


ORIGINAL ARTICLE

Effect of educational environments on nursing faculty members' perceptions regarding oral care

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Abstract

Aim: To investigate nursing faculty members' perceptions of oral care and to identify the effects of an educational environment on their perceptions.

Methods: A cross-sectional questionnaire regarding oral care was conducted at eight nursing schools in Japan. A total of 156 (71.6%) faculty members participated in this study. Their perceptions of oral care practice were compared by using a statistical analysis according to the length of work experience, teaching field, school, and facility setting (defined as whether the school had an affiliated hospital with a dental department).

Results: Almost all of the faculty members were nurses and most were female. Almost all perceived that oral care was effective in the prevention of aspiration pneumonia and frailty. There were significant differences by teaching field in the nurses' perceptions regarding with whom they should collaborate to conduct oral care and there were significant differences by school in the nurses' perceptions regarding who should provide oral care, where it should be provided, and what kinds of knowledge are important for practice. Perceptions of low involvement in oral care were significantly associated with the schools having an affiliated university hospital with a dental department.

Conclusion: There were different perceptions regarding oral care among nursing faculty members and their perceptions might have been affected by their educational environment. Therefore, it is suggested that oral care education should be standardized and nursing faculty members should standardize the curriculum regarding oral care for nursing students.

Key words: nursing education, nursing faculty, oral care, oral care education.

INTRODUCTION

Oral care is important for preventing dental diseases and maintaining oral health status (Gross, Paskett, Cheever, & Lipsky, 2017; Si, Guo, Yuan, Xu, & Zheng, 2016). Recent studies have shown that periodontal disease is an independent risk factor for

cardiovascular disease (Humphrey, Fu, Buckley, Freeman, & Helfand, 2008), diabetes (Casanova, Hughes, & Preshaw, 2014), and preterm low birthweight (Ide & Papapanou, 2013). Dental health status has been shown to be associated with dementia (Yamamoto *et al.*, 2012), mortality (Fukai *et al.*, 2007), and reduced life expectancy with disability (Matsuyama *et al.*, 2017). Oral care was found to be effective in preventing aspiration pneumonia (van der Maarel-Wierink, Vanobbergen, Bronkhorst, Schols, & de Baat, 2013) and ventilator-associated pneumonia (Hua *et al.*, 2016).

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In Japan, the population is aging. The percentage of the population that is ≥ 65 years of age has been increasing rapidly in recent decades, at 26.0% in 2014, and projected to approach 40% by 2055 (Ministry of Internal Affairs and Communications Statistics Bureau, 2011). The prevalence of dental caries and periodontal disease in older adults also has been increasing (Ministry of Health, Labour and Welfare, 2016). Therefore, oral care for older adults is particularly important to prevent dental and general diseases.

In order to prevent oral and general diseases, not only oral health professionals but also other healthcare workers, such as nurses, play important roles in providing oral care to patients in hospitals, frail older adults in long-term care facilities, and community members (Daly & Smith, 2015). However, negative attitudes towards oral care and a low level of knowledge regarding oral care among nurses and nursing students have been reported (Czarnecki, Klooster, Boynton, & Inglehart, 2014; McNeill, 2000; Miller & Rubinstein, 1987; Rwakatema *et al.*, 2015). Therefore, it is suggested that the provision of effective oral care education is necessary for nurses and nursing students in order to improve their knowledge and attitudes in their workplaces and nursing schools.

The Japanese Society of Oral Care (2018) defines oral health care as “science and technology to prevent oral diseases, promote oral health and provide oral rehabilitation with the aim of improving quality of life.” It contains oral examination, oral hygiene, cleaning of dentures, rehabilitation of mastication, eating, and swallowing, gingival and buccal massage, meal assistance, the treatment of halitosis, and the prevention of xerostomia.

Ueda (2011) reported that the term “oral care” is used widely by health professionals in Japan. However, it has various interpretations and thus its meaning is not always clear. Haresaku, Mariño, Naito, and Morgan (2016) pointed out that there are different knowledge and attitudes towards oral care among dental faculty staff members because of various existing interpretations of oral care and some university departments, such as geriatric dentistry, preventive dentistry, and prosthodontics, teach some aspects of oral health care for older adults without coordination in Japanese dental schools. In addition, the study reported that there were differences in the knowledge and attitudes regarding oral care between dental teaching fields and suggested that those problems might have a negative impact on dental oral care education. Similar problems might occur in oral care education for nursing students.

A few studies have investigated the knowledge and attitudes towards oral care among nurses, nursing

students, and dental faculty members (Czarnecki *et al.*, 2014; Haresaku, Mariño, Naito, & Morgan, 2016; McNeill, 2000; Matsuyama & Kajiwara, 2012; Miller & Rubinstein, 1987; Rwakatema *et al.*, 2015). However, no such study has been conducted for nursing faculty members. In addition, there were few studies that investigated the effect of the educational environment, such as the teaching field, school, and facility setting, on health professionals' perceptions regarding oral care. The purpose of this study is to investigate nursing faculty members' perceptions of oral care and the effect of the educational environment on their perceptions.

METHODS

Design and sample

A cross-sectional study was conducted by using a self-administered questionnaire at eight nursing schools in Fukuoka Prefecture between September, 2016 and August, 2017. Fukuoka Prefecture is situated on the northern shore of the Japanese island, Kyushu. There were 13 nursing schools in the prefecture that were all 4 year colleges or universities. In 2016, the eight nursing schools in the prefecture had meetings to promote collaboration in oral care education and research projects. All the faculty members in the eight nursing schools were selected as the sample without conducting a power analysis. The nursing schools included seven private and only one state-run school. Four schools had a university hospital with a dental department and the others did not. In order to investigate the effect of the facility setting on their perceptions regarding oral care, the eight schools were divided into two groups. Group α included the A, B, C, and D schools that had an affiliated university hospital with a dental department. Group β included the E, F, G, and H schools.

Ethical considerations

The purpose of the study was explained to all the participants during the delivery of the anonymous self-reported questionnaire. A returned questionnaire was considered to be indicative of one's consent to participate. This study was approved by the Ethics Committee of Fukuoka Gakuen Dental College, Fukuoka, Japan (Approval no. 303).

Instrument

Information was derived from a previously developed questionnaire and was used to study the opinions and

attitudes among nursing staff and dental faculty members towards oral health care (Haresaku, Mariño, Naito, & Morgan, 2016; Matsuyama & Kajiware, 2012). The validity and reliability of the questionnaires were checked in previous studies (Haresaku, Mariño, Naito, & Morgan; Matsuyama & Kajiware, 2012). The questionnaire was pilot-tested by some nursing faculty members who worked in one of the eight schools before the study. These nursing faculty members were excluded as participants in this study.

The questionnaire consisted of items in the following sections: sociodemographic variables (sex), work experience (professional qualification, length of work experience as a nursing faculty member, and teaching field), and three types of perception. The length of work experience was divided into three groups: “0–5 years,” “6–15 years,” and “≥16 years.” The teaching field was classified by using the follows categories: basic nursing, pediatric or maternity nursing, adult nursing, geriatric nursing, home care nursing, psychiatric nursing, public health nursing, and others.

The perceptions of the effect of oral care on the prevention of aspiration pneumonia or the prevention of frailty had two variables, classified into four categories: “very effective,” “somewhat effective,” “somewhat ineffective,” and “very ineffective.”

The perceptions regarding oral care practice (“Who?” or “Whom?”) included three variables: “Who should provide oral care?” (10 choices); “With whom should nurses collaborate to carry out oral care?” (eight choices); and “To whom should oral care be provided?” (five choices).

The perceptions regarding oral care practice (“Where?” or “What?”) included three variables: the places where oral care should be provided (nine choices); what should be included in oral care as treatment or instruction (13 choices); and what kinds of knowledge are particularly important to carry out in oral care (four choices).

In order to identify the differences in perceptions regarding oral care practice by the facility setting, the numbers of the choices that the faculty members selected were summed for each item on the perception of oral care. The total numbers of answer choices in each item were compared between groups α and β .

Data procedure

The questionnaire was distributed to 218 faculty members in the schools by the head of each school. Among the selected participants, 156 providers participated in

this study, with an average response rate of 71.6% (ranging from 60.0% to 88.9%).

Data analysis

The statistical analyses were carried out by using the IBM SPSS Statistics software program (v. 21.0; IBM Corporation, Armonk, NY, USA). A chi-squared test was used to analyze the differences in knowledge and attitudes towards oral care among nursing faculty members according to the length of work experience, nursing school, or teaching field. A Mann-Whitney U test was used to compare the total numbers of answer choices between groups α and β . The data were analyzed with 5% significance (Table 1).

RESULTS

A total of 156 nursing faculty members from eight nursing schools participated in this study. Of these, the numbers (proportion) of faculty members in groups α and β were 79 (50.6%) and 77 (49.4%), respectively. The maximum number (proportion) of the faculty members was 22 (14.1%) in school D and the minimum was 16 (10.3%) in school B. Almost all (97.4%) of the faculty members were nurses, while the others (2.6%) were physicians. Almost all (89.1%) of the faculty members were female, with no significant difference between schools. The most common amount of work experience as a nursing faculty member was between 6 and 15 years (37.8%), followed by 0–5 years (33.3%) and >16 years (28.8%). There was no significant difference in the length of work experience between nursing schools, although the majority of the participants’ length of work experience was 0–5 years in schools D and H and >16 years in school F. The majority (62.8%) of the faculty members were teaching basic nursing (22.4%), pediatric or maternity nursing (20.5%), or adult nursing (19.9%). The minority of the faculty members were teaching geriatric nursing (6.4%), home care nursing (7.1%), psychiatric nursing (6.4%), public health nursing (8.3%), or other fields (9.0%). There was no significant difference by teaching field between schools.

Almost all of the nursing faculty members strongly perceived that oral care was very effective or somewhat effective in the prevention of aspiration pneumonia (99.4%) or in the prevention of frailty (96.8%). There were no significant differences in those perceptions by the length of work experience, school, and teaching field (Table 2).

Table 1 Distribution of the characteristics of the nursing school teachers overall and according to the nursing school

	Total	Group α^{\dagger} ($n = 79$)				Group β^{\ddagger} ($n = 77$)				P-value
		A	B	C	D	E	F	G	H	
Nursing school	$n = 156$	$n = 20$	$n = 16$	$n = 21$	$n = 22$	$n = 20$	$n = 18$	$n = 20$	$n = 19$	
Sex					N (%)					0.713
Male	17 (10.9)	2 (10.0)	1 (6.3)	2 (9.5)	1 (4.5)	3 (15.0)	1 (5.6)	3 (15.0)	4 (21.1)	
Female	139 (89.1)	18 (90.0)	15 (93.8)	19 (90.5)	21 (95.5)	17 (85.0)	17 (94.4)	17 (85.0)	15 (78.9)	
Length of work experience as nursing academic staff (years)										0.073
0–5	52 (33.3)	3 (15.0)	4 (25.0)	8 (38.1)	10 (45.5)	6 (30.0)	5 (27.8)	6 (30.0)	10 (52.6)	
6–15	59 (37.8)	12 (60.0)	7 (43.8)	9 (42.9)	8 (36.4)	8 (40.0)	4 (22.2)	10 (50.0)	1 (5.3)	
≥16	45 (28.8)	5 (25.0)	5 (31.3)	4 (19.0)	4 (18.2)	6 (30.0)	9 (50.0)	4 (20.0)	8 (42.1)	
Teaching field										0.955
Basic nursing	35 (22.4)	5 (25.0)	5 (31.3)	5 (23.8)	4 (18.2)	5 (25.0)	3 (16.7)	5 (25.0)	3 (15.8)	
Pediatric or maternity nursing	32 (20.5)	4 (20.0)	3 (18.8)	5 (23.8)	5 (22.7)	3 (15.0)	5 (27.8)	3 (15.0)	4 (21.1)	
Adult nursing	31 (19.9)	3 (15.0)	4 (25.0)	3 (14.3)	3 (13.6)	4 (20.0)	4 (22.2)	4 (20.0)	6 (31.6)	
Geriatric nursing	10 (6.4)	1 (5.0)	1 (6.3)	1 (4.8)	2 (9.1)	0 (0.0)	2 (11.1)	2 (10.0)	1 (5.3)	
Home care nursing	11 (7.1)	1 (5.0)	1 (6.3)	3 (14.3)	1 (4.5)	2 (10.0)	1 (5.6)	2 (10.0)	0 (0.0)	
Psychiatric nursing	10 (6.4)	1 (5.0)	1 (6.3)	1 (4.8)	1 (4.5)	2 (10.0)	2 (11.1)	1 (5.0)	1 (5.3)	
Public health nursing	13 (8.3)	3 (15.0)	0 (0.0)	3 (14.3)	0 (0.0)	2 (10.0)	0 (0.0)	3 (15.0)	2 (10.5)	
Others	14 (9.0)	2 (10.0)	1 (6.3)	0 (0.0)	6 (27.3)	2 (10.0)	1 (5.6)	0 (0.0)	2 (10.5)	

[†] Nursing schools had an affiliated university hospital with a dental department.

[‡] The nursing schools had no affiliated university hospital with a dental department.

The majority (≥61.5%) of the faculty members were of the opinion that nurses (96.2%), dental hygienists (94.9%), patients' families (87.2%), care workers (81.4%), dentists (78.8%), and speech–language–hearing therapists (61.5%) should provide oral care. In contrast, faculty members' opinions were that physicians, nutritionists, occupational therapists, and physiotherapists should be less involved in the provision of oral care. There was a significant difference in the perception of physicians between schools ($P < 0.05$). The number of persons who thought that physicians should be involved in oral care was lower in the schools that had a university hospital with a dental department (18.2%–42.9%), compared to the other schools (40.0%–61.1%). The majority (>61.5%) strongly perceived that nurses should collaborate with other health-care workers (except physiotherapists) to carry out oral care. There were significant differences by teaching field in the perception of speech–language–hearing therapists and care managers. The proportions of the perceptions of faculty members in basic nursing, geriatric nursing, and home care nursing were significantly higher than those of the faculty members of other teaching fields. The great majority (>74.4%) strongly perceived that

oral care should be provided to all persons, not only patients but also older adults who need nursing care, as well as healthy persons. There were no significant differences in the perceptions of these items between groups by the length of work experience (Table 3).

The great majority (>83.3%) highly perceived that oral health care should be provided at all facilities. The exception was the maternity ward, which was endorsed by 70.5%. There were significant differences in the perceptions of faculty members in acute care hospitals (including the intensive care unit), rehabilitation centers, and pediatric wards between schools ($P < 0.05$ – 0.001). These proportions were lower in school E, compared to the other schools.

The majority (>72.4%) of the faculty members highly endorsed the many components of oral care. However, only about half perceived indirect swallowing training (the training of swallowing without food or drinks), direct swallowing training (the training of swallowing by using food or drinks), and speech therapy as oral care treatments. There was a significant difference between schools in the perception of the use of cleaning interdental surfaces. The proportion was lower among faculty members in school B, compared to those in the

Table 2 Perceptions regarding oral care practice (“Who?” or “Whom?”) overall and according to the nursing school (multiple answers)

	Total	A	B	C	D	E	F	G	H	
	(<i>n</i> = 156)	(<i>n</i> = 20)	(<i>n</i> = 16)	(<i>n</i> = 21)	(<i>n</i> = 22)	(<i>n</i> = 20)	(<i>n</i> = 18)	(<i>n</i> = 20)	(<i>n</i> = 19)	
Nursing school	%									<i>P</i> -value
Who should provide oral care?										
Nurse	96.2	90.0	93.8	95.2	95.5	100.0	94.4	100.0	100.0	0.675
Dental hygienist	94.9	90.0	100.0	85.7	90.9	95.0	100.0	100.0	100.0	0.235
Family	87.2	95.0	93.8	90.5	77.3	85.0	94.4	75.0	89.5	0.376
Care worker	81.4	85.0	87.5	66.7	81.8	80.0	83.3	85.0	84.2	0.789
Dentist	78.8	70.0	68.8	71.4	68.2	85.0	94.4	85.0	89.5	0.258
Speech–language– hearing therapist	61.5	35.0	62.5	47.6	59.1	85.0	72.2	65.0	68.4	0.056
Physician	39.1	25.0	18.8	42.9	18.2	40.0	61.1	60.0	47.4	0.021*
Nutritionist	28.2	20.0	18.8	19.0	18.2	40.0	27.8	50.0	31.6	0.218
Occupational therapist	26.3	15.0	25.0	23.8	22.7	20.0	33.3	35.0	36.8	0.746
Physiotherapist	22.4	20.0	12.5	19.0	18.2	20.0	27.8	30.0	31.6	0.858
With whom should nurses collaborate to conduct oral care?										
Dental hygienist	96.2	100.0	100.0	85.7	95.5	95.0	100.0	95.0	100.0	0.233
Dentist	90.4	90.0	87.5	95.2	95.5	90.0	83.3	85.0	94.7	0.836
Care worker	78.8	85.0	87.5	61.9	86.4	65.0	83.3	85.0	78.9	0.290
Speech–language– hearing therapist	74.4	65.0	75.0	57.1	77.3	90.0	83.3	80.0	68.4	0.307
Physician	69.9	70.0	56.3	61.9	72.7	70.0	72.2	75.0	78.9	0.869
Care manager	62.2	55.0	56.3	61.9	63.6	65.0	61.1	65.0	68.4	0.992
Nutritionist	61.5	65.0	43.8	47.6	50.0	70.0	72.2	75.0	68.4	0.284
Physiotherapist	39.1	40.0	18.8	33.3	50.0	45.0	50.0	30.0	42.1	0.524
To whom should oral care be provided?										
Older adults who need nursing care	98.1	100.0	100.0	90.5	95.5	100.0	100.0	100.0	100.0	0.222
Patients on the hospital ward	94.2	95.0	93.8	90.5	90.9	100.0	94.4	90.0	100.0	0.772
Patients with cancer	92.3	80.0	100.0	95.2	86.4	95.0	94.4	95.0	94.7	0.366
Healthy older adults	86.5	80.0	81.3	90.5	81.8	90.0	94.4	95.0	78.9	0.641
Healthy persons, except for older adults	74.4	70.0	43.8	76.2	68.2	75.0	94.4	80.0	84.2	0.058

* $P < 0.05$.

other schools. The majority (>70.5%) of the faculty members perceived that knowledge of general dentistry, general medicine, and geriatric medicine was important in practicing oral care, except for knowledge of the psychology of aging (48.7%). There were no significant differences in the perceptions of these items between groups based on the length of work experience and teaching field (Table 4).

The levels of the perception of the three items, “Who should provide oral care?”, “To whom should oral care be provided?”, and “What kinds of knowledge are particularly important to carry out in oral care?” in group α were significantly lower than in group β ($P < 0.05$ – 0.001).

DISCUSSION

The present study represents the first attempt to explore the perceptions regarding oral care among nursing faculty members and to identify the effect of the educational environment on their perceptions regarding oral care. This study found that almost all the nursing faculty members perceived that oral care could be effective in preventing aspiration pneumonia and frailty, which suggests that the information was widely spread throughout the schools and they seemed to teach oral care to the nursing students under the common understanding of the effects.

Table 3 Perceptions regarding oral care practice (“Where?” or “What?”) overall and according to the nursing school (multiple answers)

	Total (<i>n</i> = 156)	A (<i>n</i> = 20)	B (<i>n</i> = 16)	C (<i>n</i> = 21)	D (<i>n</i> = 22) %	E (<i>n</i> = 20)	F (<i>n</i> = 18)	G (<i>n</i> = 20)	H (<i>n</i> = 19)	<i>P</i> -value
Nursing school										
Where should oral care be provided?										
Nursing home	98.7	100.0	100.0	100.0	100.0	90.0	100.0	100.0	100.0	0.055
At home	96.2	100.0	100.0	95.2	100.0	85.0	100.0	90.0	100.0	0.082
Acute care hospital (including ICU)	95.5	100.0	100.0	100.0	95.5	75.0	94.4	100.0	100.0	0.001**
Cancer hospital	94.9	95.0	100.0	100.0	95.5	80.0	94.4	100.0	94.7	0.094
Hospice	94.9	100.0	100.0	100.0	90.9	80.0	100.0	95.0	94.7	0.054
Rehabilitation center	89.1	90.0	100.0	90.5	95.5	65.0	94.4	90.0	89.5	0.031*
Pediatric ward	89.1	95.0	93.8	85.7	90.9	65.0	100.0	90.0	94.7	0.023*
Psychiatric ward	83.3	90.0	93.8	85.7	77.3	60.0	94.4	85.0	84.2	0.099
Maternity ward	70.5	80.0	68.8	71.4	68.2	40.0	77.8	80.0	78.9	0.104
What should be included in oral care as treatments or instructions?										
Toothbrushing by caregiver	96.8	95.0	93.8	95.2	95.5	95.0	100.0	100.0	100.0	0.878
Swabbing oral soft tissues	95.5	90.0	100.0	90.5	95.5	100.0	100.0	95.0	94.7	0.631
Removing tongue coatings	94.2	90.0	100.0	85.7	95.5	95.0	100.0	95.0	94.7	0.581
Cleaning dentures	94.2	100.0	93.8	81.0	100.0	90.0	100.0	95.0	94.7	0.131
Cleaning interdental surfaces	89.7	90.0	68.8	90.5	95.5	80.0	100.0	90.0	100.0	0.039*
Gargling	87.8	75.0	93.8	90.5	95.5	75.0	83.3	90.0	100.0	0.135
Oral management	78.8	70.0	75.0	76.2	86.4	65.0	83.3	85.0	89.5	0.520
Perioperative oral management	78.8	80.0	81.3	76.2	81.8	60.0	83.3	75.0	94.7	0.350
Home dental care	74.4	70.0	75.0	66.7	81.8	55.0	83.3	85.0	78.9	0.371
Salivary gland massage	72.4	60.0	81.3	52.4	81.8	70.0	94.4	65.0	78.9	0.078
Indirect swallowing training	53.2	55.0	43.8	52.4	68.2	30.0	61.1	55.0	57.9	0.373
Direct swallowing training	52.6	60.0	43.8	42.9	59.1	35.0	61.1	60.0	57.9	0.566
Speech therapy	43.6	35.0	37.5	42.9	50.0	25.0	61.1	45.0	52.6	0.437
What kind of knowledge is particularly important in practicing oral care?										
General dentistry	90.4	80.0	75.0	95.2	90.9	95.0	88.9	95.0	100.0	0.164
General medicine	84.0	75.0	81.3	66.7	95.5	75.0	83.3	95.0	100.0	0.039*
Geriatrics	70.5	65.0	75.0	57.1	68.2	65.0	61.1	90.0	84.2	0.272
Psychology of aging	48.7	10.0	0.0	57.1	68.2	70.0	11.1	80.0	78.9	0.000***

P* < 0.05, *P* < 0.01, and ****P* < 0.001. ICU, intensive care unit.

Almost all the nursing faculty members perceived that nurses are responsible for the provision of oral care. Haresaku, Mariño, Naito, and Morgan (2016) reported that only 72.6% perceived nurses as the oral care providers. Nurse faculty members were more likely than dental faculty members to perceive that nurses should provide oral care.

There was a school-based difference in the perceptions of physicians as oral health providers. The nursing faculty members with low perceptions of involvement in oral care were likely to be in schools that had an affiliated university hospital with a dental department. Haresaku, Mariño, Naito, and Morgan (2016) reported that >90% of physicians in the dental schools did not feel

Table 4 Comparison of the total numbers of answer choices that were selected for each item between groups α and β

Question items (maximum numbers of answer choices)	Group α^{\dagger} (n = 79)		Group β^{\ddagger} (n = 77)		P-value
	Mean (SD) [§]	Mean rank	Mean (SD)	Mean rank	
Who should provide oral care? (10)	5.58 (2.24)	68.20	6.75 (2.20)	89.07	0.004**
With whom should nurses collaborate to conduct oral care? (8)	5.49 (2.05)	73.29	5.96 (2.06)	83.84	0.138
To whom should oral care be provided? (5)	4.28 (1.18)	72.47	4.64 (0.74)	84.68	0.038*
Places where oral care should be provided (9)	8.35 (1.10)	79.99	7.88 (2.11)	76.97	0.623
What should be included in oral care as treatment or instruction? (13)	8.35 (1.10)	76.44	7.88 (2.11)	80.61	0.557
What kinds of knowledge are particularly important to carry out in oral care? (4)	2.68 (1.06)	67.59	3.19 (1.00)	89.69	0.001***

* $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$.

[†] A, B, C, and D nursing schools that have an affiliated university hospital with a dental department.

[‡] E, F, G, and H nursing schools that have no affiliated university hospital with a dental department

[§] SD, standard deviation.

that they should provide oral care. Therefore, the physicians in the hospitals might have had the same perception. Mori *et al.* (2017) reported that nurses in a university hospital carried out oral care in collaboration with oral health professionals. The nurses and oral health professionals in the university hospitals might be the main providers of oral care. Therefore, the working environment might affect negative perceptions.

In addition, there were significant differences based on the teaching field in the perceptions of the speech-language-hearing therapists and care managers as collaborators in nursing oral care practice. The faculty members with the high perceptions were likely to belong to the teaching fields, such as basic nursing, adult nursing, geriatric nursing, and home care nursing, and they usually were collaborating with those health professionals in their work. Those strong collaborations in their work might have affected their perception of collaborators in oral care practice.

The majority of the faculty members perceived that oral care should be provided in all facilities, such as hospitals, care facilities, and homes. However, there were some differences in the perceptions among faculty members of the different schools. The faculty members with low perceptions of involvement in oral care were likely to be in a school that had no hospital with a dental department. As a result of the lack of involvement with a hospital dental department, these faculty members might have altered perceptions of hospital involvement. Further studies are needed to clarify the cause of the apparent differences in perception.

The majority of the faculty members perceived that treatments and instructions in oral care should include methods for maintaining good oral hygiene, such as

tooth brushing, removing tongue coatings, cleaning dentures, and cleaning interdental surfaces. Approximately 80% of the faculty members perceived perioperative oral management as an oral care treatment. Medical insurance regarding perioperative oral function management in hospitals was introduced in 2012. The introduction of medical insurance might affect their high perception of perioperative oral management.

The faculty members' perceptions regarding whether swallowing training and speech therapy should be included in the treatment of oral care were divided almost equally. Moreover, there were no differences in their perceptions based on their length of work experience, teaching field, and school. Therefore, the individual's background or other factors might affect the differences in perceptions. An important problem in oral care education is the possibility that nursing faculty members with different perceptions teach oral care to nursing students in the same teaching field or in the same school. This situation might confuse the nursing students and negatively impact oral care education.

The majority of the faculty members perceived that knowledge of general dentistry, general medicine, and geriatrics (except for the psychology of aging) was particularly important to oral care practice. The prevalence of caries and periodontal disease in older adults has increased (Ministry of Health, Labour and Welfare, 2016). Therefore, knowledge of geriatrics and the psychology of aging are becoming increasingly important for providing oral care to older adults. The faculty members with low perceptions of involvement in oral care might not have understood the importance of this knowledge or might have perceived that their main

persons to whom oral care was provided were not exclusively older adults.

The results of this study showed that the faculty members in the schools that had an affiliated university hospital with a dental department were more likely to perceive fewer practitioners who should provide oral care and fewer persons to whom oral care should be provided and they were more likely to need lower levels of knowledge to carry out oral care than the faculty members in the other schools. Medical insurance for perioperative oral function management, which was introduced in 2012, is applied for inpatients in the perioperative period when they receive oral function management, such as dental treatment and oral care by oral health professionals. The availability of insurance has promoted cooperation between medical and dental departments in university hospitals regarding oral care (Akamatsu *et al.*, 2015; Mori *et al.*, 2017). The perioperative oral function management was conducted by healthcare workers in all the affiliated university hospitals in collaboration with the dental department. The healthcare workers in those hospitals might be more likely to perceive that the persons who should be provided with oral care were only their inpatients, the collaborators of oral care were only the healthcare workers in the hospital, and that they could practice nursing oral care without knowledge of the psychology of aging. Therefore, such an environment in the affiliated university hospitals might affect the perceptions among the faculty members in those schools. In contrast, the faculty members in the other schools might be likely to perceive oral care as the wider concept of oral care.

Several limitations that are associated with this study warrant mention. Participation in the study was voluntary and therefore an element of self-selection was present and the data were self-reported. Maintaining anonymity was paramount, but unfortunately, the response rates were strongly affected by the self-motivation to participate. The achieved overall response rate of 71.6% was within the normally accepted range for surveys (Miyatake, Kazama, Isoda, & Nejima, 2004). Additionally, in Japan, there were 1793 nursing schools in 2016, although only eight schools in one prefecture were investigated in this study. However, there were many different perceptions of the nursing faculty members regarding oral care among the nursing schools. There might be many factors associated with their perceptions regarding oral care.

Only educational environments, such as the teaching field, school, and facility setting, were investigated as

the factors in this study. The involvement of the faculty (e.g. the number of lectures that are provided to students and who [nurse or dentist] provides the lecture) could affect the perception of oral health care. Therefore, further studies are needed to reveal nursing faculty members' perceptions of oral care and the other factors that are associated with their perceptions.

CONCLUSION

There were significant differences by teaching field in the perceptions regarding with whom nurses should collaborate to conduct oral care. There were also significant differences by school in the perceptions regarding who should provide oral care, where it should be provided, and what kinds of knowledge are important for practice. The perceptions of low involvement in oral care were significantly associated with the schools that had an affiliated university hospital with a dental department. The educational environments might affect nursing faculty members' perceptions of oral care practice. In addition, their perception regarding whether swallowing training and speech therapy should be included in oral care treatment was divided almost equally, without the effects of the educational environment. Therefore, it is suggested that oral care education should be standardized and that nursing faculty members should provide the same message regarding oral care to nursing students.

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DISCLOSURE

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

S. H. searched and reviewed the literature, analyzed the data, and wrote the manuscript; K. K., H. I., and T. N. negotiated with the nursing schools to conduct this study and critically reviewed the manuscript and supervised the

whole study process; M. M., M. M., and H. A. assisted in finding documents, issuing questionnaires, analyzing the data, and examining the manuscript; T. H., Y. S., Y. M., M. Y., and C. Y. distributed the questionnaires for research and provided the information regarding the educational environments in their schools. All the authors read and approved the final manuscript.

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