

Multidisciplinary Provision of Food and Nutritional Care to Hospitalized Adult In-Patients: A Scoping Review

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Purpose: Multidisciplinary approaches to nutritional care are increasingly emphasized and recommended. However, there is little evidence of how different disciplines work together collaboratively to deliver optimum quality care to adult in-patients. This scoping review aimed to describe the existing literature on multidisciplinary collaboration to identify the various disciplines involved and the features that influence collaborative working in implementing multidisciplinary food and nutritional care with adult in-patients.

Methods: Multiple databases were searched, including MEDLINE Complete, Embase, CINAHL Complete, HMIC, and Scopus, from their inception to December 2019. Data were retrieved from eligible studies. A narrative description of findings is reported with respect to the disciplines involved, the aspects of nutritional care explored, and the collaborative processes categorized using the input, process, and outcome framework.

Results: Thirty-one studies with heterogeneous study designs met the eligibility criteria. Studies were undertaken in six countries. Findings show a wide diversity of multidisciplinary collaborations in various aspects of nutritional care in all studies. Multidisciplinary nutritional care provision was facilitated by several processes, including training and development, communication and information sharing, and clinical leadership and management support. Outcomes were reported at the patient, team, and organizational levels.

Conclusion: This review reveals the significance of the interrelationship between different disciplines and their complementary contributions towards the delivery of optimal food and nutritional care. Key aspects include the involvement of different disciplines, the clarification of roles and multidisciplinary interrelationships, communication, information sharing, clinical leadership, and management support, all of which facilitated collaborative working. Our review uncovered that these features can significantly influence multidisciplinary working. This review is the first to present literature concerning the attributes that affect collaborative working. Further research is recommended specifically around multidisciplinary nutritional care processes and conditions that allow for better collaborative working.

Keywords: malnutrition, adult in-patient, hospital, multidisciplinary care, nutritional care

Introduction

Providing food and nutritional care in hospitals is integral to patient-centered care. This involves responding to changing nutritional requirements and patients' needs, which will vary depending on their health status. In hospitals, malnutrition (as undernutrition) is a significant clinical concern with well documented adverse consequences, including a compromised immune system in affected patients and clinical complications, increased readmissions, and mortality.^{1,2} To prevent these

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complications, patients with or at risk of malnutrition must be identified and treated efficiently and effectively.^{3,4} There is a growing awareness of not only the prevalence of malnutrition but also compliance difficulties with standardized nutritional care practices, including the use of validated screening tools, referral for diagnosis, treatment, and nutritional management plans for patients.^{5,6} The consequences of malnutrition for patients are significant and have implications for healthcare providers. These require the skills of many disciplines if they are to be managed successfully.^{7,8}

There is a growing emphasis in economically developed countries for healthcare professionals to collaborate in delivering nutritional care. In a call to action, the interdisciplinary body, the Alliance to Advance Patient Nutrition based in the United States, has stressed the importance of addressing malnutrition using an interdisciplinary approach and strategies.⁸ These depend on different stakeholders, including patients, families, volunteers, and multidisciplinary professionals.

Multidisciplinary roles and responsibilities are also significant in achieving improvements in overall care quality.⁹ In response to the need for a change in practice and improved service implementation approaches, an Australian action research study developed a Systematized, Interdisciplinary Malnutrition Pathway for imPLEmentation and Evaluation (SIMPLE) in hospitals. While it has yet to be evaluated, the interdisciplinary SIMPLE model aims to improve malnutrition management and nutritional care within hospital environments.¹⁰

A range of terms is sometimes used interchangeably to describe collaborative working practices such as “interdisciplinary,” “multidisciplinary,” and “transdisciplinary” care. However, for the purpose of this paper, the term multidisciplinary care will be used to refer to a group of professionals from two or more disciplines who work on the same project, independently or in parallel.¹¹ The term team refers to a group of people with complementary skills who are committed to a common purpose (in this case, nutritional care), performance goals, and approach for which they hold themselves mutually accountable.¹² Furthermore, in this review, the term nutritional care is taken to mean a coordinated approach to the delivery of food and fluids by different healthcare professionals and views the patient as an individual with needs and preferences.¹³ Volunteers and service users (patients) are included within this context of collaborative nutritional care.

Arguably, previous studies and reviews on nutritional care have had a narrower focus. For example, the effectiveness of mealtime interventions to improve nutritional intake for adult patients.¹⁴ While other studies investigated and reported findings on meal assistance or supportive interventions aimed at enhancing intake.^{15,16} However, the review undertaken by Rasmussen et al,¹⁷ specifically examined the effectiveness of multidisciplinary nutritional care, including nutritional support and dietary counseling in older hospitalized patients. It concluded that multidisciplinary nutritional support improves patients’ quality of life and has a positive effect on mortality. Conversely, our review focuses on exploring the different disciplines involved in the collaborative approach and activities undertaken not just with healthcare professionals but also with patients, relatives, and volunteers. In summary, despite support for the benefits of multidisciplinary care models, there is a dearth of information on the processes associated with effective collaborative working and the conditions that allow for the coordination of activities in delivering optimal nutritional care. Furthermore, multidisciplinary care is not without challenges.^{18–20,72} There appears to be a limited understanding of how the different components of a collaborative approach can individually and collectively affect nutritional care outcomes in this context. These also include the features that enable successful collaborative working to deliver optimum quality care to adult in-patients. Therefore, our review describes the existing literature on multidisciplinary collaboration to identify the different disciplines involved and explore the features of collaborative nutritional care approaches for adult in-patients receiving nutritional intake (excluding patients requiring specialized artificial nutritional support).

Review Question

The questions that guided this scoping review were:

What are the features of multidisciplinary collaborative care approaches in the provision of food and nutritional care to adult in-patients?

What disciplines are involved in multidisciplinary collaboration, and what aspects of nutritional care are explored?

What collaborative activities, processes, and outcomes of multidisciplinary nutritional care are reported?

Methods

This scoping review was conducted in accordance with the Joanna Briggs Institute’s (JBI)²¹ formal guidance for

scoping reviews. This methodology was chosen to address the research questions as its exploratory nature allows for the synthesis of the different forms of existing literature uncovered.²¹ Results are reported following the guidelines for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR).²² Our protocol is registered on protocols.io. (where doi.org/10.17504/protocols.io.bgzajx2e is the unique DOI).⁷⁶

Search Strategy

The search strategy targeted primary studies and followed the three-step process recommended by JBI to identify both published studies and unpublished studies in gray literature. The text words contained in the titles and abstracts of relevant articles and the index terms used to describe the articles were used to develop a full search strategy. The search strategy was devised for the Medline Complete database and later adapted for each subsequent database. Databases were searched from the date of their inception to December 2019. An illustrative example from the search in Medline Complete is provided in [Appendix 1](#). The reference list of articles selected for full-text review was screened for additional papers. Search terms included nutritional care, multidisciplinary, interdisciplinary, inter-professional, and collaborative (see [Appendix 1](#)).

Information Sources

The following electronic databases were searched: Medline Complete, Embase, Cochrane, CINAHL Complete, HMIC, BNI, and Scopus. Searches were also conducted in NICE Evidence, OpenGrey, ClinicalTrials.gov, and Epistomonikos for unpublished studies and gray literature.

Inclusion Criteria

The inclusion criteria for this scoping review follow the types of Participants, Concept, and Context (PCC) components stipulated by JBI. The PCC components specify the basis upon which sources were considered for inclusion as described in the next three sections.²¹

Types of Participants

The participant group of focus for this review was: any hospital staff whose role contributed to nutritional care provision. Such as those from allied health professions, medicine, nursing, clinical pharmacy, the wider healthcare team, and non-clinical support personnel, including volunteers, patients, and relatives. The review included studies

focusing on patients who were adults or groups of adult in-patients with or at risk of malnutrition. The adult patient group was defined as patients aged 18 years and above.

Concept

The concepts of interest in this review were features of multidisciplinary collaborative care approaches in delivering nutritional care to patients in hospitals.

The aspects of nutritional care explored were identified using the guidelines on terminology and definitions set out by the European Society for Clinical Nutrition and Metabolism (ESPEN).²³ For instance, nutritional care processes in a systematic sequence involve distinct, interrelated steps in the provision of nutritional care (such as malnutrition risk screening, nutritional assessment, diagnostic procedures, and nutritional care plan). While the classification of forms and products represents the many ways nutrition care and therapy can be provided (such as meal environment and diets).²³ Only studies that focused on multidisciplinary nutritional care and adopted multidisciplinary collaborative approaches were considered for inclusion. Multidisciplinary interventions involving two or more professional groups across different stages of the patient's nutrition pathway, such as assessment, eating support, and meal environment, were included.

In this review, literature that focused on multidisciplinary working with patients requiring specialized artificial nutritional support such as enteral and parenteral nutrition were excluded. Studies that focused primarily on the prevalence of disease conditions or risk factors leading to malnutrition were likewise excluded.

Context

Interventions with a primary focus on providing nutritional care outside the context of the hospital setting (as in the community and home care) were excluded. Only studies implemented within hospital settings and with a multidisciplinary follow-up after discharge were included. As original studies were of interest to this review, secondary sources of evidence such as case studies, systematic reviews, and literature reviews were not included in the analysis. However, their reference list was reviewed to identify any further primary research.

Types of Sources

The scoping review included qualitative, quantitative, and mixed-methods study designs. Published and unpublished

(gray literature) papers in English that met the eligibility criteria were included. A formal quality assessment of the included studies was not conducted; however, research quality was discussed between authors with specific emphasis on the nature, reporting, and general quality of the evidence. Moreover, this is an optional step in the PRISMA extension checklist for scoping reviews.²²

Study Selection

Study selection was an iterative process of screening abstracts and revising the inclusion and exclusion criteria. Following the search, all identified records were collated and uploaded into EndNote X9.2 Clarivate Analytics. The first author retrieved and screened titles and abstracts of all articles for relevance (GY). The selected abstracts were screened by three independent reviewers (JS, JM, GF) for assessment against the inclusion criteria to ensure validity. Full-text papers that did not meet the inclusion criteria were further excluded with reasons. Any disagreements that arose between the reviewers were resolved by arbitration involving a fourth reviewer and subsequently through discussion as a team.

Data Extraction

Information was collected using the data extraction tool presented in [Appendix 2](#), developed and reviewed by the review team. The extracted data included the study aim, study population, and specific details about the professional disciplines involved, including patients, relatives, or volunteers. The reported collaborative approach to nutritional care, the study context, methods, and outcomes relevant to the review questions were also extracted. While the studies retrieved utilized different terminology (Interdisciplinary rounds or multi-disciplinary audit), the term “multidisciplinary care” is used in the presentation of the review findings. One author (GY) extracted data and subsequently verified by three reviewers (JS JM GF). All disagreements that arose between the reviewers were resolved through discussion.

Data Presentation

Studies were reviewed and reported based on their characteristics. They were structured in descriptive themes or a narrative format related to multidisciplinary care inputs, processes, and outcomes (IPO), using a framework adapted from McGrath.²⁴ The IPO framework is a widely used guide for understanding and explaining group research; hence, it is especially valued in

“teamwork” literature.^{25,26} The framework has also been applied in various ways in other literature, including systematic and scoping reviews.^{27,28}

Results

In this section, the characteristics of the retrieved studies are described. A total of 1992 studies were retrieved from the literature search, and these were reduced to 1601 after the removal of duplicates. After title and abstract screening against eligibility criteria, 121 potential articles remained for a full review. A total of 31 studies published between January 1996 and December 2019 were identified as eligible for inclusion in the review.^{29,30} Excluded articles either did not focus on multidisciplinary collaborations in hospitals³¹ or as a nutritional care component or only examined the functionality and usage of a nutritional care tool by staff.³² A flow chart showing the number of studies at each stage is detailed in [Figure 1](#).

Study Characteristics

Location and Setting

The retrieved studies originated in six countries or regions, to wit: The United Kingdom (n=15), United States (n=1), Australia (n=11), Canada (n=2), and one each from the Netherlands and Scandinavian countries (Denmark, Norway, and Sweden). The majority of studies were conducted with patients aged 65 years or older. The studies were conducted in hospitals, including elderly care units or older persons’ wards, medical, orthopedic, trauma, geriatric, oncology, respiratory, or gastrointestinal wards. Some studies did not specify ward type or were carried out across several wards. A detailed description of the studies that were reviewed is presented in [Table 1](#).

Designs of Included Studies

Studies adopted a range of research designs including clinical audit studies,^{29,33,37} quasi-experimental studies^{34,35,58} randomized cluster trials,⁵² pilot studies,^{36,40,46} prospective or controlled prospective (cohort study or before and after comparative intervention) studies,^{41,48} pre-post observational,⁶¹ and quantitative³⁹ and qualitative studies.^{44,45,47,50,51,54–57,59,60}

Studies drew on diverse conceptual approaches ranging from participatory action research to frameworks promoting action on research implementation in health services (PARIHS),^{38,42,49,53} rapid spread clinical change methods,⁴³ and collaborative best practice implementation studies.³⁰ A variety of data collection methods were

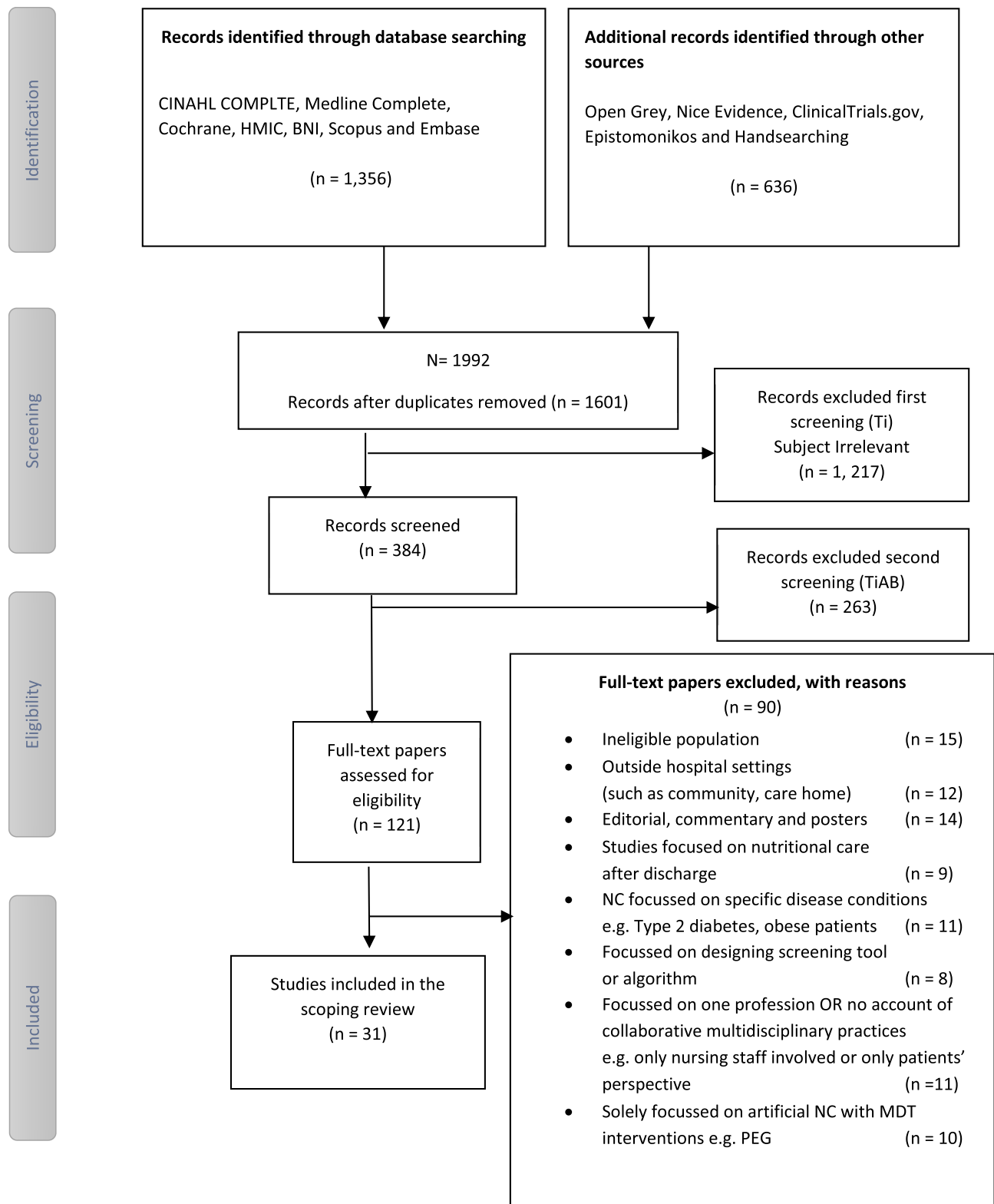


Figure 1 PRISMA diagram. Search strategy and study selection process.

Notes: PRISMA figure adapted from Liberati A, Altman D, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Journal of clinical epidemiology*. 2009;62(10). Creative Commons.⁷⁷

Abbreviations: NC, nutritional care; MD, multidisciplinary; MDT, multidisciplinary teams; PEG, percutaneous endoscopic gastrostomy.

Table 1 Characteristics of Included Studies

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Carson and Close (1996) ²⁹ United Kingdom	To examine the nutritional care received by patients, identify key areas, and develop an audit tool	Collaborative multidisciplinary exploratory clinical audit study	Community hospitals Ward not specified	Meal environment (meal support and eating support) Food modification Documentation Education Referral	Nursing Dietetic Catering and Patients	Collaborative practice based on expertise to examine, develop an audit tool, oversee the process and analyses result	<ul style="list-style-type: none"> • Commitment and enthusiasm were necessary components for project success • Requirements for nutritional adequacy, documentation and recording of nutritional assessments were met. • Nurses' nutritional knowledge base, patients' perceptions of the meal service, and good nutritional practice were fair, requiring further essential training. • Managers, nurses, dietitians, catering staff and clinical audit staff, are required in the provision of a collaborative nutritional care approach
Gee et al. (1998) ³³ United Kingdom	To provide a multidisciplinary approach to nutritional status with the objective of developing a concise assessment tool identifying the nutritionally at-risk patients	Pilot study, Nutritional Risk audit tool development	Elderly care unit	Nutritional assessment	Speech and Language therapist, Dietitian, Nursing staff	Multidisciplinary group formed to develop an assessment tool Re-educative strategy for day and night nursing staff to use the assessment tool Biweekly team meeting	<ul style="list-style-type: none"> • Multidisciplinary team approach awareness within the unit. Re-design of a more clearly defined nutritional assessment risk score tool

<p>Biernacki and Barratt (2001)³⁴ United Kingdom</p>	<p>To establish whether self-feeding could be prolonged by using foods that could be picked up rather than a meal that required the use of utensils</p>	<p>Quasi-experimental 6-year period Patient BMI scores</p>	<p>Long-stay Ward</p>	<p>Nutritional assessment Therapeutic diet Assessment Meal environment (eating support)</p>	<p>Nurses, Dietitian, Speech and Language therapist Caterers, Occupational therapist Medical personnel</p>	<p>Qualified Nursing staff training on swallowing difficulties and management and use of assessment tool Including training in the use of fluids thickening product with varying consistency for easy swallow</p>	<ul style="list-style-type: none"> ● Increased fluid intake with significantly less distress for patients ● Increased confidence of staff when assisting to feed patients and BMI scores reflected weight gain ● Outcomes shows undernutrition can be reversed and patients with dementia can have improved nutritional status
<p>Robinson et al. (2002)³⁵ United States</p>	<p>The purpose of the study was to determine if hospitalized elders would consume a greater proportion of their meals if they receive feeding assistance from trained volunteers</p>	<p>Quasi-experimental 2-month period Meal Mates records of Patient's percentage of the entire tray (food and fluids, consumed at each meal), and feelings regarding the experience</p>	<p>Medical Unit</p>	<p>Mealtime assistance and Food intake</p>	<p>Meal volunteers, nurses, Dietitian, speech therapist, and occupational therapist</p>	<p>Knowledge transfer and training In-service training taught by an interdisciplinary team composed of 4 nurses, a dietitian, a speech therapist, and an occupational therapist Followed by assessment of food chart recording</p>	<ul style="list-style-type: none"> ● Improved patient intake. Job satisfaction from volunteers and general assistance to the nursing staff. ● Patients fed by the volunteers nearly doubled their intake over those fed by nursing staff
<p>Hayward (2003)³⁶ United Kingdom</p>	<p>To evaluate the effectiveness of new nutrition coordinator role to both patients and staff</p>	<p>Pilot study Six months Questionnaire, Audit report Patient charts</p>	<p>Medical Ward</p>	<p>Nutrition monitoring, Malnutrition risk screening Meal environment (food ordering, meal service, food waste)</p>	<p>Catering Dietetics Speech and language therapy Nursing Management Ward manager</p>	<p>Collaborative effort by the team to create a new role to address the nutritional needs of patients Introduction of the new coordinator's role designed with ongoing support from the clinical team and nutrition nurse Enhanced communication between Ward and catering department</p>	<ul style="list-style-type: none"> ● Key success factor was the role of the nutritional coordinator in assisting in facilitating the administration of the patient's nutritional needs specialist ● The role demonstrated a significant impact on nutritional screening, nutritional service, patients' perceptions of their nutritional care and staff satisfaction

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Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Richmond (2007) ³⁷ United Kingdom	To develop the role of a Ward housekeeper within a multidisciplinary team	Clinical audit and using nutrition practices as a KPI	All Wards (Not specified)	Meal environment, nutrition, and stores management	Matrons, nurses, dietitians, speech and language, catering facilities managers and service users	Multidisciplinary meetings and agreed on a six-point plan for all staff to follow	<ul style="list-style-type: none"> • Multidisciplinary working between catering, facilities, dietetics, and nursing staff has improved the quality of service for patients • The development of the housekeeper service within a corporate, multidisciplinary framework has had a beneficial effect on patients 'nutrition and a positive impact on the patient experience in relation to the meal environment
Dickinson et al. (2005) ³⁸ United Kingdom	To improve the nursing care that older people received at mealtimes	Action Research Action learning, role modelling, good practice and reflection Focus groups with staff, interviews with patients, six mealtime observations and benchmarking	Older persons' Ward (Not specified)	Mealtime environment and mealtime nursing practice	Healthcare assistants, nursing staff and occupational therapist and physiotherapist	Educational sessions for staff engagement to prioritize patient's mealtime Collaboration between nursing staff healthcare assistants, occupational therapy, and physiotherapy to identify problems of poor nutrition	<ul style="list-style-type: none"> • Significant staff engagement and involvement in prioritizing mealtimes, ensuring that there were sufficient time and expertise available to assist patients with eating • Ward staff made several changes to their nursing practice

Thoresen et al. (2008) ³⁹ Scandinavia	To investigate whether doctors and nurses on units with greater access to clinical dietitians had a greater interest and focus on clinical nutrition.	Quantitative Questionnaire Survey	Hospital staff focused. (Ward not specified)	Nutritional support via referral from the perspective of staff	Doctors, nurses, and clinical dietitians working in hospitals	Collaborative questions retrieved Multidisciplinary perspective retrieved on the evaluation of nutritional status, the use of enteral and parenteral nutrition, the allocation of responsibility and measures in the unit and education, knowledge, and routines	<ul style="list-style-type: none"> Reported findings indicate that in general, doctors and nurses do not acknowledge the expertise of the clinical dietitians Findings show that doctors and nurses on Wards with greater access to clinical dietitians had better focus on clinical nutrition
Brown and Jones (2009) ⁴⁰ United Kingdom	To ensure that patients in hospital receive nutritional care in a timely and comfortable manner	Pilot study Implementing the dining companion initiatives	Hospital Two Wards (Not specified)	Eating support	Volunteers speech and language therapy dietician departments nursing staff	<p>Interactive training workshop led by speech and language therapist and dietitians</p> <p>Volunteers assisted with feeding</p> <p>Speech and language therapists liaised with nursing staff to ensure support and advice was available for nursing staff</p> <p>Dietitians education for nurses on safe eating and drinking techniques</p>	<ul style="list-style-type: none"> Reluctant eaters ate well and 'appeared' to benefit from extra time and attention Evidence of improved patient care from the nursing staff was reported. Nurses reported feeling more supported in the aspects of mealtime Findings indicate that volunteers working as dining companions can provide valuable support in helping to maintain patients' nutritional status

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Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Hoekstra et al. (2011) ⁴¹ Netherlands	To determine the effectiveness of a multidisciplinary intervention program on nutritional intake and of nutritional intake on nutritional status and quality of life in older patients treated for a hip fracture	Controlled prospective cohort study Food records	Trauma Ward	Malnutritional risk screening, nutritional assessment and eating support	Nurses, doctors, and dietitians Feeding assistant	Clearly defined roles for nurses, doctors, and dietitians	<ul style="list-style-type: none"> • A multidisciplinary post-operative approach of nutritional care was associated with an increase of energy and protein intake during hospitalization • Multidisciplinary nutritional care strategy reported to have increased the intake of energy, protein, vitamin D, zinc and calcium in the immediate postoperative period compared to standard nutritional care. • The intervention group appeared to experience a significant beneficial effect on the quality of life and nutritional status according to the MNA after three months follow-up compared to the control group.

<p>Macdonald et al. (2012)⁴² United Kingdom</p>	<p>To identify opportunities for and to develop and prototype a new food and nutritional management system able to meet individual patients' daily requirements</p>	<p>Participative people-centered action research method, ethnography and workshop-based methods</p>	<p>Hospital Ward not specified</p>	<p>Meal environment. Meal support</p>	<p>Design researcher, food scientists, dietitians, medical sociologist, ergonomists, computer scientists, technologists, food producers, caterers, Ward staff, nurses, physicians, speech, and occupational therapists</p>	<p>Iterative multidisciplinary co-design process and testing of an electronic nutritional management and monitoring system</p>	<ul style="list-style-type: none"> • The evaluation and trialing proved that the 'hospital foodie' prototype could deliver effective improvements in ward-based nutritional care. • The outcome of the whole team's efforts through a structured and iterative approach to innovation was reported greater than the sum of normally separate contributions from a different discipline
<p>McKeane (2012)⁴³ United Kingdom</p>	<p>To enhance patient care and dignity while ensuring all patients are supported to have adequate nutrition and hydration</p>	<p>Rapid Spread clinical change methods</p>	<p>Across all Wards (not specified)</p>	<p>Nutrition assessment</p>	<p>Nursing staff, dietitians, radiographer, speech and language therapists and representatives from the catering and communication departments</p>	<p>Multidisciplinary project team was set up consisting of key stakeholders that included nurses. Staff explored solutions and solve issues as a team and communicated to the rest of the trust the changes they had brought about</p>	<ul style="list-style-type: none"> • Improvement in patient care as a result of more robust nutritional assessment • Patient satisfaction has improved. Staff now feel empowered to make the changes required to deliver on aspects of patient nutritional care

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Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Walton et al. (2012) ⁴⁴ Australia	To explore current practices of foodservice provision in Australian hospitals. To determine the key barriers to adequate dietary intakes. Prioritize the most practical interventions for ongoing improvements to foodservice provision	Qualitative Survey Focus Groups	Hospital (184 hospitals participated) Medical and rehabilitation Wards	Nutritional Support	Dietitians, nurse unit managers and food service managers	Multidisciplinary inquiry via a web-based questionnaire	<ul style="list-style-type: none"> • Significant agreement between stakeholders regarding many key barriers and priority interventions for improvement • A lack of feeding assistance, limited variety and inadequate flexibility of food service were the key barriers identified • Food fortification, assistance with packaging, additional feeding assistance by nurses, non-nursing feeding assistance and further nutrition assessment were key priorities for improvement

<p>Cooper (2013)⁴⁵ United Kingdom</p>	<p>To investigate current practice at Ward level regarding adherence to a care plan generated from a nutrition screening tool, improve basic nutritional support actions by modifying a care plan and finally evaluates the change in practice</p>	<p>Qualitative study Focus groups</p>	<p>Hospital</p>	<p>Malnutrition risk screening Nutritional care plans</p>	<p>Staff nurse, clinical support worker, Student nurse assistant practitioner, sister, dietitians Ward staff</p>	<p>Multidisciplinary perspectives via Focus group discussion Focus groups allowed engagement with Ward staff to explore how care plans were used, which assisted in re-designing the care plan</p>	<ul style="list-style-type: none"> Themes regarding barriers and facilitators for completion of care plans were derived from the focus groups, including: 'duplication,' 'time pressures,' 'leadership support,' 'operational issues,' 'documentation style' and 'training.' Nutritional support actions increased from 13 (9%) to 98 (52%) for moderate or severe malnutrition risk patients. The study showed that completion rates of an ICP could be improved by involving staff in the development of documentation
<p>Farrer et al. (2013)⁴⁶ United Kingdom</p>	<p>To evaluate the practice of nutritional screening using MUST in elderly care wards, and to assess whether healthcare improvement methodology can address any discrepancies in nutritional screening that may be apparent</p>	<p>Random pilot study MUST scores records</p>	<p>Hospital care of the elderly' Wards</p>	<p>Malnutrition risk screening</p>	<p>Senior nursing leads, Ward managers, nurses and auxiliary staff catering and dietetic staff</p>	<p>The Steering team to examine six-month retrospective data and collectively evaluated the project team Baseline 'MUST' data was documented in <60% of patients within six hours of admission, of which only 70% were accurate.</p>	<ul style="list-style-type: none"> All the Wards achieved an improvement and documented MUST within six hours of admission; one Ward achieved 90% accuracy in the scores. Ward teams receiving training and monthly feedback of their results created ownership, momentum and maintained enthusiasm for striving to reach stretch targets

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Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Heaven et al. (2013) ⁴⁷ United Kingdom	To understand and describe processes that promote or inhibit nutrition in hospital	Qualitative Interviews and focus groups	Hospital staff focused (not specified)	Meal support and eating support (Food work and feeding assistance)	Catering managers, catering staff, consultants senior nursing, health care assistant, housekeeper, staff nurse, occupational therapist, physiotherapist, dietitian, speech & language therapist, stakeholder representatives patients and carers	Perspectives via Interviews with health care professionals. Interpersonal engagement through feeding assistance and reassurance and the arrangement of resources that facilitate meals such as the preparation of food trolleys	<ul style="list-style-type: none"> Findings demonstrate how food work is overlooked by being conceptualized as common sense and as one of the most mundane and elementary tasks in hospitals Food work constituted two overlapping spheres of activity: interpersonal engagement through feeding assistance and reassurance and the arrangement of resources that facilitate meals such as the preparation of food trolleys
Young et al. (2013) ⁴⁸ Australia	To implement and compare three interventions designed to specifically address mealtime barriers and improve energy intakes of medical inpatients aged 65 years	Prospective study	Hospital	Meal support and eating support	Dietitian, dietetic assistant, nursing staff other Ward staff	Clearly defined roles collaborative working between dietitians, dietetic assistants, and nursing staff	<ul style="list-style-type: none"> Findings suggest improving mealtime assistance by enhancing the mealtime involvement of existing staff across disciplines may be as effective as introducing a dedicated feeding role

<p>Bell et al. (2014)⁴⁹ Australia</p>	<p>To investigate the impact of individualized nutritional care on nutrition intake and outcomes in patients admitted to a metropolitan hospital acute hip fracture unit</p>	<p>A prospective, controlled before and after comparative interventional study using an action research-based approach Records of anthropometric measurements Records of nutritional assessment</p>	<p>Hospital Orthogeriatric unit</p>	<p>All aspect</p>	<p>Orthopaedic and geriatric consultants, surgical and medical registrars and resident medical officers, nursing staff, senior and junior physiotherapists and occupational therapists, a senior dietitian, a social worker, a pharmacist, healthcare assistant staff, and operational staff</p>	<p>Case-conferencing and daily board rounds (Monday Friday) attended by multidisciplinary staff to support integrated patient care and discharge processes</p>	<ul style="list-style-type: none"> • Multidisciplinary nutritional care reduced intake barriers and increased total 24-h energy • Multidisciplinary nutritional care improves nutrition intake and outcomes in acute hip fracture inpatients
<p>Keller et al. (2014)⁵⁰ Canada</p>	<p>To identify enablers and challenges and, specifically, the activities, processes, and resources, from the perspective of nutrition care personnel, required to provide quality nutrition care</p>	<p>Qualitative study Focus group discussion</p>	<p>Hospital staff focused. (not specified)</p>	<p>All aspect of nutritional care focused on barriers</p>	<p>Dietitians, dietetic interns, diet technicians and menu clerks</p>	<p>Multidisciplinary perspectives via focus group discussion</p>	<p>Five themes reported regarding the nutrition care process.</p> <ul style="list-style-type: none"> • Developing a nutrition culture, • Using effective tools • Creating effective systems to support the delivery of care • Being responsive to care needs • Uniting the right person with the right task

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Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Roberts et al. (2014) ⁵¹ United Kingdom	To determine the feasibility and acceptability of using trained volunteers as mealtime assistants for older hospital inpatients	Qualitative study Focus group and interviews	Hospital	Mealtime support Eating support	Volunteers, patients, and nursing staff, speech and language therapist	Multidisciplinary training	<ul style="list-style-type: none"> Changes in practice including hospital senior nursing therapy, and dietetics teams continue training and assessment of competency of volunteers Senior Ward nursing staff takes on role to identify suitable patients for assistance, supporting the volunteers as part of the Ward team
Schultz et al. (2014) ⁵² South Australia	To evaluate a multifaceted nutritional intervention implemented across a metropolitan hospital	Randomized cluster trial	Hospital	Malnutrition risk screening	Nursing staff, dietitian and other staff groups not defined	Nurse-dietitian pairs as facilitators The intervention involved staff education and training on the use of MUST tool Changes to hospital policy on nutritional screening using 'MUST' Provided patients with nutritional supplements and feeding assistance ('red trays')	<ul style="list-style-type: none"> Implementation of a multifaceted nutritional screening was facilitated by the stepped wedge design and led to improved screening rates and patients being weighed by nurses on a weekly basis

Mudge et al. (2015) ⁵³ Australia	To engage the interdisciplinary care team to recognize the care needs of older patients, recognize care gaps, and take responsibility for local, sustainable solutions	Implementation study Promoting Action on Research Implementation in Health Services (PARiHS) framework	General medical Ward	Eating support	Physician, medical officers, physiotherapist occupational therapist, social worker, nurse unit manager, nutritionist, and speech therapist	Partnership between a treating team who met daily with the medical and Ward-based nursing staff to discuss patients' care and discharge planning	<ul style="list-style-type: none"> The audit showed improved nursing documentation in targeted domains during the first 18 months and improved performance of mobilizing and cognitive strategies; length of stay for older inpatients fell by 3 days on the intervention Ward
Robison et al. (2015) ⁵⁴ United Kingdom	To obtain multiple perspectives on nutritional care of older inpatients, acceptability of trained volunteers and identify important elements of their assistance	A qualitative study Semi-structured interviews and focus groups	Acute Wards	Mealtimes environment Meal support Eating support	Health care assistant, staff nurse, Ward Sister, matron, housekeeper, volunteers and relatives	Multidisciplinary perspectives via interviews and focus groups	<ul style="list-style-type: none"> The introduction of trained volunteers was perceived by staff and patients to have improved the quality of mealtimes care by preparing patients for mealtimes, assisting patients who needed help, and releasing nursing time to assist dysphagic or drowsy patients Reported factor for success was if a good relationship and a sense of teamwork can develop between Ward staff and volunteers

(Continued)

Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Collins et al. (2017) ⁵⁵ Australia	To explore, from the perspective of hospital foodservice staff, their experiences of delivering a nutrition intervention and the barriers and enablers to its implementation	Parallel controlled qualitative pilot study Focus groups and semi-structured interviews	Hospital food service staff	Meal support/ food service	Foodservice staff, foodservice assistants, and supervisors	<ul style="list-style-type: none"> Multi-perspectives via interviews and focus groups 	<p>Five key themes were reported.</p> <ol style="list-style-type: none"> i. Environmental factors ii. Characteristics of the nutrition intervention iii. Responses of the patients, iv. Implementation process factors, v. Characteristics of the foodservice staff <ul style="list-style-type: none"> Aspects of the foodservice environment and patients' resistance were barriers to implementation and perceived sustainability. Teamwork, problem solving, leadership and job satisfaction were enablers Characteristics of foodservice staff, including their knowledge, beliefs and perceptions of diet, health, and their job role, had the potential to influence their behaviors and decision making

<p>Laur et al. (2017)⁵⁶ Canada</p>	<p>To understand how staff members perceived and described the necessary ingredients to support change efforts required to improve nutrition care in their hospital</p>	<p>Qualitative study focus groups</p>	<p>Hospital staff focused. (not specified)</p>	<p>Nutritional care practice</p>	<p>Nurses, physicians, food service workers, dietitians, and hospital management</p>	<p>Multidisciplinary discussion regarding ways to improve nutrition</p>	<ul style="list-style-type: none"> • Five main themes identified: <ol style="list-style-type: none"> i. Building a reason to change ii. Involving relevant people in the change process iii. Embedding change into current practice iv. Accounting for climate and v. Building strong relationships within the hospital team • Participants described key ingredients to support successful change and specifically engaging the interdisciplinary team to effect sustainable improvements in nutrition care
<p>Egiseer et al. (2018)⁵⁷ Australia</p>	<p>To determine the effect of the use of a valid and reliable malnutrition screening tool as part of an existing electronic documentation system in a hospital to assess the knowledge, attitudes, and perceived practices (KAP) of nurses, nurses' aides, and physicians regarding malnutrition</p>	<p>A controlled qualitative study Questionnaire</p>	<p>Hospital staff focused. (Ward not specified)</p>	<p>Malnutrition risk screening</p>	<p>Nurses, nurses' aides, and physicians</p>	<p>Multidisciplinary perspectives via interviews and focus groups</p>	<ul style="list-style-type: none"> • Implementation of a validated malnutrition screening tool helped improve the KAP of healthcare staff • KAP reported as key components for successful nutritional care in malnourished patients.

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Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Howson et al. (2018) ⁵⁸ United Kingdom	To evaluate the wider implementation of a mealtime assistance programme	Mixed methods prospective quasi-experimental study Questionnaire Interviews and focus group	Across 9 Medicine for Older People' Wards	Mealtime Environment Meal support Eating support	Patients, volunteers, Ward managers, student nurse and housekeepers	Multi-perspectives via interviews and focus groups	<ul style="list-style-type: none"> • Patients and nurses universally valued the volunteers, who were skilled at encouraging reluctant eaters • Training was seen as essential by volunteers, patients, and staff. • The volunteers released potential costs of clinical time equivalent to a saving of £27.04/patient/day of healthcare assistant time or £45.04 of newly qualified nurse time above their training costs during the study

<p>Byrnes et al. (2019)⁵⁹ Australia</p>	<p>To explore staff perceptions about barriers and enablers to practice change aligning with nutrition-related recommendations from ERAS guidelines</p>	<p>Qualitative study Interviews</p>	<p>Hospital staff focused. (Ward not specified)</p>	<p>Nutritional care policies</p>	<p>Surgical consultants, registrar, intern; anaesthetist; nurse unit managers, surgical nurse coordinator, nurses, and dietitians</p>	<p>Multidisciplinary perspectives via interviews</p>	<ul style="list-style-type: none"> • Three major themes were identified: <ol style="list-style-type: none"> Complexity of the context (unpredictable theatre times, the requirement for flexibility and large, multidisciplinary workforce) Strong decision-making hierarchy, combined with lack of knowledge, confidence, or authority of junior and non-surgical staff to implement change; and Poor communication and teamwork (within and between disciplines) • Proposed change processes and ongoing communication to establish adequate monitoring and feedback processes
<p>Ottrey et al. (2019)⁶⁰ Australia</p>	<p>To explore the relationships, roles, and responsibilities of staff involved at hospital mealtimes, and their impact on nutrition care</p>	<p>Qualitative Study Observations and interviews</p>	<p>Hospital staff focused. (Ward not specified)</p>	<p>Mealtimes, and the influences on meal provision</p>	<p>Nurses, dietitians, speech pathologists, physiotherapists, occupational therapists, social workers, food and support services, and administration staff</p>	<p>Multidisciplinary perspectives via interviews</p>	<p>Three themes describing Ward culture and staff relationships reported:</p> <ul style="list-style-type: none"> • Defining mealtime roles and maintaining boundaries • Balancing the need for teamwork and having time and space • Effective communication supports role completion and problem-solving

(Continued)

Table 1 (Continued).

Author Year & Country	Study Aim/Purpose	Type of Study/ Method	Setting Hospital Ward identified	Component of the Food and Nutritional care examined	Discipline involved	Multidisciplinary Interventions/ Approach and Collaborative activities	Key outcomes reported
Roberts et al. (2019) ⁶¹ Australia	To develop, implement, and evaluate a multifaceted, tailored intervention to improve nutrition care, delivery, and intake among acute medical inpatients	Pre-post observational study	Acute Medical Unit	Food intakes, and the mealtime environment	Nurses, patients, doctors, and foodservice staff	Multidisciplinary co-development of intervention with key stakeholders which was a multifaceted and targeted individual, Ward, and organizational levels Multidisciplinary hospital staff training	<ul style="list-style-type: none"> • Significantly higher patients' mean energy and protein intakes and the number of patients eating adequately doubled • Implementation alongside hospital staff and patients reported being effective in improving nutrition practices and patient nutrition intakes on an acute medical ward • Increased awareness of nutrition among staff groups and a change in Ward culture regarding nutrition were reported

<p>Sykes et al. (2019)³⁰ Australia</p>	<p>To improve mealtime assistance (MTA) where needed to patients on a general medical Ward</p>	<p>Collaborative best practice implementation study (audit, feedback, and re-audit). Observation, combined focus groups of nursing and food service staff</p>	<p>Medical Ward</p>	<p>Meal delivery Nutritional assessment Meal environment Meal assistance</p>	<p>Nursing staff, food services officers, dietetics, volunteers, and representation from the centre for education and research</p>	<p>Staff education program Multidisciplinary teams to revise systems and processes to ensure that patients receive adequate and timely MTA</p>	<ul style="list-style-type: none"> • Reported significant improvements in the provision of MTA attributed to improved collaboration, communication, and cooperation between nursing and food services; clearly defined roles and responsibilities; increased patient assessment of the level of MTA system and protected mealtime period • Changes in mealtimes from chaos to calm with the widespread support and buy-in from key stakeholders. • The collaborative approach to barriers taken by the nursing and food services teams reported as critical to success
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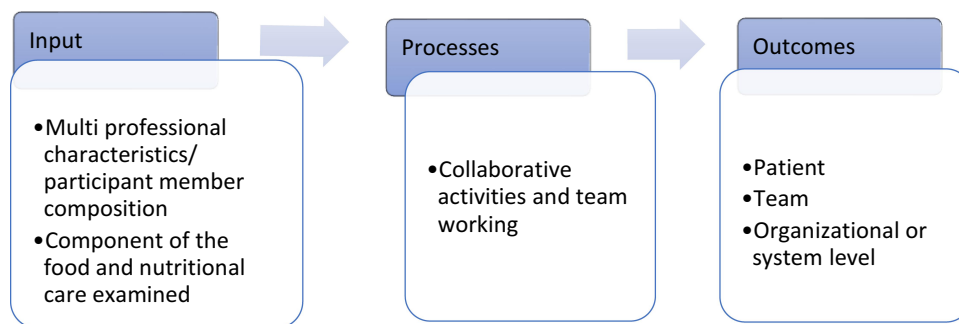


Figure 2 Application of input-process-outcome (IPO) framework.

employed. These included surveys focus groups, meetings and discussions, face-to-face and telephone interviews, observations (structured and semi-structured), questionnaires, meeting reports, and patients' medical records and data records from malnutrition screening and assessment (such as weight and height measurement).

As described in the data presentation section, the review findings are reported using the three-category framework of input, process, and outcome as a basis for categorizing and interpreting the evidence for collaborative working (see Figure 2).⁶² The term Input here refers to the contextual influences on collaborative working and, in this case, it includes the characteristics of the different disciplines and the aspects of nutritional care explored. The Process involves interactions between the participating team members and activities through which nutritional care is delivered in collaboration between different groups. The Outcomes consider the multidisciplinary activities' results and impact at the patient, team, and organizational levels. It considers the extent to which the intervention has informed, improved the way nutritional care is provided (such as satisfaction and commitment).⁶²

Input: Disciplines Involved and Aspects of Nutritional Care Explored

Multidisciplinary collaborations were mostly reported descriptively with a representation ranging between three or more different participant groups. A wide range of disciplines, including patients, relatives, and volunteers, were observed to have participated. All of them contributed to different aspects of nutritional care, depending on the objective of individual studies.

Nutritional care practices were examined from staff perspectives to understand the attributes that support change efforts towards improvement in several studies. For example, Laur et al,⁵⁶ involved nurses, physicians, food service workers, dietitians, and hospital management staff. Whereas Brown and

Jones⁴⁰ included meal volunteers, speech and language therapists, and dietetic and nursing staff in a study that highlighted the importance of meal volunteers' roles in ensuring patients receive nutritional care in a timely and comfortable manner.

The participants in the 31 studies comprised the following: registered nurses (n=26), dietitians (n=23), physicians (n=12), speech and language therapists (or speech pathologists) (n=12), occupational therapists (n=8), housekeepers (n=2), and social workers (n=3). Physiotherapists, healthcare assistants, and nursing assistants each participated in five studies while catering, and food production staff were reported to have participated in 13 studies.

The involvement of ward managers, unit leaders, and their assistants in promoting nutritional care practices is reflected in 11 studies. Also represented are the facilities staff, catering staff, student nurses, dietetic assistants, dietetic interns, nutritionists, pharmacists, food design researchers, radiographers, and food and service staff. Members of these professions were less frequently cited. Other auxiliary staff were not explicitly defined but were reported to have participated in two studies. Figure 3 summarizes the distribution of disciplines in the retrieved studies from the most represented to the least represented.

The most frequently cited professions were registered nurses (n=26), who were involved in all aspects of nutritional care, except in studies whose aim was role-specific or when nurses did not play a key role in delivering the intervention being implemented. For example, nurses were not included in a study that sought to identify factors influencing hospital food services from the perspective of management staff (who supervise and complete administrative responsibilities), food service staff, and food service assistants (responsible for serving, delivering meals, and keeping the kitchen areas clean). Notably, nurses and dietitians are the most common participants in the same studies.

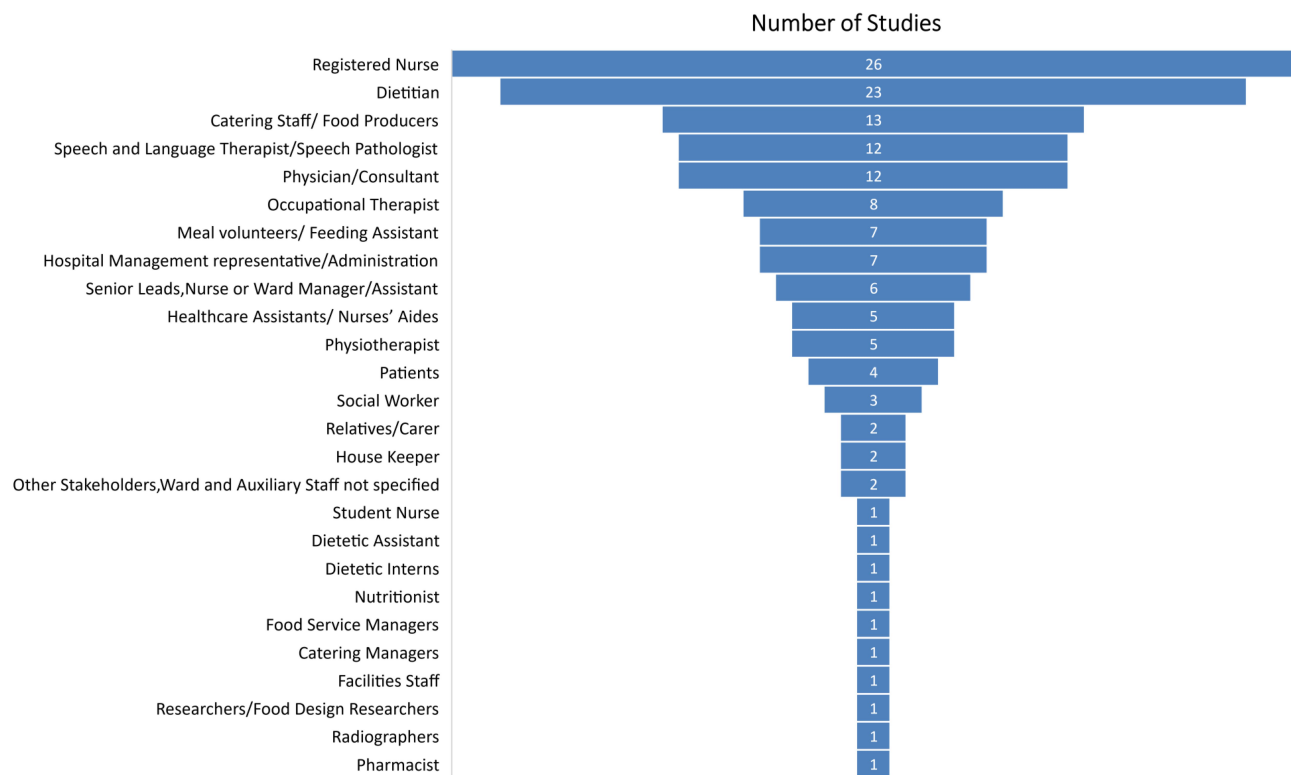


Figure 3 Distribution of disciplines in the retrieved studies.

Meal volunteers and feeding assistants participated in seven studies; relatives or carers in two; and patients in five studies. In these studies, meal volunteers and feeding assistants mostly assisted patients during mealtimes, while patients' and relatives' participation involved sharing their experiences of nutritional care provision. Although the studies adopted collaborative approaches, the associations between participant input, processes, and outcomes were not their primary research aim.

The component of food and nutritional care explored varied depending on the aim of the study. Generally, the studies either focused on one or a combination of two or more aspects of the various components, processes, and products of nutritional care interventions, as grouped by the ESPEN guidelines (2017).²³ Fifteen studies reported on the forms and products of nutritional care, such as changes in the meal environment, including meal support and eating support, to meet patients' nutritional needs.^{35,38–40,42,44,47,48,51,53–55,58,60,61} Eight studies specified on nutritional care processes such as malnutrition risk screening, nutritional assessment, and documentation.^{33,43,45,46,52,56,57,59} Similarly, eight studies reported on both the forms and nutritional care processes.^{29,30,34,36,37,41,49,50}

Although different research approaches were used, the majority of studies had a similar focus on efforts to promote patients' food intakes, including feeding support and the meal environment. While most retrieved studies were conducted in the UK, the distribution of studies across other countries is significantly small in comparison. Also, it is notable that the studies that included patients or relatives or volunteers were mainly set in the UK,^{29,40,51,54,58} with one each in Netherlands,⁴¹ United States³⁵ and Australia.³⁰

Process: Collaborative Activities and Processes

Review findings indicate there are common characteristics of staff's activities, processes, and interactions across different disciplines in the provision of nutritional care. These include co-design of nutritional care interventions, clarifying roles and responsibilities, developing existing roles (or creating a new role) to support ward processes, staff training and development, communication and information sharing, and clinical leadership support in the process of implementation.

Findings indicate that nutritional care interventions were either co-designed with or in consultation with

other disciplines.^{29,30,33,36,37,52,64} For example, in an exploratory clinical audit study, a multidisciplinary group was formed consisting of the nursing, dietetic, and catering staff to examine the nutritional care practices. This also included the patients' nutritional adequacy, documentation, and records of nutritional assessments, as well as nurses' nutritional knowledge base, which resulted in the development of an audit.²⁹ Similarly, Roberts et al,⁶¹ reported on a multifaceted intervention in which nutritional barriers were assessed. In response, color-coded nutrition intake magnets were placed at patient bedsides to identify those at risk of malnutrition. Foodservice system changes were implemented (breakfast meal timing), and discipline-specific staff training (co-developed by a multidisciplinary team) was provided at the ward level to nurses, doctors, and food service staff.

The co-creation and introduction of a new role or the development of an existing role were reported in studies with the aim to facilitate practice-based activities in delivering nutritional care on the wards.^{30,36,37} For example, upon identification of concerns specific to nutritional care practices on the ward, a multidisciplinary team consisting of nursing, dietetics, speech and language therapy, catering, occupational therapy, and management staff created the ward nutrition coordinator's role to facilitate nutritional care through the ward team. Similarly, in another study, the ward housekeeper's already existing role was expanded and incorporated within the multidisciplinary team to enhance nutritional care coordination.³⁷ As exemplified in research by Sykes et al,³⁰ the clarification of roles and responsibilities was reported to have facilitated improvement during mealtimes and in assisting patients. However, while team roles and responsibilities were entrusted to staff, supervision and "fallback" roles were introduced in the cases when the delegated staff member was unavailable to perform the required task.

To enhance knowledge and skills, training was delivered in different ways depending on the intervention being implemented. Nine studies reported and utilized training and education-based activities to enhance knowledge and develop skills in providing nutritional care.^{30,34,35,38,40,41,48,52,61} In a study undertaken to determine whether hospitalized older adults (mean age 78.2 years) would consume a more significant proportion of their meals when given feeding assistance by trained volunteers, Robison et al,⁵⁴ provided multidisciplinary training delivered by a team comprising nurses, a dietitian, a speech and language therapist, and an

occupational therapist. The study aimed to support volunteers in recognizing the complexities of feeding and developing the skills required to assist patients better. Dietitians provided specific training to nurses aimed at increasing awareness of patients' dietary intake.⁴¹ In other research, facilitator pairs⁵² were used that included a nurse and a dietitian who led the intervention. They educated and trained staff on using the Malnutrition Universal Screening Tool ("MUST") to support the implementation of feeding assistance. The facilitator pairs also worked with the hospital kitchen staff to introduce the use of red trays that identifies patients who require help at mealtimes.

To communicate and discuss ways of improving patients' nutrition care, multidisciplinary team meetings, discussions, and feedback sessions were reported in thirteen studies and used to explore solutions and solve issues as a team.^{30,39,44,45,47,50,54-60} To explore multidisciplinary perspectives in identifying barriers and facilitators to various aspects of nutritional care, thirteen studies adopted research group interaction methods (focus group, discussion forums) and interviews and questionnaires. For instance, Cooper⁴⁵ facilitated communication between stakeholders to investigate current practice at the ward level regarding adherence to a care plan, leading to the redesigning of the care plan. Similarly, two studies deployed practice-based multi-professional information-sharing activities such as patient records documentation (food and fluid).^{30,41} The influence of clinical leadership on the team was specified and identified to contribute to shaping team processes and multidisciplinary collaborations in delivering nutritional interventions.^{54,55} Related to this is commitment and enthusiasm from clinical staff reported in two studies as an essential component in the process of providing nutritional care.^{29,51}

Outcomes: Reported Outcomes of Collaborative Nutritional Care

The reported outcomes identified from the studies are grouped into three categories according to the intervention level; these are outcomes at the patient, the team, and the organizational levels. Patient level outcomes are exemplified in studies that observe modifications to patients' nutritional status and perception of satisfaction. Staff outcomes were evident in studies that reported changes in staff knowledge, skills, perceived satisfaction, and perceived impact of the interventions. The extent to which the

intervention informed, changed or improved nutritional care provision is represented at the organizational level.

Patient Level

Patients' access to improved quality of service, nutritional support actions, and practices was reported to have significantly increased.^{39,41,48,50} Patient outcomes were specifically described in twelve studies that reported outcome measures including increases in dietary energy and protein intakes, improved overall nutritional status, and patient responses such as their satisfaction with improved nutritional support and overall quality of care.^{34,35,37,40,41,43,49,51–54,61}

However, with regards to patients' nutritional care, only two of the studies reported the association between the multidisciplinary approach and patient outcomes. A controlled prospective cohort study⁴¹ analyzed the effectiveness of a multidisciplinary intervention on nutritional intake and the quality of life of older patients. They reported an increase in dietary energy and protein intake in patients who received multidisciplinary nutritional care (including nutritional support during hospitalization) as compared to patients who received the standard nutritional care where nutritional support was seldom provided. However, their findings found an association between multidisciplinary nutritional care and body cell mass (one of the parameters they measured). Bell et al,⁴⁹ reported higher increases in protein and energy intake with multidisciplinary care compared with individualized care indicating an overall better and improved patient outcome.

Team Level

Team level outcomes were reported in 15 studies and are grouped into four main categories.

Commitment, Enthusiasm and Enhanced Ownership to Improve Nutrition Care

In one study, collaborative bottom-up and solution-focused practices that involved staff throughout the process were reported to result in enhanced ownership of nutrition care. Two studies specified that the collaborative approach and the targeted nutritional training patients received resulted in increased commitment and enthusiasm among staff.^{29,46}

Increased Awareness and Confidence in Job Role

Four studies reported an increase in awareness of patients' nutrition among staff groups.^{33,38,57,61} Egelseer et al,⁵⁷ noted that healthcare staff's knowledge, attitudes, and perceived practices are key components for successful

nutritional care in malnourished patients and therefore recommended improvements for better patient outcomes. In three studies, staff confidence to assist in feeding patients³⁴ and increased job satisfaction by mealtime volunteers were reported.³⁵ One study in which staff explored solutions and solved issues as a team reported feeling empowered to make the changes required to better deliver patient nutritional care.⁴³

Support, Value and Staff Satisfaction

Three studies in which staff and volunteers were engaged and involved during mealtimes reported that both patients and nursing staff felt supported during mealtimes.^{40,43,58}

Job or Staff Role as an Indicator of Success

Two studies specified that introducing a new role³⁶ and the development of an existing role in the ward improved nutritional care delivery.⁴⁸ Farrer et al,⁴⁶ created a collaborative team and introduced a nutritional coordinator's role to facilitate the administration of patients' nutritional needs. The results demonstrated a significant impact on nutritional screening, nutritional services, patients' perceptions of their nutritional care, and enhanced staff support and satisfaction.³⁶ However, Young et al,⁴⁸ reported that existing staff's involvement across disciplines might be as effective as introducing a dedicated feeding role.

Organizational Level

Of the 31 studies, none examined the effect of collaborative working on system changes; however, twelve studies reported diverse changes made to nursing practice, including follow-up on adherence to nutritional guidelines and implementation.^{30,33,38,40,42,43,49,50,53,56–58} Studies that reported changes in practice adopted collaborative participatory and action approaches. The ward staff were reported to have made changes to nursing practice, such as better adherence to protected mealtimes and more staff engagement with prioritizing mealtimes, ensuring sufficient time and expertise to assist patients with eating support.^{30,40}

Discussion

The purpose of this scoping review was to identify and describe the features of multidisciplinary collaborative care approaches when implementing food and nutritional care interventions. The scoping review examined 31 studies and identified diverse disciplines' involvement,

including patients, relatives, and volunteers, indicating the developing evidence of collaborative working around various aspects of food and nutritional care. In summary, this review identified some collaborative activities, processes, and outcomes of multidisciplinary nutritional care in support of nutritional care practices. The findings reveal that although retrieved studies adopted collaborative approaches, examining the association of participant input, the collaborative processes, and outcomes were not the primary research aim of studies.

Features of Multidisciplinary Collaborative Care Approaches

Previous reviews have either examined the effectiveness of nutritional care,¹⁴ or the impact of specific interventions on patients' nutritional outcomes or their cost implications.⁶⁶ In contrast, our scoping review contributes to the literature in that the scope is focused on specific attributes that affect collaborative working in patients' nutritional care. This section explores the features identified to be integral to collaborative working and their implications for nutritional care.

The Involvement of Different Disciplines and Varied Aspects of Nutritional Care

Despite the policy imperative for collaborative working to improve nutritional outcomes, our review did not identify any studies that specifically examined the role of collaborating disciplines and their relationship to nutritional care processes. This finding suggests this to be a potential area for future research. However, this review demonstrates that collaborative working is evident in nutritional care provision where different disciplines and wider team, including patients, relatives, and volunteers, all contributed to these collaborations. With the exception of two studies, the composition of all the participant groups was evident and clarified. This evidence of collaborative care underscores the importance of nutritional care as everybody's responsibility.

In addition to professional healthcare providers, patients at the center of care, their families, and volunteers are key stakeholders, and they all make a valuable contribution to nutritional outcomes. The critical role of volunteers was highlighted, recognizing their contribution to patients' nutritional care. However, their involvement, as suggested from the above findings, were relatively context specific. The countries where these studies were undertaken appears to be where there is a growing recognition within regulatory

and accreditation systems on the role played by voluntary services.⁶³ This may reflect policy implications regarding nutritional care interventions for patients.

Given that public policy has been reported to impact volunteers' roles and responsibilities, effective policies and strategies for volunteering are essential, particularly for meal volunteers. Besides, previous studies have demonstrated that mealtime volunteers can be trained to provide mealtime assistance to older acute in-patients safely. This can improve the overall quality of mealtime care and benefit both patients and ward staff.⁶⁸

As healthcare providers in hospitals, health care professionals have a shared role in providing optimal nutritional care to patients. Their engagement, as well as their interrelated roles in these collaborative activities, are critical, as each discipline brings specific expertise. Hence, in collaboration, they can better understand each other's roles, plan, implement, and evaluate nutritional care (rather than doing so in isolation).⁸

The scoping review also highlights the growing evidence of collaborative working around different components of nutritional care. These not only include nutritional care processes, such as malnutrition risk screening and nutritional assessment and planning, but also involve the forms and products associated with nutritional care, such as meal environment, diets (regular hospital diet and food products), and therapeutic diets (functional and modified foods and fluids). These components reflect the recommendations found within policy and guideline documents concerning the management of malnutrition.⁶⁷ However, while nutritional care standards and guidelines are essential, their implementation requires the coordination, engagement, and collaboration of these disciplines to meet patients' needs.

Multidisciplinary Interrelationship and Role Clarity

Multidisciplinary collaboration, involving the wide range of professions identified in this review, is indicative of the complementary contributions each provides. The shared perspectives and the interrelationship between disciplines indicate that everyone plays a vital role in delivering optimal food and nutritional care.

The findings show that collaborative relationships and interdependence were evident among professionals. To coordinate ward-based nutritional care³⁶ new roles were either introduced or were developed³⁷ or delineated amongst staff, enabling collaborative working.^{41,48,49} Professional boundaries and role clarity benefit nutritional

care coordination because they enable the multidisciplinary team members to possess a clear understanding of their own roles and an appreciation of the roles performed by other team members. This mutual understanding is also likely to ensure care gaps are identified, and appropriate care is provided to achieve shared goals.⁶⁸

However, an important highlight was the notion of the interchangeability of roles in cases where roles delegated to staff or volunteers were not performed for different reasons, such as shift patterns or unavailability. For instance, when nursing staff had the fallback role of assisting patients during mealtimes, even though mealtime assistance responsibilities were delegated to other staff; in this case, nursing assistants and food services staff.³⁰ While this reflects the nursing staff's central role, it also emphasizes the importance of shared responsibility and role clarification within multidisciplinary working. Similar results were reported in two studies in which staff perceptions for in-patients' poor nutritional intake were investigated or the feasibility of identifying nutritionally at-risk patients.^{7,70} Both these studies emphasized the imperative of integrating collaborative efforts. The significance of role clarification and shared responsibility to multidisciplinary collaboration has been highlighted in other literature, as have the challenges of achieving these objectives in practice.^{7,69,70} Nonetheless, it is pertinent these are recognized as fundamental elements of multidisciplinary approaches to nutritional care.

The Role of Communication, Knowledge and Information-Sharing in the Process of Collaborative Working

Several studies have focused on knowledge and information-sharing processes. Eide et al,⁷⁴ support these findings. They reported from a study conducted from the nurses' perspective that insufficient knowledge leads to inadequate nutritional practice, impacting treatment outcomes. Nutrition training and education programs were aimed at increasing the capacity of individuals to carry out their roles more effectively by either acquiring, upgrading, or enhancing their skill sets.^{30,35,38,61} For instance, nursing staff received training from the speech and language therapist on managing patients with swallowing difficulties to enable the identification of patients with dysphagia.³⁴ While most studies did not measure the degree of the direct impact of training on patient outcomes, team-level outcomes reported indicated significant benefits. These included increased awareness and better engagement in

providing nutritional care.^{38,57,61} For example, Eglseer et al's,⁵⁷ study found that increased exposure to malnutrition knowledge prompted the need for further training of nursing staff.

Although the benefits of education and training are well-established features in the literature,^{20,71,73} sustainability in providing appropriate nutritional care requires regular training updates and adapted structural processes to reinforce nutrition knowledge and support effective implementation.⁴⁸ Problem identification and valuing the experiential perspectives of different disciplines, including patients, relatives, and volunteers^{30,54–60} reflected approaches that recognized and appreciated the expertise of different stakeholders and their contribution to addressing the concerns of malnutrition. Additionally, as a process of integrating patient care to ensure consistency and continuity of care, communication through multidisciplinary team meetings and discussions was reported in several studies.^{43,46,53} Whilst there was some significant value to team members, evidence that links the benefits of multidisciplinary meetings to improved care implementation was not apparent. Moreover, while multidisciplinary meetings are part of existing structural processes in hospitals, further research is required in establishing whether nutritional care is prioritized in such meetings amid competing clinical needs.

Clinical Leadership and Management Support

Leadership and management involvement were observed across multiple studies ranging from ward or unit managers and included nursing, dietetic, facilities, catering and food services managers.^{29,44,59} Although details of their roles and contributions were not often reported in the majority of the studies, indirect outcomes of their participation were associated with successful implementation. For instance, in Carson and Close,²⁹ hospital managers were involved in investigating current nutrition practices following concerns raised and funds made available for further investigation. The involvement of hospital leaders is crucial. Their role has clinical and financial implications on malnutrition so that appropriate steps can be taken to address concerns and improve care.⁸

In contrast, the benefits of leadership were, however, not confined to senior management roles. In the clinical setting, the adoption of change was driven by influential nutrition advocates. Previous studies on nutritional care practices recognize the vital role of such advocates, often referred to

as “nutrition champions”, in facilitating change.⁷⁵ The hospital food service supervisors and food service assistants played a significant role as reported in Collins et al,⁵⁵ by taking responsibility to lead by example and provide assistance on the wards. They also assumed the role of opinion leaders and spreaders of change amongst their peers. It seems likely that the concept of shared leadership, where mutual influence is embedded in the interactions of staff members or different disciplines, supports a positive multidisciplinary relationship, which may facilitate more collective effective change.

Also based on the premise of distributing leadership responsibility across multiple levels, a shared leadership approach to implementation has the potential to be a valuable concept for further research and may better inform sustainability and continuity of collaborative nutritional care practices in hospitals.

Managing in-practice challenges is also significant in multidisciplinary approaches. In the case of Collins et al,⁵⁵ the food service supervisors were reported to have influenced teamwork where the burden of staffing and time constraints was evident. Outcomes of multidisciplinary collaborations appeared to have some benefit at the patient, team, and system levels. For example, at the patient level, an observed increase in energy and protein intake^{41,49} indicates a significant beneficial association between collaborative activities with improved clinical outcomes. Similarly reported are increased food and fluid intakes,⁴⁹ staff confidence in their role and job satisfaction,^{34,54,57} a sense of empowerment,⁴³ and staff feeling valued⁵⁸ and supported.⁴⁰ Systemic changes where improvements to nursing practice were implemented further highlight the impact of collaborative care. Moreover, some studies reported enablers and key success factors, which included commitment and enthusiasm about patient nutritional care from clinical staff,^{29,51} which was mentioned in passing rather than being a feature intended to be measured.

Notably, methodological approaches that demonstrated systemic practice changes used action research or implementation research, which influenced the change processes.^{38,53} These approaches seek to bring about change through action, developing and improving practice by actively engaging staff in the processes of diagnosing, planning action, taking action and evaluating action within their clinical area.⁶⁵ Future studies examining the continuity and coordination of multidisciplinary nutritional care approaches are needed, given the increased imperative of guidelines and policies to increase collaborative multidisciplinary nutritional care

initiatives that benefit care quality. Pertinent to this research is the role of organizational culture in understanding how the preconditions within healthcare institutions influence health professionals’ actions and behaviors to support or disrupt optimal nutritional care.

Limitations

As part of the extent of information covered, the scoping review had some limitations. Most studies did not explicitly focus on collaborative multidisciplinary processes. Therefore, related studies might have been missed in the searches and selection process. While in some retrieved studies, such processes featured within the findings. Although some actions and interactions that shaped implementations may not have been fully recognized and the nature of reporting might have been underplayed in the analysis.

Nonetheless, the review identified the characteristics of the various disciplines involved and processes from the retrieved studies to understand collaborative nutritional care further.

The IPO framework was applied to report the findings of the studies included in this review. Given our use of the framework, we did not determine the causal relationship between the input, process, and outcome due to the studies’ complexity and heterogeneous nature. Despite this limitation, the framework can be used to diagnose the degree of collaboration and the interrelationship of the IPO components in any multidisciplinary nutritional care intervention and identify further areas for future research and improvement.

Recommendations

Further research is recommended where different health-care professionals are involved in nutritional care to identify the critical elements of multidisciplinary collaborative working more clearly. These insights will further our understanding of the impact on care outcomes.

It is recommended that participatory research approaches would be appropriate to maximize engagement and collaboration in proposing and embedding change.

Conclusion

The review demonstrates that multidisciplinary care approaches benefit from the engagement of the different disciplines, including volunteers, patients, and relatives. Some features are critical to the process of collaborative working, to wit: role clarity, effective multidisciplinary relationships facilitated by effective communication,

knowledge, and information-sharing. In addition, the ways they are implemented may either facilitate or impede the effective provision of food and nutritional care in hospitals.

This review represents the first as of when conducted to evaluate existing literature concerning collaborative working features in implementing multidisciplinary care approaches to food and nutritional care. It indicates that to enhance collaborative approaches to nutritional care, activities such as team meetings, discussion and shared learning, role clarity, and processes that enable some nutritional interchangeability, and the support from clinical leadership and management should be considered and enacted in policy guidance to impact on practice. Achieving optimum nutritional care outcomes is a worthy goal for healthcare providers, as is the process by which they can be achieved and consequently requires consideration.

Gaps in the literature indicate a need for more focused research around multidisciplinary nutritional care processes and the conditions that allow for better collaborative working. This review provides a basis to inform for future research, particularly around investigating the nature of multidisciplinary group contributions to nutritional care quality. Given that “buy-in” from various key stakeholders is essential to change practice, the adoption of participatory action research approaches may be beneficial to collaboratively develop and better implement planned changes to food and nutritional care in hospital settings.

Disclosure

The authors report no conflicts of interest in this work.

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