ORIGINAL ARTICLE

P Philip C Rogers E Kruger M Tennant

Authors'affiliations:

P Philip, E Kruger, M Tennant, The Centre for Rural and Remote Oral Health, The University of Western Australia, Crawley, WA, Australia C Rogers, Private Dental Practice, Perth, WA, Australia

Correspondence to:

E. Kruger The Centre for Rural and Remote Oral Health The University of Western Australia 35 Stirling Highway Crawley 6009 WA Australia Tel.: +61 08 6488 5810 Fax: +61 08 9346 7237 Email: ekruger@crroh.uwa.edu.au

Dates:

Accepted 13 July 2011

To cite this article

Int J Dent Hygiene **10**, 2012; 122–127 DOI: 10.1111/j.1601-5037.2011.00525.x Philip P, Rogers C, Kruger E, Tennant M. Caries experience of institutionalized elderly and its association with dementia and functional status.

© 2011 John Wiley & Sons A/S



Caries experience of institutionalized elderly and its association with dementia and functional status

Abstract: Objectives: The aim of this study was to assess the caries experience of the elderly residing in residential aged care facilities in Perth. Western Australia, and its association with dementia and functional status. Methods: Oral examinations were conducted in a sample of institutionalized aged persons. This study was carried out over a period of 7 years, between 2002 and 2008. Results: A total of 205 residents were examined. The mean decayed, missing and filled teeth index score was 25.9 for all residents. Residents with dementia did not have significantly different levels of caries experience than those without. The mean number of active caries and retained decayed roots, however, was higher among residents with dementia. There was a significant difference in the mean number of active decay and carious retained roots among residents based on their Activities of Daily Living Oral Health score and their status of assistance received with brushing. Conclusion: Caries experience among the institutionalized elderly is associated with disability, and oral care is lacking among the institutionalized elderly in this study. Appropriate preventive measures (as well as interventional activities) should be undertaken to control oral disease among residential aged care residents.

Key words: caries; dementia; dentistry; elderly

Introduction

Oral neglect, as well as poor oral health and oral hygiene, is highly prevalent among the institutionalized elderly (1, 2). Residents with dementia, who are functionally dependent and cognitively impaired, appear to be worst affected (3). This is a challenge to the dental profession as the proportion of frail elderly with dementia and disabilities is projected to rise over the coming decade in most developed countries of the world. In Australia, adults aged above 85 are the fastest growing subgroup of the population (4). Additionally, the rate of edentulism is declining; the current generation of elderly has more teeth than previous generations and will live longer than their parents (5). This implies that there will be more dentate elderly with cognitive and functional impairment in residential aged care facilities. The combination of increased dependency and increased retention of teeth will lead to a high-risk cohort with complex dental needs and more prone to dental diseases.

Residential aged care facilities are residential facilities provided to frail elderly whose care needs are such that they no longer remain in their homes. Eligibility to facilities is determined by Aged Care Assessment Teams. This is a multidisciplinary team and is funded jointly by federal and state governments. This team assesses the physical, mental and the social situation of each individual to determine whether they are eligible for residential aged care, residential aged care respite, community aged care packages, extended age care packages or transition care. There are 15 000 elderly in residential care in Western Australia, and 75% of these are in high care (6).

The complexity of organisational culture in residential aged care facilities, and lack of knowledge and awareness among caregivers, has compounded the severity of the problem (7, 8). Restricted access to proper and timely care, difficulties with caregivers providing care, especially among the cognitively impaired, and the lack of in-facility dental care also contribute to the problem (9, 10).

Individuals diagnosed with dementia have been shown to have higher levels of active dental caries compared to elderly without dementia (11). The mean annual increments of coronal and root caries have also been shown to be higher among individuals with dementia (12). Higher levels of caries incidence have been associated with dementia severity, high caregiver burden, oral hygiene care difficulties, use of drugs with anticholinergic effects and previous experience of caries (13). Prevention and maintenance of oral health is important among the institutionalized elderly with dementia to reduce early mortality and morbidity, thus enabling them to age successfully (14, 15). Recent data, however, on the dental health of elderly with dementia in aged care facilities are lacking and are required to monitor disease status and for planning of treatment and interventions (16). The aim of this study was to assess the caries experience of the elderly residing in residential aged care facilities in Perth, Western Australia, and its association with dementia and functional status.

Materials and methods

Ethics approval for this project was granted by the Ethics Committee of The University of Western Australia. The study population consisted of institutionalized frail aged persons in Perth, Western Australia, and the study included data on all those participants who were examined by the dentist between January 2002 and December 2008. Dental visits to residents took place in response to referrals from family, guardians or care workers including doctors and nurse managers, and were usually because of a reported oral health issue. Otherwise, referrals were for routine examinations. The same examiner did the same assessment over the period of time, and external conditions remained the same throughout the study period. This was one of the largest studies of Western Australian elderly in history. The only inclusion criteria were that the individual must have been a resident and examined at a residential aged care facility in Perth. All participants resided in fluoridated areas at the time of the examination. Comprehensive oral examination by a dentist is not a requirement on admission or as part of the preadmission Aged Care Assessment team. Public or private dental services provided to the facilities were limited to the following: A public dental domiciliary unit providing treatment; a public aged care programme providing limited oral and dental screening; one private dentist, restricting practice to this cohort; and a few dentists, who anecdotally provided *ad hoc* emergency care.

Residents' functional status and dementia

Residents' functional status was gauged based on the measurement of the Activities of Daily Living Oral Health (ADLOH) (i.e. self-care abilities), adapted from the study by Bauer (17). This is a measure of the ability of a person to perform the most basic physical tasks of personal care independently, with or without an assisting device. By applying a sequence of criteria, patients were accordingly categorized: able, unable and partially unable. 'Able' was classified as those who could perform all relevant activities of daily living, 'partially unable' were those who could perform only some of the relevant activities and 'unable' were those who could not perform any of the activities of daily living. Ability was assessed by a dental practitioner, not caregivers, and the assessment was done as part of the comprehensive examination and evaluation of each individual.

Patients were also classified as either having dementia or not. This was based on a diagnosis of dementia provided by the patients' medical practitioner as was documented in the resident's medical records. Those persons with suspected but unconfirmed diagnosis of dementia were excluded from the study.

Oral examinations

All oral examinations were conducted by a single registered dental practitioner (CR), while the resident was either seated or reclined. Examinations included extra- and intra-oral assessment. Extra-oral examination was comprised of systematic assessment of para-oral structures using visual and tactile stimuli. The extra-oral examination was carried out using WHO criteria (18) Intra-oral examinations included a full-mouth examination, using a headlamp, mouth mirror and a calibrated periodontal probe. One probe was used, a calibrated periodontal probe (Hu-Friedy 23/Williams Expro). The probe was used to determine periodontal health and gingival recession. Findings in terms of periodontal health were published elsewhere (19). This probe was also used in caries assessment.

A dental assistant recorded the data at the time of the examination, or the examination was audio-recorded and later transcribed into the patient's clinical record and onto the study database (Only those results from the first or initial examination were included.)

Dental caries assessment

Caries was assessed using both tactile and visual assessment. Consistent with previous studies, and the non-clinical environment of the assessment, no radiographs were used. Teeth covered in plaque were cleaned prior to review. Caries experience was assessed using the Decayed, Missing and Filled Teeth Index (DMFT) (18). Caries was also classified as active or inactive, and this was done for each tooth surface (including exposed root surfaces). Active caries was mainly soft or softened enamel or dentine gauged using the probe with a light stroking touch, not a stabbing or penetrating action. Hardened and discoloured lesions were recorded as inactive caries (healed or remineralized caries).

Data management and analysis

Statistical analyses were completed using spss for Windows (version 17). Statistical significance was set at the 95% level, with a P value of ≤ 0.05 , deemed as statistically significant. Differences in outcomes were analysed using chi-square test for categorical outcomes and student's *t*-test for continuous outcomes.

Results

The total number of study participants was 205, and the mean age of all participants was 85 ± 9.8 years. Residents with dementia combined with an ADLOH score of unable had the highest mean age (Table 1). Seventy-nine per cent of the whole cohort (n = 205) was dentate (data not shown). Of all residents, 41% had dementia. Twenty-one per cent were classified as 'able', 22% as 'partially unable' and 51% as 'unable'. Those classified as 'unable' with dementia constituted 26% of the study cohort (Table 1).

Caries experience

The mean DMFT of all residents was higher than 25 (Table 2). Residents with dementia did not have signifi-

Table 1. Basic demographic details for patient sample

Patient category	n (%)	Mean age (SD)
Dementia status		
Dementia	84 (41)	85.7 ± 9.6
No dementia	102 (49)	84.3 ± 9.9
Missing	19 (9)	
ADLOH score		
Able	43 (21)	82.0 ± 11.5
Partially unable	45 (22)	85.8 ± 10.3
Unable	105 (51)	85.6 ± 8.8
Missing	12 (5)	
Dementia disability		
Unable and dementia	53 (26)	87 ± 8.0
Others	128 (62)	83.9 ± 10.5
Missing	24 (11)	
Assisted with oral care		
Yes	75 (36)	84.7 ± 8.9
No	79 (38)	84.4 ± 11.5
Missing	51 (24.9)	
Total		85.1 ± 9.8

ADLOH, activities of daily living oral health.

cantly different levels of caries experience than residents without dementia but had a higher number of filled teeth (F).

Those with an ADLOH score of 'unable' had more mean decayed teeth (D) than the rest of the group. However, this difference was not statistically significant. The mean F (filled teeth) score decreased with increase in oral self-care disability, those with an 'able' score had more mean filled teeth than the 'partially unable' and 'unable' subgroups. The mean M and DMFT scores were slightly higher for residents with ADLOH score of 'unable' (Table 2). Residents suffering from dementia and also having an ADLOH score of 'unable' had a higher mean D, M, DMFT and active carious teeth than the rest of the cohort. Conversely, the mean number of filled teeth was slightly lower than the rest of the cohort. This difference was not statistically significant (Table 2). The mean numbers of decayed and missing teeth were also higher among those assisted with oral care, but this difference was not statistically significant. However, the mean number of filled teeth among those reported to be assisted with daily oral maintenance care was less than those not assisted.

Active caries

The mean number of active carious lesions was higher among residents with dementia than residents without (Table 2). The mean number of teeth with active caries was significantly higher (P < 0.05) among residents with an ADLOH score of 'unable' than residents with ADLOH score of 'able' and 'partially unable'. This difference was statistically significant (P < 0.05).

Retained roots and root caries

The mean number of retained decayed roots was higher among those residents with dementia than those without, but this difference was not statistically significant. Residents without dementia had slightly more caries on their exposed root surfaces than those with dementia, mean of 0.07 ± 0.46 and 0.05 ± 0.29 , respectively (Table 3).

A significant finding was that residents with an ADLOH score of 'unable' had a statistically significant higher (P < 0.05) mean number of retained and carious retained roots (Table 3). The mean number of caries on tooth root surfaces was less among residents in the dementia and 'unable' subgroup than the rest of the residents (0.04 ± 0.2 and 0.07 ± 0.44 respectively). The mean number of retained tooth roots was more among the dementia and unable subgroup than the rest of the sample (Table 3).

There also was a higher number (P < 0.05) of carious retained roots among those assisted with daily oral maintenance care (Table 3). The mean number of carious root surfaces was also higher, but this difference was not significantly different from those not assisted with daily oral maintenance care (0.05 ± 0.30 and 0.03 ± 0.35 , respectively).

Resident category	Mean (SD)						
	n	D	Μ	F	DMFT	Act decay	
Dementia status							
Dementia	84	3.0 ± 3.9	17.4 ± 7.3	5.3 ± 5.0	25.9 ± 4.5	3.2 ± 4.4	
No dementia	102	2.9 ± 3.0	18.0 ± 7.1	5.0 ± 4.8	26.1 ± 4.2	2.6 ± 3.6	
Missing	19						
ADLOH score							
Able	43	2.3 ± 2.6	15.8 ± 7.5	6.4 ± 4.6	24.7 ± 4.4	1.6 ± 2.8	
Partially unable	45	2.9 ± 2.8	17.7 ± 8.0	5.3 ± 5.2	26.0 ± 4.9	2.2 ± 2.5	
Unable	105	4.6 ± 4.7	18.3 ± 6.7	4.6 ± 4.7	26.2 ± 4.3	$3.4 \pm 4.6^{*}$	
Missing	12						
Dementia disability status							
Dementia with disability	53	3.4 ± 4.5	18.4 ± 6.9	4.5 ± 4.5	26.5 ± 4.1	3.7 ± 5.0	
Others	128	2.7 ± 2.8	17.5 ± 7.3	5.3 ± 5.0	25.7 ± 4.5	2.5 ± 3.5	
Missing	24						
Assisted with oral care							
Yes	75	3.0 ± 4.0	18.4 ± 7.1	4.8 ± 5.1	26.4 ± 4.0	$3.2 \pm 4.5^{*}$	
No	79	2.7 ± 2.8	17.5 ± 7.5	5.8 ± 4.6	26.1 ± 4.1	1.9 ± 2.4	
Missing	51						

Table 2. Mean DMFT and active caries based on dementia status, ADLOH score, dementia disability status and assistance received with oral care

 $^{*}P < 0.05.$

ADLOH, activities of daily living oral health; DMFT, decayed, missing and filled teeth index.

Table 3. Mean number of retained roots (RR) and carious retained roots based on dementia status, ADLOH score, dementia disability status and assistance received with oral care

Resident category	Mean RR ± SD	Mean carious RR ± SD	Mean no exposed carious root surfaces ± SD
Dementia status			
Dementia	1.8 ± 2.6	1.4 ± 2.5	0.05 ± 0.3
No dementia	1.2 ± 2.5	0.9 ± 2.3	0.07 ± 0.5
ADLOH score*			
Able	$1.0 \pm 1.9^{*}$	0.8 ± 1.9*	0.08 ± 0.5
Partially unable	1.2 ± 2.6*	$0.9 \pm 2.5^{*}$	0.05 ± 0.3
Unable	1.7 ± 2.6*	1.3 ± 2.4*	0.06 ± 0.4
Dementia disability status			
Dementia with disability	1.7 ± 2.4	1.2 ± 2.2	0.04 ± 0.2
Others	1.3 ± 2.6	1.1 ± 2.5	0.07 ± 0.4
Assisted with oral care			
Yes	1.7 ± 2.6*	1.3 ± 2.5*	0.05 ± 0.3
No	$0.7 \pm 1.1^{*}$	$0.5 \pm 1.0^{*}$	0.03 ± 0.3

*P < 0.05.

ADLOH score: There was a significant difference in mean RR between both the able and partially unable groups and the unable group.

There was a significant difference in mean carious RR between both the able and partially unable groups and the unable group. ADLOH, activities of daily living oral health.

Discussion

This was a retrospective examination of very detailed oral, and dental examinations were done over a period of 7 years by the same dental examiner, under the same conditions. Aged care residents do not receive routine oral treatment, and dental care is mostly demanded in response to a problem. The long study period was necessary to be able to include a higher number of participants. As such, it is acknowledged that it is still underpowered and not representative of all institutionalized elderly in high care. The disadvantage of such a long period is that external circumstances and conditions of care might change over time, but in this instance, there were no changes over the study period that could have influenced study results.

This is one of a few studies that included frail elderly with cognitive impairment and as such, does make a contribution to the knowledge in this regard. Geriatric research among the institutionalized has been notorious for excluding cognitively impaired residents, because they were deemed unfit for treatment, or half-mouth examinations were carried out where fullmouth examinations were needed, or a reduced number of teeth were examined. This has led to concessions being made in data collected.

Because the examinations were carried out in frail elderly patients in nursing homes, some compromises had to be made. It was not possible to do this in optimal clinical conditions using dental chairs, lighting and radiographs. The examinations were very detailed and comprehensive however. It is acknowledged that examinations under optimal conditions remain the preferred option, and some caries will be missed when not using radiographs; however, the loss of information under nonclinical conditions is not great enough to preclude its use when required (20). Visual inspection was also used to assess caries lesion activity. This is a practical and easy method to use, but it is acknowledged that it is subjective (21).

In this study, ADLOH was also measured, which enabled an assessment of oral health needs based on functional capabilities. This index, although very useful and comprehensive, has not been properly validated. A study on the institutionalized in Spain found significant correlation between the ADLOH and the Barthel index (BI) and have recommended that the score be used to identify elderly individuals dependent for oral hygiene (22) [The BI is an ordinal scale for the functional assessment of disability that has been widely used in stroke outcome research (23)].

This study found that there was little difference in caries experience between residents with dementia and those without. A significant difference in caries experience, however, was observed among residents based on their disability-related dementia and functional status (ADLOH). Caries experience recorded in this study is higher than that previously recorded in the elderly in other parts of Australia. Previous studies have also suggested that caries experience is higher among noninstitutionalized elderly with dementia than those without (16, 24). Our observations and several others (3, 25-27) have shown that the differences are not major among institutionalized elderly with and without dementia. The variations in DMFT score among dementia and non-dementia residents widened when severity or disability related to dementia was taken into consideration (Table 2). Recent research has indicated that caries experience may be related more to cognitive decline rather than the presence or absence of dementia (28, 29).

The overall difference in DMFT was mainly because of differences in mean number of decayed teeth. The mean D scores were higher among residents with an ADLOH score of 'unable' and with those in the 'unable' and dementia subgroup. The mean D score was also higher in our sample than that reported among the elderly with dementia in nursing homes, in other studies (3). The mean number of filled teeth (F) seemed to decrease as impairment related to oral self-care increase, and with disability related to dementia (Table 2). This probably reflects the restricted access to restorative care among residents with disability, which is a significant ongoing issue. Similar findings were found among residents in other parts of Australia and other countries (3).

There was a significant difference in mean active caries for those assisted with oral care and those not, and based on their ADLOH score. The mean active caries was recorded to indicate the progress of dental caries among this cohort. The mean number of teeth with active caries was slightly higher among residents with dementia. Other studies have reported that these differences could be due to a sugary diet, lack of fluoride application, poor oral hygiene maintenance or a lack of preventive measures (30). The high active caries prevalence was also related to dementia type and severity (30).

Chalmers *et al.* (3) reported that residents with dementia had lower numbers of carious retained tooth roots than those without dementia. This is in contrast to our findings, where residents with dementia had more carious retained roots than those without, but the difference was not statistically significant. However, there was a statistically significant difference in the mean number of carious retained roots based on ADLOH score and assistance received with oral care; those with an ADLOH score of 'unable' had a significantly higher mean number of carious retained tooth roots than 'able' and 'partially unable' residents. Similarly, those assisted with oral care also had a significantly higher prevalence of carious retained roots.

At the time leading up to the study dental awareness by carers were very limited. Most often, this only included a 1-h education by a dental nurse from a public aged care programme. For dementia residents, oral health examinations are anything but simple, and it is why initial dental decay is not usually detected until it has caused major tooth destruction. Dental hygiene measures for residents with dementia is also anything but simple and requires advanced skills in dental hygiene combined with management strategies for residents with challenging behaviour and lower levels of cooperation or compliance.

Conclusion

Caries experience did not significantly differ based on the medical diagnosis of dementia but was worse with patient who had a disability related with dementia. Mean numbers of active carious and carious retained tooth roots were also higher among residents with disability. The findings indicate that functional status is associated with caries experience and that oral care is lacking among the institutionalized elderly in this study sample. Urgent and appropriate preventive measures (as well as interventional activities) should be undertaken to control oral disease among the residential aged care residents. Preventive measures and interventional activities include training and education of caregivers, regular and efficient oral hygiene care and routine oral health assessments and dental treatment.

References

- Kiyak HA, Grayston MN, Carol Lowe C. Oral health problems and needs of nursing home residents. *Community Dent Oral Epidemiol* 1993; 21: 49–52.
- 2 Shay K. Oral neglect in the institutionalized elderly part 1: the role of the institution. *Spec Care Dentist* 1990; **10**: 166–168.
- 3 Chalmers JM, Hodge CP, Fuss JM, Spencer AJ, Carter KD. *The Adelaide Dental Study of Nursing Homes 1998*. AIHW cat. no. DEN 83 (Dental Statistics and Research Series No. 22) Adelaide: AIHW Dental Statistics and Research Unit; 2000.
- 4 Australian Bureau of Statistics. *Population by Age and Sex, Australian States and Territories, cat. no 32010.* Canberra: Australian Bureau of Statistics; 2008.
- 5 Australian Institute of Health and Welfare (AIHW). Dementia in Australia: National Data Analysis and Development. AIHW cat. no. AGE 53. Canberra: AIHW; 2006, pp. 2–10.
- 6 AIHW. Residential Aged Care in Australia 2008–09. Aged care statistics series no. 31. Cat. no. AGE 62. Canberra: AIHW; 2010.
- 7 Thorne SE, Kazanjian A, MacEntee MI. Oral health in long-term care: the implications of organizational culture. *J Aging Stud* 2001; **15**: 253–269.
- 8 Chalmers J, Pearson A. Oral hygiene care for residents with dementia: a literature review. J Adv Nurs 2005; 52: 410–419.
- 9 Hopcraft MS, Morgan MV, Satur JG, Wright FA. Dental service provision in Victorian residential aged care facilities. *Aust Dent J* 2008; **53**: 239–245.

- 10 Paley GA, Slack-Smith L, O'Grady M. Oral health care issues in aged care facilities in Western Australia: resident and family caregiver views. *Gerodontology* 2009; 26: 97–104.
- 11 Ellefsen B, Holm-Pedersen P, Morse DE, Schroll M, Andersen BB, Waldemar G. Caries prevalence in older persons with and without dementia. J Am Geriatr Soc 2008; 56: 59–67.
- 12 Jones JA, Lavallee N, Alman J, Sinclair C, Garcia RI. Caries incidence in patients with dementia. *Gerodontology* 1993; 10: 76–82.
- 13 Chalmers JM, Carter KD, Spencer AJ. Caries incidence and increments in community-living older adults with and without dementia. *Gerodontology* 2002; 19: 80–94.
- 14 Navazesh M, Mulligan R. Systemic dissemination as a result of oral infection in individuals 50 years of age and older. *Spec Care Dentist* 1995; 15: 11–19.
- 15 Ghezzi EM, Ship JA. Systemic diseases and their treatments in the elderly: impact on oral health. J Public Health Dent 2000 Fall; 60: 289–296.
- 16 Rejnefelt I, Anderson P, Renvert S. Oral health status in individuals with dementia living in special facilities. *Int J Dent Hyg* 2006; **4**: 67–71.
- 17 Bauer JG. The index of ADOH: concept of measuring oral self-care functioning in the elderly. *Spec Care Dentist* 2001; **21**: 63–67.
- 18 World Health Organization. Oral Health Surveys Basic Methods, 4th edn. Geneva: World Health Organization; 1997.
- 19 Philip P, Rogers C, Kruger E, Tennant M. Oral hygiene care status of elderly with dementia and in residential aged care facilities. *Gerodontology* 2011, In press. Doi: 10.1111/j.1741-2358.2011.00464.x.
- 20 Fairhall TJ, Thomson WM, Kieser JA, Broughton JR, Cullinan MP, Seymour GJ. Home or away? Differences between home-and

clinic-based dental examinations for older people. *Gerodontology* 2009; **26**: 179–186.

- 21 Pitts NB. Clinical diagnosis of dental caries: a European perspective. J Dent Educ 2001; 65: 972–978.
- 22 Ruiz-Medina P. Discrimination of functional capacity for oral hygiene in elderly Spanish people by the Barthel General Index. *Community Dent Oral Epidemiol* 2005; 33: 363–369.
- 23 Kasner SE. Clinical interpretation and use of stroke scales. Lancet Neurol 2006; 5: 603–605.
- 24 Chalmers JM, Carter KD, Spencer AJ. Caries incidence and increments in Adelaide nursing home residents. *Spec Care Dentist* 2005; 25: 96–105.
- 25 Adam H, Preston AJ. The oral health of individuals with dementia in nursing homes. *Gerodontology* 2006; 23: 99–105.
- 26 Ship JA. Oral sequelae of common geriatric diseases, disorders, and impairments. *Clin Geriatr Med* 1992; 8: 483–497.
- 27 Chalmers JM, Carter KD, Spencer AJ. Oral diseases and conditions in community-living older adults with and without dementia. *Spec Care Dentist* 2003; 23: 7–17.
- 28 Chalmers JM, Hodge C, Fuss JM, Spencer AJ, Carter KD. The prevalence and experience of oral diseases in Adelaide nursing home residents. *Aust Dent J* 2002; 47: 123–130.
- 29 Ellefsen B, Holm-Pedersen P, Morse DE, Schroll M, Andersen BB, Waldemar G. Assessing caries increments in elderly patients with and without dementia: a one-year follow-up study. *J Am Dent Assoc* 2009; **140**: 1392–1400.
- 30 Chalmers JM, Levy SM, Buckwater KC, Ettinger RL, Kambhu PP. Factors influencing nurses' aides' provision of oral care for nursing facility residents. *Spec Care Dentist* 1996; **16**: 71–79.

Copyright of International Journal of Dental Hygiene is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.