alimentación. Estas condiciones comprometen la ingesta de alimentos, aumentando el riesgo de inseguridad alimentaria y nutricional en esta población.

#### Palabras clave (Fuente DeCS)

Atención de enfermería al anciano hospitalizado; nutrición del anciano; revisión; asistencia alimentaria; ingesta de energía; adulto mayor.

# Fatores ambientais, assistenciais e alimentares que dificultam a alimentação oral de idosos hospitalizados: revisão integrativa

## Resumo

**Introdução:** A alimentação oral de pessoas idosas hospitalizadas é frequentemente comprometida por fatores ambientais, assistenciais e relacionados às preferências alimentares, ainda pouco valorizados na prática clínica. Reconhecer esses determinantes é essencial para subsidiar intervenções eficazes. A equipe de enfermagem é responsável por avaliar a aceitação alimentar, auxiliar durante as refeições e comunicar à equipe de nutrição as necessidades e dificuldades identificadas. **Objetivo:** identificar fatores ambientais, assistenciais e de escolhas alimentares que dificultam a alimentação oral de idosos hospitalizados. **Materiais e método:** Realizou-se uma revisão integrativa da literatura conforme as recomendações adaptadas do PRISMA. As buscas ocorreram em junho de 2024 nas bases MEDLINE, Biblioteca Virtual em Saúde, Embase, CINAHL, Web of Science e Scopus. Incluíram-se estudos observacionais e de intervenção com idosos hospitalizados ( $\geq 60$  anos), sem restrição de idioma ou data, e excluídos relatos de caso, cartas, resumos, teses, dissertações, monografias e revisões. Os estudos foram classificados segundo o nível hierárquico de evidência do Oxford Centre for Evidence-Based Medicine. **Resultados:** Identificaram-se 640 estudos, dos quais 32 compuseram a amostra final. Os principais fatores que comprometeram a alimentação foram ausência de sala de jantar, privacidade reduzida, interrupções durante as refeições, insuficiência de auxílio profissional e inadequação dos horários ou das opções alimentares, fatores associados à menor ingestão calórica e ao aumento do risco de desnutrição. **Conclusão:** Os fatores ambientais, assistenciais e alimentares que interferem na alimentação oral de idosos hospitalizados são multifatoriais. Destacaram-se a insuficiência de infraestrutura e a inadequação de horários das refeições, bem como a limitação de pessoal para o auxílio alimentar. Essas condições comprometem a ingestão alimentar, aumentando o risco de insegurança alimentar e nutricional nessa população.

### Palavras-chave (Fonte DeCS)

Cuidado de enfermagem ao idoso hospitalizado; nutrição do idoso; revisão; assistência alimentar; ingestão de energia.

## Introduction

Population aging is a natural and progressive process, representing a significant achievement resulting from improvements in living conditions, access to healthcare, and the scientific and technological development of contemporary society. This phenomenon brings with it social implications that impact the economy, politics, and, especially, health. Meanwhile, the motor and sensory impairments inherent to aging make individuals more vulnerable to the onset of diseases that directly affect their functional capacity (1).

Functional impairments require continuous care and may increase older people's (aged 60 years or older) need to use healthcare services. In this context, although hospitalizations have become more frequent as a strategy for managing health conditions and treating diseases, they can also pose health risks to older people, especially when they occur over prolonged periods (2). Among the main complications associated with hospitalization, malnutrition stands out, a condition characterized by inadequate intake of protein, energy, and micronutrients, and considered a significant vulnerability factor for this population. The imbalance between the body's nutritional needs and the nutrients actually ingested compromises muscle architecture and can exacerbate muscle frailty (3).

In this sense, oral feeding is the preferred form of nutritional support, as it consists of the provision and intake of food and nutrients through the physiological route in individuals with a functioning gastrointestinal tract and preserved swallowing ability (4). However, factors that hinder oral feeding, such as loss of appetite, polypharmacy, dementia, frailty, and social isolation, are common among hospitalized older people. These factors are often overlooked in clinical practice, which can contribute to adverse clinical outcomes (3).

This is a retrospective cross-sectional study, conducted at a hospital in São Paulo, Brazil, with the objective of understanding the nutritional profile of hospitalized older people. The study included 250 patients aged 60 years or older. It was found that 14% had difficulty with oral feeding and, consequently, consumed fewer calories than prescribed. Older people with advanced ages required greater assistance from another person to eat. These results suggest the health-care team should consider implementing measures to assist, promote, and assess the abilities or difficulties older people have with oral feeding from the time of admission until hospital discharge (5).

The hospital, as an environment designed to maintain health and life, has intrinsic elements in its physical and operational structure that directly affect the oral feeding process of older people. During meals, aspects related to food presentation—such as temperature, smell, and taste—stand out, as they influence the adequate intake of nutrients, both in terms of quantity and quality (6).

A systematic literature review analyzed 35 articles on the nutrition of older people who consume texture-modified diets. Most studies highlighted the importance of screening for feeding difficulties, adjusting mealtime environments, and providing feeding assistance. These recommendations constituted an essential part of the strategies to maintain or improve older people's physical strength during hospitalization and promote their recovery (7).

It stands out that nursing professionals systematically assess the diet and food acceptance of older people. When necessary, they assist them with eating, keeping a record of their preferences and difficulties, and communicating these details to the nutrition team (8). The nutritional care and feeding provided by nursing professionals are supported by Resolution No. 453/2014 of the Federal Nursing Council in Brazil, which confirms that the nursing team must provide assistance in the administration of nutritional therapy, its monitoring, and the identification of patients at nutritional risk (9).

In the context of hospitalized older people, these responsibilities become even more relevant. Functional changes, the presence of comorbidities, and environmental and care factors can compromise oral feeding and increase the risk of malnutrition, clinical complications, and adverse outcomes during hospitalization. In this scenario, identifying the factors that interfere with oral feeding in hospitalized older people is essential for improving the quality of nursing care and strengthening the nutritional security of this population.

Although previous studies have researched aspects related to the dietary habits of hospitalized older people, the findings remain fragmented across environmental, care, and dietary choice factors, hindering an integrated understanding of the elements that influence oral intake in this population. Furthermore, there is a limited synthesis of the available evidence on this theme. Given this, an integrative literature review was conducted to identify the environmental, care, and dietary choice factors that hinder oral feeding among hospitalized older people.

## Materials and Methods

An integrative literature review was conducted in six stages: (i) identification of the theme and selection of the research question; (ii) establishment of inclusion/exclusion criteria, literature search, and selection; (iii) characterization of the studies; (iv) evaluation of the studies included in the integrative review; (v) interpretation of the results; and (vi) knowledge synthesis (10, 11). To structure the guiding research question, the PEO strategy (P: Population or Patients; E: Exposure; O: Outcomes) (12) was implemented, where P refers to older people; E, to hospitalization; and O, to environmental, care, and di-

etary choice factors. After applying the PEO strategy and to guide the search terms, the following research question was formulated: *What are the environmental, care, and dietary choice factors that hinder or interfere with oral feeding in older people during hospitalization?*

The inclusion criteria for articles were defined as original studies with the following characteristics: Observational studies (including prospective and retrospective cohort studies, case-control studies, cross-sectional studies, and longitudinal studies) and intervention studies (clinical trials and quasi-experimental studies); studies related to the theme and conducted in a hospital setting; participants aged 60 years or older; studies that presented at least one of the factors (environmental, care, and dietary choice) that interfere with or hinder eating; studies published in any language with no restriction on publication date; and studies available in full. Exclusion criteria included case reports, letters to the editor, abstracts in conference proceedings, theses, dissertations, monographs, and review articles.

The search strategy was designed specifically for each database; initially, the Medical Subject Headings (MeSH) terms were used, which were subsequently translated into the specific terms—Health Sciences Descriptors (DeCS) and Embase Subject Headings (Emtree). The search strategy was conducted by the main researcher in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE) (PubMed Portal); Virtual Health Library (BVS)/LILACS; Embase; Cumulative Index to Nursing and Allied Health Literature (CINAHL); Web of Science; and Scopus, in June 2024.

Table 1 presents the search strategies used for the databases.

In the third stage, the studies were organized and summarized using a reference management system as a tool to assist in conducting the review. To record the data extraction, a spreadsheet was created containing the following data: Article title, author, year of publication, name of the journal or magazine, country of origin, language, study objective, study type, sample size, and study results related to the prevalence, incidence, and types of environmental, care, and dietary choice factors that influenced the oral feeding of hospitalized older people.

Next, in the fourth stage, a critical review of the articles was conducted to synthesize the available information. The selection, methodological evaluation, and data extraction were performed independently by two reviewers. In cases of disagreement, a third reviewer was consulted to reach a consensus.

For this review, the included articles were classified according to their level of scientific evidence, as defined by the Oxford Centre for Evidence-Based Medicine (13). Given the inclusion of different methodological designs, the assessment encompassed observational, cross-sectional, cohort, and intervention studies, according to the evidence hierarchy criteria proposed by the Oxford system for health research.

**Table 1.** Database Search Strategies

| Databases                                                       | Descriptors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Portal PubMed/<br>MEDLINE; CINAHL;<br>Scopus; Web of<br>Science | ((elderly) OR (frailties OR frailness OR “frailty syndrome” OR debility OR debilities OR “frail elders” OR “elder, frail” OR “elders, frail” OR “frail elder”)) AND ((inpatients OR hospitalization) AND (diet OR nutrition OR meal)) AND (“food preferences” OR “feeding behavior” OR knowledge OR culture OR “life style”)) AND (“food quality” OR “food analysis” OR “food handling” OR “food security”))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Portal BVS/ LILACS                                              | (elderly OR frailties) AND ((inpatients OR hospitalization)) AND ((diet OR nutrition OR meal)) AND (“food preferences” OR “feeding behaviour” OR knowledge OR culture OR lifestyle))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Embase                                                          | (‘hospital patient’/exp OR ‘hospital patient’ OR ‘hospitalised patient’ OR ‘hospitalised patients’ OR ‘hospitalized patient’ OR ‘hospitalized patients’ OR ‘in-hospital patient’ OR ‘in-hospital patients’ OR ‘in-patient’ OR ‘in-patients’ OR ‘inpatient’ OR ‘inpatients’ OR ‘patient, hospital’) AND ((‘nutrition’/exp OR ‘diet, food, and nutrition’ OR ‘nutrition’ OR ‘nutrition council’ OR ‘nutrition phenomena’ OR ‘nutrition physiology’ OR ‘nutrition processes’ OR ‘nutrition research’ OR ‘nutrition research center’ OR ‘nutrition study’ OR ‘nutrition survey’ OR ‘nutrition surveys’ OR ‘nutritional physiological phenomena’ OR ‘nutritional physiology’ OR ‘nutritive solution’ OR ‘sports nutritional physiological phenomena’) OR (‘meal’/exp OR ‘breakfast’ OR ‘lunch’ OR ‘meal’ OR ‘meals’ OR ‘standard meal’) OR (‘diet’/exp OR ‘diet’ OR ‘diet influence’ OR ‘diet regimen’ OR ‘diet surveys’ OR ‘dietary effect’ OR ‘dietary influence’ OR ‘dietary survey’ OR ‘dietary surveys’ OR ‘dieting’)) AND (‘food preference’/exp OR ‘diet selection’ OR ‘food preference’ OR ‘food preferences’) OR (‘feeding behavior’/exp) OR ((‘attitude’/exp OR ‘attitude’ OR ‘behavior, permissive’ OR ‘behaviour, permissive’ OR ‘faculty attitude’ OR ‘knowledge, attitudes, practice’ OR ‘permissive behavior’ OR ‘permissive behaviour’ OR ‘permissiveness’ OR ‘rejection (psychology)’ OR ‘rejection, psychology’) OR (‘cultural anthropology’/exp OR ‘anthropology, cultural’ OR ‘cultural anthropology’ OR ‘cultural evolution’ OR ‘culture’ OR ‘culture pattern’) OR (‘lifestyle’/exp OR ‘life style’ OR ‘lifestyle’)) AND ((‘food quality’/exp OR ‘food quality’) OR (‘food analysis’/exp OR ‘food handling’/exp OR ‘food security’/exp)) |

Source: Prepared by the authors.

All articles, regardless of their results and level of evidence, were submitted for data extraction and synthesis. In the fifth stage, the results were synthesized and interpreted based on the research question of the present review. In the sixth stage, the analyzed articles were synthesized, and finally, the concluding remarks were presented.

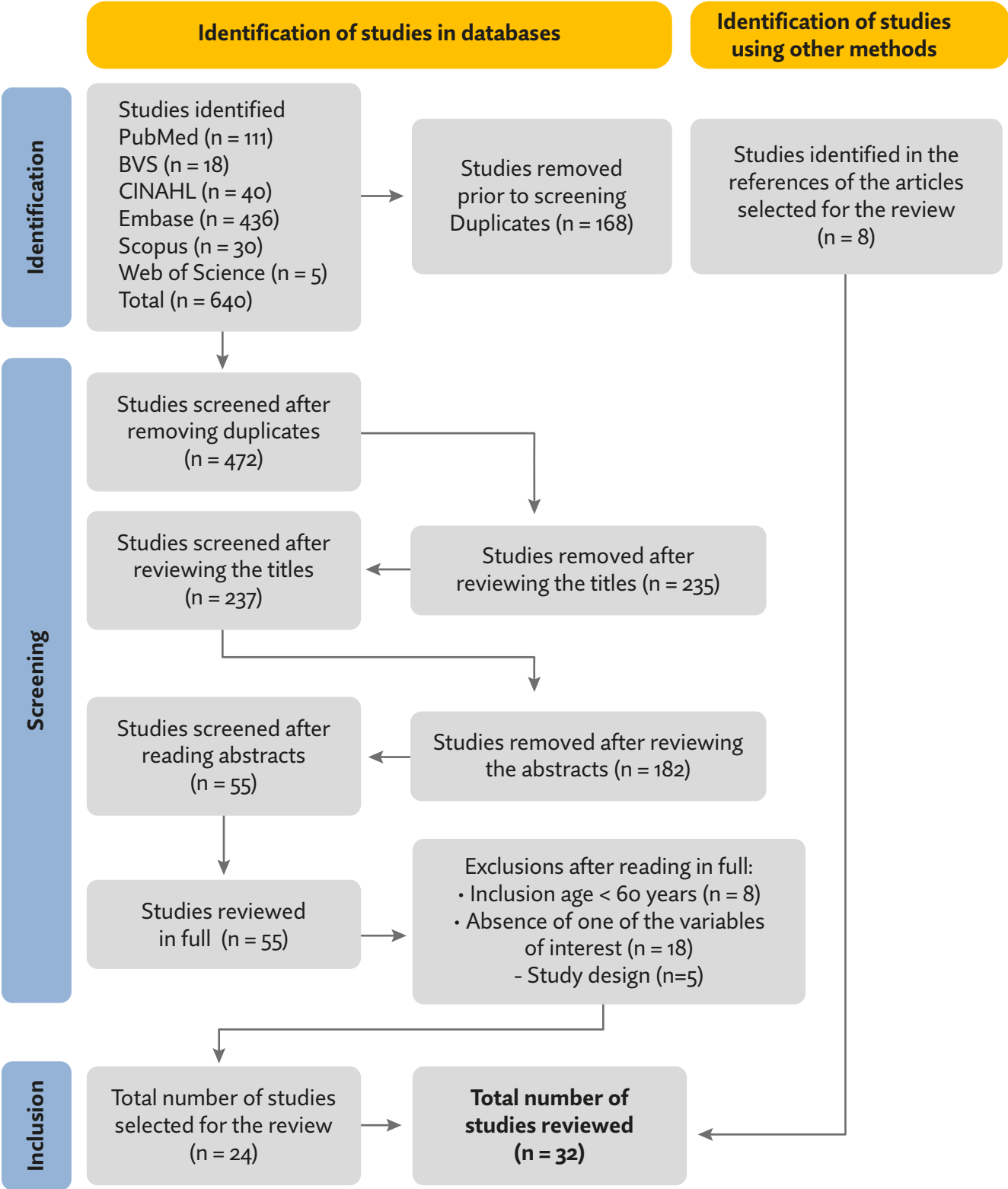
## Results

The database search yielded 640 studies, of which 168 were excluded due to duplication and 472 were selected for title and abstract screening. Of these, 235 were excluded after title screening and 182 after abstract screening as they did not address the theme under study. At the end of this stage, 55 studies remained for full-text review. Subsequently, 31 studies were excluded, leaving 24, to which another eight were added, which were iden-

tified in the references of the articles selected for the review. Thus, 32 studies were included in the analysis.

Figure 1 shows the flowchart for the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method, used to illustrate the selection of articles for this review (14).

Figure 1. PRISMA Flowchart for Study Selection



Source: adapted from (14).

Of the 32 studies analyzed, publications were most prevalent in 2013, 2017, and 2018 (n=4; 12.50 % each year), followed by 2006, 2008, and 2021 (n=3; 9.37%), 2012 and 2016 (n=2; 6.25% each year) and only one each in 2007, 2011, 2015, 2019, 2020, 2023, and 2024 (n=1; 3.12 % each year).

The publications were distributed across 19 different journals. The *Journal Appetite* concentrated the largest number of studies (n=5; 15.62%), followed by *Clinical Nutrition ESPEN* (n=4; 12,50 %). The Journals *Nutrition & Dietetics*, *Journal of Human Nutrition and Dietetics*, and *Clinical Nutrition* presented three publications each (n=3; 9.37%). The *Nutrition Journal* and *Journal of Nutrition, Health & Aging* each published two studies (n=2; 6.25%). The remaining Journals—*Age and Ageing*, *Asian Journal of Gerontology & Geriatrics*, *Australian Health Review*, *Canadian Journal on Aging*, *European Journal of Clinical Nutrition*, *International Journal of Hospitality Management*, *Journal of clinical nursing*, and *Progress in Nutrition*—presented one publication each (n=1; 3.12 %).

All articles were published in English. Among the countries where the studies were conducted, Australia (n=15; 46.87%) and the United Kingdom (n=6; 18.75%) stood out, followed by Canada, Denmark, and Israel (n=2; 6.25%), China, the Netherlands, Italy, Japan, and Malaysia (n=1; 3.12 %).

Cross-sectional observational studies were the most prevalent (28.12%). Randomized controlled trials and intervention studies each comprised 18.75%, followed by prospective cohort and prospective longitudinal studies at 12.50 %. Quasi-experimental studies (6.25 %) and case-control studies (3.12 %) were also identified. The sample size of the included studies varied significantly, with samples ranging from 9 to 407 hospitalized older people. Table 2 presents a compilation of the articles according to the following characteristics: Author, year of publication, country, journal, sample size, objective, study type, and level of evidence. The articles were coded to facilitate the identification and summarization of the findings during the discussion.

**Table 2.** Characteristics of the Studies Composing the Body of the Integrative Review

| Study Code | Author/Year                                      | Country of Origin | Journal                                         | Sample Size | Objective                                                                                                                                                                                                      | Type of Study (Level of Evidence) |
|------------|--------------------------------------------------|-------------------|-------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| E1         | Duncan DG, Beck SJ, Hood K, Johansen A/2006 (15) | United Kingdom    | <i>Age and Ageing</i>                           | 302         | To examine how improved monitoring of nutritional status and dietary intake, achieved through the use of dietary assistants, will affect postoperative clinical outcomes among older women with hip fractures. | Randomized controlled trial (1b)  |
| E2         | Wright L, Hickson M, Frost G/2006 (16)           | United Kingdom    | <i>Journal of Human Nutrition and dietetics</i> | 48          | To research the effect of meals served in a supervised dining hall on nutritional intake and weight among older patients receiving treatment in an acute care facility for older people.                       | Prospective cohort (2b)           |

| Study Code | Author/Year                                                                            | Country of Origin | Journal                                         | Sample Size | Objective                                                                                                                                                                              | Type of Study (Level of Evidence) |
|------------|----------------------------------------------------------------------------------------|-------------------|-------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| E3         | Xia C, McCutcheon H/2006 (17)                                                          | Australia         | <i>Journal of Clinical Nursing</i>              | 48          | To determine what nurses do during mealtimes regarding the eating habits of older patients in two wards of an intensive care unit.                                                     | Cross-sectional (2c)              |
| E4         | Feldblum I, German L, Castel H, Harman-Boehm I, Bilenko N, Eisinger M et al./2007 (18) | Israel            | <i>Nutrition Journal</i>                        | 259         | To compare malnourished older people with those at nutritional risk and identify factors that contribute to the variability between the groups.                                        | Case-control (3b)                 |
| E5         | Tsang MF/2008 (19)                                                                     | Australia         | <i>Nutrition &amp; Dietetics</i>                | 46          | To observe mealtimes to determine the type and amount of feeding assistance needed by older hospitalized patients and to assess the adequacy of the care provided by the nursing team. | Prospective longitudinal (2b)     |
| E6         | Walton K, Williams P, Bracks J, Zhang Q, Pond L, Smoothy R et al./2008 (20)            | Australia         | <i>Appetite</i>                                 | 9           | To determine whether the patient's energy and protein intake increased at lunch and throughout the day on the days when volunteers were present.                                       | Intervention study (2b)           |
| E7         | Wright L, Cotter D, Hickson M. 2008 (21)                                               | United Kingdom    | <i>Journal of Human Nutrition and dietetics</i> | 46          | To determine whether targeted feeding assistance provided by trained volunteers increased oral intake in older patients with dysphagia.                                                | Prospective longitudinal (2b)     |
| E8         | Mudge AM, Ross LJ, Young AM, Isenring EA, Banks MD/2011 (22)                           | Australia         | <i>Clinical Nutrition</i>                       | 134         | To measure the proportion of older patients with inadequate nutritional intake and to identify patient-related factors associated with this outcome.                                   | Prospective cohort (2b)           |
| E9         | Keller HH, Chambers LW, Fergusson DA, Niezgoda H, Parent M, Caissie D et al./2012 (23) | Canada            | <i>Canadian Journal on Aging</i>                | 100         | To evaluate the effectiveness of a mixed menu of bulk and ready-to-use commercial food products with modified textures (supplied by Healthcare Food Services, Ottawa, Ontario)         | Intervention study (2b)           |
| E10        | Manning F, Harris K, Duncan R, Walton K, Bracks J, Larby L et al./2012 (24)            | Australia         | <i>Appetite</i>                                 | 23          | To evaluate the effectiveness of the voluntary food assistance program in improving patients' dietary intake and to identify its role in a hospital setting.                           | Mixed-method study (2c)           |
| E11        | Bell AF, Walton K, Chevis JS, Davies K, Manson C, Wypych A et al./2013 (25)            | Australia         | <i>Appetite</i>                                 | 140         | To determine packaging that is "problematic" from the perspective of older people.                                                                                                     | Cross-sectional (2c)              |
| E12        | Campbell KL, Webb L, Vivanti A, Varghese P, Ferguson M/2013 (26)                       | Australia         | <i>Nutrition &amp; Dietetics</i>                | 98          | To determine the most effective method for providing oral nutritional support to hospitalized older patients with malnutrition, using clinical and patient-centered measures.          | Randomized controlled trial (1b)  |
| E13        | Walton K, Williams P, Tapsell L, Hoyle M, Shen ZW, Gladman L et al./2013 (27)          | Australia         | <i>Appetite</i>                                 | 30          | To identify the environmental factors associated with achieving adequate food intake in a hospital setting.                                                                            | Cross-sectional (2c)              |
| E14        | Young AM, Mudge AM, Banks MD, Ross LJ, Daniels L/2013 (28)                             | Australia         | <i>Clinical Nutrition</i>                       | 254         | To implement and compare three interventions specifically designed to address barriers to eating and improve energy intake among hospitalized patients aged ≥ 65 years.                | Intervention study (2b)           |
| E15        | Porter J, Wilton A, Collins J/2016 (29)                                                | Australia         | <i>Australian Health Review</i>                 | 105         | To establish baseline data describing meal practices under usual care conditions in the subacute scenario.                                                                             | Cross-sectional (2c)              |

| Study Code | Author/Year                                                                                  | Country of Origin | Journal                                                   | Sample Size | Objective                                                                                                                                                                             | Type of Study (Level of Evidence) |
|------------|----------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| E16        | Hartwell H, Johns N, Edwards JSA/2016 (30)                                                   | United Kingdom    | <i>International Journal of Hospitality Management</i>    | 162         | To evaluate an initiative in which electronic menus and touchscreen technology were tested at a large hospital in the United Kingdom.                                                 | Intervention study (2b)           |
| E17        | Markovski K, Nenov A, Ottaway A, Skinner E/2017 (31)                                         | Australia         | <i>Nutrition &amp; Dietetics</i>                          | 34          | To research the effect of the “Dinner with Friends” program on energy and protein intake in hospitalized older patients.                                                              | Intervention study (2b)           |
| E18        | Chan CS, Koo HW, Auyeung TW, Liu TY, Sin KL, Lau ST et al./2017 (32)                         | China             | <i>Asian Journal of Gerontology &amp; Geriatrics</i>      | 100         | To determine whether adding seasoning to typical hospital meals could increase oral food intake in older patients.                                                                    | Intervention study (2b)           |
| E19        | McCullough J, Marcus H, Keller H/2017 (33)                                                   | Canada            | <i>The Journal of Nutrition, Health &amp; Aging</i>       | 120         | To characterize barriers to food intake among older people in four different hospitals.                                                                                               | Cross-sectional (2c)              |
| E20        | Roberts HC, Pilgrim AL, Jameson KA, Cooper C, Sayer AA, Robinson S/2017 (34)                 | United Kingdom    | <i>The Journal of Nutrition, Health &amp; Aging</i>       | 407         | To evaluate the impact of trained volunteer food assistants on the food intake of hospitalized older people.                                                                          | Quasi-experimental (2b)           |
| E21        | Young AM, De Jersey SJ, Ellick J, Lewis CA, Banks M/2018 (35)                                | Australia         | <i>Journal of Nutrition in Gerontology and Geriatrics</i> | 30          | To compare patients’ energy and protein intake, patient satisfaction, and meal quality indicators between the pre-prepared meal and bistro services.                                  | Randomized controlled trial (1b)  |
| E22        | Amano N, Nakamura T/2018 (36)                                                                | Japan             | <i>Clinical Nutrition ESPEN</i>                           | 82          | To evaluate food intake by estimating the amount of food left on the plate.                                                                                                           | Prospective longitudinal (2b)     |
| E23        | Beelen J, Vasse E, Janssen N, Janse A, de Roos NM, de Groot LCPGM/2018 (37)                  | The Netherlands   | <i>Clinical Nutrition</i>                                 | 147         | To research whether replacing regular foods and beverages with protein-enriched alternatives would increase protein intake among older hospitalized patients.                         | Randomized controlled trial (1b)  |
| E24        | Orlandoni P, Jukic Peladic N, Cola C, Venturini C, Costantini A, Giorgini N et al./2018 (38) | Italy             | <i>Progress in Nutrition</i>                              | 75          | To identify the main barriers to adequate food intake among geriatric patients.                                                                                                       | Cross-sectional (2c)              |
| E25        | Young AM, Banks MD, Mudge AM/2018 (39)                                                       | Australia         | <i>Clinical Nutrition ESPEN</i>                           | 320         | To evaluate the impact of planned and incremental changes in nutritional care through dietary and meal interventions on the energy and protein intake of hospitalized older patients. | Prospective cohort (2b)           |
| E26        | Navarro DA, Shapiro Y, Birk R, Boaz M/2019 (40)                                              | Israel            | <i>Nutrition</i>                                          | 131         | To evaluate the effect of an orange napkin on a meal tray on food intake and satisfaction with food service among older patients admitted to an internal medicine ward.               | Randomized controlled trial (1b)  |

| Study Code | Author/Year                                                                                  | Country of Origin | Journal                                         | Sample Size | Objective                                                                                                                                                                                                         | Type of Study (Level of Evidence) |
|------------|----------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| E27        | Bell AF, Tapsell LC, Walton K, Batterham M/2020 (41)                                         | Australia         | <i>Appetite</i>                                 | 62          | To determine the impact of packaging on the actual consumption of foods routinely served at the hospital.                                                                                                         | Prospective longitudinal (2b)     |
| E28        | Dynesen AW, Snitkjær P, Andreasen LS, Elgaard L, Aaslyng MD/2021 (42)                        | Denmark           | <i>Clinical Nutrition ESPEN</i>                 | 154         | To compare energy and protein intake with estimated recommended intake and food waste before and after the introduction of a free-choice menu in a geriatric ward at a hospital in the Zealand region of Denmark. | Prospective cohort (2b)           |
| E29        | Kozica-Olenski S, Treleaven E, Hewitt M, McRae P, Young A, Walsh Z et al./2021 (43)          | United Kingdom    | <i>Journal of Human Nutrition and Dietetics</i> | 143         | To measure patients' self-reported food and meal experiences to evaluate and inform the continuous improvement of the quality of hospital nutritional care.                                                       | Cross-sectional (2c)              |
| E30        | Razalli NH, Cheah CF, Mohammad NMA, Abdul Manaf Z/2021 (44)                                  | Malaysia          | <i>Nutrition Research and Practice</i>          | 30          | To determine the percentage of food waste among patients prescribed a modified-texture diet and the factors contributing to it.                                                                                   | Cross-sectional (2c)              |
| E31        | Furness K, Harris M, Lassemillante A, Keenan S, Smith N, Desneves KJ et al./2023 (45)        | Australia         | <i>Nutrients</i>                                | 149         | To describe the mealtime experience using the qualitative components of the Austin Health Patients Mealtime Experience Tool.                                                                                      | Cross-sectional (2c)              |
| E32        | Okkels SL, Christensen AS, Bjerring TS, Erichsen A, Rask IK, Frederiksen KG et al./2024 (46) | Denmark           | <i>Clinical Nutrition ESPEN</i>                 | 206         | To test the effect of a new à la carte hospital food service concept as an autonomous intervention and in combination with individualized nutritional treatment.                                                  | Quasi-experimental (2b)           |

Source: Compiled by the authors.

The environmental, care, and dietary choice factors that influenced the oral feeding of hospitalized older people identified in the analyzed studies are presented separately.

In Table 3, the studies are categorized according to the environmental factors that influence oral feeding in hospitalized older people.

**Table 3.** Categorization of Studies Based on Environmental Factors that Influence Oral Feeding in Hospitalized Older People

| Study Code | Environmental Factors                                                   |
|------------|-------------------------------------------------------------------------|
| E2         | Absence of a dining room.                                               |
| E10        | Interruptions caused by the multidisciplinary healthcare team.          |
| E13        | Interruptions caused by the multidisciplinary healthcare team.          |
| E14        | Interruptions caused by the multidisciplinary healthcare team.          |
| E15        | Interruptions caused by the multidisciplinary healthcare team.          |
| E17        | Absence of a dining room.                                               |
| E19        | Lack of privacy.                                                        |
| E24        | Lack of privacy.                                                        |
| E25        | Interruptions caused by the multidisciplinary healthcare team.          |
| E29        | Interruptions caused by the multidisciplinary healthcare team.<br>Noise |

Source: Prepared by the authors.

Table 4 shows the categorization of the studies according to the care-related factors that influence oral feeding in hospitalized older people.

**Table 4.** Categorization of Studies Based on Care-Related Factors that Affect Oral Feeding in Hospitalized Older People

| Study Code | Care Factors                                                                                                   |
|------------|----------------------------------------------------------------------------------------------------------------|
| E1         | Lack of understanding and patience on the part of the healthcare team.                                         |
| E3         | Lack of assistance during mealtimes.                                                                           |
| E5         | Lack of assistance during mealtimes.                                                                           |
| E6         | Lack of assistance during mealtimes.                                                                           |
| E7         | Lack of assistance during mealtimes.                                                                           |
| E8         | Lack of assistance during mealtimes.                                                                           |
| E9         | Lack of assistance during mealtimes.                                                                           |
| E10        | Lack of assistance during mealtimes.                                                                           |
| E11        | Lack of assistance during mealtimes.                                                                           |
| E13        | Lack of assistance during mealtimes.                                                                           |
| E14        | Lack of assistance during mealtimes.                                                                           |
| E19        | Lack of understanding and patience on the part of the healthcare team.<br>Lack of assistance during mealtimes. |
| E20        | Lack of assistance during mealtimes.                                                                           |
| E21        | Lack of assistance during mealtimes.                                                                           |
| E24        | Lack of assistance during mealtimes.                                                                           |
| E27        | Lack of assistance during mealtimes.                                                                           |
| E29        | Lack of assistance during mealtimes.                                                                           |

Source: Prepared by the authors.

The categorization of the studies based on the influence of dietary choice factors on the oral intake of hospitalized older people is presented in Table 5.

**Table 5.** Categorization of Studies Based on the Influence of Dietary Choice Factors on the Oral Intake of Hospitalized Older People.

| Study Code | Dietary Choice Factors                                                                                                                                                                        |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E4         | Follow a special diet at home.                                                                                                                                                                |
| E10        | Type of food provided.<br>Not having the option to choose their own meal.<br>Mealtime.                                                                                                        |
| E12        | Taste of the meal.<br>Presentation of the meal.<br>Meal portion size.<br>Temperature inadequate for eating the meal.<br>Not having the option to choose their own meal.<br>Smell of the meal. |

| Study Code | Dietary Choice Factors                                                                                                               |
|------------|--------------------------------------------------------------------------------------------------------------------------------------|
| E13        | Meal portion size.<br>Mealtime.                                                                                                      |
| E16        | Not having the option to choose their own meal.<br>Type of food provided.                                                            |
| E18        | Taste of the meal.                                                                                                                   |
| E19        | Temperature inadequate for eating the meal.<br>Mealtime.<br>Presentation of the meal.                                                |
| E22        | Type of food provided.<br>Mealtime.                                                                                                  |
| E23        | Type of food provided.                                                                                                               |
| E24        | Taste of the meal.<br>Consistency of the meal.<br>Presentation of the meal.<br>Very repetitive menu.<br>Mealtime.                    |
| E26        | Temperature inadequate for eating the meal.<br>Smell of the meal.<br>Not having the option to choose their own meal.                 |
| E28        | Not having the option to choose their own meal.                                                                                      |
| E29        | Not having the option to choose their own meal.<br>Insufficient information about the menu.<br>Mealtime.                             |
| E30        | Consistency of the meal.<br>Type of meal provided.<br>Mealtime.                                                                      |
| E31        | Meals provided that are incompatible with their beliefs.<br>Very repetitive menu.<br>Taste of the meal.<br>Presentation of the meal. |
| E32        | Not having the option to choose their own meal.                                                                                      |

Source: Prepared by the authors.

## Discussion

Among the environmental factors that interfere with or hinder eating, the most common were “interruptions by the multidisciplinary team during meals” (E10; E13–E15; E25; E29), followed by “not having a dining room” (E2; E17), “lack of privacy” (E19; E24), and, less frequently, the presence of “noise” (E29). The studies agreed on the negative impacts of interruptions during meals on the food intake of hospitalized older people. Interruptions associated with multidisciplinary activities disrupt the continuity of the meal, resulting in lower energy and protein intake.

A cross-sectional study analyzed 143 hospitalized older people and found that the multidisciplinary healthcare team interrupted or disrupted meals for 28% and 27% of the participants, respectively, which was associated with difficulty in consuming the diet in this population ( $p < 0.001$ ) (E29). Interruptions for medication administration by nursing professionals, followed by visits from medical doctors, occupational therapists, and physical therapists during mealtimes, were identified as the main factors that hindered eating (E10; E13).

An intervention study conducted in Australia with 254 older people aged 65 or above showed that, among the interventions evaluated—protected meals (PM), an additional nursing assistant focused on nutrition (ANAFN), and a combined intervention (PM + ANAFN)—, the ANAFN group had the lowest frequency of interruptions during meals. However, the implementation of the PM concept, either alone or in combination (PM + ANAFN), did not significantly reduce the occurrence of interruptions when compared to the other groups (pre: 38% of patients interrupted; ANAFN: 22%; PM: 33%; PM + ANAFN: 26%;  $p = 0.18$ ) (E14).

Although strategies to protect mealtimes have shown benefits in some studies, their effectiveness has been uncertain, with some interventions reducing interruptions and improving food intake, while others have had limited impact, possibly due to organizational factors, the availability of human resources, and institutional characteristics. The results of this review corroborate previous studies by indicating that interruptions during meals reflect the organization of hospital work processes, in which the overlap between care procedures, administrative activities, and mealtimes reduces the recognition of eating as a component of care. In older people, especially in those who are frail, functionally dependent, or require more time to eat, this context can compromise food intake and limit autonomy during hospitalization (47, 48).

Multidisciplinary procedures or appointments scheduled during mealtimes have a negative impact on the dietary intake of older people. In contrast, assisted, fortified, and intermittent meals, as well as oral nutritional supplementation, led to significant and progressive improvements in energy and protein intake across two cohorts (energy—cohort 1: 5,073 kJ/d; cohort 2: 5,403 kJ/day; cohort 3: 5,989 kJ/day;  $p = 0.04$ ; protein - cohort 1: 48 g/day; cohort 2: 50 g/day; cohort 3: 57 g/day;  $p = 0.02$ ) (E25).

There are interruptions during meals that stimulate food intake, known as “positive interruptions.” Among these, the provision of additional feeding assistance and nutritional care during meals stand out. A cross-sectional study conducted in Australia found that positive interruptions were experienced by 56.2% of participants in a sample of 109 hospitalized older people (aged 65 and above). In contrast, there are those referred to as “negative

interruptions,” such as diagnostic procedures, medication rounds, and multidisciplinary treatment, which adversely affected 76.2% of the participants, regardless of whether they received feeding assistance or nutritional care. Protecting mealtimes is a strategy that can improve the mealtime environment and encourage food intake among patients, helping to reduce the high rates of negative interruptions (E15).

A quasi-experimental study with 48 older people showed that “having to eat a meal at the bedside” is a factor that significantly hinders food intake among hospitalized older people. The group of hospitalized older people placed in a dining room had a 36% higher energy intake ( $p < 0.013$ ) compared to the control group of participants who ate lunch at their bedside (E2).

The data cited above were corroborated in a prospective observational pilot study conducted with 34 patients with a mean age of 79 years, which found a 20% increase in energy and protein intake among patients who ate lunch in the dining room compared to those who ate at their bedside ( $p = 0.006$  and  $0.001$ , respectively). Participants identified the dining room as their preferred place to eat (68%); energy and protein intake increased by 30% when underweight patients ( $BMI < 22$ ) ate in the dining room (both  $p < 0.01$ ). Patients who reported a lack of appetite consumed 25% more energy and 31% more protein in the dining room. Although this was a trend, these changes were not statistically significant ( $p = 0.29$  and  $0.07$ , respectively) (E17).

Studies that evaluated specific meal settings have shown an increase in energy and protein intake. However, some of the findings showed only a trend toward improvement, without statistical significance, possibly due to the small sample size and methodological heterogeneity among the studies.

The lack of privacy during meals was a significant factor contributing to low food intake among 14.2% of the older people who participated in a study that analyzed a new tool for monitoring and assessing barriers to food intake during mealtimes among hospitalized patients (E19). Similarly, the lack of guaranteed privacy caused 10.40% of patients admitted to a geriatric hospital in Ancona, Italy, to feel insecure when eating during their hospitalization (E24).

Noise in the hospital, in addition to other interferences, negatively affected food intake among 28% of the older people participating in a cross-sectional study conducted at a public hospital in Brisbane, Australia, suggesting the need to improve environmental factors to optimize food quality during meals (E29). Thus, the environmental factors analyzed highlight the influence of the hospital's organizational context on older people's eating experiences. Privacy, a reduction in negative stimuli, and the protection of mealtimes can promote food intake during hospitalization.

Collectively, these studies confirm previous findings and indicate that the hospital food environment is an important component of nutritional care. Strategies such as ensuring consistent mealtimes, reducing interruptions, and improving environmental conditions have been associated with better outcomes related to food intake among hospitalized older people, although their effectiveness varies depending on the institutional context and the characteristics of implementation (47, 49).

Among the care factors that interfered with oral feeding in hospitalized older people, the most prevalent was “lack of feeding assistance” (E3; E5-E11; E13; E14; E19-E21; E24; E27; E29), followed by “insufficient understanding and patience on the part of the healthcare team” (E1; E19). These findings indicate that functional dependence for eating requires partial or total support during meals, especially among more frail older people with greater clinical impairment.

Of the 46 older people (mean age  $86.5 \pm 4.8$  years) who were hospitalized and assessed in an observational study conducted in New South Wales, Australia, 19.56% required intensive physical assistance and/or verbal guidance to be able to eat. However, 33% of the older people evaluated did not receive professional or family assistance (E5). In a prospective cohort study, of the 134 older people participating (mean age 80 years), 32% were dependent for feeding, and the lack of assistance emerged as the primary factor associated with low intake ( $p = 0.01$ ). Of the total sample, only 42 individuals met their estimated resting energy requirements. The authors concluded that inadequate nutritional intake is common, and patient factors contributing to poor dietary intake should be considered when planning nutritional interventions (E8).

In a study conducted in Ancona, Italy, approximately 50% of the participants required assistance during meals. Of the 75 older people evaluated, 36.87% reported that they did not receive sufficient assistance during meals from hospital personnel (E24). For older people hospitalized, the limited presence of healthcare professionals during mealtimes is a barrier that hinders their acceptance and consumption of their diet. A lack of monitoring during meals and hydration was reported by 71.3% of the hospitalized older people in one sample; furthermore, 54.3% indicated a need for visits from personnel to assist them during meals (E19).

Of the participants in the prospective study, 73% required extensive or total feeding assistance during meals. The assistance included setting up the tray, positioning the participant, bringing utensils to the mouth, and cleaning up. Of those who received assistance, 74% achieved their weight goals at the end of six months, with a trend toward weight gain ( $OR = 3.5$ ;  $p = 0.16$ ). During the intervention period, participants had a significantly higher fat intake ( $p = 0.01$ ) (E9).

In a pre- and post-intervention analysis study, it was found that 30% of participants in the pre-intervention group required nutritional assistance for one or more meals. Over the course of the study, the levels of dependence on this assistance increased significantly in the study's three interventions: PM with multidisciplinary education, ANAFN, and PM + ANAFN ( $p < 0.01$ ). Post-intervention participants were more likely to achieve adequate energy intake ( $OR=3.4$ ;  $p=0.01$ ), with no difference found between the interventions ( $p=0.29$ ) (E14).

Training volunteers to assist with meals proved to be an effective and sustainable approach, reaching 57% of the hospitalized older people with mental confusion. The only independent predictor of adequate energy intake was the level of feeding assistance required by the patients. A greater need for assistance was associated with lower energy intake ( $p < 0.001$ ) (E20).

Of the hospitalized older people, 70% required some assistance for eating during meals. Even so, fully dependent patients were observed without any assistance (33%). In addition, the time spent providing assistance by the nursing team was shorter than that spent by patients' caregivers (123 and 137 minutes, respectively) (E5). When feeding assistants or volunteers were present, energy and protein intake at lunchtime increased significantly (396 kJ). On days when volunteers were present, an average of 71% of daily protein requirements were met, compared to an average of 59% met by caregivers or nursing professionals ( $p=0.003$ ) (E10).

It was found that 42% of participants who received assistance for eating from a dietary assistant reported that the main benefit was encouragement to eat (E21). When dietary assistants were present to guide the older person during meals, in addition to helping bring food to their mouth, average protein intake increased by 10.1g at lunch ( $p < 0.05$ ) and 10.7g throughout the day ( $p < 0.05$ ); there was also a trend toward increased energy intake (E6).

Various needs for professional assistance had a negative impact on participants in a cross-sectional study conducted in Brisbane, Australia, of whom 34.3% had difficulty opening packages and unwrapping food; 16.1% had difficulty reaching the food; 19.6% needed assistance to be positioned to eat; 17.4% were unable to cut their food; and 11.9% required complete assistance to eat their meals (E29).

Difficulty in opening food packages was reported by 54.5% of the 48 older people participating in the study conducted in Australia. However, the food was not opened at the start of the meal, which led 48.7% of the patients to have their food still unopened almost until the end. The older people also reported difficulty with activities requiring the use of utensils (36.4%). Although only 22% of the participants indicated a need for feeding assistance, 44% of them requested help opening food and beverage packages. When requesting assistance from nursing professionals, 33% of these requests

were fulfilled, and 33% did not receive help (E13). Another factor that hindered eating was not being able to add seasonings (31.8%) (E3).

It was found that opening a piece of cheese demanded a maximum time of nearly 5 minutes (average = 45 seconds) and a maximum number of attempts of 46 seconds (average = 5). The biscuit package required a maximum of 32 attempts to open (average = 6) and a maximum time of 3 minutes (average = 30 seconds). The water bottle required up to 20 attempts to open (average = 7), taking a maximum of one minute (average = 15 seconds) to open. The milk in a carton (Tetrapak®-type) had a maximum time of 1.1 minutes (average of 36 seconds) as well as a maximum of 13 attempts to remove the straw from the side of the carton (average = 6). Thus, the difficulty in opening a sealed package had a significant negative effect on both breakfast intake (mean = -44.25; SD = 71.55;  $t(3) = -1.237$ ;  $p = 0.304$ ) and the afternoon snack (mean = -82.43; SD = 157.90;  $t(6) = -1.381$ ;  $p = 0.216$ ) (E27).

The older people were asked about specific difficulties they faced when opening food and beverages in general. The most common factors were loss of hand strength (40%) and vision problems (35%). Notably, 50% of hospitalized older people reported some difficulty opening ready-to-eat meals, milk, and cereal boxes, and nearly 40% had difficulty opening water bottles and carton packaging (E11).

Feeding volunteers assisted patients with dysphagia by providing targeted feeding support. Data from these patients were compared to those of a similar control group that did not receive feeding support. Feeding assistance proved to be one of the factors that contributed most to increasing energy intake (95% CI = 1,294–3,360 kJ;  $p < 0.001$ ). In the sample, 56% of patients were found to be totally or partially dependent on assistance during meals (E7).

Patients supported by dietary assistants specifically trained to demonstrate an understanding and caring attitude had a higher mean energy intake than patients receiving standard nursing care. Nursing professionals generally did not encourage the frailest patients at mealtimes ( $p < 0.001$ ) (E1).

Patients who did not consume their meal reported that the healthcare team did not offer alternatives, even when the meal tray was untouched (E19). From the moment that dietary assistants were designated by the nutrition team to assess dietary preferences, participants had a significantly higher mean daily energy intake (1,105 kcal versus 756 kcal/24 h, 95% CI = 259–440 kcal/24 h,  $p < 0.001$ ), a smaller reduction in arm circumference during hospitalization (0.39 cm,  $p = 0.002$ ), and a lower probability of dying in the acute care ward (4.1 versus 10.1%;  $p = 0.048$ ). This effect was still apparent at the four-month follow-up (13.1 versus 22.9%;  $p = 0.036$ ) (E1).

The findings synthesized in this review strengthen and expand the evidence available in the literature that factors related to the organization of care influence the food intake of hospitalized older people, beyond individual clinical limitations. Studies indicate that early identification of the need for assistance, support during meals, and the participation of trained professionals are associated with better nutritional outcomes and the prevention of malnutrition during hospitalization (47).

The dietary choice factors that prevailed as unfavorable in the diets of hospitalized older people were “mealtimes” (E10; E13; E19; E22; E24; E29; E30) and “not being able to choose one’s own meal” (E10; E12; E16; E26; E28; E29; E32). Next were “type of food provided” (E10; E16; E22; E23; E30), “taste of the meal” (E12; E18; E24; E31), and the “presentation of the meal” (E12; E19; E24; E30; E31).

Other factors were cited less frequently, such as “temperature inadequate for consumption” (E12; E19; E26), “portion size” (E12; E13), “smell” (E12; E26), “consistency of the meal” (E24; E30), “frequent menu repetition” (E24; E31), “insufficient menu information” (E29), “following a special diet at home” (E4), and “meals incompatible with personal beliefs” (E31).

The limited time allotted for meals was identified as a challenge to eating. To address this challenge, dietary assistants were provided, which resulted in higher-than-usual energy and protein intake (396 kJ and 4.3 g more, respectively) (E10).

Removing the meal tray without checking whether the older person had finished the meal, due to the scheduled time, affected the food intake of 30 % of the participants; 11 % stated that they did not have enough time to eat, and 25 % reported that the allotted time was inadequate (E13). According to the older people, the 30- to 40-minute time allotted for each main meal was insufficient; 17.6 % of them did not have time to finish their meal (E24). The older people did not eat the entire meal they wished to eat due to the insufficient allotted time, and 89.1 % were forced to eat meals and snacks when they were not hungry, at times they were not used to (E29).

Of the hospitalized older people, 26.7 % reported not consuming the desired amount of food due to inadequate meal serving times (E19). When considering the times at which meals are served and comparing breakfast, lunch, and dinner, the level of agreement with the times preferred by the individuals was highest for breakfast (81.7 %) and lowest for lunch (78.1 %) and dinner (75.2 %) (E22). The greatest amount of food waste occurred mainly at lunchtime (49.2 %) compared to dinnertime (45.9 %) due to greater alignment with the time at which the meal was served (E30). This demonstrates that the possible inadequacy of mealtimes may be a factor associated with low food acceptance and food waste. The institutional rigidity of meal schedules proves to be incompatible with the dietary preferences and habits previously established by older people.

The organization of meal schedules and the limited participation of older people in food choices influence their acceptance of the diet during hospitalization. Previous studies also indicate that approaches based on the principles of person-centered care, including flexible meal schedules whenever clinically possible and consideration of dietary preferences and habits, are associated with a more satisfying dining experience and greater acceptance of the diet (50).

The lack of freedom to choose the type of meal was one of the factors that affected the eating habits of 87% of the patients. Loss of appetite was reported by 49%; however, when patients had the opportunity to choose their food, this stimulated their appetite and led to increased food intake (E10). Being able to choose protein-rich snacks between breakfast and lunch led to satisfaction, which in turn improved food intake ( $p < 0.05$ ) (E12). A lack of information about what the daily menu would be negatively affected acceptance of the hospital diet in 28% of the participants (E16; E29). The ability to select foods encouraged healthy choices and increased food intake in 17.6% of the patients, who consumed only the meal provided by the hospital (E26).

Food waste was lower ( $p = 0.0005$ ) at lunch among older people fed under the “free-choice meal” model (15.6%) compared with the “meal cart” model (26.1%) (E28). In addition to promoting food intake, the ability to choose enhances older people’s autonomy during hospitalization. Patient participation in decisions related to food is one of the principles of person-centered care and can contribute to greater satisfaction with the hospital diet (50).

According to the Mini Nutritional Assessment of hospitalized patients, 87% were considered nutritionally compromised. One of the main barriers mentioned by 80% of the patients was the type of meal offered at the hospital (E10). When the meal did not meet expectations, food intake was lower ( $p = 0.044$ ); 28% of the participants found the meal offered to their liking, and 72% stated that it was poor (E16). Food texture was a factor in refusal when related to foods such as jellies (14.9%), pureed foods (14.6%), soft foods (33.3%), and solid foods (37.5%) (E22).

Food waste was highest for proteins (61.1% combined for lunch and dinner; 64.4% and 57.8% for lunch and dinner, respectively) and lowest for fruits/desserts (23.5% combined for lunch and dinner; 26.4% and 20.6% for lunch and dinner, respectively). Carbohydrates and vegetables had very similar mean waste volumes (54.6% and 54.5%, respectively), combined for lunch and dinner (E30). The intervention group that received non-hospital food consumed 17.5g more protein than the control group that received hospital food ( $105.7 \pm 34.2$  vs.  $88.2 \pm 24.4$  g/day;  $p < 0.01$ ). This corresponds to a higher protein intake in g/kg of body weight in the intervention group compared to the control group (1.51 vs. 1.22 g/kg of body weight;  $p < 0.01$ ) (E23).

Satisfaction with the taste of the meal was found to be higher when the food was brought on a cart from which the patient could choose what to eat ( $p < 0.05$ ), compared to those receiving a traditional nutritional supplement or a more specialized 2 cal/mL supplement, delivered in 60 mL portions four times a day during medication rounds. Despite the lower cost and higher satisfaction, participants did not meet the recommended energy and protein intake (E12). When asked whether they had difficulty eating, 14.10% of hospitalized older patients reported that the unpleasant taste of the meals negatively impacted their overall acceptance of the diet (E31).

At the time of hospital admission, 50% of patients aged over 85 years were malnourished; of these, 40% reported that homogenized proteins have a very unpleasant taste, which interfered with their protein intake (E24). The percentage of patients with inadequate oral intake decreased from 68% to 57% after the addition of seasonings. Lunch with seasoning resulted in an increase in food, energy, protein, and sodium intake by 8%, 10%, 9%, and 53%, respectively (E18).

The appearance of the food brought in a selection cart influenced increased food intake ( $p < 0.05$ ). Similarly, the portion size of the traditional meal (a set meal provided by the food service) had a negative effect on food intake, unlike in cases where the patient decided what portion to eat ( $p < 0.05$ ). Overall quality-of-life ratings improved when older people were able to choose their meal; however, they did not change with the traditional hospital meal ( $p = 0.05$ ) (E12). Hospital food did not look or smell appetizing to 58.3% of the older people, which affected their acceptance and food intake (E19; E31).

The older people, encouraged by a higher proportion of carbohydrate- and vegetable-based side dishes, consumed a larger portion of their meals. Still, they expressed dissatisfaction with foods that should have been served hot, since cold foods had a negative effect on their appetite ( $p < 0.0001$ ) (E26; E19).

Most patients rated the quality of the food provided by the hospital positively. However, 60% of them felt that the portions were too large; 75% reported that they had asked the service for a smaller portion (E13).

Compared to traditional supplements, the foods served from the food cart were considered to have a better aroma by 63% of the participants (E12). However, in another study, 17.60% of the older people surveyed considered the aroma of the foods to be unpleasant, which reduced their appetite (E26).

When asked to specify the reasons for not eating, 11.2% of the participants responded that they did not like the texture of the food served, and 11.3% stated that the pasta was overcooked and the vegetables were undercooked (E24). The mixed-diet meal was left uneaten by 65% of the patients, and the porridge was refused by

35% of the individuals evaluated (E30). Difficulties were observed among the older people in accepting the meals (16.2%) due to a lack of variety in the menus (E31; E24). The kitchen team did not provide the menu to 13% of the hospitalized patients, and 26.60% stated that being informed of the menu helped them choose a meal suited to their preferences (E29).

Food offered at the hospital was refused by 74% of the participants because these foods were not part of their daily diet. Within this group, 18.5% were identified as malnourished and 81.5% were at nutritional risk. Having cognitive impairment (OR=1.1) and fewer than 12 years of education (OR=3.2) were risk factors for malnutrition, while the absence of chewing difficulties (OR=0.3) was a protective factor (E4). For 9.40% of older people, the meals offered in the hospital environment were not in line with their beliefs, religion, or culture, which hindered their dietary intake (E31).

It should be noted, as a limitation of the present study, that the interpretation of the findings must consider the methodological heterogeneity of the included studies. There was a prevalence of observational designs, particularly cross-sectional studies, as well as variability in the samples, the outcomes analyzed, and the hospital settings researched. A geographic concentration of studies in Australia (46.87%) and the United Kingdom (18.75%) was also found, which may limit the generalizability of the results to other healthcare systems, particularly those in Latin America. In summary, the findings show that difficulties related to oral feeding among hospitalized older people are multifactorial and depend on environmental, care, and dietary factors. Although some interventions have shown favorable effects, structural and organizational barriers can hinder the implementation of nutritional care strategies in the hospital setting.

## Conclusion

Various environmental, care, and dietary choices factors interfere with oral feeding in hospitalized older people, particularly interruptions during meals, lack of feeding assistance, limitations on autonomy in food selection, and inadequacies related to the environment and food provision. These factors were associated with lower food intake and a higher risk of malnutrition during hospitalization.

The nursing team performs an essential role, particularly in optimizing identification processes, making strategic decisions, and monitoring and managing barriers to oral feeding, especially those that can be addressed through intervention.

## Conflict of interest

The authors declare that they have no conflict of interest.

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