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Original Study

Enhanced Oral Care and Health Outcomes Among Nursing Facility Residents: Analysis Using the National Long-Term Care Database in Japan

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A B S T R A C T

Background and objective: Although oral care may have salutary effects among frail elderly people, access to dental care is often limited in long-term care facilities. In 2009, the Japanese long-term care insurance system introduced an additional reimbursement scheme for enhanced oral care supervised by dentists in nursing facilities. The aim of this study was to examine whether enhanced oral care provided by trained nursing facility staff members is sufficient to improve health outcomes among nursing facility residents.
Design, setting, and participants: This was a quasi-experimental study using a nationwide long-term care database. Using facility-level propensity score matching, we identified 170,874 residents in 742 facilities that provided enhanced oral care and 167,546 residents in 742 control facilities that provided only standard care from 2009 to 2012. We used a resident-level difference-in-differences approach to analyze the impact of enhanced oral care on health outcomes among nursing facility residents.
Results: After controlling for resident characteristics and background time trends, no significant differences were found between residents admitted to the facilities with and without enhanced oral care in the incidence of critical illness, transfer to a hospital, mortality, or costs. Yearly change in the odds of discharge to home was significantly increased for residents with enhanced oral care (odds ratio = 1.07; 95% confidence interval: 1.02–1.12; $P = .008$).
Conclusion: The results suggest that enhanced oral care provided by trained nursing facility staff members may improve the general condition of elderly residents in nursing facilities and promote their discharge to home.

Existing studies have suggested that oral health is linked to general health and well-being throughout the life course.[1] Enhanced oral care is a multicomponent intervention to improve oral hygiene and feeding function. Attention has been paid to enhanced oral care because of its feasibility and potential salutary effects on systemic conditions. The salutary effects of enhanced oral care include the prevention of pneumonia,[2–7] glycemic control,[8] and nutritional improvement among frail elderly people.[9–12]

However, in long-term care facilities, the implementation of enhanced oral care has been challenging because of limited access to dental services and a lack of staff training.[1] In the United States, approximately 75% of institutionalized elderly people had poor oral hygiene.[1] Another study revealed that 90.2% of facility staff members recognized the importance of oral care, but one-third hesitated to provide it.[13]

One possible solution is collaborating with dentists to provide the necessary training and education to enable existing facility staff members to deliver daily oral care.[14] In 2009, the Japanese universal public insurance system for long-term care introduced an additional reimbursement scheme for enhanced oral care (ie, the maintenance of oral hygiene and oral functional training) managed by dentists in nursing facilities. In this management system, dentists provide oral care planning and technical instruction to facility staff members, who are

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Table 1
Characteristics of Nursing Facilities With and Without Enhanced Oral Care in the Unmatched and Propensity Score–Matched Populations

	Unmatched			Propensity Score–Matched		
	Facilities Without Enhanced Oral Care	Facilities With Enhanced Oral Care	Standardized Difference	Facilities Without Enhanced Oral Care	Facilities With Enhanced Oral Care	Standardized Difference
Number of institutions	2003	746		742	742	
Type of facility						
Public	87 (4.3)	19 (2.5)	0.099	26 (3.5)	19 (2.6)	0.052
Private	1759 (87.8)	669 (89.7)	0.060	655 (88.3)	665 (89.6)	0.041
Unknown	157 (7.8)	58 (7.8)	<0.001	61 (8.2)	58 (7.8)	0.015
Physical restraint used	8 (0.4)	2 (0.3)	0.023	0 (0.0)	2 (0.3)	0.074
Private room	124 (6.2)	42 (5.6)	0.024	39 (5.3)	42 (5.7)	0.018
Understaffed facility	11 (0.5)	4 (0.5)	0.002	2 (0.3)	4 (0.5)	0.042
Municipality quintile for average income						
Very high	39 (1.9)	27 (3.6)	0.104	26 (3.5)	27 (3.6)	0.005
High	176 (8.8)	124 (16.6)	0.236	118 (15.9)	120 (16.2)	0.008
Medium	51 (2.5)	28 (3.8)	0.074	31 (4.2)	28 (3.8)	0.020
Low	209 (10.4)	84 (11.3)	0.029	101 (13.6)	84 (11.3)	0.070
Very low	1528 (76.3)	483 (64.7)	0.256	466 (62.8)	483 (65.1)	0.048

Data are presented as n (%).

then responsible for administering direct oral care. However, it remains uncertain whether this model of indirect enhanced oral care improves health outcomes among nursing facility residents. A single-center study conducted in 2013 reported a decreased incidence of pneumonia among residents in a nursing facility after the introduction of the new reimbursement scheme for enhanced oral care.[15] However, the causal relationship between enhanced oral care and improved health outcomes remains unclear because this previous study compared pre- and post-intervention outcomes without a control group.

We conducted a quasi-experimental study using a nationwide database of long-term care insurance claims to analyze the impact of enhanced oral care on health outcomes among elderly nursing facility residents. The outcomes included incidence of critical conditions, transfer to a hospital, mortality, discharge to home, and costs of long-term care.

Material and Methods

Long-Term Care and Nursing Facilities in Japan

In 2000, Japan introduced a publicly provided long-term care insurance. Under this system, nursing facilities are used by elderly people with dysfunctional symptoms who are expected to be discharged to their homes after functional recovery. Japanese nursing facilities also provide terminal care. Each of these facilities is staffed with at least 1 full-time equivalent physician, who provides daily medical care for residents with chronic conditions and unexpected acute illnesses.

Introduction of Enhanced Oral Care in Nursing Facilities

In 2009, the Japanese long-term care insurance system introduced an additional reimbursement scheme for enhanced oral care, which includes oral functional training and the maintenance of oral hygiene in nursing facilities. This scheme aims to preserve or improve oral function, with dentists providing oral care planning for nursing facilities, as well as technical instruction for facility staff members, who then administer daily direct oral care to the individual residents in their facilities. Dentists are also required to educate facility staff members about the assessment of oral health, the proper materials for oral care, risk management in oral care, and other facility-specific issues related to oral health. The details of the provided instruction and education are decided at the discretion of individual dentists. The reimbursement cost of this new model of providing oral care is approximately one-quarter of that for direct oral care provided by dentists.

Table 2
Resident Characteristics at Facilities With and Without Enhanced Oral Care in the Unmatched and Propensity Score–Matched Populations

	Unmatched			Propensity Score–Matched		
	Facilities Without Enhanced Oral Care	Facilities With Enhanced Oral Care	Standardized Difference	Facilities Without Enhanced Oral Care	Facilities With Enhanced Oral Care	Standardized Difference
N	420,814	171,965		167,546	170,874	
Female	286,910 (68.2)	117,201 (68.2)	0.001	114,077 (68.1)	116,456 (68.2)	0.001
Age, y	84.50 (8.38)	84.28 (8.47)	0.025	84.27 (8.49)	84.28 (8.47)	0.001
Care need level						
5 (most dependent)	98,059 (23.3)	37,910 (22.0)	0.031	38,430 (22.9)	37,666 (22.0)	0.022
4	128,104 (30.4)	53,218 (30.9)	0.011	51,120 (30.5)	52,860 (30.9)	0.009
3	106,626 (25.3)	44,105 (25.6)	0.007	42,606 (25.4)	43,808 (25.6)	0.005
2	61,168 (14.5)	25,729 (15.0)	0.014	24,688 (14.7)	25,588 (15.0)	0.008
1	26,829 (6.4)	10,984 (6.4)	<0.001	10,690 (6.4)	10,933 (6.4)	<0.001
0 (least dependent)	28 (0.0)	19 (0.0)	<0.001	12 (0.0)	19 (0.0)	<0.001
Dementia	107,425 (25.5)	55,989 (32.6)	0.155	46,795 (27.9)	55,465 (32.5)	0.099
Nutritional management	382,822 (91.0)	164,742 (95.8)	0.195	153,921 (91.9)	163,658 (95.8)	0.163
Tube feeding	2275 (0.5)	1144 (0.7)	0.016	826 (0.5)	1140 (0.7)	0.023
Dysphagia						
Mild	821 (0.2)	702 (0.4)	0.037	307 (0.2)	702 (0.4)	0.037
Severe	12,601 (3.0)	7977 (4.6)	0.084	5207 (3.1)	7863 (4.6)	0.078
Special diet	124,418 (29.6)	58,423 (34.0)	0.095	49,384 (29.5)	58,038 (34.0)	0.097

Data are presented as mean (standard deviation) for age, and n (%) for female, care need level, dementia, nutritional management, tube feeding, dysphagia, and special diet.