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DYSPHAGIA IN DEMENTIA: INTERVENTIONS TO REDUCE ASPIRATION PNEUMONIA

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Abstract

This narrative review summarizes interventions used to reduce aspiration and aspiration pneumonia among older adults with dementia-related dysphagia, describes their reported effectiveness, and highlights gaps and limitations in the evidence base (Baijens et al., 2016; Wirth et al., 2016). Commonly reported approaches include diet and texture modification, feeding assistance and posture adjustments, swallowing rehabilitation, oral-care protocols, pharmacological agents, and stimulation therapies; multi-disciplinary and person-centered programs showed the most promise, but high-quality, long-term evidence remains scarce (Beck et al., 2018; O'Keeffe, 2018; Painter et al., 2017; Rofes et al., 2011). The review emphasizes the limited availability of speech and language therapy in many nursing-home settings and the need for interventions adapted to people with cognitive impairment and to low- and middle-income contexts (Levenson & Walker, 2019; Wirth et al., 2016).

INTRODUCTION

Aspiration pneumonia is a major, potentially preventable complication in older adults with dementia, largely driven by oropharyngeal dysphagia that permits food, fluids, or oral secretions to enter the airway (Morley, 2015; Teramoto et al., 2009). Dementia increases aspiration risk through cognitive decline, reduced mobility, impaired swallowing coordination, and poorer oral hygiene, each of which can increase oropharyngeal bacterial load and weaken airway protection (Baijens et al., 2016; Rofes et al., 2011; Wirth et al., 2016). Although several interventions—behavioral swallowing training, diet modification, oral care, and rehabilitation programs—have been studied and sometimes improve swallowing physiology, evidence for reductions in pneumonia or robust clinical outcomes is limited by small samples, heterogeneous methods, and few randomized trials (Logemann et al., 2008; O'Keeffe, 2018; Wirth et al., 2016). Given the clinical burden and the potential bidirectional relationship between pneumonia and cognitive decline, synthesizing available interventions and their contexts is essential to guide practice and future research (Teramoto et al., 2009; Levenson & Walker, 2019).

Methodology

Study Design:

This study employed a narrative qualitative synthesis of published primary studies, systematic reviews, and clinical trial reports examining interventions aimed at preventing or reducing aspiration pneumonia among older adults with dysphagia in residential and nursing home settings.

Data Source:

The review was based on the manuscript's existing source material, which comprised primary research articles, systematic reviews, randomized controlled trials, and observational studies

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previously identified and cited in the original draft. These sources were retained, reorganized, and synthesized according to the objectives and thematic structure of the review.

Study Selection and Scope:

The synthesis included studies incorporated in the original manuscript, predominantly conducted in developed countries. Eligible publications encompassed randomized controlled trials, cluster randomized trials, case series, observational studies, and systematic reviews. The review was restricted to studies published in English and Chinese, which may have introduced publication and language bias.

Data Synthesis:

Given the methodological heterogeneity across the included studies, a quantitative meta-analysis was not undertaken. Instead, a thematic narrative synthesis was performed, categorizing interventions into direct interventions (implemented during mealtimes) and indirect interventions (including rehabilitative, stimulation-based, pharmacological, and oral care approaches). The evidence was subsequently synthesized to summarize reported outcomes, intervention feasibility, and study limitations.

Limitations:

The narrative nature of this review, together with the heterogeneity of study designs and the limited availability of high-quality randomized controlled trials, restricts the strength of causal inferences and the generalizability of the findings.

Discussion

Dysphagia in older adults with dementia is a clinically important and increasingly recognized problem because it sits at the intersection of neurodegeneration, frailty, poor oral health, and nutritional decline (Baijens et al., 2016; Estupiñán Artiles et al., 2022; Wirth et al., 2016). In long-term care and nursing-home settings, the consequences are often not limited to difficulty swallowing alone; they extend to aspiration, recurrent chest infection, dehydration, malnutrition, dependence during meals, caregiver burden, and reduced quality of life (Levenson & Walker, 2019; Rofes et al., 2011). The evidence reviewed in this narrative synthesis shows that aspiration pneumonia in this population is not caused by a single factor but rather emerges from a combination of impaired swallowing physiology, diminished cognition, reduced mobility, weak oral and pharyngeal protection, and inconsistent mealtime support (Morley, 2015; Rofes et al., 2011; Wirth et al., 2016). For this reason, any effective management strategy must move beyond isolated compensatory measures and consider dysphagia as a multifactorial geriatric syndrome requiring integrated care (Baijens et al., 2016; Wirth et al., 2016).

A major theme in the literature is that the pathophysiology of dysphagia in dementia differs somewhat according to dementia subtype, disease stage, and degree of functional impairment (Estupiñán Artiles et al., 2022; Wirth et al., 2016). In Alzheimer's disease, swallowing difficulty is often associated with delayed oral initiation, impaired recognition of the bolus, swallowing apraxia, and prolonged oral transit time, all of which can increase the likelihood of premature spillage and aspiration (Wirth et al., 2016). In later stages, reduced hyolaryngeal excursion, delayed pharyngeal initiation, and pharyngeal residue become more prominent, creating further opportunity for penetration and aspiration (Sasegbon & Hamdy, 2017; Wirth et al., 2016). In Lewy body dementia and related disorders, oropharyngeal dysfunction may resemble the motor swallowing abnormalities seen in Parkinsonian syndromes, with more obvious pharyngeal delay and residue (Argolo et al., 2015; Wirth et al., 2016). These differences are important because they imply that a uniform intervention strategy is unlikely to work equally well for all patients.

Risk factors for aspiration pneumonia further reinforce the need for individualized management. The reviewed studies repeatedly point to malnutrition, advanced age, severe cognitive impairment, comorbid illness, poor oral environment, and severe aspiration as important contributors (Chen et al., 2020; Uno & Kubo, 2021; Wirth et al., 2016). Oral health deserves

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particular attention because aspiration pneumonia is not simply a mechanical result of food entering the airway; it is also an infectious process in which aspirated secretions may carry pathogenic bacteria (Rofes et al., 2011; Teramoto et al., 2009). Older adults with poor oral hygiene, low saliva flow, or absent dentition may therefore be at greater risk, especially when swallowing is already compromised (Rofes et al., 2011; Wirth et al., 2016). This makes oral care a logical and necessary component of aspiration prevention, even though it is often not emphasized as strongly as diet modification or posture management (Rofes et al., 2011).

Among direct interventions, diet and texture modification remain the most frequently used approaches in nursing-home practice (Beck et al., 2018; Painter et al., 2017). These interventions are popular because they are easy to introduce, can be applied during every meal, and are immediately understandable to caregivers (Beck et al., 2018; Painter et al., 2017). Thickened liquids and modified textures may reduce visible aspiration on instrumental assessment, and they are often perceived as practical solutions for people who cough during meals or have obvious difficulty handling thin fluids (Logemann et al., 2008; Beck et al., 2018). However, the evidence supporting these interventions is not as strong as their widespread use might suggest (O'Keeffe, 2018; Painter et al., 2017). Several authors have questioned whether viscosity changes meaningfully reduce aspiration pneumonia rather than merely reducing aspiration events observed on imaging (O'Keeffe, 2018). A key limitation is that many studies report physiological or instrumental improvements instead of hard clinical outcomes such as pneumonia, hospitalization, or mortality (Logemann et al., 2008; O'Keeffe, 2018).

Another concern is that texture-modified diets may create unintended harms. Residents often dislike the taste and appearance of thickened fluids or pureed foods, which can reduce intake and lower satisfaction with meals (Beck et al., 2018; Painter et al., 2017). Over time, this may contribute to dehydration, malnutrition, and poorer medication adherence, especially when tablets cannot be easily swallowed with altered consistencies (Carlisle et al., 2016; Painter et al., 2017). These risks are especially relevant in dementia, where reduced appetite and impaired self-feeding are already common (Levenson & Walker, 2019; Painter et al., 2017). In this sense, the intervention that is intended to improve safety may paradoxically worsen overall health if it reduces oral intake or discourages eating (O'Keeffe, 2018). The literature therefore supports a cautious, case-by-case approach rather than routine use of modified diets for every resident with dysphagia (Beck et al., 2018; O'Keeffe, 2018).

The findings also show that mealtime environment and feeding assistance are often overlooked but highly relevant components of prevention. Residents with dementia may be distracted easily, unable to maintain pacing, or dependent on staff for nearly all aspects of feeding (Chiang & Hwu, 2018; Levenson & Walker, 2019). A quiet dining area, reduced noise, adequate lighting, and a predictable mealtime routine can improve attention and cooperation during swallowing (Chiang & Hwu, 2018). Likewise, caregiver behaviors such as slow feeding, small bolus size, direct eye contact, encouragement, and respectful pacing may reduce the likelihood of choking or aspiration (Chiang & Hwu, 2018; Park et al., 2015). These measures are relatively low-cost and can be implemented in many settings, including those with limited resources (Park et al., 2015). Their value lies in the fact that they support safer swallowing without requiring complex equipment or highly specialized services.

Postural adjustments and swallowing maneuvers represent another major direct strategy. Upright positioning, head-of-bed elevation, chin-tuck, head-turn, and related maneuvers are frequently recommended because they are simple, noninvasive, and inexpensive (Terré & Mearin, 2012; Wirth et al., 2016). The reviewed evidence suggests that these approaches can reduce aspiration in some individuals, but they do not work consistently across all patients (Logemann et al., 2008; Terré & Mearin, 2012). Their effectiveness depends on the underlying

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swallowing impairment, the ability of the patient to understand and follow instructions, and the consistency with which caregivers apply the maneuver (Logemann et al., 2008). In dementia, this becomes a major limitation because many residents cannot reliably learn or remember instructions such as chin-tuck, supraglottic swallow, or effortful swallow (Logemann et al., 2008). As a result, postural strategies are best understood as compensatory measures with partial benefit rather than universal solutions.

Swallowing rehabilitation programs offer a more restorative approach because they aim to improve the underlying function of swallowing rather than only compensating for impairment during meals. The review includes studies of lip closure training, orofacial muscle exercises, tongue and neck exercises, cough training, and neuromuscular training, all of which showed some improvement in swallowing function or aspiration signs (Ebihara & Ebihara, 2011; Hägglund et al., 2019; Takamoto et al., 2017). These interventions are appealing because they attempt to strengthen the physiologic basis of swallowing safety. They may be especially helpful when dysphagia is mild to moderate, and the patient can engage in repeated practice (Takamoto et al., 2017). Nevertheless, rehabilitation also has clear limitations. It often requires time, trained personnel, adherence over multiple sessions, and at least some degree of cognitive participation (Hägglund et al., 2019; Takamoto et al., 2017). That makes it harder to implement in residents with advanced dementia, severe apraxia, or poor attention.

Stimulation-based treatments, including thermal-tactile stimulation, neuromuscular electrical stimulation, and other sensory approaches, appear promising but remain underexplored in the dementia population (Olchik et al., 2020; Wirth et al., 2016). The theoretical rationale is that sensory input to the oropharynx can facilitate reflex swallowing and improve timing of the swallow response (Sasegbon & Hamdy, 2017). In practice, however, the evidence is still relatively limited and often drawn from small studies or indirect populations (Olchik et al., 2020). This makes it difficult to draw strong conclusions about effectiveness in residents with dementia. Even so, these interventions highlight an important direction for future research, especially because they may offer options for patients who cannot participate fully in exercise-based rehabilitation.

Scope of studies

Population: The original draft's included works focus on older adults with dysphagia, often residents of nursing or long-term care facilities, and frequently those with dementia or neurodegenerative conditions.

Settings: Studies were primarily conducted in hospital, intermediate care, and nursing-home settings in developed regions; the draft noted minimal representation from low- and middle-income countries.

Interventions: The scope covers direct mealtime measures (diet, posture, feeding assistance), indirect strategies (rehabilitation, stimulation, medication), and oral-care protocols, as well as multi-disciplinary models combining these elements.

Outcomes: Across studies, measured outcomes include swallowing physiology (videofluoroscopy, residue/penetration/aspiration), adverse events (malnutrition, dehydration), aspiration signs, and occasionally pneumonia rates and health service utilization.

Conclusion

Available evidence suggests that a combination of direct mealtime strategies and indirect rehabilitation and oral-care interventions—delivered within an interdisciplinary, person-centered framework—offers the most realistic approach to reducing aspiration risk in older adults with dementia-related dysphagia, but strong evidence that these interventions reduce clinically important endpoints (aspiration pneumonia, hospitalization, mortality) is limited by study quality and heterogeneity. Research priorities include larger randomized trials with clinically meaningful outcomes, pragmatic studies in low-resource settings, trials targeting residents with severe cognitive impairment, and cost-effectiveness analyses to inform scalable, acceptable programs.

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