

BARRIERS AND FACILITATORS TO RECEIVING ADEQUATE NUTRITION IN LONG-
TERM CARE RESIDENTS LIVING WITH MODERATE TO SEVERE DEMENTIA

by

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Submitted in partial fulfilment of the requirements
for the degree of Master of Science

at

Dalhousie University
Halifax, Nova Scotia
July 2023

Dalhousie University is located in Mi'kma'ki, the
ancestral and unceded territory of the Mi'kmaq.
We are all Treaty people.

DEDICATION

I would like to honor the memory of my dear friend Marco Riedel (July 2, 1990 - July 1, 2023) who tragically passed away due to glioblastoma. This thesis is dedicated to his inspiring spirit and the profound impact he had on my life.

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ABSTRACT

Dementia is a condition that affects the cognitive and functional abilities of older adults, often leading to the need for long-term care (LTC) homes. Malnutrition resulting from difficulties in eating practices caused by dementia can lead to negative consequences, such as higher hospitalization rates, lower quality of life, and more co-morbidities. Previous studies have identified barriers and facilitators to eating performances for LTC residents with dementia from the perspectives of staff, but the current study aimed to explore these factors from the perspectives of LTC residents with moderate to severe dementia, family members, and staff. Participants were recruited from two LTC homes owned by Northwood in Halifax, Nova Scotia, and data were collected through interviews with 7 family members, 4 residents with moderate to severe dementia, and 4 staff members, including a registered nurse, licensed nurse practitioner, continuing care assistant, and registered dietitian. Data triangulation was applied by conducting interviews, mealtime observations, and pre- and post-consumption measurements of food intake with residents. The study analyzed data using deductive and inductive content analysis, guided by the socio-ecological model. Results showed that barriers and facilitators at the intrapersonal, interpersonal, environmental, and policy-related levels. Barriers included factors such as high variability within residents, cognitive and physical challenges, staff's lack of training and preparation, competing work demands, time pressures, and environmental factors. Understanding the barriers and facilitators is crucial for developing feasible, person-centered, evidence-driven interventions that address challenges and enhance the facilitators in LTC homes.

LIST OF ABBREVIATIONS

LTC – Long-term Care

ADL – Activities of Daily Living

MNA-SF – Mini-Nutritional Assessment Short Form

DoMAP – Determinants of Malnutrition in Aged Persons

MMSE – Mini-Mental State Examination

DRI – Dietary Reference Intake

SEM – Social-Ecological Model

TMD – Texture Modified Diets

COREQ – Consolidated criteria for reporting qualitative research

CUED – Cue Utilization and Engagement in Dementia mealtime coding scheme

NCP – Nutrition Care Process

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to the participants who generously volunteered their time and shared their valuable insights, perspectives, and experiences for this study. Your contributions were influential, and this thesis would not have been possible without your involvement.

I would also like to thank my supervisor, Dr. Caitlin McArthur. Your guidance, support, patience, and valuable insights have been indispensable throughout my learning journey. I am truly thankful for the opportunity to work with you, and your constant encouragement has been a driving force behind my progress. I also would thank my committee members, Dr. Rebecca Affoo, Dr. Marie Earl, and Dr. Shannan Grant. Your expertise, assistance, and valuable feedback have broadened my perspective on this thesis and enriched the overall research process. I am deeply appreciative of your contributions.

I would like to acknowledge the valuable contributions of Rachel Lewis, who generously volunteered her time and provided assistance during the data collection phase of this project. Additionally, I extend my gratitude to Andrea Mayo, the research assistant at Northwood, for her support in data recruitment and ethics approval. A special thank you goes to Sara Ripley, the research assistant at the 3F lab, for her assistance in data analysis and contributing to the findings.

To the members of the 3F lab, thank you for your support and encouragement throughout this journey. Your assistance has been immensely valuable.

Lastly, I would like to express my heartfelt appreciation to my entire family and friends. Your support, encouragement, and belief in my abilities have been the driving force behind my determination to achieve my goals. I am grateful for your love and constant motivation.

1.0 INTRODUCTION

The process of aging encompasses various aspects, including physiological, anatomical, psychological, and functional changes that occur gradually throughout an individual's life (1). These changes contribute to unique experiences for each person (1). Anatomical changes refer to alterations in the body's structures, while functional changes relate to mobility and activities of daily living (ADLs) (2). Aging is also associated with cognitive decline, characterized by changes in brain structure and an increased risk of dementia (1). Furthermore, aging and dementia can significantly impact nutritional status through multiple mechanisms (3–5).

In Canada, the population includes approximately 6.6 million individuals aged 65 years and older, with approximately 5% residing in long-term care (LTC) homes (Public Health Agency of Canada, 2020). As the proportion of older adults in the population continues to rise, it is expected that this number will increase in the future (5). Consequently, a significant number of older individuals will require to move to LTC homes due to the physical and cognitive challenges associated with aging (5). Dementia, a condition characterized by significant cognitive impairment, greatly affects daily functioning, including social, functional, and occupational abilities (6). Older adults with dementia face nutritional challenges stemming from cognitive and functional decline, leading to difficulties in recognizing and remembering to eat, reduced food intake, and weight loss (4-6). Individuals with moderate to severe dementia often encounter multiple barriers to food intake, including dysphagia, decreased ability to handle current diet textures, and agitation, among other factors (6).

Ensuring adequate nutrition intake in older adults is crucial for maintaining optimal health and well-being, supporting physiological functions, strengthening the immune system, preserving muscle mass, enhancing cognitive function, and reducing the risk of chronic diseases

(7). Proper nutrition also plays a critical role in addressing sarcopenia and maintaining muscle strength and function (7-10). Understanding the barriers and facilitators to adequate nutrition intake for LTC residents with moderate to severe dementia is crucial for healthcare professionals, policymakers, and researchers to develop targeted interventions and strategies aimed at optimizing nutrition and improving the overall well-being of older adults in LTC homes.

2.0 LITERATURE REVIEW

2.1 Malnutrition

Malnutrition refers to a nutritional condition in which there is a measurable negative impact on body structure, function, and clinical outcomes due to an insufficient or excessive (or imbalanced) intake of energy, protein, and other essential nutrients (6). The Canadian Malnutrition Task Force identified malnutrition as a form of undernutrition that affects body tissues, functional ability, and overall health (6). This condition is often accompanied by complications from acute conditions (such as trauma), infections, and diseases that induce inflammation (6). These complications exacerbate undernutrition and make its correction more challenging due to extensive physiological changes and increased nutritional needs when appetite is decreased (6). Inadequate nutrient intake or absorption resulting from malnutrition leads to diminished physical and mental functioning (7).

Keller et al., reported that the prevalence of malnutrition in LTC homes ranges from 30% to 50% in the 32 Canadian LTC homes (8). Although they highlighted that the prevalence of malnutrition in LTC homes is influenced by the screening tools utilized (8–10). Commonly used malnutrition screening instruments include the Mini-Nutritional Assessment Short Form (MNA-SF), Patient-Generated Subjective Global Assessment (PG-SGA) Global Category Rating, Pt-Global webtool, and the undernutrition trigger within the interRAI LTC Facility assessment (11–13). Malnutrition in older adults leads to various detrimental outcomes such as infections, falls, pressure ulcers, declines in physical and cognitive function, hospital admissions, prolonged hospital stays, and even mortality (11–13).

Understanding the determinants of malnutrition is important for developing effective interventions. Numerous factors have been identified as potential contributors to malnutrition. A

systematic review of 28 observational studies explored determinants of protein-energy malnutrition in older adults living in the community (14). The review identified 122 potential determinants across nine domains: demographic, financial, food and appetite, lifestyle, psychological, physical functioning, disease and care, oral, and social domains (14). To further conceptualize these determinants, the "Determinants of Malnutrition in Aged Persons" (DoMAP) model was developed through a consensus process involving 33 geriatric nutrition experts in Europe (15). The DoMAP model consists of three levels represented by triangles, with malnutrition at the center (15). The innermost level highlights the three primary conditions leading to malnutrition: low intake, high requirements, and impaired nutrient or energy bioavailability (15). The middle level includes factors that directly cause malnutrition, while the outermost level comprises factors that indirectly influence malnutrition through the direct factors (11). Age-related changes and general aspects, depicted in red, also contribute to the development of malnutrition but act more indirectly or subtly (15).

The DoMAP model emphasizes that directly influenced factors can consistently lead to malnutrition if not addressed promptly (15). For instance, chewing problems and dysphagia (swallowing difficulties) were identified as factors that can result in low nutrient intake and subsequent malnutrition unless interventions such as oral care or modification of food texture are implemented (15). Healthcare professionals should remain vigilant and take immediate action when directly influenced factors are present (15). Additionally, there are factors that may not directly cause malnutrition but can contribute to the development of other influential factors, indirectly triggering one or more of the central mechanisms outlined in the initial triangle (15). The DoMAP model provides a comprehensive understanding of the multiple factors involved in the development of malnutrition and the potential mechanisms at play (15).

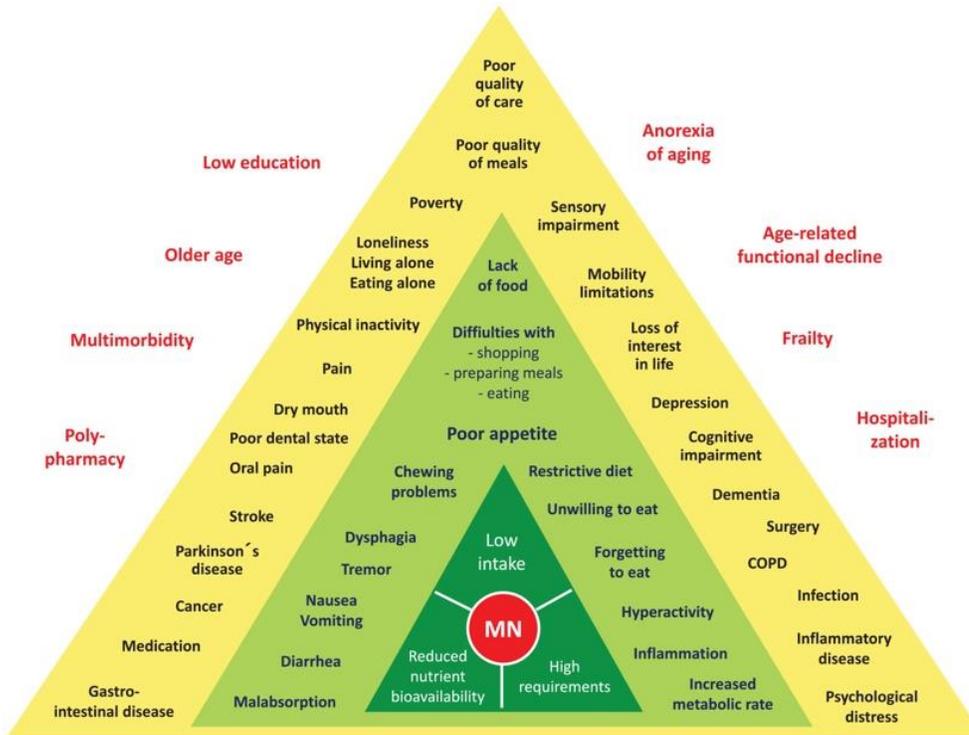


Figure 1. Theoretical framework of Determinants of Malnutrition in Aged Persons (DoMAP model) was developed by Volkert et al., 2019 (15).

In previous qualitative research, investigators have examined factors directly and indirectly influencing malnutrition among the older population living in LTC homes (16–18). Liu et al. (2020) conducted a qualitative study involving six focus groups, which consisted of 23 nursing assistants responsible for providing mealtime care to residents with dementia (19). Older adults with dementia face increased risks of compromised eating performance and low intake due to various factors including resident, caregiver, environmental, and policy-related factors, which can result in malnutrition indirectly. In this study, barriers and facilitators to optimizing mealtime care were identified and organized into a hierarchical taxonomy at the resident, caregiver, environmental (facility), and policy levels (19).

Most barriers and facilitators were found at the staff level, encompassing factors such as lack of preparation and training, competing work demands, time pressure, and frustration with

residents (19). Staff-level facilitators included caregiver preparation and the use of motivational, technical, informational, and instrumental assistance (19). At the environmental level, barriers and facilitators primarily related to the physical and sociocultural environment and facility practices (19).

Similarly, Douglas et al. (2021) conducted a qualitative study that explored the individual and interpersonal barriers experienced by nursing assistants when offering mealtime assistance to residents with dementia (20). The findings indicated that nursing assistants' individual skills, training, and personal characteristics influenced their ability to provide effective mealtime assistance (20). At the interpersonal level, nursing assistants identified their relationships with residents, residents' family members, and other healthcare professionals as factors that affected their ability to provide adequate mealtime assistance (20). They also emphasized the significance of proper training and communication among nursing assistants to ensure effective mealtime assistance (20). For instance, residents exhibiting adverse and unpredictable behaviours during mealtimes posed challenges for staff in providing necessary assistance (20). However, it is important to note that these studies solely focused on the perspective of nursing assistants and did not include the perspectives of the older adults themselves. The experiences and viewpoints of older adults regarding mealtime care, intake, and the factors affecting their engagement in eating should also be considered to gain a comprehensive understanding of the issue and inform person-centered interventions.

These barriers and facilitators identified in the two studies align with one of the central mechanisms of malnutrition, specifically the factor of low intake, as outlined in the DoMAP, emphasizing the critical need to effectively track and prevent such deficiencies (10). Similar to addressing other health-related concerns, mitigating the risk of malnutrition necessitates the

implementation of strategies for early detection and the provision of targeted interventions at the individual level. The early detection, prevention, and treatment of malnutrition in older adults often involve monitoring and assessing various outcomes to ensure their nutritional status and overall health are optimized (6). In the context of early detection, prevention, and treatment of malnutrition, various outcomes are utilized to guide interventions (6). These outcomes encompass both physical and functional aspects, including changes in body weight, body mass index (BMI), muscle mass, biochemical markers, dietary intake, and functional measures like grip strength and mobility (21). Nutrition assessment by dietitians in LTC homes is a comprehensive process that involves assessment of dietary intake, anthropometry, physical assessment, and signs or symptoms of nutritional deficiency (21). Interventions implemented in LTC homes often aim to address these various malnutrition outcomes, focusing on improving nutritional intake through meal modifications, nutritional supplements, and individualized dietary plans (21). These interventions are tailored to target the specific malnutrition indicators identified during screening and assessment processes. (21). Regular screening and assessment are critical for monitoring progress, adjusting interventions, and ensuring the overall well-being of older adults (21).

2.1.1 Adequate Nutrition Intake

Adequate nutrition refers to the consumption of well-balanced quantity and quality nutrients, essential for meeting physiological requirements and promoting optimal health (22). It involves meeting the recommended dietary requirements for macronutrients (carbohydrates, proteins, and fats) and micronutrients (vitamins and minerals) based on the specific physiological changes and metabolic demands that occur with aging (22). Adequate nutrition intake is vital for sustaining physiological functions, strengthening the immune system, maintaining muscle mass, promoting cognitive function, and reducing the risk of chronic diseases in older adults (22). It plays a critical role in their overall health and well-being, considering the changes in nutritional needs due to physiological and metabolic factors that occur with aging (22).

With aging, there is a gradual decline in skeletal muscle mass and strength over time (23). This decline in muscle mass associated with aging is termed "sarcopenia", commonly referred to as age-related muscle wasting (23). Sarcopenia can be defined operationally by assessing muscle mass alone, although a preferable approach involves a combination of muscle mass, strength, and physical performance measurements (23). Factors such as poor nutrition, physical inactivity, and coexisting health conditions accelerate the progression of sarcopenia (23). As a common consequence of aging, sarcopenia holds substantial clinical significance for the older population, with its onset significantly influenced by nutritional factors (24). Therefore, preserving muscle strength and function is another key benefit of ensuring adequate nutrition intake in older adults (11,25–29). Consuming an adequate amount of high-quality protein (i.e., sources that provide a complete array of essential amino acids in optimal proportions), along with other key nutrients, can help mitigate muscle loss and maintain muscle function (27).

Despite the recognized significance of maintaining adequate nutrition intake, older adults encounter obstacles associated with the aging process that impede their ability to meet their nutritional needs adequately (30). Inadequate nutrition intake is a prevalent issue in LTC homes and can be attributed to various determinants of malnutrition as previously highlighted on the DoMAP (11,25–29). These factors include residents' eating capacity, staff training in dementia care, organizational policies regarding dining environments, and government regulations pertaining to dietary planning attributes (14,22,27,31). Therefore, maintaining adequate nutrition intake in older adults is important as it is in other populations (32).

A cross-sectional study by Reed et al., (2005) explored the prevalence, assessment, and characteristics associated with, the food and fluid intake of 407 residents with dementia across four LTC homes in the United States (26). In this study, the prevalence of inadequate intake was documented as 54.1% for food (with 75% consumption) and 51.3% for fluids (with 8 ounces consumed) (26). It is also suggested that poor food and fluid intake serve as the primary cause of malnutrition in LTC homes, with residents consuming approximately only 50% of the food offered (12,18). This highlights the significance of ensuring that planned menus meet the Dietary Reference Intakes (DRI) for all essential nutrients, as inadequate food intake and a lack of nutritional adequacy among LTC residents can lead to adverse health outcomes, including malnutrition (33).

Inadequate intake is closely associated with the development of malnutrition. As defined by the American Society for Parenteral and Enteral Nutrition, an intake of 75% or less for a period exceeding 7 days indicates mild malnutrition, while an intake of 50% or less for at least 7 days indicates severe malnutrition (7). The intake of 75% or less serves as a valuable tool for quantifying adequate nutritional intake, which was also utilized in this study for analysis

(31,34,35). By assuming that each resident's meals adhere to their prescribed dietary service plan, this proportional definition facilitates meaningful comparisons among various LTC residents (26). The vigilant monitoring of nutritional intake holds significant importance for LTC residents, as it not only highlights insufficient intake but also allows for the early detection of malnutrition and the assessment of dietary intervention effectiveness (36). By closely monitoring intake, healthcare providers can take proactive measures to ensure that residents receive the necessary nutrition to maintain their health and well-being (36).

2.2 The Impact of Aging on the Body

2.2.1 Physiological Changes Related to Aging

The aging process is a complex interplay of physical and cognitive factors (1). With advancing age, it is common to observe a decline in physical and cognitive functions, as well as an increase in functional disability (1). The aging process initiates changes in the body, leading to a gradual reduction in overall physical capacity and cognitive performance (1). This decline can manifest as decreased muscle strength, reduced agility, diminished sensory acuity, and slower reaction times, among other physical changes (1). These changes are natural and vary from person to person, impacting individuals uniquely (1). Yet, distinguishing impairments solely attributed to aging from those arising due to lifestyle factors such as nutrition and inactivity, injuries, illnesses, and other variables remains a challenge given the current state of evidence (1).

The impact of aging on health and mobility has been confounded by a reliance on chronological age and general well-being, often determined through the absence of disease (1,37).

Researchers have predominantly relied on chronological age and a general assessment of well-being, often defined by the absence of disease, to measure the impact of aging on various aspects of health (1,38). This approach has overlooked critical factors like activity levels and nutritional well-being. This limitation is rooted in the intricate nature of the subject, wherein discerning between declines attributed solely to aging and those originating from lifestyle factors, injuries, illnesses, and other variables becomes a complex undertaking (1,38). The current body of evidence underscores the formidable challenge in establishing clear causative links between aging and mobility impairments or physiological changes (1,38–40). More often, associations are observed rather than direct causations. This complexity further emphasizes the need for nuanced terminology that accurately represents the nature of these relationships. The process of aging brings about a multitude of changes within the human body that can affect various aspects of health and function. However, disentangling the effects of aging from other influential factors, such as malnutrition leading to the loss of muscle mass, can be a complex endeavor (36,41–43). This distinction is essential to accurately understand and address the root causes of functional decline and other health-related issues in older adults (36,41–43).

As an illustration, a study conducted by Cesari et al. (2018) delves into the nuances of age-related functional decline by emphasizing the importance of incorporating a comprehensive assessment of physical function, nutritional status, and activity levels (44). This study reinforces the need for a multi-dimensional approach in understanding the interplay between aging and functional impairments (44).

A prominent physical transformation linked to the aging process involves the reduction of muscle mass accompanied by a rise in body fat percentage (14,37,41). Even if overall weight appears constant, this phenomenon is known as sarcopenia (14,37,41). This decline in muscle functionality holds the potential to exert substantial impacts on mobility, strength, and overall functional capacity. (14,37,41). Research indicates that muscle mass tends to decrease by 1-2% per year after the age of 50, regardless of activity level (14,37,41). In individuals with dementia, muscle atrophy and weakness can lead to difficulties in performing ADLs and reduced functional independence, ultimately impacting quality of life (1,37). Sarcopenia, the age-related decline in muscle mass and strength, often impairs an individual's ability to engage in ADLs (1,37). Moreover, this decline in physical function increases the risk of malnutrition as it becomes more challenging to perform daily activities and tasks related to meals (1,37).

Older adults often experience various physical changes, including the presence of chronic conditions, changes in dentition, diminished sensory abilities, and modifications in the digestive tract (45). Additionally, aging is associated with an increased susceptibility to chronic diseases such as diabetes, cancer, heart disease, and frailty, which are further exacerbated by muscle atrophy (45). As individuals age, they become more prone to developing comorbidities, which refer to the coexistence of multiple chronic diseases or conditions (45). This increased vulnerability is a result of physiological changes, cumulative exposure to risk factors, and genetic predispositions (45).

Inadequate nutritional status is also prevalent in older population. This could be driven by physiological changes such as decreased metabolic rate, gastric secretions, absorptive capacity, and sensory functions in the oral cavity (36,41–43). Medication use, deteriorating dental health, cell dysfunction, and chronic conditions also contribute to changes in taste and smell perception,

leading to decreased appetite and thirst (26). Moreover, aging can impact vitamin and mineral metabolism, gastric health, and cerebral structure and function (26). Medication interactions and fluctuations in body water content, can increase the risk of dehydration (26). In summary, older adults can demonstrate a wide range of physical changes, comorbidities, and nutritional implications. Understanding these factors is crucial for addressing the unique needs of older adults and developing strategies to maintain their overall well-being and quality of life.

2.2.2 Cognitive Changes Related to Aging

The aging process starts in early adulthood, leading to gradual changes not only in physical functions but also in cognitive functions (1,5). The cognitive changes that accompany aging represent a natural and complex phenomenon that unfolds as individuals progress through their lifespan (5,46). This cognitive transformation is often paralleled by corresponding changes within the brain's structures (1,5), intricately intertwined with neurobiological, genetic, and environmental factors (1,5). While cognitive abilities may decline in varying degrees as people age, this phenomenon spans from subtle alterations to more pronounced changes. Importantly, this decline manifests diversely among individuals, both in terms of extent and pace (1,5). Research has consistently highlighted the intricate nature of this process, indicating that cognitive abilities tend to gradually diminish over time. However, it's important to note that there is considerable variability across individuals in the extent and speed of these cognitive changes (1,5). The volume of the hippocampus, a region important for memory, tends to decrease with age at a rate of over 1% per year (5,46). The hippocampus plays a crucial role in forming new memories and retrieving past experiences (5,46). As the hippocampus volume decreases, there may be difficulties in learning and retaining new information, as well as recalling previously learned information (5,46).

Cognitive decline, referring to the gradual and natural alterations in cognitive abilities associated with aging, encompasses specific core domains such as processing speed, working memory, episodic memory, and executive functions (47). For instance, processing speed, denoting the ability to execute cognitive tasks swiftly and efficiently, consistently experiences a decline as age advances (47). These changes generally entail mild shifts and typically do not substantially impair cognitive functioning (47). However, such cognitive changes can result in issues like recognizing and remembering to eat (48). Physiological changes associated with aging, which were previously discussed, significantly influence eating behaviours (22,32,49,50). Consequently, older adults might exhibit a tendency to consume meals at a slower pace and opt for smaller portions, ultimately leading to reduced food intake and the risk of malnutrition (22,32,49,50).

Cognitive impairment, distinct from normal aging, signifies a marked and clinically substantial decline in cognitive function surpassing the anticipated age-related changes (51). This impairment extends beyond the mild cognitive shifts expected in typical aging and could point towards underlying pathological conditions (51). This impairment can stem from diverse factors, including but not limited to dementia, Alzheimer's disease, stroke, or other neurological disorders (4). Characterized by noticeable deficiencies in memory, cognition, language, problem-solving, and related functions (4), cognitive impairment profoundly affects an individual's capacity to perform ADLs (4).

In addition to cognitive decline, behavioural shifts often manifest in advanced cognitive decline, yielding phenomena like apathy and irritability, which exert considerable influences on an individual's social interactions and functional capabilities (52,53). Additionally, individuals grappling with significant cognitive impairments frequently exhibit altered moods, including

symptoms of depression and anxiety (52,54). These emotional changes can further compound the challenges faced by older adults (52,54). Communication difficulties emerge, hindering their ability to express sensations of hunger, pain, fatigue, medication side effects, and constipation. Such challenges, in turn, contribute to diminished food and fluid intake (55). The described behavioural and emotional changes, alongside the observed difficulties in communication and independent eating, are often associated with advanced cognitive decline rather than aging (55).

It is important to differentiate cognitive impairment from the broader aging process. While cognitive decline often accelerates with age, it is imperative to acknowledge that cognitive impairment does not inevitably manifest solely due to advancing years (56). Nevertheless, the risk of developing dementia doubles approximately every five years after reaching the age of 65 years (57). This underscores the importance of addressing cognitive health as a distinct domain, separate from the influences of disease and disuse, to comprehensively understand its dynamics (57). As cognitive decline progresses, the ability to eat independently gradually diminishes, necessitating increased reliance on others for feeding assistance to ensure nutritional needs are met (45). The decline in independent eating underscores the importance of comprehensive support systems and tailored interventions to address the unique nutritional challenges faced by individuals experiencing advanced cognitive impairments or dementia (45). These alterations wield significant impact on an individual's social interactions and functional abilities, underscoring the complexity of addressing such matters within the context of cognitive decline and related conditions (45).

In summary, while there are distinct cognitive changes attributed to aging and those arising from factors like disuse, injury, and disease, their interactions can complicate the picture (47). This complexity underscores the importance of comprehensive assessments and tailored

interventions that consider both the multifaceted aspects of cognitive changes and the influences of aging and other factors (45).

2.3 Dementia

Dementia is characterized by a significant cognitive impairment that impacts daily functioning, encompassing social, functional, and occupational abilities (57). This condition adversely affects various cognitive functions such as memory, attention, and problem-solving abilities (48). There are many different types of dementia, each with its own cause (57). The underlying cause of dementia is not yet fully understood; however, researchers suspect that the causes may be related to abnormal proteins in the brain, reduced blood supply to the brain, or nerve cells in the brain that stop working properly (52). Alzheimer's disease, the most common type of dementia, is progressive and characterized by the accumulation of neuritic plaques and neurofibrillary tangles (53). Other forms of dementia include vascular dementia, frontotemporal dementia, Lewy body dementia, and mixed form dementia (53).

Dementia has a profound impact on Canadian society, whether measured in economic or social costs (53). The prevalence of dementia in Canada is expected to double within the next generation, with direct and associated costs reaching upwards of \$153 billion dollars per year (58). It is estimated that the prevalence of dementia will grow to 912,000 people in Canada and to 78 million worldwide by 2030 (58). Today, over 500,000 Canadians living with dementia and 76,000 are diagnosed with dementia every year (53). These individuals, along with their families and caregivers, face immense challenges daily (53). The impact of dementia extends beyond the affected individuals themselves and has far-reaching implications throughout the broader society (53).

2.3.1 Dementia Screening Tool

The Mini-Mental State Examination (MMSE) is a widely used cognitive screening tool that follows a standardized format and has a scoring range of 0 to 30 (59). Developed by Folstein and McHugh in 1975, it is designed to provide a brief quantitative measure of cognitive impairment and changes in cognitive status over time (60). The MMSE offers a quick and simple assessment of seven cognitive domains, including orientation, registration, attention and calculation, recall, language, and visual-spatial skills (61). Many studies have examined the validity and reliability of the MMSE and they have demonstrated good concurrent and predictive validity, meaning it correlates well with other established cognitive assessment measures and can help to identify individuals with moderate to severe dementia (60–62).

A Canadian longitudinal study measured validation and assessed the diagnostic accuracy of predictive curves for age-related cognitive decline amongst older adults in the community (51). They highlighted that while the MMSE is a useful screening tool, it has limitations and is not recommended to be used as the sole diagnostic tool for dementia (51). The MMSE is commonly used in LTC homes as a screening tool to assess cognitive impairment in older adults. However, the frequency of MMSE administration in LTC homes can vary depending on several factors, such as facility protocols, individual resident needs, and available resources (59) In this study, the MMSE scores were employed to establish specific cut-off values, serving as a guideline for selecting participants falling within the targeted spectrum of moderate to severe dementia for recruitment purposes.

2.3.2 Moderate to Severe Dementia

Severe cognitive fluctuations in dementia have a significant association with impaired engagement in ADL that negatively affect the quality of life or lead to social isolation (63).

Progression of dementia to moderate and severe stages are often assessed by the assistance of ADLs and physical capacities (64). For a moderate level of cognitive impairment, MMSE scores typically range from 10 to 15, and individuals in this stage may experience significant memory loss, confusion, difficulty with language, and may need more assistance in ADLs (60–62). MMSE scores below 10 suggest a severe level of cognitive impairment (60–62). Individuals at this stage often have profound memory loss, significant language difficulties, impaired judgment, and require assistance with basic ADLs (60–62).

Determinants of food intake in persons with dementia can also change over the course of the illness (64). As the dementia progresses, an increased prevalence of barriers to food intake has been proposed and has been shown to occur. For example, (64) individuals living in LTC with moderate to severe stages of dementia have higher prevalence of dysphagia (22%); inability to handle current diet texture (46%); difficulty with utensils (14%); taking more than 25 minutes to eat (32%); playing with food (8%); eating others' food (5%); agitation (30%); requiring partial (16%) or full assistance (13%) for eating; and resisting assistance (22%). Collectively, older adults with dementia stand in a position of heightened vulnerability to malnutrition, potentially owing to a medley of risk factors that can undermine their ability to consume food (64).

2.4 Long-Term Care Homes

Many people with more advanced dementia live in LTC homes because they are no longer able to live at home. LTC homes are also referred to as nursing homes, continuing care facilities and residential care homes in Canada (52). They provide a wide range of health and personal care services for individuals with medical or physical needs who require access to 24-hour nursing care, personal care, and other therapeutic and support services (52). LTC services may be continuous or intermittent, but it is generally presumed that they will be delivered for the

long-term that is, indefinitely to individuals who have demonstrated need, usually by some index of functional incapacity (65). As part of the Canadian health care system, many LTC homes are licensed and funded by the provincial Ministry of Health and LTC to provide care for people who need a level of support beyond what is possible at home (65). Residents also often pay a co-fee for their accommodation (65).

LTC settings provide accommodation, personal support with daily activities, and on-site health care services. These services help people live as independently and safely as possible when they can no longer perform everyday activities on their own (66). The need for LTC can arise suddenly, such as after a heart attack or stroke. Most often, however, it develops gradually, as people get older and frailer or as an illness or disability gets worse (67). The Canadian Institute for Health Information's report for dementia, identifies that 69% of LTC residents had dementia in 2015–2016 (66). This percentage underscores the need for support systems that can adequately address the unique needs of individuals living with dementia.

A Canadian cross-sectional study also provided yearly snapshots of the healthcare needs of newly admitted nursing home residents over a 16-year period (68). Their observations demonstrated the characteristics of individuals incoming to LTC homes – most were aged 85 years or older and presented complex care requirements due to an increasing prevalence of five or more morbidities, nine or more prescription medications, extensive limitations in ADLs, and poor cognition (68). Considerably, this study highlighted that the prevalence of dementia in newly admitted residents to LTC increased from 42.3% in 2000 to 54.1% in 2015 (68). This higher prevalence could be attributed to the study's focus on measuring dementia upon admission to LTC homes, unlike previous studies that included all current residents, some of whom might

have experienced cognitive decline after entering (69). Consequently, recognizing dementia as one of several comorbidities among residents entering LTC homes becomes crucial (69).

Currently, over 7.1% of individuals in LTC homes fall into the category of moderate to severe dementia, facing significant challenges that greatly impact their quality of life (68). As their condition progresses, the level of care required often surpasses what can be adequately provided in a home setting (68). Hence, the transition to LTC homes becomes a necessary step for many individuals with moderate to severe dementia to access the specialized care and support they need to maintain their well-being (68). It is anticipated that the percentage of individuals with moderate to severe dementia in LTC homes will continue to rise over time (68). This projection emphasizes the urgency of implementing effective interventions and tailored care strategies to address the unique needs of this vulnerable population. By investing in resources, research, and compassionate healthcare, we can create a supportive environment that improves.

This growing population of individuals with moderate to severe dementia in LTC homes brings forth a range of challenges, particularly in the realm of nutrition (70). Multiple factors at different levels can influence the nutritional status of residents with dementia in LTC homes. Understanding these factors and their interplay is crucial in developing effective strategies to address the specific needs of this population. The Social-Ecological Model (SEM) serves as a valuable framework for organizing these factors and highlighting the dynamic interactions between various levels of influence (Figure 2).

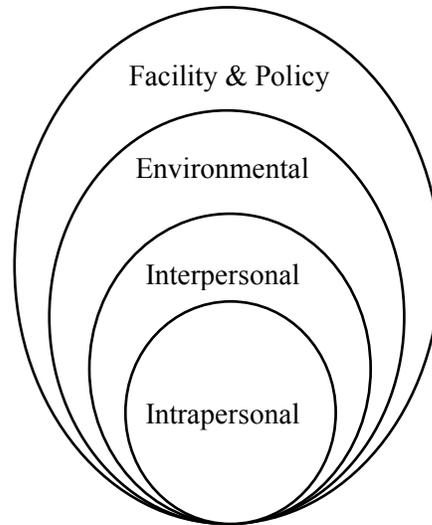


Figure 2. Social-Ecological Model as a conceptualized framework.

2.5 Contributors to Low Food and Fluid Intake for LTC Residents

This section provides an overview of the factors that influence adequate nutrition intake for residents with dementia in LTC home, as reported in the existing literature. The SEM has been effectively adopted in studies addressing many public health issues, including issues related to nutrition and eating (71). It should be noted that while the levels appear concrete and defined, there is an interplay between levels, allowing some overlap (71). This model has been widely applied in nutritional studies to examine various issues related to dietary behaviours, food choices, and nutrition-related health outcomes (20,72,73). Researchers have recognized that individual dietary behaviours are influenced by a multitude of factors at different levels of the social ecological model, and understanding these influences is crucial for developing effective interventions and policies to improve nutrition and public health (73–75).

Liu et al. (2016), used SEM to provide a framework for conceptualizing and understanding the association of factors with eating performance (76). They described the levels as follow: intrapersonal factors (e.g., individual characteristics, psychological, and comorbidities), interpersonal factors (e.g., staff and peers), environmental (e.g., physical, and cultural), and facility and policy domains (76). This study provided valuable insights in examining the eating performance challenges of individuals with moderate to severe dementia (76). In individuals with dementia, low food intake encompasses various factors beyond eating performance and dependability (76). Following section delve into profound insights of diverse dimensions that shape nutrition intake, offering a more holistic comprehension of the interplay between individuals, their environment, and the overarching context.

2.5.1 Intrapersonal Factors

Within the SEM, the intrapersonal domains are positioned as the center. At the intrapersonal level, the SEM recognizes that personal characteristics, such as knowledge, attitudes, beliefs, and biological factors, and disease can impact health behaviours (71). These individual factors interact with interpersonal relationships, including family, friends, and peers, which influence health choices and behaviours through social norms, support systems, and social influence (71). The individual is then embedded within multiple levels of influence and thus, reciprocally interacts with subsequent levels. Individual behaviour and experiences are the result of the interaction of a person with their environment and, therefore, the two are always connected (71).

Examining distinct domains within the SEM in isolation overlooks the significance of an individual's "positionality," which pertains to their unique perspective and how it evolves over time (71). Previous studies have established a connection between cognitive impairment,

particularly moderate-to-severe impairment, and dependence on others for eating (26,76,77). Furthermore, research has demonstrated associations between nutrition intake and changes in appetite, comorbid conditions (26,77), oral and swallowing issues, physical capabilities such as mobility, grip strength, and chair sit and rise abilities (24,50), and mood and behavioural symptoms such as depression, apathy, agitation, pacing, wandering, aggression, and resistance to care (70,78). These factors can act as both barriers and facilitators when it comes to achieving adequate nutrition for individuals with dementia in LTC homes, which will be discussed.

2.5.1.1 Appetite

Alterations in body composition due to aging, coupled with psychological and pharmacological influences, wield a profound impact on one's appetite status (26). The physiological shifts resulting from aging encompass modifications in the digestive system, fluctuations in hormones, the presence of diseases, the experience of pain, alterations in sensory perception, including smell, taste, and vision, as well as a diminished energy requirement (32,79). Appetite is also strongly influenced by the environment and mood (26). Depression, delirium, social isolation is known to be some of the psychological contributors to appetite modification. (26) Older adults are likely to be taking at least one medication (79). There is a number several commonly used medications that are known to alter sense of taste and smell or cause nausea and may therefore reduce appetite, which would be a barrier for adequate nutrition intake (26).

In a qualitative study by Murphy et al., (2017), researchers explored the nutritional challenges associated with eating and drinking among individuals with dementia (75). They interviewed family members and care staff working in LTC homes (75). The study revealed a crucial overarching aspect of providing nutritional care in dementia, which involves adopting a

person-centered approach that prioritizes the unique nutritional needs and preferences of individuals living with dementia (75).

As people advance in age, their sensory systems undergo a decline, underscoring the significance of presenting food and beverages in a visually appealing and appetizing manner to stimulate consumption (75). This can be achieved by working closely with individuals to understand their preferences and enhancing the flavour, color, taste, and appearance of meals (75). Recognizing and addressing individuals' preferences is crucial for facilitating effective care in individuals with dementia (75). Research indicates that targeted interventions can effectively reduce agitation, neuropsychiatric symptoms, and depression while enhancing overall quality of life (75). By tailoring nutritional interventions to individuals' preferences, caregivers can contribute to improved well-being and positive outcomes in individuals with dementia.

2.5.1.2 Comorbidities

Comorbid medical conditions exhibit a heightened prevalence among older adults and have been identified as potential contributors to the disability experienced by those with dementia (39,80). Prior research has also delved into the impact of comorbidities on the degree of disability, affirming the findings illuminated in the current study (75). Navigating comorbidities in individuals with dementia presents distinctive challenges due to cognitive impairment, which can hinder the interpretation of symptoms, communication of distress, and adherence to treatment regimens (75). This intricate interplay of cognitive decline often culminates in less proactive management of comorbid conditions among individuals with dementia, thereby introducing complexities into the application of conventional strategies for treating chronic diseases (76,77,80).

2.5.1.3 Swallowing Impairment and Dysphagia

Dysphagia refers to the difficulty or impairment in eating and swallowing, characterized by disrupted or prolonged movement of food or liquids from the oral cavity to the esophagus (55,81). The process of swallowing can be divided into four distinct phases: oral preparatory, oral transport, pharyngeal, and esophageal phases (55,81). Impairments in any of these phases can result in dysphagia (55,81). Several age-related factors, including reduced tissue elasticity, changes in the cervical spine, oropharyngeal disorders, decreased oral moisture, and sensory impairments such as diminished smell and taste, can contribute to alterations in swallowing function during each phase (55,81).

Dysphagia is also characterized by the inability to swallow safely, resulting in the redirection of ingested substances into the respiratory tract, a phenomenon referred to as aspiration (82,83). Secondly, it diminishes the efficiency of the swallow, resulting in residual material remaining in the throat after swallowing (84). Dysphagia is associated with a range of negative health consequences. Aspiration, a potential outcome of dysphagia, can result in aspiration pneumonia (84). Aspiration pneumonia occurs when substances, such as food, liquids, secretions, or stomach and esophageal contents, enter the lower airways and cause infection in the lung parenchyma (84). Aspiration pneumonia increases the risk of hospital admission, mechanical ventilation, longer hospital stays, and mortality (84). Furthermore, dysphagia can elevate the risk of dehydration (85) and malnutrition (84).

In recent scientific literature, the coexistence of sarcopenia (age-related loss of muscle mass and strength) and dysphagia has garnered significant attention (24,83). It has been suggested that older adults with dysphagia may experience muscle loss not only in generalized skeletal muscles but also in the specific muscles involved in swallowing (24,83). This age-

related decline in muscle mass can be observed as a reduction in the thickness of the tongue, geniohyoid muscle, pharyngeal wall, as well as a decrease in tongue pressure and weakened pharyngeal contractility (24,83). The interplay between sarcopenia and dysphagia highlights the importance of understanding the impact of muscle loss on swallowing function in the older population (24,83).

Difficulties in swallowing may cause discomfort, pain, or a fear of choking, leading individuals to reduce their food intake or avoid certain types of foods altogether (83). Dysphagia can also lead to social isolation due to its impact on individuals' ability to participate in social eating experiences (83). Dysphagia can result in feelings of embarrassment, frustration, or self-consciousness during mealtimes, leading individuals to withdraw from social interactions involving food (83). These difficulties can lead to reduced enjoyment of eating and may result in individuals eating smaller portions or avoiding certain textures or consistencies that are particularly challenging to swallow (83). These factors highlight the importance of addressing dysphagia in LTC homes to minimize the reduction of food intake. Research indicates that dysphagia is commonly observed in individuals with dementia affecting approximately 13% to 57% of people living with dementia (12,13,86,87). Dysphagia is also prevalent in up to 60% of LTC residents and as it is presented in the DoMAP known to be directly associated with malnutrition (13,15). This can be attributed to the impairment of the brain regions responsible for coordinating the complex process of swallowing.

Texture-modified diets (TMDs) refer to specific food and liquid preparations designed to meet the texture and consistency needs of LTC residents with oral health conditions and dysphagia (84). The prescription of TMDs is influenced by various factors, including residents requiring high levels of care, prolonged stays in LTC, a diagnosis of dementia or cognitive

impairment, signs of malnutrition (e.g., weight loss), and dependence on others for ADLs (13,15). TMDs, including pureed foods commonly used in LTC homes, are often employed as a management strategy for dysphagia (13,33). Individuals who require TMDs often experience eating difficulties or require assistance with eating (13,33,55,88). Despite being disliked by many individuals and having a negative impact on quality of life (13,15), TMDs are widely used in LTC facilities throughout Canada. However, there have been reports of TMD refusal and nonadherence to TMD recommendations (13,15). Additionally, TMDs have been associated with an increased risk of malnutrition and dehydration, attributed to reduced palatability and the poor nutritional quality of TMDs themselves (13,15). Providing optimal nutritional support for these particularly vulnerable residents becomes a challenging task.

Previous studies have indicated a significant association between the use of TMDs and a high prevalence of malnutrition and weight loss in LTC residents with dementia (13,33). Findings from the "Making the Most of Mealtimes (M3)" study, cross-sectional examined 32 LTC facilities across Canada, revealed a negative association between the prescription of TMDs (i.e., minced or pureed food textures) and the scores obtained from the Mini Nutritional Assessment-Short Form (MNA-SF) in LTC residents (13). The findings further emphasizes that dysphagia risk alone is insufficient in predicting malnutrition; rather, it is the specific diet employed to manage dysphagia that plays a significant role (13). This highlights the importance of considering the sensory and nutrient quality of TMDs in preventing malnutrition (13). This study also analyzed the TMD menus and found that pureed menus typically provided lower nutrient amounts compared to regular texture menus (13). These findings underscore the potential nutritional limitations associated with TMDs in LTC homes.

2.5.1.4 Functional Decline

Literature highlights that there is an association with eating performance of LTC residents and cognitive impairment (76,77,80). The ability to effectively bring food into the mouth and swallow is influenced by various cognitive deteriorations, including disorientation, visual and spatial disabilities, motor apraxia, language and attention deficits, and memory decline (76,77,80). These cognitive challenges become more pronounced in individuals with severe dementia (76). One of the factors contributing to the nutritional problems with this population is that with progression of dementia and functional decline of aging, they lose the ability to eat independently (57).

Some of the functional disabilities that occur affecting adequate nutrition intake are changes in movement and the ability bring utensils to the mouth or to eat without dropping food, lack of concentration and the ability to maintain attention on the meal (26). Muscle wasting leads to functional decline and frailty, which are in turn associated with a loss of independence, increased risk of morbidity and mortality (89). Residents with moderate to severe cognitive impairment face difficulties in planning and executing the sequential tasks involved in eating (76). They may struggle to respond to verbal cues provided by nursing staff during mealtime (76). The cognitive degenerations experienced by individuals with severe dementia impede their ability to carry out the necessary steps for eating and respond to verbal prompts, further underscoring the challenges faced by this population (76).

2.5.1.5 Mealtime Disorientation

Mealtime disorientation refers to a condition commonly observed among individuals with dementia where they experience confusion and disorientation specifically during mealtimes (26). Individuals with dementia have a progressive decline in cognitive and behavioural functions, and

finally lose their abilities to independently function physically (90). This phenomenon can manifest in various ways, including responsive behaviours related to dementia, difficulty recognizing food or utensils, forgetting how to use them, or being unsure about the purpose of the meal (90). It may also involve challenges in understanding the sequence of steps involved in eating, such as forgetting to chew or swallow food or experiencing difficulty coordinating movements required for eating (90).

Mealtime disorientation can be attributed to the cognitive impairments associated with dementia, which affect memory, attention, and executive functioning (90). The disorientation can disrupt the normal eating process and lead to difficulties in independently managing meals (90). This can result in reduced food intake, malnutrition, and dehydration, as well as increased frustration and emotional distress (90). Therefore, it is crucial to implement strategies to minimize the disorientations by creating a calm and structured mealtime environment, providing visual cues and reminders, using adaptive eating utensils or techniques, offering assistance with eating when needed, and adapting the food texture or presentation to meet the resident's specific needs (90). Additionally, individualized care plans and person-centered approaches are essential to address the unique challenges and preferences of each person with dementia during mealtimes (90).

2.5.2 Interpersonal Factors

Interpersonal interactions related to nutrition intake also encompass various factors. The social environment is composed of the immediate relationships, friendships, and social environments within which the individual interacts (71). Interpersonal factors such as social support and encouragement from friends, family and health care professionals play an important role in mealtime experience and improving adequate nutrition intake (19).

Staff member interactions with residents with moderate to severe dementia may be influenced by their perceptions, knowledge, and beliefs regarding the ability of residents to eat independently and ensure sufficient caloric intake (76). It has been previously reported that staff members provide excessive assistance to these residents, opting to feed them instead of encouraging and enabling self-feeding (76). Moreover, many staff and family members view feeding an older adult as an expression of care and nurturance (76). Communication with staff and other residents about eating and food during mealtimes and social support from staff and peer residents who sit adjacently are other interpersonal factors that impact adequate nutrition intake for LTC residents with dementia (26,56).

Role modeling by staff members and other residents can influence the resident's ability to eat independently (91). Communication between caregivers, residents, and peers during mealtimes plays a significant role as well, affecting the resident's eating experiences and food choices (91). Additionally, social support from caregivers and nearby residents who sit adjacently can impact the resident's eating performance (91).

These interpersonal interactions within LTC homes are essential considerations as they can either facilitate or hinder residents' ability to eat independently and influence their overall eating experiences. Understanding and addressing these factors can contribute to the development of supportive and empowering environments that promote optimal eating performance and enhance the quality of life for residents with dementia.

Kolanowski et al. (2015) highlighted that education and training on managing resident behaviours could improve mealtime experience and food intake for LTC residents with dementia (92). They also expressed that training staff on how to redirect distracted residents could be an intervention to improve the resident–staff relationship and thereby improves oral intake (92).

Another barrier that was highlighted by participants was the importance of positive attitude and approach to residents (92). They mentioned that residents ate markedly less when paired with a task-focused nursing aides who did not provide verbal cues and interaction. This is also supported in the literature that staff creating a relationship with residents and understanding their preferences could improve their efficacy in providing mealtime assistance and improves food intake of residents (19,30,93).

2.5.2.1 Person-Centered Care

Person-centered care is a sociopsychological treatment approach that acknowledges the unique characteristics and circumstances of each patient within the context of their attitudes and care practices (94). It recognizes that individuals with dementia may have unmet needs, such as feelings of isolation, which can contribute to behavioural symptoms or neuropsychiatric symptoms (94). By employing a person-centered care approach, healthcare providers can enhance their understanding of and responsiveness to the unmet needs of individuals with dementia, thereby providing them with appropriate support to facilitate adequate nutrition intake (94).

A systematic review and meta-analysis study conducted in Korea, explored the importance of implementation of person-centered care approaches for individuals with dementia (94). They found that there is a positive impact of person-centered care on reducing agitation in individuals with dementia which align with previous research, which has demonstrated that engagement in specific activities, particularly those aligned with personal interests, can significantly decrease agitation and challenging behaviours in people with dementia (94). Therefore, it is reasonable to suggest that incorporating person-centered care approaches, which

prioritize personal preferences and interests, can enhance the therapeutic benefits for individuals with dementia.

Moreover, the effectiveness of person-centered care in reducing depression and improving quality of life among individuals with dementia was found to be significant (94). The person-centered care approach emphasizes the importance of fostering meaningful relationships between staff and residents, which in turn provide ample opportunities for social interactions and promote overall well-being (54,94,95).

2.5.3 Environmental Factors

The nutrition intake of LTC residents is influenced by the supportive physical and social environment in which they have their meals (20). Inadequate nutrition intake has been associated with a less supportive physical and social environment in LTC homes (20). Previous research has identified connections between eating independently and various elements of the physical environment during mealtime (29,76). These include factors such as lighting, table setting contrast in the dining room (20), availability of adapted food options (e.g., finger food), and the presence of assistive eating devices such as no-spill cups, built-up utensils, and plate guards (20).

Additionally, the comfort, fit, and positioning of chairs or wheelchairs used by residents during mealtimes play a crucial role in optimizing eating facilitation (20).

These factors are also essential facilitators in maintaining adequate nutrition intake among LTC residents with dementia, an aspect that previous literature has not adequately highlighted. At the environmental domains, cultural practices are also influential and the way in which the food is presented, and the cultural compatibility of the food choices provided play roles in residents' facilitators or barriers in eating practices (72,77,96,97). Additionally, distraction, meal appearance and quality, physical environment elements, and dining routines have been discussed

in relation to adequate nutrition intake in LTC (20,56). Liu et al, (2020), emphasized facility support and that facilities can commit to a supportive dining environment that provides minimal distractions, well-tasting culturally appropriate food based on resident preferences, and opportunities of socialization (19). Facility support by staff consistently has been highlighted in research where staff commitment in providing quality care and the importance of teamwork impacts the adequate nutrition intake of LTC residents (19).

2.5.3.1 Mealtimes in LTC homes

Many observational studies demonstrate that mealtimes provide a sense of structure, independence, and autonomy, as well as opportunity to socialize, and as a result, are highly anticipated by residents (97–100). Mealtimes are essential for the health and quality of life of residents living in LTC homes (20). Research has demonstrated that when a mealtime is more person-centred, improved food intake results, suggesting that a pleasurable dining experience should be the goal (97,99). However, mealtimes are complex as various factors and activities are involved in the meal service and mealtimes often devolve into a task to be completed as quickly and efficiently as possible (20). It has been suggested that both physical and psychosocial environments are important at mealtimes (97). These factors include type and availability of music; home like décor (e.g., pictures, tablecloths/place mats, dishware); smaller dining areas; table groupings to support interaction (and including staff at the table); involving residents in meal activities; and no other care activities occurring at mealtime (20,97).

In the "Making the Most of Mealtimes (M3)" study, researchers examined the physical and psychosocial environments during mealtimes using standardized measures (99). They employed a tool called the Mealtime Scan (MTS) (101) to quantitatively assess these environments. The study included observations of 10 diverse dining rooms, evaluating factors

such as size, layout, and resident profile. Each dining room was observed during breakfast, lunch, and dinner, resulting in a total of 30 observations. The findings revealed significant negative associations ($p < 0.05$) between the physical environment summary scale and factors such as loudness, the number of residents, the number of residents eating together, the number of staff involved in food service, and the total number of people present in the dining room (29).

It was found that age-appropriate music in the dining room, such as soothing or preferred music, had therapeutic effects, positively stimulating residents, transforming mood, and reducing responsive behaviours (29). The size of the dining room was associated with residents' behaviours, with larger spaces linked to increased agitation and smaller spaces enhancing well-being, reducing decline in ADLs, and improving quality of life (29). Increased lighting and noise reduction were positively associated with a pleasant mealtime experience as indicated by the MTS summary scale rating (29). These factors have been implemented in most LTC homes in Nova Scotia, aligning with the best practices for food service provision for LTC residents (102).

2.5.4 Policy Factors

In the context of LTC homes, there are various institutional and policy domains that impact nutrition intake among residents. The system, including institutional policies and care practices, which are designed to meet regulatory requirements, can also influence nutrition intake for LTC residents. Policy-related factors encompass a focus on ensuring adequate caloric intake as mandated by regulatory oversight, with the prevention of weight loss serving as a clinical quality indicator in LTC homes (103) factors such as appropriate staffing for mealtime supervision and assistance, high workload, and staff turnover have been identified as important considerations (103). Additionally, institutional policies that prioritize safety concerns, such as the prevention of aspiration and choking, may limit residents' ability to independently perform eating tasks (103). However, these safety concerns, may inadvertently restrict residents' independent performance of eating tasks (19,56). Effective interventions aim to address these diverse personal and environmental factors to promote residents' engagement at their highest level of function in terms of eating practices (56).

Moreover, custodial care practice policies that prioritize food intake and task completion for efficiency, rather than fostering an enabling and therapeutic meal experience, can negatively impact eating performance (18,104,105). Inadequate staffing levels and policies aimed at preventing weight loss in LTC homes can lead staff taking over feeding residents or modify food and fluid consistency to ensure caloric intake and expedite feeding (19,56). However, excessive and unnecessary assistance with feeding, regardless of residents' ability to eat independently, can inadvertently foster dependence, undermine residents' autonomy, reduce mealtime enjoyment, and provoke resistance to care (18,104,105).

Considering the multifaceted nature of factors influencing nutrition intake in individuals with dementia, it is important to take into account determinants at various levels (76). Numerous factors would act as barriers and facilitators to adequate nutrition intake for LTC residents, and the interplay between these factors creates complex and dynamic situations that shape experiences among older adults with dementia care (56). Individual deficits may exacerbate the impact of social or environmental barriers, while supportive social and environmental factors can mitigate individual deficits and promote optimal nutrition intake.

2.6 Quality of Current Evidence

COREQ (Consolidated Criteria for Reporting Qualitative Research) is a comprehensive 32-item checklist designed to enhance the transparency and quality of reporting qualitative research studies that involve interviews and focus groups (106). It provides a standardized framework to ensure that researchers provide sufficient information about their research design, data collection methods, data analysis, and the interpretations drawn from the findings (106). By using the COREQ checklist, researchers can improve the rigor and reproducibility of their qualitative studies and enable readers to evaluate the trustworthiness and validity of the research (106). The checklist is a tool for researchers, reviewers, and readers to assess the completeness and transparency of reporting in qualitative research studies (106). Each item on the checklist represents an important aspect of the research process that should be adequately described in the research report (106). For each item, using a rating scale, reviewers can indicate the level of completeness or quality of reporting for each item (e.g., fully reported, partially reported, not reported) (106).

The four qualitative studies included (2,20,75,91) in this literature review played a significant role in shaping the findings of this literature review and study design. However, these studies exhibited a consistent pattern of partially reporting the required information outlined in the COREQ checklist (Appendix A). Notably, all studies lacked detailed information regarding the characteristics of the interviewers/facilitators and any pre-established relationship they had with the participants prior to conducting the interviews. This information is crucial as it can significantly influence the dynamics and quality of the interview process. Additionally, there was limited reporting on the methodological orientation that guided the research, which is essential for understanding the underlying theoretical framework. Furthermore, comprehensive reporting on the participants' method of approach and sampling was lacking, which is vital for assessing the representativeness and generalizability of the findings.

All the reviewed studies shared a similar pattern of reporting their data, but there were limitations in providing comprehensive information. Specifically, they lacked detailed reporting on the characteristics of the interviewers/facilitators and participants' familiarity with the interviewer or any pre-established relationships prior to the interview. This information is critical for establishing context and identifying potential biases during the interview process. Additionally, the studies did not adequately report the methodological orientation that guided their research, resulting in a gap in understanding the theoretical framework guiding their investigations. Additionally, information regarding the participants' method of approach and sampling was insufficient, which can affect the generalizability and representativeness of the findings. By improving the reporting in these areas, readers can have a more complete understanding of the study.

However, it is worth noting that the studies demonstrated a complete reporting of the collection and analysis of the data, including the description of themes identified. Despite this strength, the lack of comprehensive information in the aforementioned areas limits the ability to fully evaluate the studies' rigor and reproducibility. Providing a more detailed account of interviewer/facilitator characteristics, participants' knowledge of the interviewer, pre-established relationships, methodological orientation, and sampling approach would enhance the transparency and credibility of the research. Addressing these information gaps in future studies would contribute to a more robust understanding of the research process and facilitate the replication and application of findings in diverse settings. design, implementation, and findings. This, in turn, can contribute to advancing the field of qualitative research and ensure that studies are conducted and reported in a thorough and transparent manner.

The current study recognizes a gap in the previous literature in sharing personal characteristics of data collectors and emphasizes essential factors such as identity, credentials, occupation, gender, experience, and training in the methodology section. This approach addresses potential biases and enhances transparency, ultimately bolstering the credibility of the findings. This transparency empowers readers to assess the influence of these factors on the researchers' observations and interpretations. The study also accounted for the dynamic between researchers and participants through a reflexivity journal (Appendix B), acknowledging its impact on participants' responses and the researchers' comprehension of the phenomena.

In terms of study design, the methodology (chapter 3) offers clarity on the theoretical frameworks underpinning this research. This contextualizes how the research questions was approached and investigated. Detailed insight is provided into participant selection and the chosen setting, with a notable emphasis on purposive sampling to ensure the richness and

diversity of the gathered data. Moreover, the study also meticulously reports on data saturation, the inclusion of multiple coders, and the application of triangulation methods. In presenting the findings, the author prioritizes supporting quotations, the representation of diverse participants, and the presentation of both major and minor themes, interpretations, and theories. By addressing these essential components within qualitative research publications, the study achieves enhanced transparency, supports trustworthiness, and elevates the overall quality of the research.

2.7 Knowledge Gap

Research on nutritional outcomes often tends to concentrate on individuals with mild cognitive impairment, early-onset dementia, or mild dementia, often excluding those with moderate to severe dementia, especially those residing in LTC homes (2,20,91,96,107). However, delving into the unique needs and preferences of older adults with moderate to severe dementia holds immense significance, given that their requirements may diverge significantly from those with mild cognitive impairment (26,70). Understanding the specific obstacles and catalysts that shape their nutrition intake is pivotal, as it directly guides the formulation of tailored interventions (26,68). Without this crucial knowledge, the task of personalizing interventions for this population remains considerably challenging (26,70).

Furthermore, by neglecting to incorporate the perspectives of individuals grappling with cognitive impairment, there's a risk of overlooking invaluable insights and gaining only a partial comprehension of their experiences, despite a substantial proportion of these individuals being situated in LTC homes (53). To bridge this gap, it's imperative for researchers to prioritize the involvement of residents with cognitive impairment and actively seek input from their caregivers (53). Such an approach allows researchers to garner a more comprehensive understanding of the needs, preferences, and viewpoints of this population (100).

This study addresses gaps present in previous work by providing details on data collection including interviewer characteristics, methodological orientation, and sampling approach, while employing a reflexivity journal throughout the study to enhance transparency and credibility.

Prior research had often focused on individuals with mild cognitive impairment or early-stage dementia, with limited attention given to the distinct needs and experiences of those at the moderate to severe stages of dementia. This gap in the literature highlighted the necessity to delve into the unique nutritional challenges faced by LTC residents. Therefore, as driven by the recognition of a significant gap in understanding the specific challenges and factors that impact the nutrition intake, the purpose of this study was to identify barriers and facilitators influencing adequate nutrition by LTC residents with moderate to severe dementia.

3.0 METHODOLOGY

3.1 Study Design

This study was a mixed methodology design including a qualitative phenomenological approach and a descriptive quantitative component. Barriers in the context of nutrition intake for LTC residents were defined as factors that obstruct the ability to consume adequate nutrition, while facilitators encompass factors that enable and support adequate intake (91). Adequate nutrition intake refers to the assumption that the food provided by the LTC home is nutritionally adequate to meet the residents' needs. Barriers and facilitators to nutrition intake were captured from multiple sources including semi-structured interviews and mealtime observations while analysis of adequate nutrition intake was obtained through plate measurement. This aligns with the principles of a mixed method research design, which seeks to leverage the strengths of multiple methods to address a research question more comprehensively (108).

3.2 Orienting the Research

An important step when conducting qualitative research is the acknowledgment and explicit articulation of the impact the researchers' position, experiences, personal characteristics and values have on the entire research process (109). Recognizing that the act of doing research in and of itself is inherently subjective, Austin and Sutton (2014) contend that it is better to be "honest and transparent" (p. 437) about one's relation to the research, thereby allowing readers to draw their own conclusions about the researcher and their interpretations presented in the output. This process, known as reflexivity, is intended to enhance the trustworthiness of the research and credibility of the findings (109). Therefore, as I aim to establish trustworthiness in this body of research, I will begin this section by acknowledging my paradigmatic position and the worldview that I bring to this study, including an explanation of the underlying philosophical assumptions

that have guided this research process. Next, I will discuss how my role as a registered dietitian in LTC influenced my decision to explore adequate nutrition intake of residents with dementia in LTC. Finally, I will describe how my personal identity, values, and perspective in relation to the relevant roles that I hold in society, have influenced my approach to conducting this research.

3.3 Paradigmatic Position and Philosophical Assumptions

The post-positivist or interpretative paradigm has played a crucial role in shaping the design of this study. Post-positivist researchers engage in reflexivity, meaning they critically examine their own biases, assumptions, and perspectives that may influence the research process, and will aim to minimize the impact of their own preconceptions on the research outcomes (110,111). By aligning with this paradigm, I have acknowledged the importance of understanding the subjective meanings and interpretations that individuals, particularly LTC residents with dementia, give to their own actions and interactions. This paradigm recognizes the role of subjectivity and the diverse ways in which individuals make sense of their experiences. It emphasizes the influence of context, social, and cultural factors on individuals' perspectives and behaviours (112,113).

By adopting the post-positivist paradigm, I have engaged in reflexivity, critically examining my own biases, assumptions, and perspectives that may influence the research process. This reflexivity helps minimize the impact of my preconceptions on the research outcomes, ensuring a more objective and comprehensive understanding of the barriers and facilitators to adequate nutrition intake in LTC residents with dementia.

I chose this paradigm specifically because it addresses the common oversight of the perspectives of LTC residents with dementia in research. By actively involving them as participants in the study, along with other key stakeholders such as family members and staff, I

aim to gain a comprehensive and holistic understanding of the factors influencing their dietary needs. This approach ensures that their voices are heard, and their experiences are considered, contributing to more meaningful and impactful research outcomes.

This research has been shaped by my experience as a registered dietitian working in a LTC home, both as an intern during my Bachelor of Applied Human Nutrition degree and through my ongoing part-time employment. Throughout my work, I have observed a concerning trend of residents with advanced dementia being overlooked and having limited input regarding their care and choices. Despite the already low food intake in this population, I have discovered that the diversity of food offerings can vary based on home regulations, facility budgets, and available resources. Consequently, residents may face limited options when it comes to their food choices.

However, it is important to note that continuing care and licensing regulations exist to ensure that all LTC homes in Nova Scotia and across Canada meet certain standards. These regulations play a crucial role in governing the operations of these homes. It is precisely due to these interactions in my part-time role and my deep interest in this specific population that I made the decision to focus my research on this population and include them in the interviews. By doing so, I aim to shed light on their unique perspectives and experiences, bringing attention to the need for more inclusive and person-centered approaches within LTC homes.

3.3.1 Phenomenological Approach

Phenomenology, as expounded by Husserl in 1970, can be understood as the investigation of "phenomena" and pure experiences (114). This philosophical approach centers on understanding an individual's lived experiences within the world (115). The phenomenological approach aims to recognize phenomena by examining how they are

subjectively perceived by individuals involved in a particular situation (115,116). This study examined the adequate nutrition intake of LTC residents with moderate to severe dementia from various perspectives.

Phenomenology is commonly used in food and nutrition experiential research, as a means to develop theories for the shared meanings that a group of individuals attaches to a particular lived experience (115,117,118). However, phenomenology has many different strands where each is defined by how lived experiences or phenomenon are explored (117). Two encountered strands are transcendental phenomenology and interpretive phenomenology (114). The transcendental phenomenology approach, derived from Husserl and advanced by Moustakas, places emphasis on the participants' provided descriptions to distill the essence of the lived experience (117). In contrast, interpretative phenomenology places greater reliance on the researcher's interpretations to derive meaning from the lived experience (115). Interpretive phenomenology was founded by Martin Heidegger whose work originated from Husserl, with focus on ontology—the science of interpretation (116). Heidegger did not think it was possible for a researcher to bracket their experiences related to the phenomenon under study (116). Instead, he believed a researcher's expert knowledge is considered a valued and welcomed guide to the research process, as it is thought to make the inquiry a meaningful undertaking (117). Interpretative phenomenology comprehends the mind-set of participants and their language which mediates one's experiences of the world, in order to translate their message (116). By employing this approach, researchers can explore the complexity of human experiences, uncovering their subjective meanings and significance (117).

This study is designed to understand the barriers and facilitators to adequate food intake and eating experiences among LTC residents with moderate to severe dementia in LTC homes.

Adopting an interpretative phenomenological approach was particularly fitting for our study, as participants willingly shared their perspectives on the barriers and facilitators to adequate nutrition intake. My familiarity with the subject matter adds credibility to this study. My expertise in the field enhances the trustworthiness of this research by enabling me to navigate the intricacies of the topic, interpret the data effectively, and provide meaningful insights that accurately reflect the experiences and viewpoints of the participants.

My experience in the field may lead to a potential unintentional conflict of interest or a desire to advocate for certain practices or policies related to nutrition in LTC homes. While I strive to maintain objectivity and neutrality throughout the study, it is essential to acknowledge and mitigate any potential bias that may arise from my personal interests or professional background.

These preconceptions, although unintentional, can potentially influence the research process and interpretation of the data. It is crucial to engage in reflexivity and critically examine these biases and assumptions to minimize their impact on the research outcomes. Despite these challenges, my familiarity with the subject matter and expertise in the field have also been beneficial. They have enabled me to navigate the complexities of the topic, establish rapport with the participants, and gain in-depth insights into their experiences.

3.3.2 Descriptive Quantitative Research

Descriptive quantitative research, typically used for studying phenomena by analyzing numerical data in large populations, can still be valuable with small sample size (119). Numerical data can enable researchers to effectively describe and summarize the characteristics or behaviours within that specific group (119). This data can include various characteristics, such as age, gender, medical history, or any other relevant variables (119). By calculating averages,

researchers can determine the typical or mean value of these characteristics within the sample. Once the data is collected, statistical analysis is used to summarize the data in terms of measures of central tendency (such as mean, median, and mode), measures of variability (such as standard deviation), and other statistical techniques such as frequency distributions and correlations.

In this study, the descriptive quantitative component summarized participants' characteristics and quantified their food intake. By calculating the percentage of pre and post consumption of three observed meals of LTC residents, I evaluated the adequacy of nutrition based on the observed data. Through the objective summarization of the collected demographic data, I aimed to draw meaningful conclusions and provide details about the participant characteristics and food intake.

3.4 Participant and Setting

3.4.1 Inclusion and Exclusion Criteria

This study included three groups of participants: LTC residents with moderate to severe dementia, family members, and staff members who directly care for the residents. Each group provided unique perspectives and insights that were essential for understanding the topic at hand. Table 1 shows the specific characteristics of the participants and outlines the criteria for inclusion in the study.

Table 1. Inclusion criteria for participants in the study.

Residents	Family members	Staff members
<ul style="list-style-type: none"> • Speak English • MMSE \leq20 • Not actively receiving end-of-life treatment 	<ul style="list-style-type: none"> • Speak English • Close relationship with residents (e.g., partner, children, grandchildren, parent, SDM) 	<ul style="list-style-type: none"> • Speak English • Work at LTC home \geq6 months • Provide nutrition care (e.g., dietary aides, CCA, LTCA, RN, LPN, RD)

MMSE: Mini-mental state exam SDM: Substitute decision maker CCA: Continuing care assistant
 LTCA: Long-term care assistant RN: Registered nurse LPN: Licenced nurse practitioner RD: Registered dietitian

Participants from all three groups were recruited by Northwood research assistant using purposive sampling, a nonprobability sampling method that involves selecting individuals based on specific inclusion criteria related to the research question. The selection of participants was based on their ability to provide in-depth and detailed information about the phenomenon under investigation (120). We included staff members with 6 months or more of LTC experience to ensure the study captured insights from those familiar with the challenges and dynamics of the care setting (120). Their deep understanding and firsthand experiences provided valuable perspectives on caregiving, decision-making, and quality care in LTC.

In consideration of the unique needs and circumstances of residents receiving palliative or end-of-life care, they were excluded from the study. These individuals require compassionate and specialized care, and their minimal food intake may be influenced by personal reasons and end-of-life procedures (27). Recognizing the sensitive nature of their situation, it was deemed appropriate to exclude this specific group from the study.

3.4.2 Recruitment Strategies

The recruitment process for this study was conducted at two Northwood LTC homes situated in Nova Scotia, Canada. Northwood, a prominent not-for-profit continuing care organization in Atlantic Canada, operates two distinguished campuses in Halifax and Bedford. Northwood caters to over 6,500 diverse range of individuals, including older adults who may have varying levels of physical or cognitive impairments, chronic illnesses, or disabilities. (121). Participants were recruited over a 4-month period between December 2022 and March 2023. Detailed process of screening and recruitment is outlined in the flow diagram in Appendix C. The principal investigator and the research assistant at Northwood were responsible for recruitment of participants. The Northwood research assistant received an email template that

was prepared by me and the principal investigator which included the study poster (Appendix F) and details regarding the study. She then disseminated the email to the relevant departments (i.e., nursing, food service, recreation, etc.) and substitute decision makers of residents (Appendix E). Prospective participants then contacted the principal investigator, Dr. McArthur, who provided them with further details about the study. To determine their eligibility for participation, me and the principal investigator then reviewed the eligibility checklist with all participants. An eligibility checklist (Appendix D) was reviewed with proposed participants at the two study sites.

Recruitment of participants for this study was conducted until data saturation was achieved and no new themes emerged from the transcripts. Data saturation refers to the point in qualitative research where no new themes, insights, or information emerge from the collected data (117).

3.4.3 Consent Process

Eligible participants then thoroughly reviewed the consent form (Appendix G) with me or the principal investigator and, upon their consent, scheduled individual interview sessions for further data collection and exploration. All LTC residents were unable to provide consent themselves, so they gave their assent to participate, while substitute decision makers provided written consent. Family members and staff also provided written consent. During the observation of mealtimes, I approached staff members who were providing assistance to residents. I explained and discussed the study information with the staff. Once the staff showed interest and determined to be eligible for participation, the consent form was thoroughly reviewed and signed by the participants, ensuring their voluntary agreement to participate in the study. All participants were informed that they had the option to withdraw from the study at any point, and

they were required to communicate their decision to the research team. Additionally, participants had the right to retract their data within six months of their interview or mealtime observations.

3.5 Data Collection

3.5.1 Qualitative Data Collection

3.5.1.1 Interviews

Semi-structured interviews are optimal for collecting data on individuals' personal histories, perspectives, and experiences, particularly when sensitive topics are being explored (108). The interviews allow the researcher to probe for underlying values, beliefs, and assumptions of participants shaping their interpretations (108). The interviews also allow participants a voice on issues deemed salient to them (122). Suggested interview methodology indicates that well-designed interviews are completed with five or six participants, which promotes the collection of a diversity of information to reach saturation (123). In this study, individual semi-structured interviews were conducted with the three participant groups. To facilitate effective communication with residents who faced difficulties in conversing, interviews were conducted in a dyad setting, involving both family members and residents. This approach was chosen to ensure a supportive and inclusive environment for the participants, enabling them to express their thoughts and experiences more comfortably (124).

The in-person interviews were conducted at two sites of Northwood. I conducted the interviews with the assistance of a semi-structured interview guide attached in Appendix H. I developed the interview guide to answer the study question and the questions were framed by the five levels of SEM (19). For each participant group, a tailored guide was developed, incorporating the social-ecological model to comprehensively explore participant viewpoints across different levels of the model. This guide included a series of open-ended questions and

prompts, ensuring a holistic understanding of each group's perspectives within the framework of the social-ecological model. The objective was to facilitate comprehensive and in-depth responses from the participants within their respective groups. The interviews were carried out in adherence to evidence-based guidelines, lasting no longer than 60 minutes (19). Remote interviews were conducted with staff and family members using Microsoft Teams. This selection was made for the convenience of the participants, allowing for flexible scheduling and eliminating the need for physical travel. The interviews then were audio-recorded using Otter software (Otter.ai) for in-person interviews or Microsoft Teams (Microsoft 365) for virtual meetings that transcribed the audio verbatim. Otter.ai is an artificial intelligence-powered transcription software that uses machine learning algorithms to transcribe audio and video recordings into text.

3.5.1.2 Mealtime Observations Using Cue Utilization and Engagement in Dementia Mealtime Coding Scheme

Qualitative observational studies are designed to collect non-numerical data, capturing the intricate tapestry of human experiences, behaviours, and interactions (125). Researchers utilize direct observations to procure detailed depictions, narratives, and interpretations of the phenomenon being investigated (125). In our pursuit of holistic insights into mealtime dynamics and the factors influencing adequate nutrition intake among LTC residents with dementia, we undertook three observations per resident. Given the verbal communication challenges posed by dementia, interviews posed difficulties, prompting our reliance on observations to comprehend their intake and meal experiences. By harmonizing interviews and observations, we embraced triangulation, thus amplifying validity and acquiring a comprehensive grasp of the research subject. This approach entails leveraging diverse sources to probe a research query, supporting the validation of findings, and augmenting the study's credibility and resilience (120). Consequently, this methodology bolsters the authenticity and robustness of research outcomes and engenders a deeper, more all-encompassing understanding of the research domain (120).

Throughout the mealtime observations, our research team employed the Cue Utilization and Engagement in Dementia (CUED) mealtime coding scheme tool to document our observations (Appendix I) (126). In this tool each mealtime is defined as the complete process of consuming the initial solid food or drink, from plate, tray, or cup, to mouth, chewing, swallowing, and continuation until completion (126). Within the coding scheme, diverse codes are assigned to verbal and nonverbal behaviours exhibited by both staff and residents (126).

Staff nonverbal behaviours are classified into eight categories including modifying resident capacity, five categories involving care approach modifications (e.g., the appropriate use of affectionate touch), three categories addressing dining environment adaptations (e.g.,

arranging edible items for accessibility), and eight negative behaviours, including physically controlling (126). Resident nonverbal behaviours are categorized into 14 behaviours, grouped under three headings: chewing and swallowing difficulties, functional impairments, responsive behaviours, and positive or neutral behaviours (126). It is important to note that the CUED tool used the term "resistive behaviour" which has been replaced with "responsive behaviour" when discussing dementia. This shift reflects a more compassionate and person-centred approach to understanding the behaviours exhibited by individuals with dementia. The term "responsive behaviour" acknowledges that these behaviours are often meaningful responses to the challenges and experiences faced by individuals living with dementia (126).

The CUED tool assesses an individual's ability in various mealtime tasks, their use of external cues like table arrangement and food presentation, and their engagement level during meals (126). A comprehensive analysis assessed psychometric properties of mealtime observation tools for individuals with dementia (124). This study identified 16 instruments used with dementia-diagnosed individuals and LTC residents, both with and without dementia (124). Among numerous coding tools for meal observation, the CUED tool displayed outstanding inter-rater reliability (Cohen's Kappa: 0.93 to 0.99; 95% CI = 0.92 – 0.99) and strong evidence of reliability, validity, and feasibility (124). It demonstrated consistent reliability across observers and showed favorable outcomes in accuracy, practicality, and utility compared to other meal observation tools (124,126). Despite its initial design for video-recorded observations, the tool proved versatile enough for direct observations as in this study (126,127).

Mealtime observations were conducted by a team of three researchers, including myself, the principal investigator, and a research volunteer, where we documented participants' observed mealtime behaviours. To ensure a comprehensive understanding of experiences, we conducted

these observations with both resident participants and mealtime staff, recognizing that individuals with dementia may exhibit varying eating patterns from day to day. Our presence was acknowledged by both staff and residents in the dining room, where we positioned ourselves at a distance from the participant and serving area, allowing for discrete observations. This non-intrusive setup ensured that usual mealtime care proceeded uninterrupted. Our observations were comprehensive, encompassing continuous monitoring of individual behaviours during mealtimes. We carefully marked off the behaviours specified in the tool and maintained ongoing field notes for any behaviours not explicitly covered in the tool. Behaviours predefined as negative were identified as barriers, while positive behaviours were categorized as facilitators. The presence or absence of these behaviours was recorded under their respective categories, allowing for a clear differentiation between barriers and facilitators.

To enhance the reliability and validity of the recorded data, the research team conducted debriefing meetings after each observation to address any discrepancies and ensure consistency in their recordings during the observation process. Through collaborative discussions, the team aimed to resolve any inconsistencies in their interpretations and ensure a consistent approach to recording behaviours across all observations. This stringent protocol of debriefing not only enhanced the accuracy and consistency of the recorded data but also added an additional layer of rigor to the research process.

3.5.1.4 Training for Mealtime Observations

Training with the three researchers was conducted to familiarize the research team with the CUED mealtime coding scheme and to apply it simultaneously during the direct mealtime observations. The research team participated in two training meetings, to ensure a shared understanding of the various categories within the CUED tool and its associated behaviours.

Prior to these sessions, all researchers thoroughly reviewed the CUED tool and relevant articles (124,126) offering detailed insights into its nuances. I facilitated these sessions, taking a thorough approach in reviewing the tool alongside my fellow researchers. This process enabled us to address any uncertainties tied to the distinct categories within the CUED tool. This training regimen served as a cornerstone, laying the foundation for consistent and accurate data collection procedures throughout the study.

3.5.2 Quantitative Data Collection

The researchers collected demographic data from the participants to gain a better understanding of the sample (119). Prior to conducting interviews, we completed demographic information forms with the participants, which included details such as age, sex, and relevant information specific to each group. Staff members provided information about their role and experience working in LTC home. To supplement this data, the research assistant at Northwood retrieved medical information from the resident participants' files, including information on other comorbidities, MMSE scores, height, weight, body mass index (BMI), and diet orders. This medical information was shared with the research team for analysis and inclusion in the study. This data was utilized to understand the sample and provide context for the study.

4.5.2.1 Adequate Nutrition Intake

To assess adequate nutrition intake among LTC resident participants, I employed a weighing procedure encompassing pre- and post-meal consumption measurements during each mealtime. I undertook the task of weighing the plates of resident participants, which contained both the main course and dessert, within the dining room's serving area. Following the initial plate measure, the portioned plate was presented to the resident by the mealtime staff, particularly the dietary aides, who continued their mealtime duties. Once the resident finished

their meal, the mealtime staff retrieved the plate and handed it to me for a post-consumption plate measure. The measured weight in grams was recorded. It's important to note that, for this evaluation, I operated under the assumption that the portion size on the plate was adequate.

3.6 Data Analysis

In this study, two methods of thematic content analysis (TCA) were employed: deductive analysis and inductive analysis. Thematic analysis is a versatile approach that can be applied to different perspectives, including the phenomenological approach.

3.6.1 Qualitative Data Analysis

TCA is a qualitative research method that enables the identification, analysis, and documentation of themes within a given dataset (128). By systematically coding and categorizing the data, TCA allows for the discovery of underlying themes or patterns (128). One significant advantage of content analysis is its adaptability to different research designs, allowing for the use of deductive and/or inductive approaches based on the research objectives (129). This study followed the TCA guideline outlined by Braun and Clarke (2006) in a six-step process: (1) becoming familiar with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and labeling themes, and (6) producing the final report.

According to Braun and Clarke (2006), the identification of themes needs to rely on the researcher's judgment rather than being bound by a predefined set of criteria (128). The importance of a theme is not necessarily determined by quantifiable measures, but rather by its ability to capture something significant in relation to the overall research question (128). In this study, I opted for a latent content analysis approach (128) to delve beyond the surface-level meaning of the data and explore underlying and implicit themes that may not be immediately apparent but are inferred through data interpretation. This approach involves interpretative work

during the development of the themes, resulting in an analysis that goes beyond mere description (128).

3.6.1.1 Inductive and Deductive Analysis

TCA was facilitated using NVivo 12, a software developed by QSR International (2018). The codebook (Appendix J) developed for analyzing interview transcripts and observation field notes, was constructed prior to data analysis using a deductive approach from Liu et al. (2020) (19) study then as the new themes arose from the data, we added them to the codebook inductively. Deductive thematic analysis involves testing a pre-existing theory or framework against collected data (122). It's a suitable approach when an a priori theory pertains to the phenomenon under study, permitting operationalized content analysis based on established knowledge (122). While the themes from the Liu et al. (2020) study (19) provided a valuable foundation, they were refined to align with unique insights and nuances from the current dataset through inductive analysis.

Inductive analysis was employed as a complementary method to analyze data that was not highlighted in the predetermined categories during the deductive analysis. Inductive analysis involves examining collected data and identifying patterns, themes, and categories emerging directly from the data (130). This approach facilitated the exploration of novel patterns, themes, and categories, deriving directly from the data, to provide a comprehensive understanding of research findings (130). The integration of both deductive thematic analysis and inductive analysis carried weight in recognizing established theoretical knowledge while embracing new insights and emergent themes from the data (130). This mixed approach enhances qualitative research findings' rigor and validity, offering a more holistic depiction of the phenomena (130–132).

The data analysis process commenced during data collection. As I conducted interviews and observations, I maintained reflective journal entries capturing initial analytic interests and reflections. After transcribing audio-recorded interviews, the initial transcripts were meticulously reviewed, revised, and cross-referenced with audio recordings, field notes, and recorded categories from the CUED tool applied during mealtime observations. Systematic coding was undertaken by assigning relevant codes to each data item, employing highlighting and annotation features in NVivo. The codes were then organized into potential themes and patterns aligned with pre-existing themes (19), with emphasis on the first study aim. As new themes and subthemes emerged from the transcripts, they were incorporated into the evolving codebook. To ensure comprehensive representation of participants' voices, results were categorized by participant group (i.e., resident, family member, and staff).

To enhance inter-coder reliability, a research assistant was trained to independently code the data. Ongoing meetings and discussions were held throughout the data analysis phase including myself and the research assistant to deliberate on codes and address discrepancies. This step aimed to heighten consensus between two coders when coding or analyzing identical data, a crucial component in ensuring the rigour and consistency of the qualitative analysis process, thereby reflecting the alignment between interpretations or coding decisions of distinct coders (132).

3.6.1.2 Mealtime Observations Analysis

The mealtime observations were analyzed by recording the structure of the mealtime and highlighting the presence or absence of specific behaviours using the CUED tool. Analysis of the observations involved inspecting the presence or absence of behaviours across participants, seeking out both commonalities and distinctions in their mealtime behaviours. We also created a

summary table and matrix that displays the presence or absence of each behaviour (observed by researchers) for each participant during each mealtime. This approach provided an understanding of the mealtime dynamics and allowed us to identify any consistent themes or notable differences among the participants. It is important to note that with a small sample size, the focus is on understanding the behaviours qualitatively rather than quantitatively. Therefore, the analysis was descriptive in nature, aiming to provide a rich and detailed account of the observed behaviours during the mealtime observation.

4.6.2 Quantitative Data Analysis

The participant characteristics were analyzed using descriptive statistics in Microsoft Excel. Participant demographic information described was sex (male and female), cognitive impairment levels via the MMSE, age, and the types of staff members involved. By elucidating these distinctions, we obtained valuable insights into the backgrounds of our participants, allowing us to distinguish differences.

For the analysis of participants' adequate nutrition intake, we computed the difference between the plate's initial weight and its weight post-consumption following each mealtime observation. This calculation enabled us to determine the volume of food consumed and evaluate whether participants achieved the pre-established criterion for adequate nutrition intake, which was consuming 75% or more of the meals (7). The resulting weight difference was then transformed into a percentage, representing the proportion of remaining food. Notably, the calculations did not account for wastage or spillage of unconsumed food items. This approach was consistently applied to assess residents' nutrition intake throughout the study, ensuring a comprehensive evaluation of their dietary habits and compliance with the predefined standard (99).

3.7 Assessing Rigour and Trustworthiness

The trustworthiness or rigor of a study relates to the level of confidence researchers can have in the data, interpretation, and methods employed to ensure the study's quality (132). It is essential for researchers to establish appropriate protocols and procedures in order for their study to be deemed worthy of consideration by readers (133). Readers will interpret the findings and assign their own interpretations to the data based on their individual worldviews influenced by their lived experiences, and while some readers' understandings may not fully align with the interpretations presented, Koch (1993) suggests that it is essential for readers to understand the researcher's process in arriving at those interpretations (109).

Guba and Lincoln (1994) suggest that a postpositivist qualitative study aligns itself with established standards of inquiry that are conventionally framed, and presented four criteria to be prioritize when aiming to establish a study's trustworthiness (112,113). These criteria consist of credibility (emphasizing internal validity), transferability (emphasizing external validity), dependability (emphasizing reliability), and confirmability (emphasizing objectivity) (113). It is important to acknowledge that qualitative research cannot be evaluated for validity (e.g., legitimation, generalizability) in the same way as quantitative research, as assessing legitimation does not result in a simple binary determination of validity or invalidity, but rather reflects a continuum or gradation of validity (110).

Recognizing the inherent challenge of ensuring data validity and establishing clear conclusions, the evaluation of methodologies employed in qualitative research remains pivotal (110). This evaluation serves as a key means to differentiate among alternative interpretations of data and contributes to enhancing the dependability and robustness of findings (110). In this

study, trustworthiness was demonstrated by addressing credibility, transferability, dependability and confirmability (110,113,134), as outlined below.

3.7.1 Credibility

Ensuring the reliability of qualitative data necessitates addressing a crucial factor known as internal validity or, in qualitative terms, credibility. This pertains to the extent to which the study accurately captures what it set out to measure (110). Credibility is one of the most important factors in establishing trustworthiness (111,113). Credibility deals with how well the data and analysis address the intended research focus. According to Cohen et al., (2000), credibility of phenomenological research can be identified with three approaches including ‘content-related’ ‘methodological’, and ‘communicative’ validity (135).

Content-related validity concerns the researcher's understanding of the subject matter being examined, while methodological validity assesses the alignment of study objectives with its design and implementation (111). As mentioned earlier, my position as a clinical dietitian in an LTC home allowed me to gain valuable insights into some of the challenges and factors that impact adequate nutrition intake of residents with dementia. This experience has shaped my decision-making process and directing the path of my research. To ensure methodological validity in this research, which aimed to gain an understanding of adequate nutrition intake among LTC residents with moderate to severe dementia, a comprehensive approach was employed.

The interpretative phenomenological approach placed the residents at the centre of the study. This involved conducting interviews with them, observing mealtimes, and interviewing staff and family members to gather extensive information. The use of an interpretative phenomenological approach was chosen because its goals align closely with the objectives of

this research. Phenomenology seeks to comprehend and explore lived experiences, making it well-suited to gaining insights into the nutrition intake of LTC residents with dementia.

Communicative validity centers around the researcher's proficiency in presenting and justifying their data interpretation (111). To enhance communicative validity, I ensured that my data interpretation was well-justified by establishing its alignment with the collected evidence. I presented a coherent narrative that effectively connected the data to the research objectives and research questions. Furthermore, I maintained a reflexive journal throughout the duration of the study to promote transparency and provide a detailed account of the data analysis process. This involved offering a coherent rationale for the interpretation, considering alternative explanations, and addressing potential biases or limitations that could impact the findings. By consistently reflecting on my own perspectives and potential influences, I aimed to maintain an objective and rigorous approach to data analysis.

Other techniques for establishing credibility as identified by Lincoln and Guba (1985) are: prolonged engagement, persistent observation, triangulation, peer debriefing, negative case analysis, referential adequacy, and member-checking (133). Lincoln and Guba posit that member checking and data triangulation to be is the most crucial technique for establishing credibility (112). To capture a comprehensive understanding of participant's perceptions and experiences, prolonged engagement was emphasized, supported by persistent observation by other members of the research team (this was mainly performed during mealtime observations). In this way, prolonged engagement with the participants provided a scope of their experiences whereas persistent observation by the researchers added depth to the data (134). The interviews were conducted for 30-45 minutes to give adequate amount of time to obtain a representative view. During the interviews, objectivity was maintained, and the use of open-ended, semi-structured

questions allowed participants the opportunity to elaborate on any topic or provide explanations. This approach facilitated a thorough exploration of their perspectives. Recruitment and interviews were conducted until no new information was obtained marking a level of information saturation.

Triangulation involves the use of multiple and different methods, investigators, sources, and theories to obtain corroborating evidence (110,113). Triangulation mitigates the risk of chance associations and minimizes the influence of systematic biases associated with using a single method (110). This approach instills greater confidence in the research findings (110). In this study we used a combination of strategies to demonstrate triangulation including a) methodological triangulation (interpretative phenomenological approach and descriptive statistical analysis), b) investigator triangulation (combination of four researchers), and c) data triangulation (semi-structured interviews and mealtime observations). There is a suggestion that utilizing more sources in a study improves the likelihood of achieving a comprehensive representation of the underlying phenomenon (110). Triangulation also ensured confirmability of this study.

Peer debriefing provides an external evaluation of the research process and Lincoln and Guba (1985) describe the role of the peer debriefer as the “devil’s advocate,” a person who keeps the researcher “honest”; who poses difficult questions about the procedures, meanings, interpretations, and conclusions; and is empathetic with the researcher’s feelings (110,133). Peer debriefing involved ongoing engagement and meetings with the research team (principal investigator, student volunteer, my committee members, and research assistant). This included sharing research progress, discussing emerging themes, presenting preliminary findings, and seeking their perspectives and suggestions for enhancing the study’s credibility. This process

helps to identify potential biases, flaws in the methodology, or overlooked aspects of the research (110,133). Lastly, in member checking, the participants are afforded the opportunity to play a major role assessing the credibility of the data (133). Member checking was conducted during the interviews by restating the participants' responses to ensure a clear understanding of their experiences.

3.7.2 Transferability

Thick description is a strategy used to enhance transferability in qualitative research to achieve a form of external validity (112,133). By providing detailed descriptions of a phenomenon, researchers can assess the extent to which the conclusions drawn from the study can be applied to different contexts, situations, and individuals (133). The researcher should provide ample information about themselves (as the instrument), the research context, processes, participants, and the relationships between the researcher and participants (109). This enables readers to determine how the findings may apply (109). Since qualitative data typically involves small sample sizes and lacks statistical analyses, it cannot be generalized in the conventional approach (109). Therefore, it is crucial to avoid suggesting that the findings can be applied to other populations or settings as all observations are dependent on the specific contexts in which they occur (113,135).

To facilitate transferability, I provided a detailed description of the study's setting, mealtime observations, and contextual information about participant characteristics and selection. This allows readers to understand the unique characteristics and nuances of the study (133). Verbatim transcripts of the interviews and descriptive field notes captured environmental cues and behaviours, promoting transparency in data collection. Additionally, I provided detailed explanations of the data collection methods, including the duration and number of sessions, the

study's timeframe, and the analysis procedures used. To address and acknowledge potential biases and subjectivities in this study, a reflexive journal was utilized. Through this practice, I engaged in self-reflection regarding my perspectives, assumptions, and values. I maintained an ongoing journal, documenting key moments starting from the initial stages of the study, such as methodology and sample selection, ethical considerations, interviews, mealtime observations, meetings with the research team, analysis, theme selection, and interpretation of findings. Every journal entry guided by Amankwaa (2016), was documented in an electronic word document, noting the date and time of the event (133). It began with acknowledging and recognizing my emotional responses during the event. Subsequently, I engaged in reflective contemplation of the moment, capturing key insights gained from the experience. Additionally, an action plan for next steps was formulated to guide future actions and decisions. Periodically I revisited and reviewed my reflexive journal entries throughout the research process to identify potential patterns, track personal growth, and adjust ensure rigour and validity.

3.7.3 Dependability

The positivist approach aims to demonstrate reliability by showing that if the study were repeated under identical conditions, using the same methods and participants, consistent results would be obtained (136). However, qualitative researchers face challenges in ensuring dependability due to the dynamic nature of the phenomena they investigate (136). This is accomplished through carefully tracking the emerging research design and through keeping an audit trail, that is, a detailed chronology of research activities and processes; influences on the data collection and analysis; emerging themes, categories, or models; and analytic memos (134).

I maintained an extensive, detailed documentation of data collection processes and reflexive journal of my thoughts as previously mentioned. Detailed records for data collection

include raw data (e.g., and audio recordings), process notes (e.g., methodological notes and journal entries), data analysis products (e.g., transcribed audio recordings, field notes, CUED tool entries, codebook and descriptions of themes and subthemes), and materials related to intentions and dispositions (e.g., research proposal, reflexive journals). Lincoln and Guba (1985) emphasize the strong connection between credibility and dependability, stating that demonstrating credibility can contribute to ensuring dependability in practical terms (112). Maintaining a detailed reflexive journal further acknowledged the personal biases, expectations and intentions of the researcher, also facilitating provisions to ensure both the credibility and confirmability of this study (136).

3.7.4 Confirmability

Confirmability, referring to objectivity of the study, entails addressing the researcher's preconceived notions and biases (110,113,134). Maintaining true objectivity is challenging in qualitative research since the methods employed by the researcher are inevitably influenced by their individual perspectives (137). To establish confirmability Lincoln and Guba (1985) suggested audit trail, triangulation, and reflexivity (112). As previously described, I maintained a reflexive journal to uncover and share my assumptions guiding the research questions and methodology employed in this study. The previous section (i.e., credibility) already covered the discussion on the implementation of triangulation strategies to enhance trustworthiness. It has been suggested that confirmability is established when credibility, transferability and dependability are achieved by both audit trail and reflexive journaling (110,113,134,137).

3.8 Ethical Consideration

Ethical clearance for this study was secured from the Dalhousie University Social Sciences and Humanities Research Ethics Board (REB # 2021-5724), in alignment with the

ethical principles set forth in the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. All participants received study information for review and had the opportunity to ask questions during an in-person meeting prior to the interview. Consent was obtained from the substitute decision makers for the residents, and the residents themselves provided assent to participate. This study is a part of a larger project called "*Developing and testing a resident-centered rehabilitation program for LTC residents with dementia.*" Participants were given the choice to participate in either one or both studies.

In order to further ensure confidentiality, the research team, which includes the principal investigator, myself, and a research assistant, de-identified and coded the data. Participants' names were removed and replaced with randomly generated study ID numbers. The de-identified data was stored in encrypted folders in SharePoint hosted by Dalhousie to maintain confidentiality. Qualitative data was presented in an aggregate format, without any personal identifiers. When presenting the results, supporting quotations were only identified by the participant's group (i.e., LTC resident, family member, or staff), without disclosing any specific individual information. Participating in this study did not pose any harm or direct benefit to the participants. However, by investigating the obstacles and factors that promote proper nutrition in LTC homes, we aimed to identify barriers that can be addressed and facilitators that can be utilized to enhance the quality of life and support available.

4.0 Results

4.1 Participant Characteristics

The characteristics of the participants are presented in Tables 2, 3, and 4. A total of 19 individuals were initially screened across the two sites for this study. After the screening process and accounting for dropouts, a total of 16 participants met the eligibility criteria and took part in the interviews (Figure 3). The dropout was related to ineligibility to participate or related to over commitments. During the identification phase, one resident underwent end-of-life treatment, and another resident had an MMSE score exceeding 20. The four residents included in the study had an age range of 82 to 98 years. Their MMSE scores ranged 0 to 16, indicating a classification of moderate to severe dementia. The score of 0 suggests that the individual was perhaps unable to respond to or perform any of the cognitive tasks and questions included in the MMSE tool (59). All participating family members in the study were identified as substitute decision makers for the residents. The interviews were conducted in a dyad format, involving both the resident and their respective family member. The staff members who participated in the study held diverse roles within the LTC home, including registered dietitian, continuing care assistant, long-term care assistant, and a licensed nurse practitioner. Their experience in working in the LTC homes ranged from 1 to 13 years. The staff members' age ranged from 22 to 49 years, where family members age ranged from 55 to 68 years.

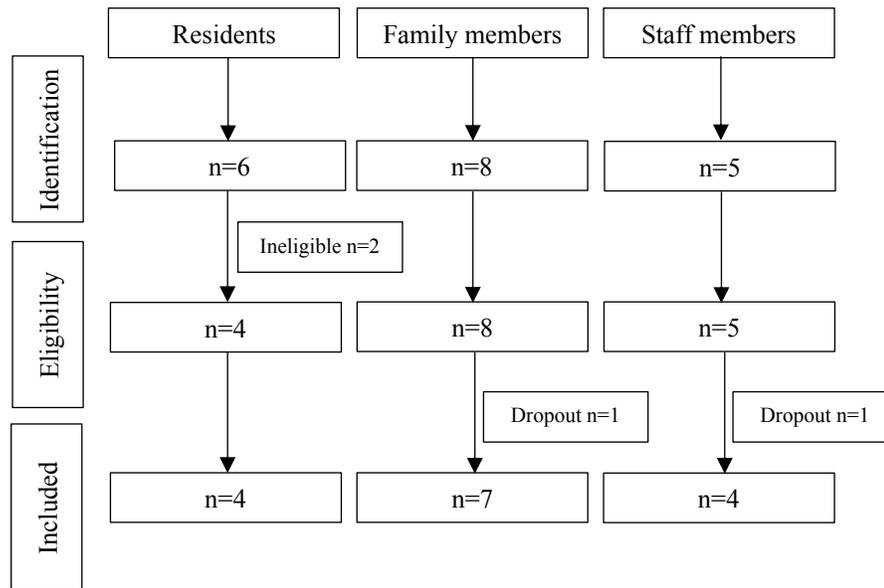


Figure 3. Participant recruitment flow diagram.

Table 2. Resident participants characteristics (N=4).

Age (years)	Sex	BMI	MMSE	Diet Order
82	F	22.0	9	Regular texture diet.
98	F	32.9	16	Regular texture diet.
88	F	20.7	0	Modified texture diet.
82	F	25.3	15	Minced texture diet. Special utensils.

Table 3. Staff member participants characteristics (N=4).

Age (years)	Sex	Primary profession	# of years worked in LTC home
40	M	Continuing care assistant	3
30	F	Registered dietitian	1
22	F	Long-term care assistant	3
49	F	Licensed nurse practitioner	12

Table 4. Family member participants characteristics (N=7).

Age (years)	Sex	Relationship to resident
60	F	Daughter
55	F	Daughter
68	F	Niece
61	F	Daughter
65	F	Daughter
60	F	Daughter
58	F	Daughter

4.2 Barriers from Semi-Structured Interviews

Themes and subthemes presented below were deductively and inductively developed based on the interview discussions. Thematic analysis revealed a complex and dynamic interplay between factors influencing adequate nutrition intake in LTC residents with dementia. Those factors, including barriers and facilitators, occurred across all levels of the SEM. Multiple barriers to adequate nutrition intake were identified for LTC residents, encompassing intrapersonal, interpersonal, environmental, facility, and policy levels (Table 5). The emerging themes from the interviews were subjected to deductive analysis, guided by Liu et al.'s (2020) study, while also incorporating elements of inductive analysis. Particularly, the theme of financial commitments and constraints was not addressed within this study. However, several additional themes, denoted by asterisks, were added inductively.

The more frequently discussed barriers were observed at the resident level, involving factors such as resident and mealtime variability, aging and dementia-related changes impacting food intake, functional limitations in self-feeding, mealtime disorientation due to behavioural issues, and perceptions towards dining in LTC homes. Furthermore, barriers were also evident at other levels, including stressors experienced by staff and family members in providing care, insufficient preparation and training regarding feeding and mealtime support, and a lack of environmental and facility-wide support.

Table 5. Summary of the barriers at the various SEM levels.

SEM Level	Themes	Subthemes	Description
Intrapersonal Level	High variability across or within resident	Requirement for individualized approach (S)	Every resident is different or has special needs
		Meals are trial and error (F, S)	Every meal is different for residents (Hit or miss or trial and error)
	Physiological factors influencing food intake	Sleep or Fatigue (R, F, S)	Sleep disturbances or feelings of fatigue influenced by various factors.
		Medications (S)	Late administration of medications or the side effects can affect level of alertness.
		Physical discomfort (e.g., hot/cold, bathroom needs, pain) (S)	Having to urgently use a bathroom, temperature fluctuations, and pain from other comorbidities can be uncomfortable.
		Appetite/palate changes (F)	-Appetite or palate changes related to medications, loss of hunger cues, etc.
		Inadequate oral care* (F)	Inadequate oral care leads to tooth decay and pain and can affect taste, chewing, and swallowing food.
	Lack of physical capability*	Lack of functional ability (R, F, S)	Diminished ability to perform ADLs or engage in self-feeding activities.
		Difficulty using utensils (F, S)	Diminished capacity of motor skills, dexterity, and cognitive abilities significantly affects their proficiency in managing utensils.
	Mealtime disorientation*	Mood or behavioural disturbances (S)	Behavioural disturbances related to dementia (e.g., agitation, apathy, wondering, aggression, and confusion)
		Sun-downing or sun-down syndrome (S)	Pattern of increased agitation, confusion, and restlessness that commonly occurs in the late afternoon or evening
		Distraction* (F, S)	Not remembering what happened or did not happen and disorientation to time and place.
		Glassware, cutlery, plates different from home* (F)	Unfamiliar glassware, cutlery, and plates and disrupts sense of familiarity
	Feeding and eating problems	Resistance to mealtime care (S)	Losing interest in food and refusing meals or assistance during mealtimes.
		Eating non-edible items (S)	Behaviours of individuals with dementia consuming non-edible items.
		Not swallowing food or holding food in mouth (pocketing) (S)	Retaining food or liquid in oral cavity, leading to potential choking hazards and inadequate nutrient intake

SEM Level	Themes	Subthemes	Description
		Choking (S)	Blockage or obstruction of airway due to improperly swallowed food or liquid.
		Dysphagia (F, S)	Difficulty swallowing food.
		Portion size is overwhelming (S)	Pre-dementia portion size is overwhelming for some individuals.
Interpersonal Level	Staff lack of preparation	Limited professional training on dementia mealtime care (S)	-Limited knowledge and training among staff members in providing appropriate mealtime care for individuals with dementia (e.g., inadequate assistance, and a lack of understanding of individualized dietary needs)
		Not knowing resident's preferences/allergies (F, S)	Not taking resident's preferences into mealtime menu
		Elderspeak (S)	Communicating by using simplified language when interacting with older adults, which can undermine their dignity, independence, and self-esteem.
		Inconsistent or lack of communication with families* (F)	Inconsistent or lack of communication with families can limit collaboration in resident's care
	Staff task-centered behaviours at mealtimes	Time constraints (S)	-Time constraints that minimizes focus on residents.
		Workflow interruption, disruption, or distraction (S)	When normal flow of work or tasks is interrupted, disturbed, or diverted, leading to inefficiencies, delays, errors, or decreased productivity in a work setting.
	Perception on lack of nutritional value in LTC home*	Family perception of LTC home food's nutritional value* (F, S)	Perception that the nutritional value of food provided in the LTC home was below standard.
		Discouraging/taking over* (S)	Overtaking over decision-making for residents.
Environmental Level	Overstimulating physical environment	Poor dining room environment (F, S)	Dining room is not dementia friendly. (e.g., over stimulated, distraction, noise)
	Lack of flexibility around food and menu	TMDs over usage* (R, F, S)	-The excessive use of TMDs recommended by health care professionals
		Wrong food temperatures (i.e., too cold) (R, F)	Lack of promptly delivering meals, resulting in delayed service and decreased food temperature.
		Preparation of food (i.e., being dry and bland) (R)	Food textures are unpleasant or unappealing.

SEM Level	Themes	Subthemes	Description
		Inflexible mealtimes* (F)	Structured mealtimes although beneficial for some residents, may not accommodate all residents
Facility and policy Level	Lack of staffing and organization	Insufficient staffing (S)	-Insufficient staffing that would lead to high workload for other staff members may diminish care provision.
		Lack of organization and accommodation (F)	Absence of effective organization and accommodation strategies for residents with dementia during mealtime experiences.
		Registered staff giving medication at mealtimes (S)	Implications of this practice on residents' dining experiences, considering factors such as the timing of medication, potential interference with appetite and food enjoyment, and the overall impact on their quality of life.
		Not incorporating residents' preferences in the menu* (F)	Not incorporating resident's preferences and lack of diversity in menu planning.
	Restricting safety regulations	-Temperature regulations* (F)	-Temperature regulations that affect the palatability of food.
		COVID-19 protocols* (F, S)	COVID-19-related protocols such as staffing limitations, social isolations, and distancing measures that can disrupt the communal dining experience.
		Restricting protocols* (F, S)	Protocols and practices that restrict residents' autonomy and choices during mealtime experiences.
		Family cannot sit and eat with residents* (F)	Not accommodating family meals due to infection control protocols, meal service regulations, etc.

*Themes and subthemes that emerged inductively.

(R) Resident

(F) Family members

(S) Staff

(TMD) Texture-modified diet

4.2.1 Intrapersonal level

4.2.1.1 High Variability Across or Within Resident

Barriers at the resident level were frequently discussed amongst participants. Staff members reported that there is a high variability of adequate food intake within and across residents, indicating the individuality of residents in relation to mealtime care. Participants described how residents differed due to fluctuations in physical and cognitive changes that varied by meal. This required the staff to use “trial and error” strategies, which may succeed or fail depending on the meal. One of the staff participants described the challenges related to resident variability of how texture changes may be helpful to keep the level of autonomy for some residents, but it does not work for all residents, and it is based on individual needs of residents. A family member shared that the staff faced challenges in comprehending the food preferences of their mother, leading to a “trial-and-error” approach to identify suitable options. The staff member explained:

“Meals are individualized some textures may work for some (residents) but not for others who are able to notice say puree versus a minced (texture). They can’t recollect what food item it’s supposed to resemble.” –Staff member

4.2.1.2 Physiological Factors Influencing Food Intake

Both staff and family members identified physiological factors that influence food intake. Staff members mentioned that factors such as sleepiness, tiredness, and fatigue significantly influenced the residents' performance during meals. The staff members' emphasis on alertness is particularly noteworthy, as it indicates that maintaining an optimal level of cognitive functioning is crucial for ensuring adequate food intake among residents. Sleepiness, tiredness, and fatigue

can compromise the residents' ability to engage actively in mealtime activities, leading to reduced interest in food and decreased intake. One staff explained:

“Sometimes they (residents) fall asleep during feeding and that is a choking risk. So, we try to stimulate by touching their hands or their faces to wake them up...But you can only eat one or two more spoons and they fall sleep again.” –Staff member

Physical needs of residents, such as temperature discomfort, bathroom needs, and pain/discomfort from comorbidities, were found to interrupt mealtimes and impact physical function. Uncomfortable temperatures could result in physical discomfort, hindering residents from fully enjoying their meals. Additionally, inadequate oral care and hygiene among residents, as reported by a family member, can also affect their food intake. Poor oral hygiene may lead to oral health problems, causing pain, discomfort, and mouth sensitivity, making it difficult for residents to chew, swallow, and consume food effectively. One family member reported:

“We all know that oral care and dental care is huge. But my aunt has not been to a dentist for a long time before her diagnosis and I have asked the staff about this, and they said she can chew the food, so we are not worried about it. But how do we know if they're having any discomfort in their mouth? There is no way to measure this.” –Family member

Family members were mainly concerned with residents' appetite and palate changes, indicating that residents are interested in food that they did not eat before diagnosis of dementia. One family member explained:

“Mom used to love fish but then when she got here (LTC home), and now she doesn't like fish. I got to know that she wasn't eating her normal foods and she wasn't liking the stuff that she used to like.” –Family member

4.2.1.4 Lack of Physical Capability

During the interviews, the staff members emphasized the importance of physical capability and functional ability to perform the task of eating. They noted that residents' physical function can fluctuate, which poses a challenge in determining their level of autonomy versus dependence. As a result, there is a need for regular assessments of their capability at each mealtime. Family members also expressed concerns about the residents' loss of physical function and autonomy during mealtimes. When asked from one resident with dementia if she needs assistance with feeding during mealtimes, she stated “No” with a sense of independence. And she also mentioned that “*I like my independence in that*”. One staff member also explained:

“On our floor we have a ton of people that (we) feed. They lost their independence because of lack of mobility.” –Staff member

4.2.1.5 Mealtime Disorientation

Staff and family members highlighted concerns regarding mealtime disorientation among residents, which is attributed to their confusion about time and place as well as forgetfulness. Residents may struggle with recalling whether they have already eaten or the actions necessary for mealtimes, which can further exacerbate their disorientation during mealtime. One family member explained:

“I think she (mom) forgets that she eats. Because sometimes after lunch she says we should go have a snack. I'm say well, Mom, you just ate. So, I don't know if it's the dementia or the progression of the disease that she forgets that she is hungry or forgets that she has eaten.” –

Family member

During interviews with staff and family members, distraction during mealtimes was consistently identified as a common problem among residents with dementia. Residents often

experience difficulties in filtering out distractions and maintaining sustained focus on the task at hand. One staff member mentioned:

“Residents get distracted a lot. It's a big facility. Some units have 24 residents during mealtimes. Staff sometimes forget to eliminate, extra napkins, extra utensils, or things that aren't needed at the table at that time which is distracting for residents.”-Staff member.

One family member mentioned that her mother gets easily distracted by seeing them during mealtimes:

“It's better if mom doesn't see me or my sister during mealtimes. Like if we are there and we come to the table with her, she won't really eat.” –Family member

Family members highlighted a concern that involved the different shape and size of glassware, cutlery, and plates used in LTC home compared to what the resident was accustomed to at home.

When residents are presented with unfamiliar dining items, it may contribute to feelings of alienation and a loss of identity. One family member mentioned:

“Mom was very thirsty. She went through this phase and that's part of the medication. They have tiny cups here (LTC home) that she is not used to, which is impractical. Because that means staff have to continually go to her room, every hour and say, do you need a drink of water?” – Family member

4.2.1.6 Feeding and Eating Problems

Behavioural problems related to eating were also a barrier for adequate nutrition intake that were highlighted in discussions with staff and family members. Participants mostly reported problems related to losing interest and refusing to open their mouth with progression of dementia. Less commonly participants reported spitting food out, eating non-edible items, and not swallowing food or holding food in mouth (pocketing). One staff member mentioned:

“For food assistance I take the decision for them, unfortunately, because they often don’t cooperate, they don’t do nothing.” –Staff member

Staff members have highlighted the significance of addressing swallowing difficulties as a crucial aspect of feeding residents to reduce the risks of choking. One staff member mentioned:

“Texture changes can help the most. if someone with dementia is struggling to chew or swallow, they may not be able to tell you, and we sometimes will see their intake increase if they have a better or easier texture.” –Staff member

4.2.2 Interpersonal Level

4.2.2.1 Task-Centered Behaviours at Mealtimes

Barriers at the staff level were mostly related to their challenges with workflow and time constraints during mealtime care. Staff participants reported that they were overwhelmed with a multitude of tasks and responsibilities, making it unrealistic for them to fulfill all the mealtime needs of the residents. These challenges include issues such as time constraints, insufficient staffing, or inadequate resources. Additionally, the participants emphasized that their workload was excessively demanding, which frequently disrupted their interactions with residents during mealtimes. One staff explained:

“Staffing levels, can also make a difference. If you’re really short staffed and you have a ton of people to feed. You might be going quicker than you should, trying to get through all residents. We sometimes sit between two people and try to feed them both at a time.” –Staff member

Family members also highlighted that an excessive workload of staff often disrupted their engagement with residents and diverted their attention from providing uninterrupted mealtime care. One family member also explained:

“Once mom’s sight started going, I was asking staff to put the food in a bowl as opposed to on a plate, making sure all of her food is cut up because that was one of the big things as she needed help with feeding herself. They don’t do it for her all the time, they just don't have the help and staffing.” –Family member

“They (staff) got a lot of residents to serve. So, they're just serving the food to people. I'm not sure if they're really paying attention all the time to see if residents are eating or not eating.”
–Family member

4.2.2.2 Staff Lack of Preparation

Staff participants expressed challenges in providing optimal mealtime care, due to limited training, education, and a lack of appropriate assessment tools to determine residents' mealtime preferences. Additionally, they highlighted the difficulties resulting from inadequate preparation. One staff explained: *“I just think there needs more education on how to feed the residents properly. Also, to explain rationales for assistive tools and diets. Staff don't understand why we have residents on that texture, and they'll give them whatever they want.”* –Staff member

This also came up in another interview with staff who thought that there is a lack of training for staff feeding practices to minimize choking risks.

“There needs to be a training on how to feed residents. Because at the end of the day, with TMD and dysphagia staff are piling food in resident’s mouth before they're clearing that previous swallow.... So, I'm continuously reminding staff to ensure food residue is gone as staff don't always realize that there's food in resident’s mouth.” –Staff member

Staff also emphasized the significance of comprehending and education of palliative care strategies to honor residents' wishes when they decline meals. One staff reported:

“Staff need to be educated that with progression of dementia, residents may stop eating and sometimes I find staff get very upset when residents stop eating.” –Staff member

One staff member expressed the view that research on nutrition and dementia is inconclusive, emphasizing that there is no singular practice guideline to provide a definitive recommendation:

“I think in general, there needs to be more research on nutrition and dementia. I find when I'm looking for a guideline, sometimes they're not there. So, you really have to piece together like 10 guidelines to figure out what you would recommend.” –Staff member

Some family members noted inconsistent or inadequate communication with both staff members and them. These communication challenges may contribute to uncertainties and misunderstandings regarding the dietary needs and preferences of residents, ultimately leading to adequate nutrition intake. One family member explained:

“I worry about her getting enough calories and just eating. I would like them to let me know what seems to be foods that she likes or even a suggestion of what I could bring for her from outside.” –Family member

Another family member expressed frustration with the absence of nutrition services and the lack of a dietitian involved in the care of their mother:

“I think they should have sat down and talked to family members, and they should observe what's happening and have a debrief with the family member. I could have probably showed them all kinds of things I didn't have so much trouble getting mom to eat things... When they had challenges, there was no communication with me. Nobody ever offered to talk to a dietitian to say here's what's working in mom's diet.” –Family member

4.2.2.3 Family Members' Perception of Meals in LTC Home

In interviews with family members, a common perception emerged that the meals provided to residents lack nutritional value. Additionally, they highlighted a lack of awareness among kitchen staff or nursing personnel regarding the residents' preferences. A staff participant emphasized that family members' involvement in a resident's care can generally be beneficial, but there are instances where their involvement can be discouraging. One staff explained:

“I have family members who refuse to supplement their loved ones if they are on a certain diet texture and if they're not really accepting the texture... So, we see weight loss and malnutrition happen but again, we just have to honor their wishes at that time.” –Staff member

4.2.3 Environmental Level

4.2.3.1 Overstimulating Physical Environment

Both staff and family members thought that dining room environment was recognized as a barrier for residents due to overstimulation and numerous distractions. This includes noise from conversations, disruptions caused by co-residents, and other factors that draw attention away from the meal. These distractions can make it difficult for residents to focus on their food and have a satisfying dining experience.

“I would say the distractions is a big thing for some residents... Any type of like music that's left on or TV can be distracting as well. And I think that although eating with co-residents is beneficial sometimes there's other co-residents that may not be calm during mealtimes and that can upset some residents and prevent them from eating.” –Staff member

4.2.3.2 Inflexible Food and Menu

Other barriers to adequate nutrition intake of residents that were discussed include the food and menu offered at the home. These barriers encompassed concerns about the food quality and flavour, preparation of food (being dry and bland), and kitchen time and staffing when serving meals, and wrong food temperatures.

“Mom loves fish and chips, but she doesn't like the fish they have here (LTC home) ... She will eat it all up. But the fish they get here is like just plain fillet and dry, same as roast beef she finds it dry.” –Family member

This quote was also reinforced by resident’s agreement that she did not enjoy the salmon meal that LTC home provides. Family members highlighted that the structured timing of the meals may not be beneficial for residents as their hunger patterns can fluctuate throughout the day, potentially influencing their meal preferences and timing.

“I'm wondering about the timing of food. Mom would be someone to sleep in, like the time of breakfast is good, but sometimes at lunch, say it's 1145 or 12 o'clock, she's not really hungry to eat.” –Family member

4.2.4 Facility Level

4.2.4.1 Lack of Staffing and Organization

Facility level barriers were related to staffing of the LTC home. More commonly, staff and family members reported that inadequate staffing and high workload was a significant barrier to assist residents across various aspects of care including mealtimes.

“They were short staffed during Covid-19 pandemic, and they (residents) had to wait sometimes for hours to have their pads changed or go to bathroom or even get out of bed.” – Family member

A staff member raised a concern regarding insufficient staffing during dinner time, emphasizing the need for increased mealtime care for residents. They mentioned:

“I do find in the evenings the residents are very different than, during the day... As you know, in the evenings, staffing is shorter, and dinner is the hardest meal I find because they (residents) get easily distracted and not patient. I am usually done before dinner, but I do stay longer if there is not enough staff.” –Staff member

Family members also expressed frustration about lack of resources and limited accommodation of resident’s preferences during menu planning. One family member reported:

“Mom loves peppermint tea. I have to buy it and bring it in... And things tend to disappear. That's frustrating.” –Family member

Other facility level barriers include the practice of registered nurses administering medication during mealtimes. This practice proved to be distracting for residents, as their attention was divided between taking medication and engaging in eating activities. Furthermore, the administration of medication during mealtimes sometimes led to confusion among residents regarding the taste of food and medication, potentially affecting their overall dining experience.

4.2.5 Policy Level

4.2.5.1 Restricting Safety Regulations

Policy-level barriers were less frequently mentioned during the interviews. Some of the staff members did not feel qualified to provide comments on this aspect as they did not know nutrition related LTC home policies. Family members reported that certain safety protocols, such as choking and temperature regulations, posed challenges to ensuring residents' sufficient nutrition intake. Residents, accustomed to receiving hot food and beverages, found that the LTC home was unable to provide them due to safety considerations. In addition, residents with limited

mobility faced difficulties in accessing beverages in their rooms due to the risk of choking. One family member explained:

“Staff won't leave liquids with mom if she's in her room because of choking. Dehydration has always been an issue because it's not like she can just get up and get a drink. They (Staff) don't have time to go in her room sometimes.”—Family member

4.3 Facilitators from Semi-Structured Interviews

Similar to the barriers to adequate nutrition intake faced by LTC residents, various facilitators were identified at multiple levels, including intrapersonal, interpersonal, environmental, facility, and policy levels (Table 6). Particularly, most facilitators were found at the staff and facility level, focusing on enhancing nutrition intake for residents and improving the overall dining experience. Key factors emphasized during discussions included staff preparation for mealtime care, understanding residents' needs and preferences, and the active involvement of family members in resident care. Additionally, facility norms and regulations were identified as significant contributors to effective mealtime care for residents. Although some of the subthemes from Liu's 2020 study were not specifically addressed during the interviews in this study, they were nevertheless observed during mealtime observations and are highlighted in the corresponding section. These include socialization of residents, feeding techniques, appropriate portion size assessments, visual and olfactory appeal of foods, etc.

Table 6. Summary of the facilitators at the various SEM levels.

SEM Level	Themes	Subthemes	Description	
Intrapersonal Level	Enhancing independence*	Maintaining independence (R, F)	Maintaining independence and autonomy to continue their usual routines.	
		Maintaining the same routine as home (R, F)	Maintaining a routine that closely resembles their home environment, as familiarity can promote a sense of comfort and security.	
Interpersonal Level	Staff preparation and training	Knowing the resident and establishing emotional connection (F, S)	Understanding of the resident's needs, preferences, and emotions while establishing a meaningful emotional connection with them.	
		Learning and trying new techniques (F, S)	Learning and actively experimenting with novel techniques and approaches.	
		Training needs for individualized dementia mealtime care (S)	Tailoring care and support to the unique preferences, needs, and values of each resident.	
		Palliative mealtime care (S)	Providing support in palliative care nutrition care to enhance residents' quality of life by addressing their nutritional needs, managing symptoms, and providing comfort.	
		Assessment for appropriate TMDs (F, S)	The evaluation process for determining suitable TMDs for individuals' dietary needs and preferences.	
	Physical assistance during eating process	Assistance with feeding (F, S)	Provision of appropriate support in the act of feeding.	
		Re-approaching resident (S)	Revisiting resident again to address their needs or concerns in a more effective or supportive manner.	
		Physical touch to stimulate (S)	Using tactile interactions to provoke or awaken various physical, emotional, and psychological responses in individuals.	
	Person-centered care approach	Reminding, cueing, prompting (S)	Facilitating memory recall, guiding actions, or encouraging thought processes through external triggers or stimuli.	
		Respecting autonomy (S)	Respecting residents' autonomy and choices by refraining from coercing or pressuring them into eating.	
		Maintaining a friendly attitude* (F, S)	Maintaining a warm and compassionate demeanor when interacting with residents to foster a supportive environment.	
	Instrumental assistance during mealtimes	Providing assistive devices to residents (S)	Implementing the provision of assistive devices to residents to enhance resident's mobility, independence, and overall quality of life.	
		Providing finger food (F, S)	Offering small, easily consumable snacks that can be eaten without the need for utensils.	
			Family providing snacks and food for residents* (S)	Family involvement in care extends to the provision of snacks and food for residents,

SEM Level	Themes	Subthemes	Description
	Family involvement in resident care*		highlighting their active participation in enhancing the well-being and sustenance of their loved ones.
		Physical assistance by family members* (S)	Family members help residents by physically assisting them in the process of eating.
		Empowering residents to have autonomy in decision making* (S)	Instead of making decisions on behalf of residents, caregivers and facility staff collaborate with residents to understand their preferences, values, and wishes.
Environmental Level	Dementia-friendly physical environment	Food and smell as the strongest stimuli beyond the dining room environment (S)	Creating a dementia-friendly dining environment involves recognizing that food and smell act as powerful stimuli, extending beyond the physical dining room space, and incorporating a spacious table setup that allows for movement.
		Clear layout and visual contrast* (S)	Having well-defined and spacious pathways with clear signage to help individuals navigate independently. Also, using high contrast colours to enhance visibility.
		Familiar and homelike elements* (F, S)	Incorporating familiar elements from the individual's past can provide a sense of comfort and recognition.
	Social and cultural engagement opportunities*	Shared Dining Experiences* (S)	Small number of residents in dining room to minimize distraction, noise, stimulation. Facilitating social interaction through shared dining experiences refers to the practice of creating opportunities for individuals to connect, engage, and build relationships while dining together.
Facility and Policy Level	Facility-level norms accommodating dementia care	Availability of eating aides (F, S)	Availability of eating aides (assistive devices) to assist residents with their meals.
		Communication among nursing and kitchen staff, and families (F, S)	Effective communication among nursing and kitchen staff, as well as involving families in meal-related discussions.
		Staff consistency at mealtimes among nursing and kitchen (S)	Consistency of staff presence and approach during mealtimes among nursing and kitchen teams.
		Documenting and learning preference information (S)	Documentation and learning of resident preferences to tailor meal experiences accordingly.
		Multidisciplinary evaluation (e.g., speech-language therapy, occupational therapy, physiotherapist, etc.) (S)	Multidisciplinary evaluation, involving professionals such as speech-language therapists, occupational therapists, and physiotherapists, to assess and address individual needs.
		Teamwork (S)	The importance of teamwork in coordinating care and providing holistic support.

SEM Level	Themes	Subthemes	Description
		Providing appropriate supplementation* (S)	Assessment for oral supplementation, to minimize malnutrition.
		Accommodating family members at mealtimes* (S)	Accommodating family members during mealtimes to promote a sense of support.
		Focusing on quality of life of residents* (F, S)	Placing emphasis on the quality of life of residents, considering their preferences and individual needs.
		Incorporating resident's preferences in menu planning* (F, S)	Incorporating resident's preferences in menu planning to offer a more personalized dining experience.
		Offering menu diversity* (F, S)	Offering a range of dishes that span different cuisines, flavours, textures, and preparations, accommodating the diverse tastes and preferences of residents.
	Regulations for food safety *	Following food safety regulations* (F, S)	To ensure food safety, minimize choking hazards, and provide assistance to residents, it is important to follow food safety regulations, closely supervise residents in the dining room.
		Staff supervision in the dining room to assist residents* (S)	

*Themes and subthemes that emerged inductively.

(R) Resident

(F) Family members

(S) Staff

(TMD) Texture-modified diet

4.3.1 Intrapersonal level

4.3.1.1 Enhancing the Feeling of Independence

During the interviews with residents, those who were able to engage in conversation (n=2) emphasized the importance of maintaining independence and autonomy. They expressed a desire to have control over their daily experiences, particularly during mealtimes, highlighting the significance of making decisions that align with their preferences and needs. The residents also emphasized the significance of maintaining a daily routine that closely mirrors their home environment, as it promotes a sense of comfort and security. Furthermore, they expressed the value of social interaction, both with staff members and fellow residents. Engaging with staff creates a supportive and stimulating environment, while connecting with peers enables residents to forge meaningful relationships and alleviate feelings of isolation. One resident explained:

“I am practically home in a way. My mother used to make homemade bread. Here (LTC home) for dinner tonight, we had one slice of homemade bread with the lasagna which was delicious.” –Resident

Another resident highlighted importance of eating independently and mentioned:

“I want to be able to eat, but I can't by myself. They (staff) come feed us.” –Resident

4.3.2 Interpersonal Level

At the interpersonal level, facilitators included various actions taken by staff to assist residents and fulfill the desired tasks expressed by all participants in the groups. Certain interpersonal aspects overlap and are not clearly separate from each other. For instance, person-centered care approaches can also be utilized in providing instrumental assistance.

4.3.2.1 Staff Preparation and Training

Family members and staff highlighted the importance of staff members' preparation and assistance during mealtimes on adequate nutrition for residents. They emphasized that it is important for staff to practice person-centered care through knowing the resident, establishing an emotional connection, and being patient, along with embracing a philosophy of person-directed care. One family member explained:

“When it comes to caring for my mom, I've noticed that making the presentation of food more appealing can make a difference.... I believe being creative with food placement, like cutting toast into smaller slices, could encourage her to eat more... Making the meal visually appealing seems to draw her attention and helps with her weight loss issue.”—Family member

Staff members recognized the potential benefits of personalized training for mealtime care specific to dementia. They expressed the need for training in palliative mealtime care, learning new techniques, and assessing residents for appropriate modified textures.

“I find that there are varying perspectives among the staff regarding the concept of eating. For instance, during the final week of one resident, the staff attempted to keep food in her mouth, hoping it would prolong her life.... This would make her (resident) to vomit. It highlighted the need for education of proper swallowing and actually observing the swallow.”—Staff member

4.3.2.2 Physical Assistance During Eating Process

Staff members highlighted the importance of their role in providing technical assistance to enhance the eating experience through the use of verbal and physical. These techniques encompassed various strategies such as re-approaching the resident and utilizing physical touch to stimulate the resident and redirecting or gently waking them up when needed.

“I think staff need to realize that if a resident doesn't want something right away you can re-approach them later and ask. I find lot of people get frustrated and they walk away from the resident.” –Staff member

4.3.2.3 Person-Centered Care Approach

Staff members also emphasized the significance of verbal techniques and use of verbal cues, prompts, and considering resident preferences for person-centered care strategies. It is worth noting that having friendly attitude was combined with the use of elderspeak (baby talk communication) for staff when speaking with residents and it was emerged as both barriers and facilitators. Additionally, person-centered care techniques, such as respecting residents' choices, avoiding the imposition of eating, providing reminders and cueing during mealtimes, and having friendly attitude with residents were recognized as effective strategies for improving adequate nutrition intake. Also, actively encouraging residents to join the dining room and giving focused attention to residents during mealtimes were also emphasized as effective person-centered care techniques. One staff explained:

“We do cueing and reminders (for residents). So, the staff are always in the dining room when the residents are there and they will help whether they need full assistance, partial assistance or just someone looping by and saying, “finish your meal, have one more bite” –Staff member

4.3.2.4 Instrumental Assistance During Mealtimes

Instrumental and food strategies were discussed in all interviews with staff and family members. These food strategies encompassed various approaches such as offering snacks, providing assistive devices, incorporating finger foods, serving smaller portions, and offering

additional food options not initially included in the meal tray but readily available in the kitchen or easily prepared at any time. One family member explained:

“They bring mom snacks in the evening when we’re usually on the phone. She gets a warm milk and a cookie usually, which she loves, and I can hear them in the background chatting.” –Family member

One staff member highlighted the importance of preferred and finger food to the residents to improve their appetite. She explained:

“Another thing that I like to do is offer preferred foods and finger foods (to residents). So, if they're not really understanding the concept of what the meal is in front of them on the plate, giving them something they can pick up can really help. We don't have a menu here for that... Say if a resident just likes ice cream, offer them ice cream with every meal to get their appetite going.” –Staff member

4.3.2.5 Family Involvement in Resident Care

Family involvement in resident care was identified as a facilitator for adequate nutrition intake of residents. Family members played an active role in supporting their loved ones by providing preferred snacks and food, assisting with feeding, cutting food into smaller, manageable bites, and respecting residents' autonomy in making dietary choices. Also, they acknowledged that their presence during mealtimes or their active participation in the feeding process significantly contributed to a sense of ease and comfort for their loved ones. One family member explained:

“Mom would not eat certain food. for example, mashed potatoes because they were dry but If I add a little butter and let it melt to make it creamy, she will eat it. I think she trusted me because she knew I was her daughter, so she trusted me to do a few things.... I would cut up her

meat, for instance, because she wasn't able to eat big pieces, but she wouldn't let staff do it."–
Family member

4.3.3 Environmental Level

4.3.3.1 Dementia-Friendly Physical Environment

During the interviews, facilitators at the environmental level were explored and categorized into two main themes by both staff and family members. These themes revolved around the physical and social-cultural environment and their impact on residents' adequate intake. Within these discussions, the physical environment emerged from participants' discussions. Staff members frequently emphasized the importance of a dining environment characterized by minimal distractions and low levels of stimulation, as it was found to be particularly beneficial. Additionally, the role of food and smell as potent stimuli beyond the dining room environment was recognized.

4.3.3.2 Social and Cultural Engagement Opportunities

In interviews with staff members, the significance of a supportive social-cultural environment in facilitating optimal mealtime care was highlighted. This involved recognizing the importance of social conversation as a means of engagement and ensuring consistent table companions for residents. Staff members recognized the value of social conversation during mealtime interactions, as it served as a meaningful way to engage residents and create a sense of connection. Meaningful discussions and interactions not only contributed to a more enjoyable dining experience but also helped to enhance residents' overall well-being. One staff explained:

"Communal dining setup is not always beneficial just like other things are not, but for the most part, residents can see their co-residents eating and if they are struggling with the concept

of eating, what do I do with what's on my plate then it's kind of like a role play or role modeling happening.” –Staff member

4.3.4 Facility and Policy Level

4.3.4.1 Norms in Accommodating Dementia Care

In discussions about promoting adequate nutrition intake for residents, facility-level norms and administrative organization of LTC home were identified as important facilitators. Various key factors emerged from these discussions, including staff teamwork, effective communication between staff and family members, and documentation of residents' preferences. Furthermore, during the interviews, the LPN and dietitian emphasized the significance of assessing and addressing the potential need for nutritional supplementation to effectively meet residents' dietary requirements. They pointed out that a considerable number of residents often require additional supplementation with their meals to prevent malnutrition and ensure adequate nutrition intake. Recognizing the significance of this issue, both family members and staff members expressed the importance of having flexibility within the facility's norms and policies regarding the implementation of nutritional supplements. This flexibility allows for tailored approaches to meet individual residents' needs, ultimately promoting their overall health and well-being.

“Some require assistance with their eating habits as dementia progresses. They tend to eat less and may express reluctance. In such cases, we provide them with a resource in the form of a supplement so that they get enough nutrition... They seem to have a stronger inclination towards sweets rather than other food options. And resource (nutritional supplement) is sweet.”

–Staff member

Resident's quality of life and preferences were also highlighted in the discussion by staff members. They expressed that it is important to place an emphasis on quality of life of residents, considering their preferences and individual needs rather than only focusing on guidelines. Staff member reported:

“Although nutrition and preventing malnutrition is important, sometimes it's not the priority. Sometimes we need to consider quality of life. You know if they are malnourished but they're happy, maybe that's something we need to accept.... We should continuously monitor and be prepared to adjust our approaches. We can lose sight of the individual resident amidst guidelines and targets for protein and calorie intake. Ultimately, we should redirect our focus back to the residents themselves and consider their unique needs.” –Staff member

4.3.4.2 Regulations for Food Safety

During the interviews, policy-level facilitators for residents' adequate nutrition intake were less commonly discussed. Only one staff member and one family member commented on this topic. The highlighted themes revolved around the facility's adherence to regulations concerning food safety during food preparation and serving. Additionally, measures such as removing sharp bones to minimize choking hazards, providing staff supervision in the dining room to assist residents, and incorporating a diverse range of options in the menu were emphasized as important considerations. While policy-level facilitators were less extensively discussed, these key points highlighted the significance of maintaining food safety, reducing potential risks, and enhancing overall dining experiences for residents.

4.4 Mealtime Observations

The research team conducted 12 mealtime observations, observing LTC resident participants (n=4) as presented in table 7. Most observed meals were dinners, except for one breakfast session, chosen due to convenience and scheduling constraints. The team employed the CUED tool to document both verbal and nonverbal behaviours exhibited by both LTC residents and the staff providing mealtime care (Table 8). Additionally, we took detailed field notes that encompassed aspects such as the physical environment, residents' level of independence, table arrangements, and other relevant observations not covered by the CUED tool. During the observations, there was a notable level of noise from background music, conversations, and staff movement, while the participants' tables were cluttered with extra napkins and leftover glasses.

As shown in table 7, Resident 1 was able to eat independently and was seated with two tablemates, whereas Resident 2 faced challenges due to limited mobility and blindness, requiring assistance with feeding but receiving minimal attention from staff during the observed breakfast. Residents 3 and 4 required feeding assistance, resulting in shorter meal durations; however, when staff offered partial assistance and allowed residents to feed themselves, mealtime durations increased. The average solid intake for residents was 46.4%, with the highest recorded intake at 71.1% and the lowest at 22.0% observed in Resident 1 during two mealtimes. Resident 3, who easily got distracted, consistently had the lowest intake across all three meals, while Resident 2 and 4, who required feeding assistance, consistently had the highest intake.

None of the participants achieved the benchmark of 75% for adequate nutrition intake in any of the meals, as each participant had unique circumstances influencing their ability to consume sufficient nutrition. During the mealtime observations, it was recorded that Resident 1 did not require staff assistance, and the observers did not capture staff verbal behaviours in this specific case due to a lack of consent from mealtime staff. However, staff behaviours were observed and documented for residents 2, 3, and 4.

Table 7. Structure of observed mealtime including type of food, duration, percentage of intake of solids, and number of glasses of fluids provided.

Participant	Mobility	Meal type	Eating technique	Type of food	Duration of mealtime (minutes)	% of Intake
Resident 1	Wheelchair	Dinner	Resident	Zesty meatballs, mashed potatoes, green beans, rice, ice cream	35	71.1%
		Dinner	Resident	Haddock, mashed potatoes, peas, carrots, pudding	20	39.2%
		Dinner	Resident	BBQ chicken, herb roasted potatoes, carrot stick, pumpkin pie	25	22.0%
Resident 2	Wheelchair	Dinner	Staff	Haddock, tartar sauce, mashed potatoes, vegetables, ice cream	20	53.0%
		Breakfast	Resident	Oatmeal, eggs, cereal	40	40.8%
		Dinner	Resident	Corn beef, potatoes, cabbage, turnip, ice cream	25	54.0%
Resident 3	Mobile	Dinner	Both	Chicken, rice, vegetables, cherry cheesecake	30	29.8%
		Dinner	Staff	Fish and chips, coleslaw, vanilla pudding	21	28.1%
		Dinner	Staff	Turkey, mashed potatoes, vegetable, ice cream	20	39.0%
Resident 4	Wheelchair	Dinner	Staff	Roast beef, mashed potatoes, beets, muffin	10	70.3%
		Dinner	Staff	Chicken breast, mashed potatoes, carrots, ice cream	14	42.3%
		Dinner	Staff	Turkey, mashed potatoes, gravy, pudding	12	69.0%

4.4.1 Barriers to Adequate Nutrition Intake from Mealtime Observations

4.4.1.1 Resident Verbal Behaviours

During the observation, it was noted that three residents verbally declined or expressed their dissatisfaction with the food, while others remained non-communicative or showed no signs of disagreement. For instance, one resident engaged in a conversation with a staff member, expressing statements that conveyed resistance or objection to assistance or care. She offered her food to the staff member who was assisting her during the meal. The resident also expressed frustration with the first and second meals, vocalizing her refusal to eat to the staff due to her dislike. The specific reasons for her dislike, whether related to taste, appearance, or other factors, was unclear as coders were unable to capture the resident's specific frustration.

4.4.1.2 Staff Verbal Behaviours

During the observation of mealtime, a staff member assisting a resident frequently shifted topics when the resident asked questions about different subjects, diverting their attention from the meal, which the observers perceived as a barrier rather than a facilitator, as it disrupted the residents' speech and changed the subject. Furthermore, some staff members engaged in elderspeak and resorted to bargaining with residents during feeding, exemplified by one staff member consistently using the phrase "have one more bite" throughout the entire meal, specifically observed with resident 3 during Meal 2. This behaviour undermines the resident's dignity, autonomy, and trust in the staff, while instances of controlling voice behaviour were also noted as staff members used commanding or hurried statements to complete the feeding task.

4.4.1.3 Resident Non-Verbal Behaviours

A. Chewing or Swallowing Difficulty

Among the residents, there were frequent observations of non-verbal behaviours primarily associated with difficulties in chewing or swallowing. Residents 1, 2, and 3 displayed prolonged or continuous chewing, persisting for over 10 seconds without swallowing food or sips of drinks. Another noticeable behaviour was food pocketing, where staff members placed food or drinks in a resident's mouth, but the resident did not appear to chew or swallow. These non-verbal behaviours, indicating chewing or swallowing difficulties, can have implications for the residents' overall nutrition intake, mealtime experience, and pose potential risks such as choking or aspiration. Resident 4 consistently exhibited signs of coughing, choking, or gagging during all three meals, experiencing a distressing moment during one meal when she had trouble breathing and turned red, suggesting a potential blockage in her throat from either food or lack of air. Prompt action was taken by the staff to address this issue and ensure the resident's safety during the mealtime.

B. Functional Impairment

During mealtime observations, a common functional impairment observed among residents was their difficulty in using utensils correctly, specifically in handling food on their plates and struggling with preloading the utensil before bringing it to their mouths. This challenge was particularly noticeable in residents 1 and 2, both capable of self-feeding, while resident 3 demonstrated good functional ability without encountering utensil-related issues. Ensuring proper utensil use or implementing adaptive utensils is crucial for efficient and safe eating, as these impairments can hinder residents' ability to independently consume their meals. Another notable non-verbal behaviour associated with functional impairment was residents

moving empty utensils towards their mouths or overloading utensils with food, resulting in unintentional spills due to their difficulty in maintaining a grip on the food or utensil.

Additionally, residents occasionally spilled a portion or the entirety of their drinks.

C. Responsive Behaviours

During the mealtime observations, it was evident that some participants with dementia displayed responsive behaviours that indicated their unique responses to the environment and their personal circumstances. These responsive behaviours manifested as disengagement with meals, such as ceasing chewing or eating. Observed behaviours were residents closing their eyes, becoming distracted, or falling asleep and would wake up by staff members calling their name. The observers noted that the residents struggled to maintain attention to the meal due to various distractions in the dining room. This was observed in residents 3 and 4 throughout all three meals. Even when food or beverage items were brought close to their mouths, these residents displayed resistance by not opening their mouths to accept them. These distractions, such as visual stimuli, noises, activities, or other people, diverted their focus away from the meal itself. It is important to understand that these responsive behaviours are not deliberate acts of resistance but rather expressions of their individual experiences with dementia. Furthermore, in some cases, residents may demonstrate reluctance to open their mouths to receive food or drinks, even when offered by staff members.

4.4.1.4 Staff Non-verbal Behaviours

Staff task-centered behaviours were identified as barriers to achieving adequate nutrition intake. Negative non-verbal behaviours commonly observed included a lack of staff interaction, hurried and rushed pacing that outpaced residents, interfering with residents' self-feeding attempts, indiscriminate mixing of food items, and removing plates before checking with

residents. Staff members disregarded a request made by resident 2 (during meal 2) for tea, resulting in the resident having to ask three times during the meal. Another concerning observation made by the coders was when staff mixed all the food items together for convenience of feeding resident 4 (had modified food texture), which could potentially lead to decreased appetite and food refusal.

The observation of staff removing residents' plates before providing cues to finish the meal, despite there being food left, was noted in almost all meals. It is important to acknowledge that staff may have taken this action to facilitate plate measurement by the researcher. We also observed that registered staff members interrupted the regular flow of mealtimes by administering medication in four mealtimes. Resident 3 spit out the medication due to its taste. As a result, staff had to provide it twice and follow by ice cream afterward to help alleviate the unpleasant taste and ensure that she received the necessary medication.

4.4.2 Facilitators to Adequate Nutrition Intake from Mealtime Observations

4.4.2.1 Resident Verbal Behaviours

Among the residents who were able to converse (n=3), it was evident that they expressed their need for comfort during the designated mealtime in diverse ways. They communicated their preferences by expressing the desire for additional clothing to combat the feeling of coldness, requesting alternative food options or condiments, displaying interest in the served food, seeking attention from both staff and their tablemates, and engaging in conversations with others. Notably, Resident 1 demonstrated an active interaction with both staff and a tablemate by calling their names to capture their attention whenever assistance was required. The residents' engagement in conversations with others demonstrates their socialization during mealtime. Meaningful interactions and conversations may contribute to a positive dining experience. Residents 2 and 3 did not have tablemates, and resident 4 was unable to converse.

4.4.2.2 Staff Verbal Behaviours

The mealtime staff proactively assessed the comfort level of the residents by asking questions and taking necessary steps accordingly. They effectively gained the residents' attention by calling their names, provided instruction and orientation to the meal, provided reinforcing statements when the residents took a bite, and offered alternative food or beverages when the initial options were not preferred. Positive reinforcement encouraged the resident to actively continue eating and enhanced their experience.

4.4.2.3 Resident Non-Verbal Behaviours

Non-verbal behaviours commonly observed among residents that facilitated adequate nutrition intake included the ability to independently continue feeding themselves once the meal was initiated or set up. Furthermore, residents were able to communicate their end of meal by

waving at staff or putting their apron away. Having self-sufficiency to self-feed supports adequate nutrition intake, as residents were able to independently eat their meals without relying on constant assistance of staff or waiting for staff to help.

4.4.2.4 Staff Non-Verbal Behaviours

A. Modifications of Resident Functional/Cognitive Ability

A positive non-verbal behaviour commonly observed among staff members was the modification of residents' functional ability and positioning prior to mealtime. Staff actively assisted residents in sitting in appropriate positions and repositioned them to facilitate their ability to eat. This supportive behaviour was particularly observed for residents who were seated in wheelchairs (resident 1, 3, and 4). For instance, staff members ensured residents were positioned upright in their wheelchairs or transitioned them from the bed to a seated upright position, which is optimal for safe swallowing. Additionally, staff members made facilitating modifications to residents' functional abilities that were less commonly observed but still noteworthy. These modifications included offering beverages, providing alternative food choices, ensuring appropriate bite sizes, and promptly addressing any oral spillage by gently wiping the area.

B. Modification of Care Approaches

Staff members were observed approaching residents during mealtime to provide cueing or assistance, which was recognized as a facilitating non-verbal behaviour and patient-centered approach.

C. Modification of Dining Environment

Facilitating non-verbal behaviours employed by staff were that they rearranged the food and drinks in a manner that made it convenient for the residents to access them. Additionally, they helped residents by cutting their food into smaller pieces as needed.

Furthermore, the staff offered the use of assistive devices such as hearing aids and glasses, as well as meal-related items like bibs and napkins. They were also willing to adjust or remove these devices or items based on the specific needs of each resident, or even assist with personal belongings such as coats or protective items.

Table 8. Resident and staff members verbal and non-verbal behaviours captured during mealtime observations.

Barriers and Facilitators	Resident 1			Resident 2			Resident 3			Resident 4		
	1	2	3	1	2	3	1	2	3	1	2	3
# of Observed Meals												
Resident Verbal Behaviours (Barriers)												
1. Interrupting tablemates/staff	■						■	■				
2. Verbal refusal/ Disagreement						■	■					
3. Verbal frustration with food or condition						■	■	■				
4. Other												
Resident Verbal Behaviours (Facilitators)												
1. Asking for help/ cooperation	■											
2. Expressing the need for comfort/condition			■				■	■	■			
3. Asking for other choices		■	■		■	■		■				
4. Conversing with tablemates	■	■	■	No interaction			No tablemates					
5. Conversing with staff	■	■	■	No interaction			■	■	■			■
6. Showing interest in food		■	■	■	■	■		■	■			
7. Gaining Attention of staff/table mates	■	■	■			■						
Staff Verbal Behaviours (Barriers)												
1. Interrupting/ changing topic	■	■	■	■			■	■				
2. Bargaining/ bribing resident to eat	■	■	■				■	■	■			■
3. Elderspeak	■	■	■				■	■	■			
4. Controlling voice	■	■	■				■	■	■			
5. Other	■	■	■					■				
Staff Verbal Behaviours (Facilitators)												
1. Asking to assess the need for	■	■	■	■		■				■		
2. Assessing for comfort/ condition	■	■	■	■	■					■		■
3. Giving choices with different options	■	■	■	■		■						
4. Orientation/giving instructions	■	■	■	■		■				■	■	■
5. Showing approval/ agreement	■	■	■	■						■	■	■
6. Reminding, cueing, prompting resident	■	■	■			■				■	■	■
7. Gaining Attention verbally	■	■	■							■	■	■
8. Other	■	■	■									
Resident Non-Verbal Behaviours (Barriers)												
A. Chewing or Swallowing Difficulty												
1. Leaving mouth open allowing food falls out of mouth (passive)												
2. Prolonged/continuous chewing/sipping		■	■	■						■	■	
3. Doesn't chew/swallow (pocketing)					■	■				■	■	■
4. Coughing, choking, or gagging on food	■			■	■	■				■	■	■
5. Other												
B. Functional Impairment												
1. Difficulty using utensil properly	■	■	■		■	■				■	■	■
2. Not able to initiate eating					■	■				■	■	■
3. difficulty transporting food to mouth		■	■		■	■						
4. Contracture/Limited Range of Motion					■	■						

Barriers and Facilitators	Resident 1	Resident 2	Resident 3	Resident 4
5. Taking empty utensil/container to mouth	■	■		
6. Spillage	■	■		■
7. Drooling		■		
8. Other				
C. Responsive Behaviours				
1. Doesn't open mouth (when mouth is empty)			■	■
2. Biting the utensil (when food is offered)			■	
3. Turning head away/tilts head backward			■	■
4. Leaning backward			■	
5. Pushing away help/food			■	
6. Spitting out food (two modifiers)				
• Doesn't seem to like food/texture			■	
• Intentionally spitting food at the feeding assistant – Aggressive				■
7. Disengaging from meal (three modifiers)				
• Closing eyes	■	■	■	■
• Distracted			■	■
• Falling asleep/becoming drowsy	■	■	■	■
9. Playing with food/utensil			■	
10. Taking food from others				
11. Attempting to eat non-edible items			■	
12. Attempting to leave the table				■
13. Other				
Resident Non-Verbal Behaviours (Facilitators)				
1. Using hands to eat/take over attempts to eat/drink		■		■
2. Leaning forward	■	■		■
3. Wiping away oral spillage or drool	■	■	■	■
4. Indicating end of meal (waving hand no; taking off apron, etc)	■	■	■	
5. Other				
Staff Non-Verbal Behaviours (Barriers)				
1. Ignoring/lack of interactions			■	■
2. Physically controlling				■
3. Inappropriate touch				■
4. Outpacing resident				■
5. Discouraging /taking over resident self-eating			■	■
6. Mixing ALL food up				■
7. Leaving the table/resident			■	■
8. Removing plate before asking resident			■	■
9. Other				

Barriers and Facilitators	Resident 1	Resident 2	Resident 3	Resident 4								
Staff Non-Verbal Behaviours (Facilitators)												
A. Modification of Resident Functional/Cognitive Ability												
1. Positioning resident appropriately												
2. Adjusting to resident's pace (if feeding)												
3. Offering different type of food												
4. Offering beverage												
5. Offering finger food												
6. Offering condiment												
7. Putting item in container/utensil for resident												
8. Giving a bite of appropriate size												
9. Guiding resident's hand to pick up food												
10. Putting food/utensil into resident hand												
11. Holding resident hand to get food into mouth												
12. Wiping away oral spillage or drool												
13. Other												
B. Modification of Care Approaches												
1. Adjusting proximity (Resident to table)												
2. Re-approaching resident												
3. Positive gestures/facial expressions												
4. Appropriate use of affectionate touch												
5. Assessing comfort												
6. Resident-directed eye gaze												
7. Other												
C. Modification of Dining Environment												
1. Modifying traffic												
2. Modifying noise level												
3. Reducing clutter												
4. Limiting distractions on the table												
5. Arranging/mixing edible items for easy access												
6. Cutting food into manageable size												
7. Adjusting, providing or taking away assistive devices/items (hearing aid, glasses, apron, napkins, etc)												
8. Other												

Barriers 
 Facilitators 
 Not Applicable 

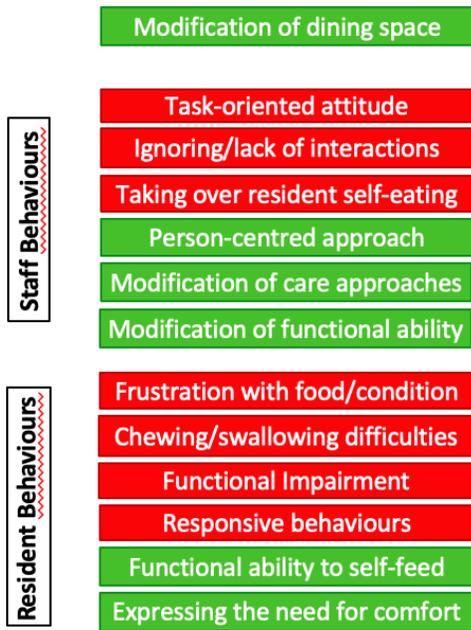


Figure 4. Resident and staff members verbal, and non-verbal behaviours captured during mealtime observations.

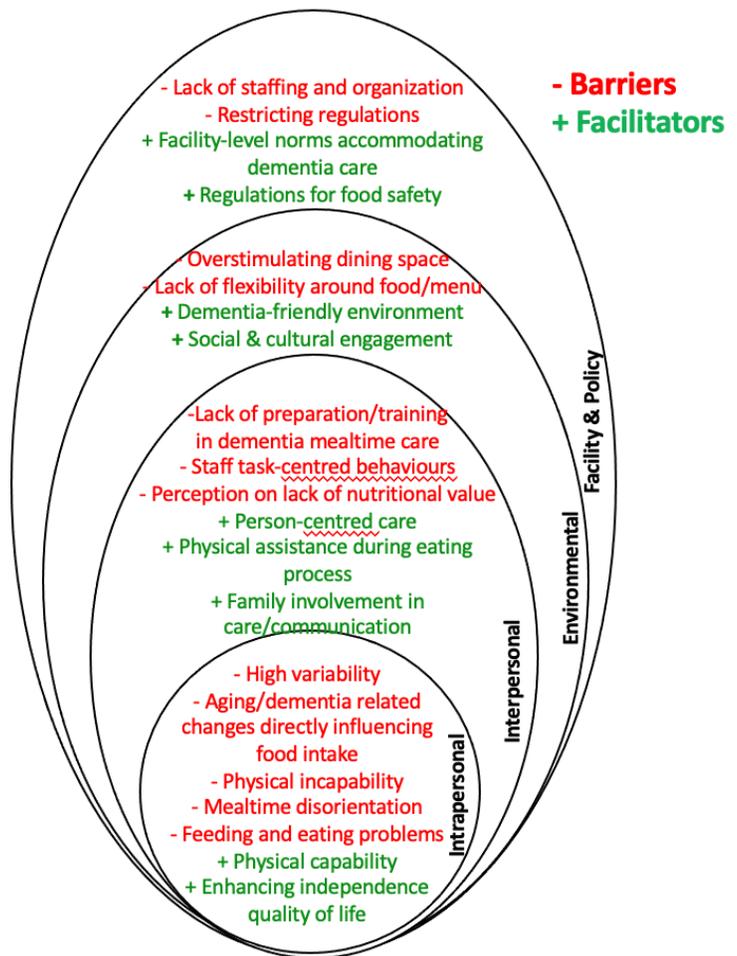


Figure 5. Barriers and facilitators that impact adequate nutrition intake of LTC residents with moderate to severe dementia framed by Social Ecological Model.

As seen in the figures 4 and 5 the mealtime observation results further correspond with the findings from the interviews regarding barriers to adequate nutrition intake among LTC residents with moderate to severe dementia. The interview results highlighted the high variability across and within residents in terms of their food intake. The mealtime observation confirmed this variability by noting that some residents verbally declined or expressed dissatisfaction with the food, while others remained non-communicative. For example, one resident engaged in a conversation with a staff member, vocalizing her refusal to eat due to her dislike of the food. This observation aligns with the interview findings, where staff members discussed the “trial-and-error” approach required to accommodate individual preferences and fluctuations in residents' physical and cognitive changes.

The interviews with participants emphasized the influence of physiological changes on food intake, including factors like sleepiness, tiredness, and fatigue. The mealtime observation further supported this by noting that residents displayed non-verbal behaviours associated with chewing or swallowing difficulties. Prolonged chewing without swallowing, food pocketing, and signs of coughing, choking, or gagging were observed among residents. These behaviours can be linked to the physical and cognitive changes that often accompany the physiological shifts associated with the aging process, as elucidated during the interviews.

The interviews also highlighted mealtime disorientation and distraction as common issues among residents with dementia. The mealtime observation confirmed these concerns by noting that residents demonstrated disengagement with meals, becoming distracted, closing their eyes, or falling asleep. They struggled to maintain attention to the meal due to various distractions in the dining room. This aligns with the interview findings, where staff and family members discussed the confusion, forgetfulness, and difficulties in filtering out distractions experienced by

residents with dementia. Additionally, it was observed that identified functional impairments among residents, such as difficulties in using utensils correctly and unintentional spills. This aligns with the interview findings that highlighted physical capability and functional ability as important factors influencing residents' eating tasks. The observation further emphasizes the need for regular assessments of residents' physical capability during mealtimes, as mentioned in the interviews.

Moreover, the observation identified negative non-verbal behaviours exhibited by staff, such as a lack of interaction, rushed pacing, interfering with residents' self-feeding attempts, and inappropriate handling of food items. These staff behaviours contribute to the barriers faced by residents during mealtimes, which were not discussed in the interviews.

5.0 Discussion

This study was conducted to investigate the barriers and facilitators to achieving adequate nutrition intake among LTC residents with moderate to severe dementia. Perspectives were gathered from LTC residents, family members, and staff working in LTC homes. Emerging themes from the interviews and observations encompassed around high variability across or within resident, physiological factors influencing food intake, lack of physical capability, mealtime eating difficulties, staff lack of preparation and person-centered care, physical dining experience, family involvement and ongoing communicant and facility-oriented norms and restrictions.

5.1.1 Adequate Nutrition Intake

In the context of this study, it became apparent that LTC residents with moderate to severe dementia encountered difficulties in attaining adequate nutritional intake and reaching the stipulated 75% threshold. Despite the utilization of a quantitative measure for this threshold (31,34,35), it becomes evident that LTC homes are falling short of meeting the DRIs and energy requirements for their residents. This shortfall can be attributed to the lack of individualized meal planning that specifically caters to the unique nutritional needs of each resident. The existing approach seems to lack the necessary customization required to adequately address the varying dietary needs of residents, particularly those with moderate to severe dementia. Rodríguez-Rejón et al. (2019) found that many LTC residents do not meet the recommended daily calorie intake due to a lack of personalized meal plans and assistance during meals (138). Porter Starr et al. (2015) highlighted that LTC residents with dementia often receive meals that are not tailored to their preferences and nutritional needs, leading to inadequate energy intake(139). These findings resonate with the observed discrepancy between the implemented 75% threshold and the actual

energy and nutrient intake of residents. The failure to individualize meals in LTC homes for residents with moderate to severe dementia is particularly concerning.

A study by Keller et al. (2014) emphasized the importance of customized nutritional interventions for older adults with dementia to ensure optimal health outcomes (11). Also, a person-centered approach, as advocated by Edvardsson et al. (2014), emphasizes the need to prioritize individual preferences and requirements in meal planning for older adults with cognitive impairments (140). This finding underscores the gravity of the issue under examination. This aligns with previous research that has consistently reported high rates of malnutrition in LTC homes (8,15,40,141). By confronting these challenges and building upon the existing knowledge, the nutritional status and overall well-being of LTC home residents can be improved, thereby enhancing their overall quality of life. These findings shine a spotlight on the pivotal role of targeted strategies and interventions in overcoming the impediments to residents' nutrition intake and harnessing the factors that contribute to enhanced nutrition.

5.1.2 Physical Capability

One intrapersonal barrier frequently highlighted in this study was the residents' physical capability, which affects their ability to eat independently. Our findings underscore that maintaining physical capability corresponded with a heightened likelihood of residents exhibiting self-directed eating habits.

The DoMAP also highlights that mobility limitations indirectly contribute to malnutrition among older adults (104,142). This alignment with prior research that underscores the pivotal role of physical capability in nurturing independence lends further credence to these findings (104,142). Proposing a pathway for potential future advancements, it is recommended that the integration of periodic physical capability screenings becomes a fundamental aspect of

caregiving practice (50). By seamlessly weaving these assessments into regular evaluations, a holistic comprehension of residents' unique capacities and constraints can be cultivated, thereby establishing a robust framework to anchor pragmatic expectations for eating performance.

It is recommended to regularly screen residents' physical capability to establish realistic expectations for eating performance (104,142). Additionally, individualized plans should be developed, incorporating strategies to enhance capability and optimize performance in eating tasks (104,142).

5.1.3 Independence and Autonomy

Maintaining overall independence, particularly in the realm of eating, emerges as a central concern for LTC residents with moderate to severe dementia, as highlighted by the input of participants in this study. The findings underscore the profound significance of preserving autonomy for this specific population. Maintaining independence stands as a paramount health priority, as emphasized in prior research involving older adults (143,144), as it nurtures a sense of dignity and autonomy within this demographic (145,146). Eating is a fundamental ADL, and being able to feed oneself allows individuals to retain a sense of control and independence over their own lives (147). It contributes to their overall well-being and quality of life, as they can make choices regarding their food preferences and eating habits (148). Previous studies have also recognized the significance of physical capabilities in relation to independence during mealtimes (20,76). Adequate physical capability is essential for individuals to independently perform eating tasks (144). This involves possessing upper extremity mobility, which allows for effective self-feeding, as well as the ability to follow verbal and visual cues during meals (144). Recognizing the influence of the challenges and changes associated with dementia, it becomes important to approach and interpret verbal and nonverbal behaviours empathetically. These behaviours serve

as responses that reflect the intricate effects of cognitive and physical factors, underscoring the importance of a sensitive understanding when catering to the unique needs of individuals with dementia (70).

Prior research underscores the equal importance of maintaining autonomy and respecting individual food preferences for older adults with dementia (2,149). This highlights the necessity of accounting for each resident's distinct circumstances and specific needs within their unique context. This discovery carries profound implications for the formulation of effective, tailored interventions aimed at enhancing mealtime care. The recognition of individualized interventions for older adults with dementia seamlessly aligns with the principles of person-centered care. This approach recommends prioritizing an understanding of the distinctive experiences of individuals with dementia and fostering a positive social environment (95). Within the concept of person-centered mealtime care, the central point is establishing an environment that cultivates the individual's well-being, comfort, and enjoyment during the dining experience (149). This spotlight on personal well-being and satisfaction signifies a holistic approach to addressing the dietary needs of LTC residents with moderate to severe dementia.

5.1.4 Individualized Mealtime Care

High variability across and within residents emerged as barriers to adequate nutrition intake for residents, which is consistent with previous research (20,72,76,91). Staff emphasized the need for individualized mealtime interventions for residents with dementia, acknowledging the implementation of tailoring the approach to meet the unique needs, preferences, and functional abilities of each resident. On the other hand, residents and their families reported dissatisfaction with the lack of individualized mealtime care, but their concerns are often disregarded despite their efforts to advocate for improvements. Though the importance of

individualized mealtime care planning and strategies has been identified in other adult adults (150), they are not consistently performed in LTC homes despite the needs (19).

From the perspectives of residents living with moderate to severe dementia, their families, and their care providers, the observed gap in service provision emerged as a notable barrier. However, the absence of evidence to guide the customization of services to leverage resident strengths and preferences exacerbates this challenge (19). To bridge this gap effectively, it becomes imperative for LTC homes to prioritize the development and implementation of individualized mealtime care planning. This approach can involve the incorporation of residents' preferences, abilities, and needs, allowing staff to cultivate a more supportive and inclusive dining environment.

Addressing these barriers necessitates a multifaceted strategy that contains several dimensions. Enhancing the assessment tools employed is paramount, ensuring that they comprehensively capture the nuanced requirements of residents (19). Moreover, the establishment of realistic expectations regarding the inherent individuality of mealtime care proves essential. This understanding provides the foundation for providing appropriate and personalized support to each resident, thereby mitigating potential frustration among staff members who may feel overwhelmed by individualized care demands (91). To facilitate such transformative changes, considerations extend to multiple aspects. Adapting the physical setup of the dining area, providing assistive devices tailored to individual needs, offering a diverse array of personalized food choices, and ensuring optimal staff-to-resident ratios during mealtimes all contribute to creating an environment conducive to person-centered care (54). Importantly, the discrepancy in staff concerns reported in this study compared to a previous one (91) suggests the

need for continual communication, education, and training for staff to reinforce the importance of individualized care and alleviate any misconceptions about their current practices.

5.1.5 Dysphagia and Textured-Modified Diets

Other frequently mentioned barriers were related to the effects of physiological changes of aging that impact residents' food intake. Factors such as dysphagia, mood fluctuations, behavioural disorientation, and challenges in oral care were commonly discussed during the interviews as barriers to adequate nutrition intake in residents. In our study 2 out of 4 residents required modifications in food textures because of dysphagia. Clinical screening conducted by health care professionals in LTC residents indicated a higher estimated prevalence of 52.7% for dysphagia and recommendation of TMDs (3). Staff members emphasized that it is the responsibility of dietitians to evaluate residents and provide suggestions for alterations in texture and often recommend the use of TMDs, which can be restrictive for residents. Additionally, some residents may exhibit noncompliance with the prescribed textures. Refusal of TMDs and/or nonadherence to TMD recommendations have been also previously reported (87). While performing a swallowing assessment is within the scope of practice for dietitians, it's imperative that this assessment takes place within a multidisciplinary care framework. Involving a speech-language pathologist is crucial to ensure informed decisions regarding the residents' swallowing capabilities and appropriate interventions (151).

Holteng et al. (2017) conducted a qualitative study involving focus group interviews with frontline staff in LTC homes (151). The findings revealed that the staff members reported a sense of increased safety during mealtime when serving TMDs to residents with known swallowing impairments, as opposed to regular food textures. While the use of TMDs has been associated with the potential risk of malnutrition, the participants expressed that serving TMDs enabled

them to deliver personalized nutritional care tailored to the specific needs of patients, resulting in fewer eating difficulties (151). Thus, the absence of a standardized protocol for dysphagia screening and the recommendation of TMDs is evident in the current literature.

In our study residents who had TMD reported to dislike the taste and the texture. Minced and pureed textured foods have been reported to be visually unappealing and less palatable (33). Additionally, TMDs have been observed to be deficient in providing adequate amounts of energy, protein, and various essential micronutrients (13). Prior research suggests success in enhancing food appeal and increasing intake of energy and protein through various strategies, such as improving ingredients (13,86).

While previous studies have examined the aesthetics and safety of TMDs there was a lack of standardized evaluation for mealtime satisfaction (86). Given the cognitive challenges often faced by this population, subjective measurements for assessing mealtime satisfaction may be limited, and alternative methods like observations or audits could be considered (86). To achieve visually appealing food shapes, the traditional manual approach of using silicone molds is commonly used; however, this method is time-consuming and limited in creating realistic shapes that satisfy consumers (152). Recently, three-dimensional (3D) printing technology has emerged as a promising solution, allowing for the production of foods with diverse textures and meeting demands for visual appearance (86,152). Although limited, a few studies have explored the utilization of 3D food printing for creating specialized foods for individuals with dysphagia. One study reported that 3D printing reduced design and fabrication time, improved consistency and repeatability, and enhanced sensory characteristics of a pureed food made from tuna, pureed pumpkin, and pureed beetroot for dysphagic patients (153).

Therefore, interventions aimed at improving the nutrient density and sensory appeal of TMDs should be implemented in LTC homes. To drive a change in practice, it is essential to establish standards and policies that make these initiatives the norm for LTC residents who require TMDs. To enhance food satisfaction and improve the overall mealtime experience, additional efforts are required to enhance the visual appeal and taste of TMDs, considering the physiological changes associated with aging that may result in decreased taste, hunger, and appetite (12,86).

5.1.6 Staff Preparation and Training

Barriers at the interpersonal level focused on lack of preparation and task-centered behaviours at mealtimes often due to time constraints. These barriers have been extensively recognized in LTC research, emphasizing the urgent need for a focused and supportive approach from both staff and the facility (154). It is essential to address these challenges through targeted interventions, such as training programs and enhanced resources, to alleviate staff burden and improve the overall mealtime experience for residents.

The findings of this study underscore the urgent necessity for targeted education and training initiatives aimed at enhancing the proficiency of staff members in providing specialized mealtime care tailored to residents with dementia. Notably, staff members consistently emphasized the significance of such supportive measures to augment their knowledge and skills in navigating the intricacies of dementia-related care during mealtimes. Despite the evidence supporting the use of education and training to improve staff skills regarding individualized mealtime care and feeding assistance for residents with dementia, there is a lack of standardized tools to assess their knowledge and skills in this domain (54,105,154,155). The lack of ongoing in-service training opportunities, as highlighted by staff members, further compounds this

challenge by limiting avenues for reinforcing and updating their expertise in mealtime care needs of residents. Therefore, there is a need for the development and implementation of valid and reliable assessment tools to ensure ongoing professional development and proficiency among staff in delivering optimal mealtime care to LTC residents.

This identified need aligns with the broader trajectory of enhancing person-centered care and advancing the quality of life for residents with dementia. Robust assessment tools serve as a cornerstone for evaluating the effectiveness of training initiatives, assessing staff competency, and facilitating targeted skill development (127). By bridging this gap through the creation of standardized tools, LTC homes can position themselves at the forefront of comprehensive dementia care, fostering an environment that empowers staff and ensures consistent, high-quality mealtime experiences for residents.

Staff members training and preparation for dementia care holds potential benefits and was reported as facilitator; yet it should be accompanied by adequate staffing levels to effectively cater to the needs of residents. Doyle and Rubinstein, (2014) suggested that staff members tend to revert to task-focused approaches, even after receiving person-centered care training, indicating that organizational structures reinforced a culture centered on tasks (95). This suggests that to support staff in providing person-centered care, it is essential to implement organizational structures that prioritize and reinforce a culture of person-centeredness, rather than solely task completion. This can be achieved through ongoing training and education, clear communication channels, supportive leadership, and an organizational culture that values the individual needs and preferences of residents with dementia (54,105,154,155).

These findings carry significant implications for both future research and practice. From a research standpoint, investigating the design, implementation, and effectiveness of tailored

education and training programs for staff emerges as a crucial avenue. Studies could examine the impact of such interventions on staff confidence, resident outcomes, and overall dining experiences within LTC homes. Furthermore, exploring innovative approaches, such as incorporating technology-based learning modules or simulation exercises, could enhance the accessibility and engagement of educational initiatives for staff members.

5.1.7 Staff Workload and Time Constraints

Staff shortages are an ongoing barrier that has been also previously reported in the literature (91,156). It is important to acknowledge that the data collection process for this study took place during the COVID-19 pandemic, and resident admissions may have coincided with the initial stages of this challenging time. The impact of healthcare staff shortages, as highlighted in the report by the Canadian Federation of Nurses Union (2022), has had a detrimental effect on patient care, leading to longer wait times, reduced access to services, and compromised quality of care. Ongoing staff shortages persist and require attention through facility and policy-level interventions. As emphasized by the staff members in this study, they had to work overtime to compensate for the shortages, resulting in heightened workload, elevated levels of stress, burnout, and fatigue. These factors have a direct negative impact on their performance and the quality of care they can provide. To address the nursing shortage, it has been suggested to implement various strategies, including increased funding for nursing education programs, improved recruitment efforts, and enhanced support for nurses in the workplace (103).

5.1.8 Family Involvement in Care

Staff members emphasized the importance of involving family members in resident care as a facilitator but acknowledged that there are instances where their input on food choices can be discouraging, as they sometimes overshadow the expertise of kitchen staff and nursing

personnel. While the benefits of family participation in care, such as improving the relationship between family and staff and enhancing the family caregiving experience (157,158), have been widely acknowledged, family members expressed concerns about a lack of communication and involvement. Despite the recognized importance of their role, family members felt that their contributions and input were not adequately valued or integrated into the care process.

Family members, driven by their heartfelt dedication to their loved ones, have shared concerns regarding the nutritional value of meals within the LTC home. Their questions have revolved around whether the caregiving team is delivering the high-quality care, with a sense of unease stemming from the perceived lack of communication. To mitigate these perceptions and apprehensions, encouraging an open channel of communication among family members, kitchen staff, and nursing personnel becomes pivotal, fostering a synergistic and collaborative approach. Additionally, educating family members on best practices for providing nutritional care to residents is essential (159). By reinforcing a supportive and inclusive environment where all stakeholders work together, the perception of meals' nutritional value can be improved, ultimately enhancing overall resident satisfaction.

5.1.9 Supportive Dining Environment

In alignment with previous research, this study supports that environmental barriers can have unfavorable effects on mealtime care within LTC homes, notably highlighting the detrimental implications of an unsupportive dining environment (91). Factors such as inadequate seating arrangements, insufficient lighting, or discomfort due to noise levels can collectively contribute to a less-than-ideal atmosphere for meal consumption. This, in turn, can lead to reduced mealtime satisfaction, reluctance to eat, and potential challenges in achieving adequate nutrition intake among the residents (91). Thus, it was highlighted by participants that creating a

conducive and nurturing dining environment for LTC residents with moderate to severe dementia can foster a positive and comfortable mealtime experience. While addressing certain barriers such as staffing may pose challenges, numerous environmental factors within the facility can be modified and should be targeted in intervention research to enhance residents adequate nutrition intake (91,155).

Creating a supportive dining environment for LTC residents with dementia should be a primary commitment for facilities. This involves minimizing distractions during mealtime, providing culturally appropriate and enjoyable food choices that align with resident preferences, and fostering opportunities for socialization (91,155). By implementing these measures, LTC homes can optimize the dining experience for residents and improve their overall nutrition intake. Research has been conducted on creating a supportive environment for LTC residents, developing tools to assess the environment and ensure its suitability for this population (29,101,150).

One tool that has been used to assess the physical and psychosocial environments during mealtimes is the Mealtime Scan developed by Keller et al., (2017) (29,101,150). This study revealed that there is a significant correlation between the physical environment and factors such as loudness, number of residents, staff involvement, and total people in the dining room (29,101,150). Furthermore, it has been suggested that creating a supportive and conducive environment during mealtimes will enhance the well-being and satisfaction of LTC residents (29,101,150).

5.1.10 Safety Regulations

At both the facility and policy levels, regulations for safety were identified as both a barrier and a facilitator. While these regulations are intended to ensure the safety of residents,

they can sometimes become overly restrictive, limiting the autonomy and freedom of the residents, and potentially diminishing their quality of life. Striking a balance between safety and individual choice is important to promote the well-being and enhance the overall quality of life for residents in LTC homes. This requires a careful evaluation and revision of existing policies to ensure that safety measures are implemented without unnecessarily compromising residents' independence and enjoyment (91).

5.2 Strengths and Limitations

The study exhibited several strengths, including the using SEM as a framework to guide the research process, allowing for a comprehensive exploration of multiple levels and dimensions related to the topic. The inclusion of reflexivity, considering multiple perspectives from families, residents, and staff, added richness and depth to the findings. Additionally, employing multiple methods of data collection, such as semi-structured interviews and mealtime observations enhanced the credibility and validity of the study through triangulation of findings. Achieving a comprehensive understanding of the barriers and facilitators that affect the sufficient nutrition intake of LTC residents with moderate to severe dementia involved employing a variety of diverse data collection methods. This approach allowed for a well-rounded insight into participants' experiences and perspectives, ensuring the validation of study through triangulation.

Additionally, the deliberate use of both deductive and inductive reasoning strategies further strengthened the investigation. The study employed a mixed approach to qualitative data analysis, combining deductive thematic analysis informed by inductive analysis, to leverage the respective strengths of each method. By integrating existing theoretical knowledge with emerging themes from the data, the study strengthened the rigor and validity of the qualitative research findings (130–132).

While this study had strengths, it is important to acknowledge certain limitations. Using semi-structured interviews within a qualitative study brings forth strengths and limitations that influence the applicability of findings. On the positive side, these interviews offer a flexible and nuanced approach, enabling participants to express their viewpoints in depth. However, the probing questions and examples provided to participants during the interviews were based on the SEM as described in the literature and may have influenced participants' responses. Furthermore, due to their exploratory nature, these interviews might struggle to establish firm cause-and-effect connections between variables. This dual nature arises from the design's inclination towards rich, contextual insights, which can sometimes hinder the study's capacity to draw definitive conclusions about intricate relationships and causal associations. Also, dyadic format of interviews with family members present during interviews may have influenced the responses of the residents. The dynamic between family members and residents could impact the dynamics of the interview. Residents might feel obliged to conform to family members' views or opinions, leading to an imbalance of power and limiting their ability to express their genuine experiences.

Additionally, the presence of interpretation bias within the research may have led to not completely capturing every nuance in the information shared by participants during the interviews. However, it is important to note that the research team members were well-trained in qualitative research methods, and they created an audit trail to maintain rigour and ensure representativeness of the findings.

Another limitation of the study is that the concepts that emerged from the interviews might be specific to the two LTC homes where the interviews took place and may not be readily generalizable to participants in other LTC homes. These concepts might not readily translate to participants in other LTC homes. The distinct attributes of the two selected LTC homes,

determined by the principal investigator through a collaborative partnership and representing not-for-profit entities in urban settings, contribute to this limitation. Although the findings carry valuable implications within this framework, prudence is advised when attempting to extrapolate these findings to different LTC homes or diverse populations.

Furthermore, it is important to acknowledge the potential influence of social desirability bias on the behaviours and responses of both LTC residents and staff members who were observed during mealtimes. The presence of researchers and being aware of being observed may lead individuals to alter their usual behaviours consciously or subconsciously to present themselves in a more favorable light or align with perceived expectations. To mitigate this concern, the researcher employed multiple data collection methods, including interviews and plate weight measuring. It is also important to acknowledge that resident's nutritional intake can fluctuate due to various factors outlined in the existing literature (45,70,96), and we cannot make definitive conclusions on their overall nutritional intake based solely on the observation of three meals.

Lack of dysphagia assessment in the clinical records of LTC residents also highlights a limitation. This hinders the ability to accurately ascertain the prevalence, severity, and impact of dysphagia within the cohort. Acknowledging this limitation underscores the existing gap in tools available for dysphagia assessment and underscores the importance of developing a universal dysphagia assessment tool that healthcare professionals can employ within LTC homes.

Lastly, recruitment and data collection occurred during the COVID-19 pandemic at a time when staff shortages and staff burnout were a major concern, this may have resulted in low recruitment rate for the study; however, data saturation was achieved with the included sample.

5.3 Directions for Future Research

Future direction should focus on validating the identified barriers and facilitators to adequate nutrition intake of LTC residents with moderate to severe dementia through rigorous validation processes. This entails using additional data collection methods, such as follow-up interviews or surveys with a larger sample of stakeholders within LTC homes. By triangulating the findings from multiple sources, the robustness and reliability of the barriers and facilitators can be further substantiated. This mixed approach not only provides a comprehensive understanding of the phenomena under investigation but also has the potential to generate new theories or frameworks rooted in the empirical data (130–132). Future directions should also focus on the development and implementation of targeted interventions and policies to address the identified barriers and leverage the facilitators to improve nutrition care in LTC homes. It is essential to prioritize the development and implementation of individualized mealtime care planning that incorporates the preferences, abilities, and needs of residents with dementia. This includes adapting the physical setup of the dining area, providing appropriate assistive devices, offering personalized food choices, and ensuring adequate staff-to-resident ratios during mealtimes. Additionally, interventions should aim to improve the nutrient density and sensory appeal of TMDs and establish standards and policies for dysphagia screening and the use of TMDs. Addressing staff-related barriers, such as lack of preparation, task-centered behaviours, and staff shortages, requires targeted interventions such as training programs, ongoing education, and support for staff.

Open communication channels should be established among family members, kitchen staff, and nursing personnel, fostering a collaborative approach in resident care. Furthermore,

modifications to the dining environment, regulations for safety, and the balance between safety and individual choice need to be addressed at both the facility and policy levels.

Dietitians employing nutrition care or medical nutrition therapy leverage the Nutrition Care Process (NCP) as a methodical approach to delivering effective and personalized nutrition care to patients (160). The NCP establishes a uniform vocabulary and framework for communication, encompassing a series of interconnected phases intended to gather comprehensive information for assessment, diagnosis, intervention, monitoring, and evaluation of individuals' nutritional statuses and requirements (160). By providing a structured framework, the NCP facilitates the provision of evidence-based and patient-centric nutrition care. This ensures that individuals receive interventions tailored to their distinct needs and aspirations. Notably, while embarking on the development of this thesis, despite my background as a dietitian, the NCP wasn't initially integrated into the analysis. However, it became evident during the process that the themes extracted from the findings resonated with the terminologies inherent to the NCP.

Several parallels were drawn between the themes identified in this study and the NCP concepts. These included challenges related to self-care management, inadequate food intake, food behaviours, and environmental obstacles. Traditionally, clinical aspects such as dietary restrictions, medical conditions, and medication interactions have traditionally garnered significant attention within LTC homes. However, the behavioural and environmental dimensions, encompassing factors such as the inability to manage self-care or food preparation, tend to be overlooked in LTC homes by dietitians (161). Hence, it emerges as imperative to bridge this gap and consider the holistic aspects encapsulated by the NCP, as they are instrumental in providing a more comprehensive understanding of individuals' nutritional needs.

Acknowledging and integrating these behavioural and environmental factors, which are often overlooked, can significantly enhance the effectiveness of nutrition care interventions in LTC homes.

5.4 Significance

One of the significant contributions of this study lies in its comprehensive perspective on the barriers and facilitators to nutrition intake in LTC residents with dementia. The findings are consistent with previous research, highlighting the impact of physical capability on eating independence. Regular screening of residents' physical capability and the implementation of individualized plans that enhance capability and optimize performance in eating tasks are important recommendations derived from the study. This study also sheds light on the barriers faced by LTC residents with dementia, including impacts of physiological changes of aging and cognitive impairment on food intake. Factors such as dysphagia, mood fluctuations, behavioural disorientation, and challenges in oral care are commonly discussed barriers. The study underscores the need for standardized protocols for dysphagia screening and the use of TMDs. Efforts to improve the nutrient density, sensory appeal, and visual appeal of TMDs should be implemented in LTC settings to enhance residents' food satisfaction and overall mealtime experience.

Moreover, this study underscored the vital role of personalized mealtime care and the significance of upholding autonomy and respecting individual food preferences. The advocacy for person-centered care is further evident, emphasizing on the meaningful interpersonal bonds, the prioritization of unique needs and choices, and the cultivation of a dining environment that is both positive and custom-tailored. Additionally, staff training and ongoing professional development are crucial to ensure optimal mealtime care delivery. It was also highlighted on the

need for valid and reliable assessment tools to evaluate staff knowledge and skills in this domain, along with adequate staffing levels to effectively cater to residents' needs.

This study also emphasizes on the significance of family involvement in mealtime care. Family members play a crucial role in advocating for residents with limited ability to advocate for themselves, particularly within the context of moderate to severe dementia (162). Their active involvement and support during mealtime care can significantly contribute to promoting adequate nutrition intake for these residents. While previous research has demonstrated the importance of family companionship in older adults with mild cognitive impairment (162), its impact on those with moderate to severe dementia has not been extensively explored. The findings show that family members who act as companions for LTC residents with moderate to severe dementia play a vital role in facilitating communication, acting as advocates, ensuring accurate information exchange, promoting understanding, and maintaining rapport.

5.5 Conclusion

In conclusion, this study identified barriers and facilitators that impact adequate nutrition intake in LTC residents with moderate to severe dementia from the perspectives of LTC residents, their family members, and staff. The majority of the interview findings in this investigation also align with prior research, confirming that the identified factors function as both barriers and facilitators in attaining adequate nutritional intake among residents afflicted by moderate to severe dementia, requiring particular attention. This study additionally uncovered that the engagement of families in mealtime care and the attentiveness of LTC homes to residents' needs stood out as pivotal catalysts for ensuring proper nutrition intake.

The findings highlight the need for targeted interventions that address barriers and leverage facilitators to promote the overall well-being of residents. A key finding of the study is

the significant impact of staff education on providing optimal mealtime care. It emphasizes the urgent need for comprehensive education and training programs that equip staff with the necessary knowledge and skills to deliver personalized care to residents with dementia. Ongoing in-service training opportunities and the development of reliable assessment tools are vital for ensuring continuous professional growth and proficiency among staff members. By prioritizing staff education, LTC homes can elevate the quality of care provided during mealtimes, leading to improved nutrition outcomes for residents. Another crucial factor identified is the involvement of families in resident care, which plays a pivotal role in ensuring positive outcomes. The study underscores the concerns expressed by family members regarding inadequate communication and limited participation in decision-making related to food choices. Establishing clear channels of communication among family members, kitchen staff, and nursing personnel is essential to enhance family satisfaction and foster a collaborative approach to resident care. Educating family members on best practices for providing nutritional care can further empower their involvement and contribute to positive outcomes. Ultimately, the focus on staff education and family involvement aims to enhance the overall quality of life for residents. The study recognizes the significance of person-centered care, which emphasizes understanding the unique experiences and preferences of individuals with dementia. By implementing organizational structures that prioritize person-centeredness, LTC homes can create a supportive environment that respects resident autonomy and cultivates a positive social atmosphere during mealtimes. This approach fosters improved resident satisfaction, overall well-being, and quality of life.

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APPENDIX A: Consolidated Criteria For Reporting Qualitative Research (COREQ)

Domain 1. Research team and reflexivity: personal characteristics and relationship with participants

Study/ year	Interviewer/ facilitator	Credential	Occupation	Gender	Experience/ training	Relationship with participants	Participant knowledge of the interviewer	Interviewer characteristics
Milte et al., 2016	Research team	yes	NR	NR	NR	NR	NR	NR
Douglas et al., 2021	Research team	NR	NR	NR	NR	NR	NR	NR
Liu et al., 2020	Researchers	NR	NR	female	trained	NR	NR	yes
Murphy et al., 2017	Research assistant	NR	Research assistant	female	prior experience	NR	NR	NR

Domain 2. Study Design: Theoretical framework, participant selection, and setting

Study/ year	Method	Sampling	Sampling method	Sample size	Non-participation	Setting of collection	Sample characteristics
Milte et al., 2016	NR	purposive	NR	42	NR	LTC	yes
Douglas et al., 2021	NR	purposive	flyers	53	NR	LTC	yes
Liu et al., 2020	NR	purposive	NR	23	34	LTC	yes
Murphy et al., 2017	NR	purposive	NR	50	NR	LTC	yes

Domain 2. Study design: data collection

Study/year	Interview guide	Repeat interviews	Audio recording	Field notes	Duration	Data saturation	Transcripts returned
Milte et al., 2016	no	NR	yes	NR	30 min	NR	NR
Douglas et al., 2021	yes	NR	yes	NR	50 min	NR	NR
Liu et al., 2020	yes	NR	yes	NR	NR	NR	NR
Murphy et al., 2017	yes	NR	yes	NR	NR	yes	NR

Domain 3. Analysis and findings: data analysis and reporting

Study/ year	Number of data coders	Description of coding tree	Derivation of themes	Software	Participant checking	Quotations presented	Data and findings consistent	Clarity of major themes	Clarity of minor themes
Milte et al., 2016	no	yes	inductive	Smart Docs Pty., Ltd	no	yes	yes	yes	yes
Douglas et al., 2021	2 coders	yes	NR	NVivo12	yes	yes	yes	yes	yes

Liu et al., 2020	2 coders	no	inductive	NVivo9	yes	yes	yes	yes	yes
Murphy et al., 2017	2 coders	yes	NR	NR	NR	yes	NR	yes	yes

APPENDIX B: Reflexivity Journal

Entry 1: Recruitment

In the beginning of the recruitment process for the, I noticed a mixture of excitement and apprehension within myself. I acknowledge that my role as a registered dietitian may influence my interactions, as I have developed a deep understanding of the challenges faced by these residents in meeting their nutritional needs. I aim to approach this study with empathy and open-mindedness, ensuring that I do not let my preconceived notions unduly influence the recruitment process.

Entry 2: Ongoing recruitment

I have a few interested family members who are substitute decision makers to residents and staff to participate. It was heartwarming to witness their families' dedication and willingness to participate in the study. However, I also noticed my inclination to gravitate towards residents who appeared more responsive or communicative, possibly due to the anticipation of better engagement during data collection. I need to be aware of this bias and ensure that all eligible residents are given equal consideration and opportunities to participate, regardless of their level of cognitive function.

Entry 3:

As the recruitment process progresses, I find myself reflecting on the ethical considerations involved in recruiting vulnerable individuals with dementia. It is crucial to prioritize informed consent and ensure that the residents' autonomy is respected. I will make every effort to provide clear and accessible information to both the residents and their families, giving them the opportunity to make informed decisions about their participation. I am conscious of the power dynamics inherent in the researcher-participant relationship and will strive to maintain a supportive and equitable dynamic throughout the study.

Entry 4: Interviewing Older Adults with Moderate to Severe Dementia on Barriers and Facilitators to Adequate Nutrition Intake in LTC

The first interview I conducted was with a resident and their family member. It was important for me to establish a rapport with them, considering the sensitive nature of the topic and their cognitive impairment. I approached the interview with empathy, ensuring that I created a safe and comfortable environment for open dialogue. Active listening skills played a crucial role in establishing trust and allowing the interviewee to express their thoughts and feelings freely.

During the interview, I encountered several challenges due to the participants' cognitive limitations. It required patience and adaptability to navigate through their cognitive impairments, finding alternative communication methods to ensure their voices were heard. Non-verbal cues, such as facial expressions and body language, became essential tools for understanding their responses. The resident was easily distracted so I was having trouble to engage them in the conversation.

As the interviews progressed, I noticed recurring themes related to the barriers and facilitators to adequate nutrition intake. Intrapersonal factors, such as distraction, physical; capability and cognitive decline, emerged as significant barriers, directly impacting the residents' ability to independently consume meals.

Given my expertise in the field, I found it essential to balance my knowledge with the insights gained from the participants. It was a humbling experience to witness their unique perspectives and challenges, which sometimes challenged my preconceived notions. This reflexive process reminded me of the importance of continuously learning and adapting my practice to provide the best care possible.

Entry 5: Mealtime Observation

During today's mealtime observation, I focused on observing a resident with moderate to severe dementia who appeared to be easily distracted and not easily redirected. As I commenced the observation with the other research teams, I recognized the importance of maintaining self-awareness and acknowledging my own perceptions and biases throughout the process.

Initially, I felt a sense of empathy towards the resident, as their struggle to stay focused on the meal resonated with the challenges associated with dementia. I also found myself becoming concerned about the resident's nutritional intake, considering the evident distractions that hindered their ability to consume food effectively. These initial perceptions may influence the lens through which I interpret and report the observations, thus emphasizing the significance of reflexivity.

I noted a degree of frustration within me, arising from the desire to assist the resident in maintaining attention and ensuring adequate nutrition intake. This frustration stemmed from a genuine concern for their well-being and the desire to provide optimal care. However, I acknowledge that it is crucial to separate these emotions from the objective observation process to avoid potential bias.

Additionally, I recognized a sense of curiosity and eagerness to uncover potential strategies or interventions that may help mitigate the resident's distractions during mealtimes. This curiosity drives me to explore possible approaches that could enhance the mealtime experience for individuals with moderate to severe dementia and facilitate better nutrition intake.

As the observation progressed, I remained attentive to my own emotions, continuously reminding myself to approach the study with objectivity and respect for the resident's experiences. I strived to be mindful of any potential assumptions or preconceived notions that might influence my perception of the resident's behaviours and responses.

Entry 6: Mealtime Observation

Today's mealtime observation focused on a resident with moderate to severe dementia who is immobile and experiences difficulty eating independently. It was challenging to witness her struggle without being able to assist her directly due to our roles as researchers rather than caregivers or healthcare providers.

Throughout the observation, I found myself grappling with conflicting emotions. On one hand, I recognized the importance of maintaining a non-interventionist stance to ensure the integrity of the research data. However, on a personal level as a registered dietitian working closely with these patients, I felt a strong desire to support her and alleviate her struggles during mealtimes.

As I observed the resident, I noticed her attempts to feed herself, but her limited mobility and cognitive impairment made it challenging for her to do so effectively. She exhibited difficulty grasping utensils and experienced frequent spillage and frustration. It was evident that she required assistance and guidance to ensure adequate nutrition intake and a more pleasant mealtime experience.

During the observation, I also became acutely aware of the impact of the environment on the resident's eating performance. The absence of direct support from staff and the isolation in her room seemed to contribute to her struggles and decreased motivation to eat. It highlighted the significance of a supportive and engaging dining environment for residents with dementia, where they can receive personalized assistance and social interaction during meals.

Entry 7: Data Analysis

During the deductive analysis of the transcripts and mealtime observations, I approached the codes with pre-established categories derived from existing literature and theoretical frameworks. The codes related to factors such as physical capability, realistic expectations, individualized care, autonomy, aging, dementia-related changes, staff training and support, and family involvement emerged as expected and aligned with the research objectives.

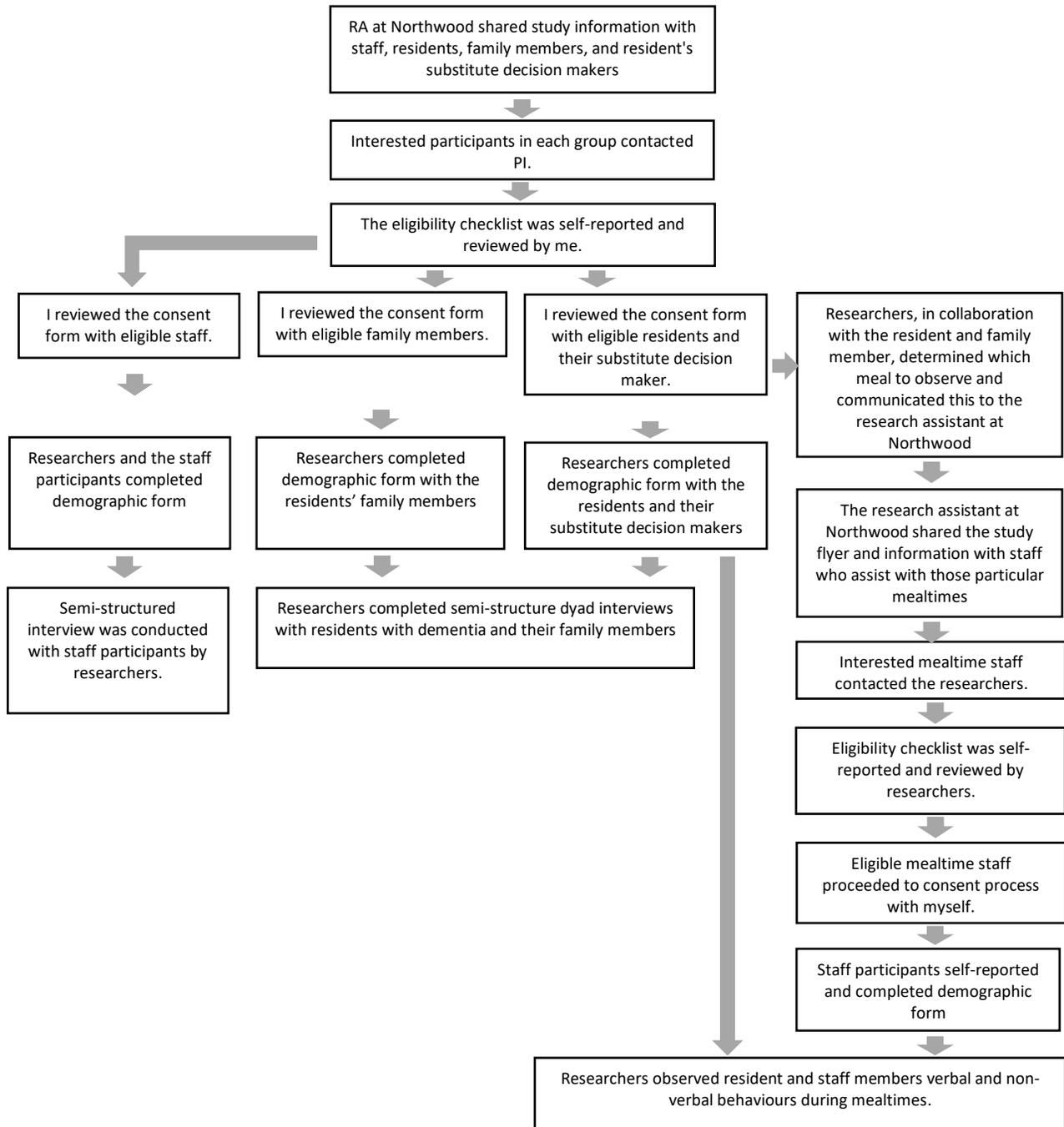
However, I also noted the importance of an inductive analysis approach to capture the nuances and unique experiences of the residents. In some instances, codes emerged that were not initially part of the deductive framework, reflecting the complexity and individuality of the residents' situations. These inductive codes encompassed themes such as resident preferences, environmental distractions, social dynamics, and personal care practices.

Witnessing the inadequate nutrition intake among the residents elicits feelings of frustration, concern, and even sadness. It is disheartening to observe these individuals struggling to meet their nutritional needs, knowing the importance of proper nutrition for their overall health and quality of life. The knowledge that many of these residents require specialized support and interventions further intensifies my determination to contribute meaningfully through this research.

Additionally, the emotional connection I have developed with the residents over time brings a sense of empathy and compassion to the data analysis process. I find myself reflecting on the

personal relationships I have built with these individuals and their families. This emotional investment motivates me to delve deeper into the data, seeking insights that can lead to practical solutions and improvements in their mealtime care.

APPENDIX C: Recruitment Chart



APPENDIX D: Eligibility Data Collection Sheet

For all participants :

Age (years) _____

sex Male Female Other

For residents:

1. How many years they had dementia : _____ years

2. Admission date to long-term care : _____ year

For family members :

1. How many years has your family member had dementia : _____ years

2. How many years has your family member lived in long-term care : _____
year

3. What is your relationship to the reside

child

spouse/partner

sibling

friend

other, please describe : _____

prefer not to say

For staff members :

What is your primary profession?

registered dietitian

dietary aide

health care aide

registered practical nurse

registered nurse

other

How many years have you worked in long-term care : _____ year

APPENDIX E: Sample of Recruitment Email to LTC Homes

Recruitment email to LTC Homes

Dear {name},

I am contacting you about your help with a research project being conducted by researchers in the School of Physiotherapy at Dalhousie University and the Department of Kinesiology at the University of Waterloo.

What are we doing?

We will be conducting two studies simultaneously by recruiting participants with similar characteristics.

1. Our study is going to find out what rehabilitation goals are important for residents with dementia, their family members, and long-term care staff.
2. Our second study is going to look at the challenges and motivators that residents with moderate to severe dementia may experience for food intake in long-term care homes.

Why are we doing it?

Rehabilitation can improve quality of life and prevent bad outcomes like falls and broken bones. Most long-term care residents live with dementia and are less likely to get the rehabilitation they need.

The findings will help us design a rehabilitation program for long-term care residents with dementia and make sure that it meets resident-centred goals.

Nutrition support is an important aspect of quality of life for older people. People with moderate to severe dementia face nutritional challenges that lowers their quality of life. They often may need to move to LTC homes if they can't be supported at home. Involving LTC residents with moderate to severe dementia in nutritional studies is important to increase relevance and applicability of research outcomes and increase sense of authority and patient empowerment. Understanding the barriers and facilitators for adequate nutrition intake will help us to design interventions that will target the challenges and leverage the facilitators to support and improve quality of life.

Who are we looking for?

1. Long-term care residents living with moderate to severe dementia (Cognitive Performance Scale Score of 3 or higher/MMSE < 20) who live at Northwood LTC
2. Family members of long-term care residents living with dementia living at Northwood LTC
3. Staff members (e.g., health care aides, nurses, physiotherapists/dietitians, dietary aides) who work with residents living with dementia at Northwood LTC

What will they be expected to do?

For the rehabilitation study, participants will be asked to completed a 30-60 minute one-on-one interview in-person or online with the lead investigator. Long-term care residents will also participate in a 30-60 minute observation.

For the nutrition study, participants will be asked to complete a 30-60 minute one-on-one interview in-person. Residents with moderate to severe dementia will complete the interviews with presence of their family members. We will also conduct 3 mealtime observations with the participating residents and staff who provide mealtime assistance to residents.

What are we asking you do?

We are asking you to help us identify long-term care residents, their family members, and staff who would be interested in participating. You can contact us with their names and contact information, and we will provide them with more information, determine if they are eligible, and obtain informed consent to participate.

Who do I contact for more information?

You can contact the lead investigator, Dr. Caitlin McArthur at caitlin.mcarthur@dal.ca

APPENDIX F: Recruitment poster

Rehabilitation and nutrition can improve quality of life in people with dementia. Most long-term care residents live with dementia and are less likely to get the rehabilitation and receive adequate nutrition that they need.

Our study is going to find out **what rehabilitation goals are important** for residents with dementia, their family members, and long-term care staff. We are also going to look at challenges and motivators that help them to achieve nutrition goal.

The findings will help us design a rehabilitation program for long-term care residents with dementia and make sure that it meets **resident-centred goals**.

Join our study!

What will I be expected to do?

A one-on-one interview that will take 30-60 minutes (residents and staff will also do a 30-60 minute observation)

Who are we looking for:

Long-term care residents living with dementia

Family members of residents living with dementia

Staff who provide care for residents living with dementia

For more information, please contact the lead researcher, Dr. Caitlin McArthur (caitlin.mcarthur@dal.ca)

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APPENDIX G: Informed Consent for Residents, Family members, and Staff



CONSENT FORM – RESIDENT, FAMILY MEMBERS, STAFF

Project title: Developing and testing a resident-centered rehabilitation program for long-term care residents with dementia

Lead researcher: Dr. Caitlin McArthur, assistant professor, Dalhousie University, caitlin.mcarthur@dal.ca

Student researcher: Niousha Alizadehsaravi, Dalhousie University, niousha.alz@dal.ca

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Funding provided by: Alzheimer’s Society New Investigator Operating Grant

Introduction

We invite you to take part in a research study being conducted by, Dr. Caitlin McArthur, who is an assistant professor and researcher at Dalhousie University. Choosing whether or not to take part in this research is entirely your choice. There will be no impact on this study if you decide not to participate in the research. The information below tells you about what is involved in the research, what you will be asked to do and about any benefit, risk, inconvenience or discomfort that you might experience. You should discuss any questions you have about this study with Dr. Caitlin McArthur or Research Assistant (NAME). Please ask as many questions as you like. If you have questions later, please contact Dr. Caitlin McArthur (caitlin.mcarthur@dal.ca).

Purpose and Outline of the Research Study

You are being asked to participate in **one or both** of the following related studies.

1) Nutrition

Most LTC residents live with dementia and are more prone to eating difficulties and malnutrition. Malnutrition has serious negative problems for older adults, such as a increasing risk of co-morbidities, infections, pressure ulcers, lower quality of life, and higher chance of

hospitalization. This study is going to find out barriers and facilitators from the perspectives of residents with dementia, family members, and staff. We will interview each person and observe residents during mealtimes. Understanding the barriers and facilitators to adequate nutrition in LTC is important for us to make sure we can modify the barriers that can be overcome and facilitators that can be leveraged to support and improve quality of life.

2) Rehabilitation

Most LTC residents live with dementia and are less likely to get the rehabilitation they need. Rehabilitation can improve quality of life and prevent bad outcomes like falls and broken bones. In addition, most studies looking at rehabilitation in LTC do not involve residents with dementia. This study is going to find out what rehabilitation goals are important for residents with dementia, their family members, and LTC staff. The findings will help us design a rehabilitation program for LTC residents with dementia and make sure that it meets resident-centred goals.

You can choose to participate in one or both of these two studies.

Who Can Take Part in the Research Study

You may participate in this study if you are a 1) a long-term care resident with dementia; 2) a family member of a long-term care resident with dementia; or 3) a staff member (e.g., health care aide, nurse, physiotherapist/dietitians and dietary aides) who provides care for residents with dementia.

What You Will Be Asked to Do

1) Nutrition:

If you decide to participate in this research, you will be asked to participate in a 30–60-minute interview at Northwood or completed online on Microsoft Teams. During the interview you will be asked to specific questions that are related to the research and the interview will be audio recorded for data analysis. We will also do an additional observation with LTC residents and during their mealtimes. This observation will not interrupt their usual meals and we will just stand aside and observe the resident while they are eating/providing assistance at their usual routine. A researcher will observe the resident and during this time and take notes about what they are eating, what they say, who they are interacting with, how they are interacting with them, and what it appears to mean to the resident. We will not record audio or video during the observation, only write notes.

2) Rehabilitation:

If you decide to participate in this research, you will be asked to participate in a 30-60 minute interview at Northwood or completed online on Microsoft Teams. During the interview you will be asked to specific questions that are related to the research and the interview will be audio recorded for data analysis. We will also do an additional 30-60 minute observation with LTC residents during a time they are being active (e.g., walking around the home, doing seated exercises). A researcher will observe the resident during this time and take notes about what they are doing, what they say, who they are interacting with, how they are interacting with them, and what it appears to mean to the resident. We will not record audio or video during the observation, only write notes.

Participant groups	Nutrition study	Rehabilitation study	Both studies
LTC resident	<ul style="list-style-type: none"> - 30-60 minute interview - 3 mealtime observations over 1 week 	<ul style="list-style-type: none"> - 30-60 minute interview - 30-60 minutes of an additional observation 	<ul style="list-style-type: none"> - 30-60 minute interview - 30-60 minutes of an additional observation - 3 mealtime observations
Family member	<ul style="list-style-type: none"> - 30-60 minute interview 	<ul style="list-style-type: none"> - 30-60 minute interview 	<ul style="list-style-type: none"> - 30-60 minute interview
Staff	<ul style="list-style-type: none"> - 30-60 minute interview 	<ul style="list-style-type: none"> - 30-60 minute interview - 30-60 minutes of an additional observation 	<ul style="list-style-type: none"> - 30-60 minute interview - 30-60 minutes of an additional observation

Possible Benefits, Risks and Discomforts

The risks associated with this study are minimal; there are no known risks for participating in this research beyond being bored or fatigued. You will be offered breaks between activities to reduce these risks. Participating in the study might not benefit you, but we will learn things to help design a rehabilitation program for long-term care residents with dementia. Staff and family members may feel uncomfortable providing critical information about the LTC organization in relation to their family member’s care or their work status. However, these risks will be mitigated by providing an opportunity for the interviews to be completed at an alternate location or virtually, and all presented data will be deidentified.

Data collection is for sole purpose of research and if you (i.e., staff) decided to participate, we will not take any information shared to us against you or your career. However, a potential risk to staff is if we observe or you inform us about abuse or neglect of an adult in need of protection, we are required by law to contact Adult Protection Services.

Compensation / Reimbursement

There will be no compensation for participating in the study.

How your information will be protected:

Will I be identified?

Your participation in this research will be known only to Dr. McArthur and Niousha Alizadehsaravi. Since long-term care residents and mealtime staff (e.g., CCAs and dietary aides) will also be participating in an observation, other people within the long-term care home may know you are participating in a research study. The information that you provide to us will be kept confidential. Only the Dr. McArthur’s research team at Dalhousie University will have access to this information. The people who work with us have an obligation to keep all research

information confidential. All your identifying information (such as your name and contact information) will be securely stored separately from your research information. We will use a participant number (not your name) in our written and computer records so that the research information we have about you contains no names. During the study, all electronic records will be kept secure in an encrypted file on the researcher's password-protected computer. All paper records will be kept secure in a locked filing cabinet located in the researcher's office. We will describe and share our findings in journal articles, presentations, and lectures. We will only report group results and not individual results. This means that you will not be identified in any way in our reports. If we use supporting quotations to support our findings they will only be identified as the group that the participant belonged to (i.e., LTC resident, family member, or staff). We will not disclose any information about your participation except as required by law or our professional obligations. If you inform us or we observe any abuse or neglect of an adult in need of protection we are required by law to Adult Protection Services.

How will my data be stored?

The researchers will use their Dalhousie University credentials for the Microsoft Teams meeting, which will ensure that the Teams meeting recordings are securely stored in Canada. During the live Teams meeting, audio and video content is routed through the United States, and therefore may be subject to monitoring without notice, under the provisions of the US Patriot Act while the meeting is in progress. After the meeting is complete, meeting recordings made by Dalhousie are stored in Canada and are inaccessible to US authorities.

All electronic data (i.e., audio files) will be stored electronically in password protected encrypted files on a password protected computer. All hard copy documents (i.e., signed consent form, completed demographic forms) will be stored in Dr. McArthur's locked office (Room 316D, Forrest Building) in a locked filing cabinet. Only Dr. McArthur will have the key to the filing cabinet. All hard copy documents will be immediately transferred to Dr. McArthur's office upon completion at the LTC home. Electronic and hard copy data will be maintained for 1 year after publication and then permanently destroyed (deleted or confidentially shredded).

If You Decide to Stop Participating

You are free to leave the study at any time. If you decide to stop participating during the study, you can decide whether you want any of the information that you have provided up to that point to be removed or if you will allow us to use that information. After participating in the study, you can decide for up to 6 months if you want us to remove your data. After that time, it will become impossible for us to remove it because it will already be analyzed.

How to Obtain Results

We will provide you with a short description of group results when the study is finished. No individual results will be provided. You can obtain these results by including your contact information at the end of the signature page.

Questions

We are happy to talk with you about any questions or concerns you may have about your

participation in this research study. Please contact Dr. Caitlin McArthur (caitlin.mcarthur@dal.ca) at any time with questions, comments, or concerns about the research study (if you are calling long distance, please call collect). If you have any ethical concerns about your participation in this research, you may also contact Research Ethics, Dalhousie University at (902) 494-3423, or email: ethics@dal.ca (and reference REB file # 2021-5724).

Signature Page

Project 1 Title: Barriers and Facilitators to receiving adequate nutrition for long-term care residents with moderate to severe dementia

Project 2 Title: Developing and testing a resident-centered rehabilitation program for long-term care residents with dementia

Lead Researchers: Dr. Caitlin McArthur, assistant professor, Dalhousie University, caitlin.mcarthur@dal.ca

Niousha Alizadehsaravi, Dalhousie University, niousha.alz@dal.ca

I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I understand that I have been asked to take part in an interview that will occur at Northwood, and that those interviews will be recorded. I understand direct quotes of things I say may be used without identifying me. I agree to take part in this study. I realize that my participation is voluntary and that I am free to withdraw from the study at any time, until 6 months after my interview or observation is completed.

Please select the proper check box. I would like to participate in:

- 1) Barriers and Facilitators to receiving adequate nutrition for long-term care residents with moderate to severe dementia
- 2) Developing and testing a resident-centered rehabilitation program for long-term care residents with dementia
- Both 1 and 2

_____	_____	_____
Participant Name	Signature	Date

_____	_____	_____
Substitute Decision Maker Name	Signature	Date

Options (you can still participate in the research if you select no):

I agree that my interview may be audio-recorded

Yes No

Name

Signature

Date

I agree that direct quotes from my interview may be used without identifying me Yes No

Name

Signature

Date

I confirm I have completed the interview and agree that direct quotes without my name may be used.

Participant Signature

Date

Substitute Decision Maker Name

Signature

Date

Please provide an email address below if you would like to be sent a summary of the study results.

Email address: _____

APPENDIX H: Interview Guides

Interview Guide – Residents

Pre-amble

I want to ask you questions about food in LTC. This information will help us to understand challenges and motivators to eating adequate food in LTC for residents. I will be audio-recording the conversation. If you have something to say that you do not want audio-recorded you can tell me, and I will turn off the audio-recorder. You can also tell me afterwards if there is something you want removed. Your responses will be kept confidential, and you will not be identified in any presentations or publications of the results.

1) Tell me about the foods here.

Follow up/probing:

a) Do you like the food here? Why? (If not) Why? Tell me more.

b) What food you like and what food you don't like?

2) Does food get stuck in your throat when you swallow?

Follow up/probing:

a) Is swallowing painful for you?

b) Is it hard for you to swallow pills?

c) Is it hard for you to swallow solids and drinks?

3) Do you ever cough or choke when you eat or drink?

Follow up/probing:

a) (If yes) Do you ever feel stressed when you swallow?

4) Do you enjoy mealtimes (breakfast, lunch, supper)?

Follow up/probing:

a) Do you go down to the dining room?

b) Do you sit with other people? Why do you like sitting with people (or not)?

c) Does somebody (Staff) help you with your food? How do you feel about it?

5) Is there anything that staff do at mealtimes that you like? **Example.** Serve your favourite food, sit with you to help with meals, take you to sit in the dining room, etc.

6) Is there anything that staff do at mealtime that you don't like? **Example.** Give your pills when you are eating, too loud in the dining room, don't give second choice for food, etc.

7) Is there anything else you would like to tell me about food/mealtimes?

Interview Guide - Family member

1) Tell me about your experience in assisting/feeding your family member who had dementia?

Follow up:

a) What are some factors that make it easier to for your family member to eat? Why is that?

b) What are some factors that make it difficult for them to eat? Why is that?

2) What are some things within the facility environment (e.g., kitchen, dining rooms, etc.) that make it easier for residents with dementia to eat? Why is that?

3) What are some things within the facility environment (e.g., kitchen, dining rooms, etc.) that make it difficult for residents with dementia to eat? Why is that?

4) What are some things in terms of facility policy (e.g., long-term care food policies, workload, staffing, etc.) that makes it easier for residents with dementia to eat? Why is that?

5) What are some things in terms of facility policy (e.g., long-term care food policies, workload, staffing, etc.) that makes it difficult for residents with dementia to eat? Why is that?

6) Is there anything else you would like to tell me about adequate nutrition of residents with dementia in LTC?

Interview Guide - Staff

1) Tell me about your experience working with residents with dementia during mealtimes?

Follow up/probing question:

a) What makes it easier (e.g., specific techniques, encouragement, cueing, texture, etc.) to get them to participate in eating/feeding tasks? What works? What does not work? Why is that?

b) How do your relationships with others (i.e., residents, family members of residents, your coworkers, or supervisors) make it easier to feed residents with dementia? How do they make it more difficult? Why is that?

2) What are some things within the facility (e.g., environment, routine, culture, menu, texture, etc.) that make it easier for residents with dementia to eat? Why is that?

3) What are some things within the facility (e.g., environment, routine, culture, menu, texture, etc.) that make it difficult for residents with dementia to eat? Why is that?

4) What are some things in terms of facility policy (e.g., long-term care food policies, workload, staffing, etc.) that makes it easier for residents with dementia to eat? Why is that?

5) What are some things in terms of facility policy (e.g., long-term care food policies, workload, staffing, etc.) that makes it difficult for residents with dementia to eat? Why is that?

6) What are some of your needs or suggestions for strategies that you want to learn more for the purpose of engaging residents with cognitive impairment in eating activities?

Follow up/probing question:

a) What opportunities exist for increasing your knowledge, skills, and confidence in assisting/feeding residents with dementia?

7) Is there anything else you would like to tell me about adequate nutrition of residents with dementia in LTC?

APPENDIX I: Cue Utilization to Dementia Mealtime Care

A. Structure of intake	Meal 1 Breakfast: Lunch: Dinner:	Meal 2 Breakfast: Lunch: Dinner:	Meal 3 Breakfast: Lunch: Dinner:
1. Eating Technique (Resident completed, Staff facilitated)	Staff: Resident: Both:	Staff: Resident: Both:	Staff: Resident: Both:
2. Type of food (Solid, liquid)	Solid: Fluid:	Solid: Fluid:	Solid: Fluid:
3. Duration of mealtime	Start time: Finish time: Duration:	Start time: Finish time: Duration:	Start time: Finish time: Duration:
4. Intake outcome (Intake, no intake)	Intake: Partial intake: No intake:	Intake: Partial intake: No intake:	Intake: Partial intake: No intake:
Intake of solid percentage	Pre-meal weight: Post-meal weight: Percentage:	Pre-meal weight: Post-meal weight: Percentage:	Pre-meal weight: Post-meal weight: Percentage:
Intake of fluids Small glass ~ 125 mL Tea/Coffee mug ~ 250 mL	# of glasses:	# of glasses:	# of glasses:

Resident Verbal Behaviours

A. Positive	Meal 1			Meal 2			Meal 3		
	C	N	R	C	N	R	C	N	R
1. Asking for help/ cooperation									
2. Expressing the need for comfort/condition assessment - Write down statement used									
3. Asking for other choices									
4. Conversing with tablemates									
5. Conversing with staff									
6. Showing interest in food									
7. Gaining Attention of staff/table mates- Verbally									

8. Other									
B. Negative									
1. Interrupting tablemates/staff									
2. Verbal refusal/ Disagreement									
3. Verbal frustration with food or condition – write down statement									
4. Other									

Staff Verbal Behaviours

A. Positive	Meal 1			Meal 2			Meal 3		
Observer	C	N	R	C	N	R	C	N	R
1. Asking to assess the need for - Write question									
2. Assessing for comfort/ condition									
3. Giving choices - Write question									
4. Orientation/giving Instructions									
5. Showing Approval/ agreement									
6. Reminding, cueing, prompting resident									
7. Gaining Attention – Verbally									
8. Other									
B. Negative									
1. Interrupting/ changing topic									
2. Bargaining/ bribing resident to eat									
3. Elderspeak									
4. Controlling Voice									
5. Other									

Resident Non-Verbal Behaviours

Positive	Meal 1			Meal 2			Meal 3		
A. Chewing or Swallowing Difficulty									
Observers	C	N	R	C	N	R	C	N	R
1. Leaving mouth open allowing food falls out of mouth (passive)									
2. Prolonged/continuous chewing/sipping									

3. Doesn't chew/swallow (signs of pocketing, holds food in mouth)									
4. Coughing, choking, or gagging on food									
5. Other									
B. Functional Impairment									
1. Difficulty using utensil properly									
2. Not able to initiate eating									
3. difficulty transporting food to mouth									
4. Contracture/Limited Range of Motion (ROM)									
5. Taking empty utensil/container to mouth									
6. Spillage									
7. Drooling									
8. Other									
C. Resistive Behaviours									
1. Doesn't open mouth (when mouth is empty)									
2. Biting the utensil (when food is offered)									
3. Turning head away/tilts head backward									
4. Leaning backward									
5. Pushing away help/food									
6. Spitting out food (two modifiers) <ul style="list-style-type: none"> • Doesn't seem to like food/texture – (passive) • Intentionally spitting food at the feeding assistant – (aggressive) 									
7. Disengaging from meal (four modifiers) <ul style="list-style-type: none"> • Closing eyes • Distracted • Falling asleep/becoming drowsy • Other 									
9. Playing with food/utensil									
10. Taking food from others									
11. Attempting to eat non-edible items									
12. Attempting to leave the table									
13. Other									
D. Positive/Neutral Behaviours									
1. Using hands to eat/take over attempts to eat or drink									
2. Leaning forward									
3. Wiping away oral spillage or drool									
4. Indicating end of meal (waving hand no; taking off apron, etc)									

5. Other									
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Staff Non-Verbal Behaviours

Positive	Meal 1			Meal 2			Meal 3		
A. Modification of Resident Functional/Cognitive Ability									
Observers	C	N	R	C	N	R	C	N	R
1. Positioning resident appropriately									
2. Adjusting to resident's pace (if feeding)									
3. Offering different type of food									
4. Offering beverage									
5. Offering finger food									
6. Offering condiment									
7. Putting item in container/utensil resident can manage									
8. Giving a bite of appropriate size									
9. Guiding resident's hand to pick up food									
10. Putting food/utensil into resident hand									
11. Holding resident hand to get food into the mouth									
12. Wiping away oral spillage or drool									
13. Other									
B. Modification of Care Approaches									
1. Adjusting proximity (Resident to table)									
2. Re-approaching resident									
3. Positive gestures/facial expressions									
4. Appropriate use of affectionate touch									
5. Assessing comfort									
6. Resident-directed eye gaze									
7. Other									
C. Modification of Dining Environment									
1. Modifying traffic									
2. Modifying noise level									
3. Reducing clutter									
4. Limiting distractions on the table									
5. Arranging/mixing edible items for easy access									
6. Cutting food into manageable size									
7. Adjusting, providing or taking away assistive devices/items (hearing aid, glasses, apron, napkins, etc)									
8. Other									
D. Negative Behaviours									
1. Ignoring/lack of interactions									
2. Physically controlling									
3. Inappropriate touch									

4. Outpacing resident									
5. Discouraging /taking over resident self-eating attempt									
6. Mixing ALL food up									
7. Leaving the table/resident									
8. Removing plate before asking resident									
9. Other									

APPENDIX J: Code Book

Resident level (Intrapersonal)	Subthemes
a. High variability across or within resident	1. Requirement for individualized approach
	2. Every meal is different (hit or miss-trial and error)
b. Physiological changes directly influencing food intake	1. Needing to use bathroom
	2. Physical discomfort (being hot or cold)
	3. Sleep/Fatigue
	4. Pain
	5. Medications
c. Aging or dementia related changes directly	5. Resident concerns about their weight
	1. Appetite or palate changes
	2. Dysphagia
	3. Taste changes
	4. Choking
d. Physical capability	1. Difficulty using utensils
	2. Functional ability
d. Mood or behavioural disturbances	1. Aggression
	2. Agitation
	3. Apathy
	4. Confusion
	5. Depression
	6. Forgetfulness
	7. Resistance to care (i.e., being fed, refusing meals)
	8. Wandering
e. Feeding and eating problems	1. Chewing difficulties
	i. Ill-fitting dentures
	ii. Texture difficulties
	2. Distraction
	3. Dysphagia
	4. Eating non-edible items
	5. Portion size changes (Pre-dementia portion size is overwhelming)
	6. Pocketing
	7. Refuse to open mouth
	8. Spitting food out
	9. Sun-downing

Staff level (Interpersonal)	Subthemes
b. Staff lack of preparation	1. Limited professional training on dementia mealtime care
	2. Not knowing resident's preferences
	3. Elderspeak
	4. Force feeding residents due to lack of education on dysphagia
	5. Inconsistent or lack of communication with families
	6. Lack of training on preparing high quality thickening products
	7. Not paying attention to food potential allergens
	8. Providing medication during mealtime
	9. Staff feeding two people at a time
	10. Task-oriented attitude for mealtimes

Family level (Interpersonal)	Subthemes
Perception of dining in LTC	1. Adjustment process of resident transition
	2. Family perception on facility low standards
	3. Family perception on nutritional value in institutionally prepared foods

Environment level	Subthemes
a. Physical environment	1. Dining room environment (overstimulated)
	2. Distractions
	3. Noise
	4. Table contrast
	5. Table layout to fit wheelchairs
	6. Tables cluttered

Policy level	Subthemes
a. Staffing and organization	1. High workload or insufficiency
	2. lack of organization and accommodation in the facility
	3. Not incorporating resident preferences in the menu planning and providing low quality convenience food
	4. Timing of mealtimes out of routine
b. Safety regulations	1. Temperature regulations
	2. Covid-19 regulations (staffing, social-isolations, distancing)
	3. Lack of diversity in the menu planning
	4. Facility's choking prevention protocols restricting

Facilitator Staff level (Interpersonal)	Subthemes
a. Staff preparation	1. Being patient
	2. Knowing the resident and establishing emotional connection
	3. Philosophy of personal directed care (it is always whatever works for that person)
	4. Learning and trying new techniques
	5. Learning resident language
	6. Training needs for individualized dementia mealtime care
	7. Palliative mealtime care (give them what they want)
b. Technical assistance during eating process (Non-verbal physical techniques)	1. Handfeeding
	2. Olfactory and visual stimulation
	3. Providing one thing at a time
	4. Providing open drink with straws
	5. Just offering them the food even if they say no or no I am not hungry
	6. Sitting them upright or positioning correctly
	7. Hand in hand feeding
	8. Hand under hand feeding
	9. Re-approaching resident
	10. Giving small bites for those who cannot chew big bites
d. technical assistance during eating process	1. Reminding, cueing, prompting

(Verbal techniques)	2. Redirect residents to mealtime
	3. Informational assistance
e. Person-centered care techniques	1. Not forcing residents to eat
	2. Respecting autonomy (giving them a choice)
	3. Keeping normal routine from home
	4. Not mixing all food up
	5. Playing resident's favorite music
	6. Making sure they get enough fluids or water
f. Instrumental assistance (i.e., food strategies)	1. Providing snacks sweets and condiments to residents
	2. Providing assistive devices to residents
	3. Providing finger food
	4. Providing anytime menu options
	5. Providing smaller portions of food

Environment level	Subthemes
a. Physical environment	1. Food and smell as the strongest stimuli beyond the dining room environment
	2. Table layout
	3. Tables are not cluttered
	4. Room trays
	5. Spacious dining room to move around and help
b. Social and cultural environment	1. Tablemates
	2. Social conversation engagement
	3. Playing soft music in the background
	4. Dining environment made resident awake and alert
	5. Flexibility in the dining room for residents
	6. Small number of residents in dining room to minimize distraction, noise, stimulation

Policy level e	Subthemes
a. Facility norms	1. Commitment (do our job, be creative, think outside the box, see what is working for residents)
	2. Kitchen serving the assisted table first and then independent table
	3. Availability of eating aides (assistive devices)
	4. Communication among nursing and kitchen staff, and families
	5. Staff consistency at mealtimes among nursing and kitchen
	6. One on one time to assist residents
	7. Documenting and learning preference information
	8. Table assignment
	9. Multidisciplinary evaluation (e.g., speech-language therapy, occupational therapy, physiotherapist, etc.)
	10. Teamwork
	11. Supplementation
	12. Accommodating family members at mealtimes
	13. Availability of finger foods
	Collaboration of other departments during mealtime care
	Focusing on quality of life of residents
	Following food safety regulations
	Incorporating resident's preferences in menu planning
	Limiting choking hazards of food

	Menu variety and providing two choices at each meals
	Opportunities for staff education on dementia and nutritional needs
	Providing additional staffing at mealtimes
	Providing modified texture foods
	Staff supervision in the dining room to assist residents