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Working interprofessionally to improve oral health and reduce aspiration pneumonia risk

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Introduction

In Tasmania, a rural state, 23% of the population is over 60 years of age. Seven percent of people aged ≥ 65 years live in residential aged care and estimates suggest a majority of these older adults are experiencing cognitive decline or dementia.^{1,2} Many of these older adults are dependent on others for feeding and oral care.^{3,4} Langmore and colleagues in the United States have shown this co-related dependency is a strong predictor for aspiration pneumonia due to pathogenic oral microorganisms from saliva, tooth decay, and an unclean mouth migrating into the lungs and the inability of adults to cough and clear the aspirated material.^{5,6} The subsequent lung infection frequently results in hospitalisation, increasing frailty, and can cause death.⁷ Even when teeth are removed, oral pathogens remain a risk indicator for aspiration pneumonia as they line the mucosal surface of the oral and pharyngeal cavities, including the tongue.⁸⁻¹¹ The current treatment approach for aspiration pneumonia solely with antibiotics is ineffective.⁶ Evidence-based and sustainable oral care needs to be an integral aspect of a paradigm shift to actively promote function, maintain health, and significantly reduce costs associated with aspiration pneumonia, ill health and hospitalisation for older people.⁶

Accreditation standards¹² and Principles of Care¹³ for residential settings in Australia stipulate the provision of evidence-based oral care and regular staff education. However, oral care is frequently delegated to personal care assistants (carers) who may not be informed of the evidence guiding care, nor appreciate the impact of poor oral health on function, overall health, and quality of life (QOL). Australian guidelines for effective oral care exist.¹⁴ However, since the publication of the *Better Oral Health in Residential Care* report, there has been limited evidence of its implementation, nor any investigation of the recommended interprofessional approach to increase staff capacity and capability to improve residents' oral health. Australia's National Oral Health Plan (2015-2024)¹⁵ emphasises the value of an interprofessional approach where the different professionals invested in residents' health work together to support nurses and carers in providing effective oral care. Some residential organisations have now begun to implement this approach,¹⁶ the value of which was emphasised by Dr Edward Strivens, President of the Australian and New Zealand Society for Geriatric Medicine, in his recent testimony at the Royal Commission on Aged Care.¹⁷ The purpose of the current study was to provide interprofessional support to nurses and carers to improve the oral health of residents in their care and reduce aspiration pneumonia risk.

Method

Participants

Older adults (≥ 65 years of age) with a diagnosis of cognitive decline or dementia and living in residential aged care (two sites) in a city in the north of Tasmania.

Interprofessional team: a speech pathologist, dentist, pharmacist, and nutritionist assisted nurses and carers to screen the residents, provide support during the intervention phase of the study, complete post-screening, and evaluate findings.

Study design

Staff education and training: The speech pathologist and dentist were available on-site over one week for a group session followed by drop-in sessions for all care staff.

Four pre- and post-intervention screening measures were completed by care staff under the guidance of the dentist and speech pathologist.

- *Oral Health Assessment Tool (OHAT)*.¹⁴ This tool documented the status of each resident's lips, tongue, gums and oral tissue, saliva, teeth and/or dentures, oral cleanliness, and dental pain through yes/no responses to a scale indicating (i) healthy, (ii) changes, or (iii) unhealthy and in need of referral.
- *Mini-Nutritional Assessment (MNA)*.¹⁸ This is a validated tool for the systematic nutritional screening of older people, particularly to determine risk for malnutrition. The Short Form (maximum 14-point score) was used to document any decline in food intake over the past 3 months; weight loss during the past 3 months; mobility; psychological stress or acute disease in the past 3 months; presence of dementia or depression; and Body Mass Index (weight in kg/height in m^2). Normal nutritional status = 12-14 points; at risk of malnutrition = 8-11 points; malnourished = 0-7 points.
- *Yale Swallow Protocol*.¹⁹ Residents were asked to drink 90cc of room temperature water through a straw without stopping. A pass/fail scoring system documented any coughing or other difficulty in swallowing safely and aspiration risk.
- *EuroQOL-5D-3L*.²⁰ This validated 5-dimension, 3-level scale documented residents' perceptions of their ability to move, undertake personal care, participate in usual activities, pain or discomfort, and anxiety or depression. Residents who were cognitively able to complete the scale also documented how good or bad they felt their health was on a scale of 0 (worst imaginable)-100 (best imaginable).

Intervention

A 3-month program of 2-minutes of teeth cleaning after meals (breakfast and dinner), or daily cleaning of dentures. Each resident was given a timed electric toothbrush, on a gentle setting, that indicated 30 seconds of brushing per quadrant (top left teeth; top right teeth; bottom left teeth, bottom right teeth). Care staff and residents were instructed on the use of these toothbrushes. A subgroup of randomly selected residents, divided into intervention and control (regular care) groups, provided oral swabs from the tongue, gum, hard palate, and cheek before and after a 6-week period of teeth cleaning to monitor oral microorganisms.

A Focus Group meeting for nursing and care staff was held following the intervention period, led by an experienced facilitator who had not been involved in the study.

A meeting for participating residents and family members is planned to review results of the study.

Primary outcome measure

Change in chest infections in the 6 months prior to the initiation of the study, during, and following the study.

Secondary outcome measures

Changes in oral health, nutritional health, and perceived general health.

Results

For the pre-intervention screening, 142 residents consented to participate (mean age = 82.4 years). Close family members of these residents also gave their consent. Of these residents, 78% warranted referral to a dentist or physician for a range of issues from reported oral pain to active infection; 57% were at-risk for malnourishment; 13% were malnourished; and 70% failed or refused the swallow protocol, indicating difficulty with, or apprehension about, swallowing thin liquids safely. Self-reported quality of life ranged from 34-95% (M=65%). Many residents were taking multiple medications that appeared to have been prescribed prophylactically and which had potentially adverse effects on saliva and gastrointestinal function, and thus nutritional intake.

One hundred and eleven (111) residents consented to continue in the intervention phase of the study and 77 residents were available and consented for the post-intervention screening. Of these residents, 21% warranted referral to dentist (7% with some urgency due to plaque build-up, reported oral pain, and ≥ 4 broken teeth; 14% needing attention due to oral dryness, tongue coating and redness, sticky saliva, and 1-3 broken teeth); 55% were at-risk for malnourishment; 16% were malnourished (1 person was in palliative care); and 32% of residents on thin liquids failed or refused the swallow protocol. Self-reported quality of life ranged from 50-100% (M=71%). A comparison of these secondary outcome measures is shown in Table 1. The measurement of pathogenic oral bacteria before and after a 6-week period during the intervention showed notable decreases in bacterial load, particularly for the tongue. Changes in documented chest infections at both sites are shown in Table 2.

Findings from the staff Focus Group showed increased awareness of the importance of sustained oral care although the barriers of time and ability to encourage some residents to participate in care remained. This confirmed the barriers reported in other studies.²¹ Residents' comments during the post-intervention screening documented their pleasure in being asked to provide information and this may have played a role in the increased quality of life rating.

Table 1 Comparison of pre- and post-intervention screening measures

	# Residents	Needing dental referral	Malnourishment risk	Malnourished	Aspiration risk	Mean QOL
Pre-intervention screening	142	78%	57%	13%	70%	65%
Post-intervention screening	77	21%	55%	16%	32%	71%

Table 2 Documented chest infections at each of two sites over time

	# Beds	6-mos prior to intervention	During intervention	6-mos post intervention
Site 1	102	19	13	7
Site 2	98	6	7	7

Discussion

Actively involving residents, carers, and nurses in coordinated care with an interprofessional team has provided valuable insight into issues of concern that needed to be addressed to promote and maintain residents' oral health and reduce aspiration pneumonia risk. The organisation had been cited for the number of chest infections in a recent accreditation report. It can now report data documenting the positive change in chest infections for Site 1 and consider how what worked at this site can be followed at Site 2.

All team members, including carers, have gained additional understanding of the importance of oral health and the contribution to dental care of professions such as speech pathology in monitoring oropharyngeal function and swallowing safety; pharmacy in medication management and the impact of medications on oral health and gastrointestinal function; and nutrition in monitoring adequate food and liquid intake for nutritional health. The use of the electric toothbrushes proved problematic. Many nurses believed they were a choking hazard. Most residents felt that they made their gums sore. The five residents who continued to use the electric toothbrushes had been using them before moving into residential care and enjoyed being able to use them again.

Staff believe that on-site dental care is optimal. While we work to accomplish this, the following achievements have resulted from this study:

- Prior to the study, new residents were asked if they had their own teeth, had seen a dentist recently, and if they were experiencing any oral pain. Following the study, the organisation hosting the study has implemented a policy to screen residents' oral health, upon admission and periodically, using the four measures administered in the study. This will continue to promote residents' active engagement in their care.
- Engagement with community dentists has increased for residents whose families are able to take them to appointments.

- The frequency of visits by a consultant dietitian has been increased from monthly to twice per month. This positive change may influence a more proactive, rather than reactive, approach to maintaining residents' nutritional health. This is important as risk for malnourishment remains an area of concern. The organisation has also implemented different software to track residents' health. This software includes both height and weight calculations and thus provides a systematic review of each resident's Body Mass Index over time.
- Staff have recognised the ready availability of community pharmacists and the contribution of carefully managed medications in promoting and maintaining overall health.
- Staff understand the evidence supporting 2-minutes of teeth cleaning after meals, or daily cleaning of dentures, and the role of such oral care in reducing aspiration pneumonia risk.

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Presenter

Dr Lynette Goldberg teaches and conducts research at the Wicking Dementia Research and Education Centre, University of Tasmania. She completed her undergraduate degree in speech pathology at the University of Melbourne, and her graduate and postgraduate degrees in the United States. She is a Fellow of the American Speech-Language-Hearing Association (ASHA). She worked in the US as a clinical speech pathologist for 12 years before being recruited for an administrative, policy development position at ASHA in Washington, DC. In this position, Goldberg's responsibilities included providing testimony for legislators on Capitol Hill on issues in ageing, including oral care and dysphagia (swallowing difficulties) experienced by adults in residential care, particularly those diagnosed with dementia. Goldberg then moved into academia and accrued a consistent record of university and philanthropic grants. Her 30 years' experience in the field of medical and health sciences as a clinician, administrator, policy developer and academic has given her powerful and multi-faceted insight into the impact of poor oral health on swallowing, nutritional health and quality of life for older adults living in residential care. Goldberg is recognised for her leadership in the area of interprofessional education and practice.