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Original Article

Risk factors of aspiration pneumonia related to improper oral hygiene behavior in community dysphagia persons with nasogastric tube feeding

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KEYWORDS

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Abstract *Background/purpose:* Aspiration pneumonia (AsP) was reported to be closely related to poor oral hygiene. This study aimed to investigate the association between caregivers' oral hygiene behavior with AsP in the community dysphagia persons with nasogastric tube feeding (DPNgTF).

Materials and methods: A cross-sectional study was conducted on 128 DPNgTF and their corresponding caregivers. A self-reported structuralized questionnaire was used to measure the oral care behavior of caregivers. All data analyses were performed using the SPSS. The Chi-square was used for comparison of nonparametric data. Fisher's exact test was used when the expected frequency of any cell in the table was less than five. A *p* value <0.05 was considered statistically significant.

Results: Fifty-five DPNgTF had developed AsP (43.0%) and they had statistically significantly halitosis (adjusted OR = 4.46; 95%CI = 2.01–9.93), deposition of oropharyngeal secretion (OR = 4.39; 95%CI = 1.99–9.66), dry mouth (OR = 4.23; 95%CI = 1.81–9.85) and closing mouth and not allow to brush (adjusted OR = 2.83; 95%CI = 1.28–6.27). The poor oral hygiene status of DPNgTF was significantly correlated with the occurrence of AsP. The caregivers' oral care to DPNgTF after getting up (OR = 14.09; 95%CI = 2.92–68.08) and using sponge stick to care (OR = 3.29; 95%CI = 1.26–8.55) were the risk factors of AsP.

Conclusion: The implemented oral care after getting up only, using sponge stick has a higher risk compared to the implemented oral care prior to sleeping, using toothbrush. The

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importance of implementing oral care prior to sleeping by using toothbrush should be reinforced in DPNgTF. Guidelines of oral care and education courses for caregivers during the process in their career training are needed.

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Introduction

Aspiration pneumonia (AsP) is defined as a misdirection of oropharyngeal or gastric contents caused by dysphagia, accompanied with massive oral bacteria flora and secretion to invade into the larynx and lower respiratory tract, and then to produce an infectious response in the lungs.¹ AsP is one of the most critical complications and a major cause of death in patients with dysphagia.² The risk factors of AsP are dysphagia, compromised consciousness, insufficient oral care and decrease in salivary clearance.³

Dysphagia is a complication of cranio-neurological injuries and diseases, also often seen in fragile elderly due to the degenerative process of aging. Nearly 50% of all individuals residing in nursing homes suffer from a swallowing disorder.⁴ Dysphagia persons always have problems in loss of sensation and mobility, paralysis or weakness of affected side of mouth and limbs, which makes them unable to feel whether food is pocketed in the mouth or not, cannot take care of their daily life activities including tooth brushing by themselves, or cannot get proper oral care from caregivers. Moreover, dry mouth often acts as an exaggeration factor to produce multiple caries or severe periodontitis. A massive bacteria reservoir in the oro-pharyngeal area and oral cavity may invade the trachea and lung tissues accompanied with dysphagia, finally leads to AsP.^{5–8}

Dysphagia elderly always suffer from chronic malnutrition and dehydration caused by the difficulty of taking meals and drinking orally.^{9,10} Nasogastric tube feeding is an option, yet it has not been shown to reduce the risk of aspiration or pneumonia.¹¹ Furthermore, gastric bacteria can migrate upward along the tube and colonize the pharynx.¹² Prolonged nasogastric tube feeding is associated with pathologic colonization of bacteria in the oropharynx, reduces the ratio of stimulated saliva flow to basal level and alters the content of saliva that is related to the risk of AsP.¹³ Stroke patients have poor oral health status in tooth loss, dental caries experience, and periodontal status, and less dental attendance. This is caused by lack of oral health knowledge by nurses and poor patient attitude.¹⁴

A study of 115 nurses and healthcare professionals working regularly on care of the elderly in wards found that respondents think that oral and dental health of older persons is 'extremely important', and approximately half of the respondents regularly give advice to their patients about dental care. Unfortunately, their knowledge of and reasons for providing oral care and advice is often incorrect. They are even potentially giving inappropriate advice regarding oral care to the patients.¹⁵ Talbot surveyed oral care training courses for nurses in the wards of stroke units

showed that only a third of units received oral care training in one year, the use of oral care assessment tools and protocols was limited, and not all units had access to toothbrushes, toothpaste or chlorhexidine.¹⁶

It is evident that dysphagia and long-term placement of nasogastric tube feeding are risk factors for AsP, and improper oral care will act as a bacteria reservoir to cause AsP in dysphagia patients. Since long-term care elderly always have poor oral hygiene and unmet needs in oral care, we investigated to find out what is incorrect about caregivers' skills in daily oral care and how poor oral hygiene status has been involved in developing AsP for dysphagia persons with nasogastric tube feeding (DPNgTF).

Material and methods

This is a cross-sectional, descriptive study conducted from June to December 2015 on 128 DPNgTF receiving home care and their corresponding main caregivers in the Tainan area, Taiwan. The Research Ethics Committee of Chi Mei Hospital (No. SMA-NHR10311) approved the protocol. All study subjects signed an Informed Consent Form.

DPNgTF had similar severity caused by cranio-neurological disorder or injuries such as stroke, dementia and Parkinson's disease. Subjects receiving placement of nasogastric tube for more than 6 weeks and home care for more than 3 years, have clear consciousness, with communicable skills and full past medical history records were included in the study. Consciousness assessed by observing a patient's arousal and responsiveness based on the physician's judgment while he/she left hospital and went home.

The caregivers had been fully trained and certified by the Taiwan Ministry of Social Welfare, had more than 3 months experience in long-term care residents and are currently employed in caring for DPNgTF at least 6 h a day.

The demography and physiological status of DPNgTF were evaluated as follows: the physiological data diagnosed and recorded by physicians including consciousness status, cardiopulmonary function, symptoms and signs of pneumonia; hospitalization history due to pneumonia in the last year. The evaluation of oral hygiene and health status of DPNgTF was conducted at bedside with a head light torch and obtained the data by a dentist. The oral hygiene status included halitosis (bad oral odor can be detected when the dentist standing at bed side); deposition or oropharyngeal secretion (plaque deposition more than 25% over teeth of fixed prosthesis or removable denture, or oropharyngeal secretion more than 25% attached to soft tissue of hard palate and buccal mucosa); dry mouth (saliva over tongue surface and oral mucosa shows less moisture, sticky or cleft

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