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Barriers and Facilitators to Implementing Nutrition Intervention for Older Adults Living in Nursing Homes: A Scoping Review

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ABSTRACT

In North America, the rate of malnutrition among older people is increasing, especially in care facilities. This is mainly associated with increased mortality rates, prolonged hospitalization, and other health problems. Despite the potential benefits of nutritional interventions, there are knowledge gaps in the implementation of nutritional interventions in care homes. A scoping review was conducted to identify the factors and barriers to implementing nutrition interven-tions for older adults who are malnourished or at risk of malnutrition and living in nursing homes. The review included information on adults aged 60 and over and nursing home staff but excluded hospitals and community settings. A search of four electronic databases yielded 16.290 citations, of which 25 studies were eligible for the review. Seventeen themes emerged, which were categorized into six main domains: Organization, staff, intervention, environment, residents, and support. Barriers identified included inadequate education and training, staff turnover, and inconsistent nutritional care. Potential facilitators included training, support strategies, the presence of family or volunteers, consistency, and a focus on specific eating difficulties.

KEYWORDS: Nutrition Intervention; Nutritional Care; Skilled Facilities; Older Adults; Nursing Home.

KEY PRACTITIONER MESSAGE

1. Promoting education, training, socialization, effective management strategies, staff in-volvement, and multimodal interventions can improve the quality of care and reduce nutrition intervention inconsistency in nursing homes.

INTRODUCTION

In North America, the number of people aged 65 and over has increased due to longer life expectancy. In the United States, 17% of the population was 65 or older in 2020 (Admin-istration on Aging, 2022), while in Canada, 18.8% of the population was at least 65 years old (Government of Canada, 2022). In some of North America's poorest countries by Gross National Income (GNI) per capita, including Jamaica, Grenada, and Mexico, about 10 to 16 percent of the population is 60 years of age or older (Eldemire-Shearer et al., 2014; Angel et al., 2016; Wong, 2020). This suggests that the malnutrition rate in this region is likely to increase as the older adult population increases. Malnutrition is characterized by a deficiency, excess, or imbalance in energy and/or nutrient intake.

Nursing homes, which include long-term care facilities, geriatric care facilities, skilled nursing facilities, and residential care homes, are places where older adults or people with dis-abilities receive inpatient care. Nursing home residents are more likely to be malnourished and at high nutritional risk, which is associated with higher mortality rates, longer hospital stays, disability, medical problems, and other health issues. Addressing the nutritional needs of older people is critical to achieving Sustainable Development Goal 3 (Target 2.2), which aims to en-sure that everyone has the opportunity to live a long and healthy life.

Nutrition plays a crucial role in healthcare as it reduces mortality rates, readmissions, length of hospitalization, complications, and care costs for people over 65. However, there are inconsist-encies and gaps in the treatment of malnourished older or vulnerable people.

Nutritional interventions such as oral nutritional supplements, medical nutrition therapy, fortification, enrichment, and nutrition education are commonly used to prevent or treat malnu-trition in older people. Oral nutritional supplementation is the most successful measure for achieving meaningful results. However, resources for oral supplements are limited. In addition, there is a need for improved evaluation of intervention outcomes, integration of treatment across all settings, and education about age-related issues (The Institute of Medicine (2012)).

The treatment of malnutrition is hampered by factors that affect both patients and healthcare providers. Harris et al. (2019) and Ezezika et al. (2021) have identified significant problems with nutritional care, including unrecognized malnourished patients, inadequate staffing, delayed care, lack of dietary instructions, consultation times, and patients struggling to finish their meals. These issues highlight the need to improve nutritional care and the im-portance of rapidly implementing extensive nutrition interventions. However, barriers to im-plementing nutrition interventions remain, such

as the characteristics of the intervention, lack of program incentives, external support, and social support from the community. Nutrition interventions in nursing homes and the community differ in their limitations and enablers, such as support, accessibility, education, and training.

Understanding these barriers is crucial for developing effective nutrition programs for older people. A review was conducted to identify facilitators and barriers to implementing nu-trition interventions for older adults who are malnourished/at risk of malnutrition and living in nursing homes. The aim was also to discover strategies for sustainable nutritional interventions and determine the nursing home staff's role in effective implementation. This review has the potential to inform future research on organizational, staffing, and resident-related factors that influence nutritional interventions.

Review Questions

The primary study question is: "What factors influence the successful implementation of nutrition interventions for older adults at risk of malnutrition in nursing homes?" In addition, this review investigated the following sub-questions: (1) How does nursing home staff in North America contribute to implementing nutrition interventions for older adults who are malnourished/at risk of malnutrition? (2) What is the implementation of nutritional interventions for older adults at risk of malnutrition in for-profit nursing homes compared to non-profit nursing homes in North America? (3) What measures are in place to monitor the delivery of nutrition interventions for older adults who are malnourished/at risk of malnutrition in nursing homes in North America? (4) How sustainable are nutritional interventions for older adults who are malnourished/at risk of malnutrition in nursing homes in North America?

METHOD

Eligibility

The study aimed to gather comprehensive knowledge about nutrition interventions implemented in North American nursing homes. Therefore, articles focusing on older adults aged 60 years living in nursing homes were included. Nursing home staff and employees were also consid-ered. Concepts describing nutrition interventions and care to prevent malnutrition were includ-ed, while articles focussing on pharmaceutical therapies were excluded. The review considered quantitative, qualitative, and mixed-methods papers published between 2009 and 2023, with no restriction on language. Non-traditional sources such as reports, clinical trials, theses, and dis-sertations were also considered.

Search Strategy

The protocol identified keywords and search terms related to nutrition intervention, nursing homes,

staff. The JBI Manual for Evidence Synthesis' three-step search technique was used to conduct a focused search on electronic databases EBSCOhost, Medline (PubMed), Science Direct, and Cochrane Library. The search strategy was updated based on the four research questions. The EBSCOhost database was the first to be searched, followed by PubMed, using advanced search features and Boolean operators to extract recent papers from 2009 to 2023. A second search was conducted from February 18 to February 26, 2023, using Science Direct and Cochrane Li-brary. All prospective grey literature was retrieved from the four databases, and additional sources were reviewed in the reference lists of the papers and publications included.

Study Selection

The search phase involved evaluating titles, abstracts, and full text of publications for potential inclusion. Duplicates were removed, and the selected articles were imported into the Rayyan web tool. The selection was based on abstract screening and full-text screening. A more thorough full-text screening was performed on articles chosen from the abstract phase.

Charting of Data

The process involved several iterations to ensure consistency and relevancy. The study characteristics and variables were extracted, including author(s), year of publication, country of origin, aims/purpose, methodology, nutrition intervention, duration, outcome measures, role of staff, monitoring tool, sustainability and cost-effectiveness of interventions, types of facilities, and key findings related to the review questions. The results provided a broad overview of the research field without ranking the quality of individual studies, adhering to the methodology for scoping reviews advised by the Joanna Briggs Institute.

Synthesis of Result

The study presents geographic distribution and publications of studies on nutrition intervention in nursing homes using charts and narratives. It identifies factors influencing its implementa-tion, including duration, outcome measures, methodologies, sustainability, cost-effectiveness, and facilities. Key findings were coded, and themes emerged.

RESULTS

Identification of Potential Studies

The searches from four electronic databases yielded a total of 16290 records (EBSCOhost: 754, Medline (PubMed): 386, Science Direct: 15023, and Cochrane Library:127) from which 11.470 titles and abstracts were screened after duplicate records were eliminated. Ten thousand four hundred seventy were journal articles, and 1.000 were chapters. Most abstracts, 8.627, were written in English, followed by 137 in Spanish, 85 in French, 30 in Portuguese, and 3 in German. The titles and abstract screening phase resulted in a final list of 351 potential articles.

There were nine records for which full-text access was not available. A total of 29 possible publications pertinent to the study emerged from the full-text screening stage, including one found in the reference list. There were 25 publications, including the data extraction and narrative ac-count. Following the full-text screening, four more articles were eliminated for the reasons mentioned in Figure 1.

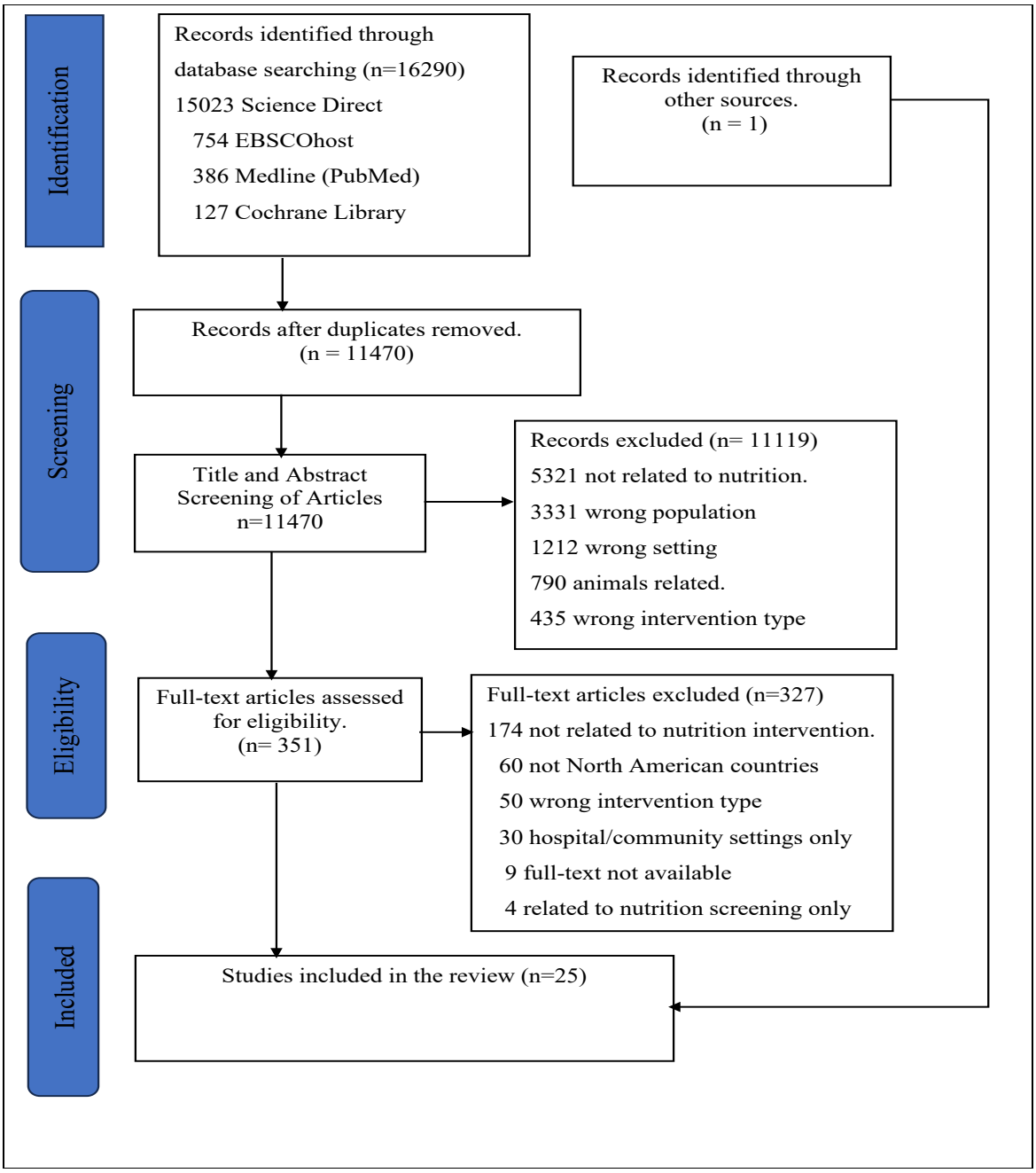

Figure 1. *Flow Chart of Data Extraction Process*

First Author and Year	Country of Origin	Method and Study Design	Type of Nutrition Intervention	Outcomes measures	Nursing Staff Role in Intervention	Monitoring System / Tool	Sustainability /Cost-effectiveness Strategies	Type of Facility (For Profit/ Not-for-Profit	Key findings relate to the scoping review questions
Simmons, 2013 (Simmons et al., 2013)	USA	Quantitative Randomized translational study	Food and/ or nutrient delivery Education	nutritional status dietary intake weight change	Feeding Assistance Care	Minimum Data Set quality indicator (MDS) Standardized weighing and Observation protocol	Mult-faceted Intervention	Not stated	Multifaceted intervention enhances feeding assistance care quality, but staffing levels are below optimal.
Simmons, 2015 (Simmons et al., 2015)	USA	Quantitative Randomized controlled trial	Food and/or nutrient delivery	nutritional status dietary intake, weight change	FAC Weigh and record the weight of residents	MDS Standard weighing protocol. Nutrition Data System for Research Software - Calore	cost-effective in increasing caloric intake, Meals, and Snacks (M&S) Interventions	Four for-profits and one non-profit	Staff time spent promoting snack consumption increases during interventions, with M&S and ONS providing cost-effective caloric intake improvements but no significant weight impact.
Simmons, 2010 (Simmons, Zhuo, and Keeler, 2010)	USA	Quantitative Randomized controlled trial	Food and/or nutrient delivery	nutritional status dietary intake weight change		MDS Standardized weighing and Observation protocol Photography	M&S intervention was more cost-effective than ONS intervention in caloric gain, staff time, refusal rates, and costs.	Not stated	The snack intervention was more cost-effective than the supplement intervention in terms of cost, staff time caloric gain, and refusal rates
Smith, 2017 (Smith et al., 2017)	USA	Quantitative Secondary Data analysis							Administrative decisions impact residents' care. Staffing higher, more apparent roles and adequate education in feeding, food handling, and dietary aspects can improve nutritional care.
Carrier, 2009 (Carrier, West, and Ouellet, 2009)	Canada	Quantitative Cross-sectional study						Not stated	Enhancing the quality of life in cognitively intact and cognitively impaired residents can be achieved by encouraging dining with others and increasing food autonomy.
Harding, 2016 (Harding et al., 2016)	USA	Quantitative Retrospective Chart Review	Food and/or nutrient delivery	Biochemical marker - nutrition status	Prescribe and administer supplements	MDS		Not stated	Skilled Nursing Facilities patients with protein supplementation showed increased prealbumin levels after 30 days. Barriers to implementation included taste, timing, time constraints, and dietitian buy-in. Sharing program evaluation results could increase staff participation in malnutrition screening.

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Barnhart, 2016 (Barnhart et al., 2016)	USA	Qualitative Semi-structured, In-depth interviews						Not stated	NH residents and their physicians viewed diabetes and diabetes intervention as burdensome.
Blumberg, 2018 (Blumberg et al., 2018)	USA	Qualitative Focus group						Not stated	Frontline workers possess extensive knowledge about food and nutrition care, but their skills are often overlooked in management strategies, leading to understaffing and employee dissatisfaction.
Mallidou, 2013 (Mallidou et al., 2013)	Canada	Qualitative Observational pilot study						Not stated	The study revealed that the working environment, caregiver workload, and time use led to fragmented care for residents, with limited interactions and no evidence of alignment with their needs.
Morrison, 2021 (Morrison-Koechl et al., 2021)	Canada	Quantitative Secondary analysis - a cross-sectional multisite study						Not stated	Social engagement predicts energy intake but not eating challenges. Low social engagement leads to appetite loss, suggesting appetite as the relevant mechanism.
Batchelor-Murphy, 2019 (Batchelor-Murphy et al., 2019)	USA & Canada	Quantitative Secondary data analysis / archival study						Not stated	Dementia residents require 59.92% more feeding assistance than non-dementia residents, highlighting the need for staff to play a role in meal-eating support.
Leydon, 2023 (Leydon and Dahl, 2023)	Canada	Report Project report						Not stated	Areas for improvement are food selection, adequate time, meal presentation, and staff-resident relationships.

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Ilhamto, 2014 (Ilhamto et al., 2014)	Canada	Qualitative Semi-structured interviews and observation						Not stated	No harmonized guidelines exist for textured-modified foods. Education is needed for optimal texture outcomes.
Namasivayam-MacDonald, 2018 (Namasivayam-MacDonald et al., 2018)	Canada	Quantitative Secondary analysis cross-sectional, multisite project	Food and/or nutrient delivery	dietary intake	FAC report food and beverage intake	MDS Mealtime Scan. Dining Environment Audit Protocol		Not stated	Inadequate fluid intake is linked to cognitive impairment, older age, eating challenges, gender, and lack of physical assistance.
Trinca, 2019 (Trinca et al., 2019)	Canada	Quantitative Secondary analysis of the cross-sectional study	Food and/or nutrient delivery	dietary intake	FAC report food and beverage intake	MDS		Not stated	Residents' energy and protein intake in LTC are linked to eating occasions, with age, sex, family/volunteer presence, and dementia care unit living influencing protein intake.
Keller, 2017 (Keller et al., 2017)	Canada	Quantitative Multisite cross-sectional study						Not stated	Recent menu revisions have increased protein and energy intake, suggesting interventions like pureed food, restorative dining, eating assistance, and person-centered care practices may improve food intake.
Velázquez-Alva, 2020 (Velázquez-Alva et al., 2020	Mexico	Quantitative cross-sectional study						Private Nursing Homes (NHs) - 3 For Profit	Malnutrition is linked to depression, and daily use of three or more prescription drugs is linked to a worsening nutritional status in older adults nursing home residents.
Simmons, 2008 (Simmons et al., 2008)	USA	Quantitative Crossover randomized controlled trial	Food and/or nutrient delivery	Nutritional status, BMI/ weight checks dietary intake	FAC	MDS Observational protocol. Photography method		four NHs 3 - for profit	Optimal feeding assistance during or between meals significantly impacts weight loss. Depression patients lost more weight. Convenient snacking is preferred.

First Author and Year	Country of Origin	Method and Study Design	Type of Nutrition Intervention	Outcomes measures	Nursing Staff Role in Intervention	Monitoring System / Tool	Sustainability /Cost-effectiveness Strategies	Type of Facility (For Profit/ Not-for-Profit	Key findings relate to the scoping review questions
Simmons, 2009 (Simmons and Rahman, 2009)	USA	Chapter review				LTC residents' intake increased due to a feeding aid regimen, but facilities must improve availability and address issues like errors and missing medical records to improve care quality.	Simmons, 2009 (Simmons and Rahman, 2009)	USA	Chapter review
Johnson, 2018 (Johnson et al., 2018)	Canada	Qualitative Exploratory						Not stated	Nutrition screening and assessment by Registered Dietitians face challenges due to time constraints and understaffing.
Colón-Emeric, 2015 (Colón-Emeric et al., 2015)	USA	Qualitative Focus groups							LTC intervention sustainability is challenging due to staff diversity and education levels.
Simmons, 2009 (Simmons, Peterson, and You, 2009)	USA	Quantitative Longitudinal study						four NHs, (one for-profit)	NH staff struggle to monitor residents' monthly weight changes, potentially affecting nutrition recommendations. A systematic weighing routine can help detect weight loss and aid in early dietary management.
Rahman, 2011 (Rahman et al., 2011)	USA	Qualitative Observational study					The course model was designed to provide more support over a longer period	Not stated	Supervisors reported that the coaching course model effectively provides support and care interventions in NH care practice despite barriers to change.
Durkin, 2014 (Durkin, Shotwell, and Simmons, 2014)	USA	Qualitative Observational Sub tudy	**Food and Nutrient Delivery**	dietary intake	FAC Physical assistance Reports	MDS Standardized observation protocol.		Not stated	Mealtime visitation, while infrequent, significantly enhances residents' quality of care, meaningful activity, and well-being, similar to minimal eating dependence in residents with minimal dependence.

Characteristics of the Included Studies

Apart from 2012, for which no articles were found, only one to three publications on the factors influencing the implementation of nutrition interventions in nursing homes were pub-lished each year from 2009 to 2023. Additionally, one paper from 2008 was found in the refer-ence list of included articles. With a total of 14 studies, the United States of America was the main source for these publications, followed by Canada with nine studies and Mexico with one. In one article, the research was conducted in the United States and Canada. Table 1 illustrates the data extracted from each publication.

Types of Methods and Design

This review included both quantitative and qualitative study methods. Crossover control stud-ies, randomized trials, secondary data analyses, cross-sectional studies, and one longitudinal study were used in 14 studies.

Nutrition Intervention Studies and Outcome Measures

Nine studies focused on nutrition-related interventions, with food and/or nutrient delivery being the most employed strategy. The interventions were categorized into six classes: enteral and parenteral nutrition, nutrition supplements, feeding assistance, managing the feeding environ-ment, and nutrition-related medication management. The outcomes measured were nutrition status, food intake, BMI/Weight Change, and biochemical markers.

The Roles of Nursing Staff in Nutrition Intervention Studies

Nursing staff were instrumental in carrying out the nutrition intervention in nursing homes. Their roles included feeding assistance care, prescribing and administering supplements, sup-porting the program, reporting food and beverage intake, weighing residents' weight, providing physical assistance, and data documentation.

Monitoring Procedures and Tools for Nutrition Interventions

Nine nutrition intervention trials utilized the minimum data set (MDS) instrument for monitoring adult health and other technologies like weighing, photography, performance-based assess-ment forms, and dining environment audit protocol for research software.

Sustainability, Cost-effectiveness, and Types of Facilities

Of the nine nutrition intervention studies, three addressed cost-effectiveness, and one sustainable cost savings. Five of 25 publications classified nursing homes as for-profit or non-profit institutions. Two studies were conducted in for-profit facilities and one non-profit, while the other used one for-profit facility and three non-profit ones.

Reporting of Barriers and Facilitators

Most studies focused primarily on the efficacy of the intervention (n=19) and reported barriers and

facilitators as secondary data. Only a few studies (n=6) directly addressed barriers to implementing dietary interventions. There was no direct evidence from studies (n=0) of what makes dietary interventions effective; however, the interventions' effectiveness or outcomes allowed for identifying potential facilitators.

Factors Influencing the Implementation of Nutrition Interventions

There were 17 identified themes from the key findings related to barriers and facilita-tors to implementing nutrition intervention. The themes were then grouped into six main do-mains: organizational, staff, intervention, environmental, residents, and support. The identified barriers and facilitators were mapped onto the six domains.

Barriers and Facilitators to Implementing Nutrition Intervention

Domain 1: Organization

Theme 1: Education and Training

Five studies (Ilhamto et al., 2014; Smith et al., 2017; Blumberg et al., 2018; Namasivayam-MacDonald et al., 2018) mentioned the requirement for a sufficient level of education. A suffi-cient dietary education and training level is required (Smith et al., 2017). Additionally, it was found that staff education level impacted the intervention's sustainability (Colón-Emeric et al., 2015). However, when training was put into practice, the effect was noticeable and reported to improve the quality of care (Simmons et al., 2013), which explained the variations in nursing homes (Trinca et al., 2019). Training nonnursing personnel was also noted as a facilitator; Simmons et al. (2016) emphasized the requirement for nonnursing staff to supplement tradi-tional nursing assistant staff, particularly in nursing homes with nursing aide staff that falls be-low the national standard. According to Rahman et al. (2011), the coaching course model was adaptable and reliable enough to incorporate a variety of everyday interventions into nursing home care practice. Additionally, according to Colón-Emeric et al. (2015) and Leydon and Dahl (2023), offering orientation materials, indicators, and techniques to measure and monitor edu-cation and training is essential for long-term effectiveness.

Theme 2: Staffing Level and Turnover

Three studies mentioned low staffing levels as an implementation barrier (Rahman et al., 2011; Simmons et al., 2013; Johnson et al., 2018). The shortage of healthcare professionals was one of the most significant issues noted (Johnson et al., 2018). Additionally, it was noted that significant leadership turnover made it difficult for the intervention to be sustained (Colón-Emeric et al., 2015). Furthermore, understaffing leads to unhappiness (Blumberg et al., 2018) and affects residents' quality of life. In contrast, greater staffing could potentially support high-quality nutrition care (Smith et al., 2017).

According to Carrier, West, and Ouellet (2009), the ratio of residents to registered assistance correlated favorably with quality of life.

Theme 3: Management Strategies and Staff Involvement

One of the barriers noted was the lack of integration of employee knowledge in management methods. Frontline staff members, such as nurses and dietary assistants, were highly knowl-edgeable about food and nutrition care, but management failed to take this into account (Blum-berg et al., 2018). The enablers were recognized as implementing tactics that increased the intervention's efficacy (Trinca et al., 2019), integrating the intervention into staff members' regular workdays (Leydon and Dahl, 2023), balancing complexity, employing a variety of meth-odologies, and being inclusive (Colón-Emeric et al., 2015). It was also advantageous to train nonnursing workers to supplement the usual nurse aide workforce (Simmons et al., 2016).

Theme 4: Standard Nutrition Care

The absence of guidelines was identified as a challenge. For instance, no standards or objec-tive methods were created to prepare textured-modified foods (Ilhamto et al., 2014). Addition-ally, better coordinated and consistent nutrition care systems were required (Johnson et al., 2018). The feeding assistance protocol (Simmons and Rahman, 2009) and a standardized weighing methodology (Simmons, Peterson, and You, 2009) were mentioned as examples of protocols that were shown to be facilitators. Additionally recognized as a facilitator for nutrition care was institutions' optimal feeding assistance (Simmons et al., 2008).

Theme 5: Workload and Time

Five studies (Rahman et al., 2011; Mallidou et al., 2013; Simmons et al., 2015; Harding et al., 2016; Johnson et al., 2018) indicated a high workload with limited time as a barrier. According to Johnson et al. (2018), lack of time was the most frequently encountered obstacle. For this theme, neither enablers nor coping mechanisms were explicitly mentioned. Samra (2021) con-tends that organizations should prioritize workload management in corporate policies and practices by creating detailed job descriptions, conducting reviews, and identifying areas that could benefit from improvement.

Theme 6: Work Diversity and Workforce Composition

In one study, the staff's composition was seen as a challenge. Smith et al. (2017) claim that the staff composition affects how well residents are cared for. The diversity of the employees fur-ther presents a problem to the sustainability of the intervention. Unfortunately, none of the in-cluded studies addressed this issue, and neither of those two papers contained any enablers or practical solutions. However, according to Durkin, Shotwell,

and Simmons (2014), managers need to foster an inclusive culture, resolve conflicts among diverse staff members, and foster a safe environment to boost creativity and patient care. In addition to managing workplace diver-sity, assessing organizational culture, establishing objective standards, treating employees as individuals, building relationships with mentors, and promoting inclusion are crucial (The George Washington University, 2021).

Theme: 7 Food Service Management

The food selection at the time of serving, allowing for appropriate eating time (Leydon and Dahl, 2023), and not adhering to a harmonized guideline (Ilhamto et al., 2014) are a few areas of food service that need to be improved. Other factors, such as menu changes and the provi-sion of a tray meal delivery system in addition to therapeutic meals, were recognized as facili-tators for food service management (Carrier, West, and Ouellet, 2009).

Theme 8: Feedback and Communication

Two studies identified poor communication as a barrier (Simmons et al., 2013; Colón-Emeric et al., 2015). Long-term care facilities' issues with intervention sustainability are ascribed to communication breakdowns or a lack of trust between managerial and direct care workers (Colón-Emeric et al., 2015). Sharing and implementing feedback, on the other hand, was noted as a nutrition management enabler. Staff involvement in managing patients at risk for malnutri-tion may increase because of staff feedback being incorporated into program evaluation out-comes (Harding et al., 2016).

Domain 2: Staff

Theme 9: Social Interaction

Two studies (Mallidou et al., 2013; Leydon and Dahl, 2023) identified a barrier as having little interaction between the caregiver and the resident. There was little evidence that residents' needs or preferences were considered in their interactions (Mallidou et al., 2013). However, social interaction was found to be a facilitator of high-quality nutrition care in situations where it was promoted. Social interaction was the most important predictor of energy intake (Morri-son-Koechl et al., 2021). Dining events are ideal for fostering interaction. Carrier, West, and Ouellet (2009) contend that promoting interconnected dining can improve residents' quality of life.

Theme 10: Person-centred care practice

Three studies (Simmons, Zhuo, and Keeler, 2010; Simmons et al., 2015; Namasivayam-MacDonald et al., 2018) highlighted inadequate person-centered care as a barrier. In those studies, insufficient physical or eating support was the obstacle to an effective intervention. As stated by Namasivayam-MacDonald et al. (2018), interventions to increase total intake should concentrate on the unique eating challenges of residents and staff education to improve sup-port at mealtime. In agreement, Keller et al. (2017)

pointed out that a person-centered care practices-focused intervention may enhance increased food intake. Trinca et al. (2019) acknowledged greater person-centered care practices as the cause of the distinction between different types of facilities.

Theme 11: Work knowledge and quality

Two studies cited performance and product quality as barriers. Simmons, Peterson, and You (2009) identified the challenges staff experienced in keeping track of residents' body weight fluctuations monthly, while Simmons and Rahman (2009) noted errors and missing medical da-ta. This might be one of the reasons the MDS's "prevalence of weight loss" quality indicator may not be entirely reliable. The detection and treatment of malnutrition may be delayed, which could have implications for nutrition intervention. Limited enablers have been identified in this area. However, according to two studies (Simmons et al., 2008; Simmons et al., 2013), delivering the highest possible standard of care is an important part of nutrition intervention. After the intervention period, quality care was still provided (Simmons et al., 2013). The neces-sity for training, which has been emphasized in numerous studies, may enhance the effective-ness and caliber of staff work.

Theme 12: Workplace Identity and Relationship

Three studies identified barriers relating to staff roles and relationships. Colón-Emeric et al. (2015) observed mistrust between direct care and managerial workers, while Smith et al. (2017) noted the necessity for better role descriptions. Blumberg et al. (2018) noted the unhap-piness between aides and other employees. Under this theme, no enablers were identified. However, Waters (2022) asserts that developing effective working connections requires an in-dividual to comprehend their team, practice active listening, using non-verbal cues, planning breaks, asking for help, consulting human resources, setting boundaries, and expressing ap-preciation.

Theme 13: Resistance to Change and Absenteeism

Rahman et al. (2011) identified staff absence and opposition to schedule changes as obstacles to nutrition intervention. However, no other articles addressed this barrier, and no facilitators were found for this theme. Nevertheless, Hayashi (2017) suggests that to address this issue effectively, leaders must instill a sense of vision, give assurance, respond calmly, relate per-formance to collaboration, discuss progress, promote emotional awareness, and establish a schedule for evaluating progress.

Domain 3: Intervention

Theme 14: Intervention Characteristics

Three intervention characteristics were recognized as enablers, while two were barriers to nu-trition intervention. In two studies (Barnhart et al., 2016; Harding et al., 2016), the nature and practicability of the intervention were identified as barriers. Residents viewed dietary re-striction, a type of

nutrition intervention, as the most burdensome intervention (Barnhart et al., 2016). Additionally, residents had trouble taking the supplement at the designated time (Har-ding et al., 2016). This proved how ineffective the nutrition intervention was in helping those residents. However, two studies identified the type and practicality of the intervention as an enabler. According to Simmons et al. (2013), a multifaceted training intervention was found to increase care quality. In addition, it was more practical to serve snacks in between meals than supplements (Simmons et al., 2008). In two studies, consistency and cost-effectiveness (Sim-mons, Zhuo, and Keeler, 2010; Simmons et al., 2015) were also identified as enablers. Calorie intake was improved by consistently providing meals, snacks, and oral nutrition supplements (Simmons et al., 2015). However, it was discovered that the snack intervention was more eco-nomical than the supplement intervention (Simmons, Zhuo, and Keeler, 2010).

Domain 4: Environment

Theme 15: Work and Dining Environments

In one study, the place of dining was identified as a barrier. Staff demands are increased by residents eating in their rooms during meals (Simmons et al., 2013). This is viewed as a barrier to intervention since it might need more staff to provide residents individual attention rather than in a group environment, or it might result in insufficient feeding assistance and low oral intake because of a staffing shortage. Poor working conditions are another barrier that can be exacerbated by insufficient employees (Mallidou et al., 2013), and this can have an adverse ef-fect on the care provided to residents. On the other hand, a different study identified the dining setting as an enabler. The quality of life of residents was positively correlated with employing Chinese dishes and a tray meal delivery system (Carrier, West, and Ouellet, 2009). Many long-term care institutions are adopting the idea of "home" to give their residents comfortable living spaces. According to Keller et al. (2017), restorative dining is advised in place of physical alter-ations to foster home-likeness to improve residents' nutritional status.

Domain 5: Residents

Theme 16: Residents-related

Three studies (Simmons et al., 2008; Batchelor-Murphy et al., 2019; Velázquez-Alva et al., 2020) identified the residents' health status as a barrier. Residents with dementia were more likely to have low intake. Depression and the daily use of three or more prescription drugs have been associated with deteriorating nutritional status in senior nursing home pa-tients (Batchelor-Murphy et al., 2019; Simmons et al., 2008; Velázquez-Alva et al., 2020). Nutri-tion intervention was also found to be hindered by residents' resistance to new routines

(Rahman et al., 2011), loss of appetite (Morrison-Koechl et al., 2021), and non-modifiable factors like age, sex, impairment, and eating challenges (Namasivayam-MacDonald et al., 2018; Trinca et al., 2019). Such circumstances may affect not only the nutritional status of the population but also the efficacy of nutrition programs. Residents' views and taste prefer-ences were mentioned as additional impediments. Examples of obstacles to nutrition interven-tions include the flavor of the nutritious drink (Harding et al., 2016) and the resident's opinion of the dietary limitations and fingerstick monitoring (Barnhart et al., 2016).

Providing a variety of options, mealtime visitation (Durkin, Shotwell, and Simmons, 2014), mealtime autonomy, and meal-eating support were all identified as enablers (Carrier, West, and Ouellet, 2009; Simmons et al., 2015; Batchelor-Murphy et al., 2019; Trinca et al., 2019). Namasivayam-MacDonald et al. (2018) also recommended that interventions to enhance total intake should concentrate on residents' specific eating challenges.

Domain 6: Support

Theme 17: Internal and External Support

Insufficient internal support was reported in three studies (Rahman et al., 2011; Harding et al., 2016; Batchelor-Murphy et al., 2019). Lack of staff support, such as buy-in from administrators and dietitians (Harding et al., 2016; Batchelor-Murphy et al., 2019), had an impact on how con-sistently nutrition intervention programs were carried out. While Colón-Emeric et al. (2015) emphasized the significance of external support to ensure the success of interventions, Batch-elor-Murphy et al. (2019) stressed the requirement for meal-eating support, a staff-to-resident kind of internal support. Two studies (Durkin, Shotwell, and Simmons, 2014; Trinca et al., 2019) advocated family and volunteer assistance. According to Durkin, Shotwell, and Simmons (2014) and Trinca et al. (2019), encouraging and supporting family participation in mealtime assis-tance has the potential to improve care quality, offer meaningful activity, and improve the qual-ity of life and well-being of residents.

DISCUSSION

The analysis of 25 publications published between 2008 and 2023 revealed numerous parameters influencing the implementation of nutrition interventions in nursing homes. Six do-mains—Organisational level, Staff level, Intervention level, Environmental level, Resident level, and support—were used to group the 17 overarching themes discovered throughout this analy-sis. Even though only six of the included research expressly addressed these obstacles, the primary findings indicated roughly 32 barriers and 26 facilitators. Thirteen of the barriers iden-tified were at the organizational level,

seven at the staff level, two at the intervention level, two at the environmental level, six at the residents' level, and two at the support domain. Twelve potential facilitators were identified at the organizational level, five at the staff level, three at the intervention level, one at the environmental level, four at the residents' level, and one at the support domain.

The Malnutrition Task Force (2015), Harris et al. (2019), and Ezezika et al. (2021) identi-fied several factors that influenced the implementation of nutrition interventions, including in-tervention characteristics, support, cost, staff knowledge, workload, time, resources, educa-tion, and training. Some of the barriers identified in this review are comparable to those seen in community settings, such as the health of residents, a lack of resources (staff, time), inade-quate training, erroneous data entry, and a lack of resources (staff). However, whereas cost was cited as a facilitator in our study, it was viewed as a barrier in other community-based studies (Brunner et al., 2021; Ezezika et al., 2021; Harris et al., 2019). Additionally, certain ob-stacles, such as difficulties with shopping and meal preparation, found in previous studies con-ducted in a community setting are not relevant to implementing nutrition interventions in nurs-ing homes (Harris et al., 2019). This illustrates how knowing the facilitators and barriers to their implementation and the setting are essential for modifying or developing effective nutri-tion treatments that benefit older adults.

In nursing home settings, meals and snacks and ONS were employed as the most com-mon nutrition intervention; however, in prior research about the community environment, only ONS was used (McKeever et al., 2019; Sulo et al., 2020). In this study and previous studies (Poscia et al., 2017; McKeever et al., 2019; Sulo et al., 2020), the ONS was rated as extremely successful. On the other hand, meal and snack intervention proved to be more useful and effi-cient than ONS (Simmons et al., 2008; Simmons, Zhuo, and Keeler, 2010).

For older people who are malnourished or at risk of becoming malnourished, interven-tions that take a comprehensive approach and incorporate additional nutrition intervention components, such as education, are preferred. Previous research has shown the benefits of a multifaceted nutrition intervention on older people's nutritional status (Smith et al., 2020). The multimodal intervention was recognized in this study as a facilitator, which supported this strategy. Additionally, the improvement persisted even after the intervention period (Simmons et al., 2013), demonstrating the efficacy of the intervention.

It takes a multidisciplinary team to ensure that residents' nutritional needs are met to the level necessary for high-quality care. Most frequently, the interventions were incorporated into the regular duties of the staff members. The dietitian's role

encompasses problem diagnosis, nutritional status assessment, diet plan preparation, and counseling regarding dietary alterations (Tappenden et al., 2013). Unfortunately, only a few nutritionists were working in nursing homes full-time.

The choice of outcome measures relied on the intervention study; for instance, dietary intake was employed as an outcome measure in a study that sought to describe fluid consump-tion in long-term care residents and identify the factors related to fluid intake (Namasivayam-MacDonald et al., 2018). The biochemical data and nutrition status outcome measures were used in a different study (Harding et al., 2016) to compare prealbumin levels of patients before and after 30 days of protein supplementation as well as between patients who received proto-col treatment and those who did not. In most cases, several outcome measures were utilized, and the outcome measure selection might have been adjusted for the population.

Nursing home performance and quality are monitored using the Minimum Data Set (MDS), also utilized for research. The MDS was employed by the researchers of the studies in-cluded in the nutrition intervention process together with additional techniques like standard weighting and observation procedures, photography, and standard performance-based skilled evaluation 13-item forms. MDS accurately captures measures like admission, transfer, and mortality, however, it does not include additional healthcare uses (Doupe et al., 2018). So, it seemed logical to combine the MDS with other suitable technologies.

The review aimed to identify barriers and facilitators in nutrition interventions, but only four out of nine studies explicitly mentioned barriers, and sustainability was not effectively re-ported. The review also compared nutrition interventions in for-profit and not-for-profit facili-ties but found no variance in treatment across the two settings.

Organizational, staff, and resident levels influence nutrition interventions in nursing homes. To be successful, these three levels must be considered in unison. Owners and admin-istrators must ensure that staff have the necessary skills and knowledge to provide residents with the highest standard of care.

Staff involvement in nutrition care programs, suitable staff-ing levels, training, good communication, and harmonized standards are crucial. Addressing resident-level variables and offering solutions on an individual basis is essential.

This review of nutrition studies from 2008 to 2023 was conducted using a methodical search technique. However, because the search was conducted in February 2023, research that might have been available after that time was excluded. The search criteria were in English, potentially

missing other relevant studies. The review only used grey literature found in data-bases, which may have overlooked relevant publications. Most studies were from the United States and Canada. Further studies should include diverse nutritional strategies, including education and the coor-dination of nutritional care, with effective food and nutrient delivery technology, to improve the effectiveness of dietary treatments. Comparing the nutrition care of for-profit and non-profit facilities and examining long-term effects is also essential. Addressing barriers like workload, absenteeism, and staff composition is crucial. Additionally, assessing the outcomes of inter-ventions tailored to individual residents' needs and attitudes is essential.

CONCLUSION

The review focuses on nutrition interventions for older adults at risk of malnutrition in North America's nursing homes. Most interventions involve food and nutrient delivery, followed by nutrition education. Staff plays crucial roles in feeding assistance, supplement administration, supporting programs, reporting intake, weighing residents, providing physical assistance, and documenting data. The review highlights the importance of education, training, management strategies, and staff involvement in implementing nutrition interventions. Multimodal interven-tions are recognized as facilitators, and staff participation is essential for improving care quali-ty and reducing variations in nursing homes.

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