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Comparison of perceptions, attitudes and performance regarding collaborative oral health care among health-care workers

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Objective: Collaborative oral health care among health-care workers (HCWs) is important to prevent oral and systemic diseases. The purpose of this study was to investigate the perceptions, attitudes and performance of HCWs regarding collaborative oral health care and to compare them among HCWs. **Method:** The subjects were dentists (DTs), dental hygienists (DHs), hospital nurses (HNs), speech–language–hearing therapists (STs) and certified care workers (CCWs) in Fukuoka Prefecture, Japan. DTs were members of the Fukuoka Dental Association, and DHs worked in dental clinics. HNs worked in hospitals without dental departments. STs and CCWs were members of professional associations. Data were collected by a mail survey. The chi-square test and Kruskal–Wallis test were used to compare the data among HCWs. **Results:** A total of 119 DTs, 91 DHs, 229 HNs, 119 STs and 121 CCWs participated in this study. The total response rate was 20.6%. There were significant differences in perceptions of what should be performed as part of oral health care among HCWs. Only 20%–60% of HCWs performed collaborative oral health care, while more than 75% were willing to perform such care. Levels of collaborative oral health care with other types of professionals and positive willingness to perform such care were lower among HNs than among the other HCWs. **Conclusions:** It is suggested that oral health professionals should recognise the presence of differences in the perceptions, attitudes and performance among other types of HCW and try to improve these to promote interprofessional collaboration of oral health care in hospitals.

Key words: *Oral health care, nurse, dentist, interprofessional collaboration, health care worker*

INTRODUCTION

Oral health care is important for preventing dental diseases and maintaining good oral health[1,2], and health professionals other than oral health professionals perform oral health care for patients in hospitals and for residents in nursing care facilities[3,4].

In Japan, because of the rapidly increasing number of elderly in the population, measures related to oral health care in such individuals have significantly improved[5]. However, the term 'oral health care' has various interpretations and thus its meaning is not always clear[6]. The Japanese Society of Oral Health Care[7] 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'. Oral health care includes: oral examination; oral hygiene; cleaning of dentures; rehabilitation of mastication, eating and swallowing; gingival and buccal massage; meal assistance; treatment of halitosis; and prevention of xerostomia. Despite proposals of definitions of oral health care by some institutions[7,8], differences in perceptions of oral health care among nurses[9], dental faculty members[10] and nursing faculty members[11] have been reported and it was suggested that these differences might have negative impacts on oral health-care education[10,11].

Collaborative oral health care by health-care workers (HCWs), for patients in hospitals or residents in elderly care facilities, is important, not only to prevent oral complications but also to prevent systematic diseases, such as pneumonia and cardiovascular disease[12–14]. Problems with different perceptions of oral health care among HCWs may occur in such facilities. However, there are few studies in which differences of perceptions regarding oral health care among HCWs in a community have been investigated, although the results of a study about this perception in a small

group (n = 67) of HCWs have been reported at a conference[9]. In addition, there have been few studies at the community level examining the percentage of HCWs who have performed collaborative oral health care with professionals and the percentage who are willing to perform such care.

The purpose of this study was to investigate the perceptions, attitudes and performance of HCWs regarding collaborative oral health care, and to compare these factors among different types of HCW in Fukuoka Prefecture, Japan.

METHODS

Design and sample

A cross-sectional study was conducted using a self-administered questionnaire for HCWs in Fukuoka Prefecture between February 1, 2019 and July 30, 2019. Fukuoka Prefecture is situated on the northern shore of the Japanese island of Kyushu. The subjects were dentists (DTs), dental hygienists (DHs), hospital nurses (HNs), speech–language–hearing therapists (STs) and certified care workers (CCWs) in the prefecture. DTs were members of the Fukuoka Dental Association (FDA) in Fukuoka city and worked in their private dental clinics. Fukuoka city is a prefectural capital in the prefecture. The total number of FDA members in Fukuoka prefecture was 3,108, 813 (26.2%) of whom were in Fukuoka city. Two copies of the questionnaire were sent to all FDA members in Fukuoka city by mail from the FDA. DTs were asked to complete a copy of the questionnaire and to select a DH to complete another questionnaire. If the selected DHs completed the questionnaire, they were included as DHs in this study. The DTs were asked to return the questionnaires in the enclosed return envelope. HNs were nurses who worked in five hospitals in the prefecture. The five hospitals were randomly selected, using a random number table, from 28 collaborative hospitals for nursing research and nursing student education that were affiliated with a nursing school to which the author belonged. There were 30, 35, 38, 200 and 250 HNs in the five hospitals selected. All hospitals were general hospitals with no dental departments. A copy of the questionnaire was distributed to HNs by the head nurse in each hospital. HNs were asked to complete the questionnaire and return it in the enclosed return envelope. STs were members of the Fukuoka Speech–Language–Hearing Therapist Association, and CCWs were members of the Fukuoka Association of Certified Care Workers. The total number of members of the respective associations in the prefecture was 662 STs and 680 CCWs. A copy of the questionnaire was sent from all associations to all their members by mail. The members were asked to complete the questionnaire and return it in the enclosed return envelope.

Ethical considerations

The purpose of the study was explained in the documents enclosed with the questionnaire. A returned questionnaire was considered to indicate consent to participate. This study was approved by the Ethics Committee of Fukuoka Gakuen, Fukuoka, Japan (approval #429).

Instrument

Information was derived from previously developed questionnaires that were used to study the perceptions of, and attitudes towards, oral health care among nursing staff[8], dental faculty members[9] and nursing faculty members[10]. The questionnaire was pilot tested by some STs and CCWs who worked in a hospital in the prefecture before the study. These STs and CCWs were excluded from participating in this study.

The questionnaire consisted of items in the following sections: sociodemographic information (gender and age); work experience (profession, length of work experience and workplace); perceptions of oral health care; and attitudes and performance regarding collaborative oral health care with HCWs. Age and length of work experience were divided into two groups: '<40 years' and '≥40 years' for age and '<15 years' and '≥15 years' for length of work experience. Workplace was categorised into four groups: private dental clinic; hospital; elderly care facility; and other.

Regarding oral health care, the subjects were asked, 'What should be performed in oral health care?' There were 15 items regarding oral health-care skills and treatments in this question. Response options of 'Yes' or 'No' were given for each item. Next, the subjects were asked, 'How often do you perform collaborative oral health care with professionals?' and 'How often would you be willing to perform collaborative oral health care with professionals?' Response options were 'Very often', 'Sometimes', 'Seldom' or 'Never' for seven items (dentist, dental hygienist, physician, hospital nurse, visiting nurse, speech–language–hearing therapist, and certified care worker), indicating the frequency of collaborative oral health care for each of these types of health-care professional. The total percentages of 'Very often' and 'Sometimes' responses for each type of health-care professional indicated the level of collaborative oral health care performed by this type of professional and the positive willingness of the subject to undertake such collaboration. To investigate the levels of collaborative oral health care performed by other types of health-care professional and levels of positive willingness, the

responses 'Very often', 'Sometimes', 'Seldom' and 'Never' for the questions were scored as '4', '3', '2' and '1', respectively. The scores for the items related to collaboration with six professionals (i.e., excluding the same type of professional as the subject) were summed, and the summed scores were defined as the levels of performance of collaborative oral health care with the other types of professionals and levels of positive willingness. For example, for DTs, the scores for the items related to the six types of professionals except for 'Dentist' were summed, and the summed scores were defined as DTs' levels. The total scores ranged from 6–24 points.

Data collection

The questionnaire was distributed to 3,521 HCWs in the prefecture. Among the selected participants, 679 HCWs participated in this study, with an average response rate of 20.4% (14.6% for DTs, 11.2% for DHs, 41.4% for HNs, 17.5% for STs and 18.3% for CCWs).

Data analysis

Chi-square tests were conducted to analyse differences in characteristics among HCWs, differences in their perceptions of oral health care and differences in their attitudes and performance regarding collaborative oral health care. Kruskal–Wallis testing was used to compare the level of collaborative oral health care among the HCWs and positive willingness to perform this collaboration. Dunn's pairwise tests were used to compare the levels of collaborative oral health care among the five pairs of professional groups. Data were analysed with 5% significance. All statistical analyses were performed using IBM SPSS Statistics for Windows (Version 21.0., Released 2012; IBM Corp., Armonk, NY, USA).

RESULTS

A total of 679 HCWs participated in this study. The majority (75.3%) of the HCWs were female, while the majority (79.8%) of the DTs were male (*Table 1*). The majority of DTs and CCWs were ≥40 years of age, while the majority of subjects in the other groups were <40 years of age. Except for the DT group, the majority of the HCWs had worked for fewer than 15 years. All DTs and DHs worked in private dental clinics. All HNs and 73.9% of STs worked in hospitals. The majority (62.0%) of CCWs worked in elderly care facilities. There were significant differences in all categories of characteristic among the HCWs ($P < 0.001$).

Table 2 shows the percentages of HCWs who perceived each item to be included in oral health care. There were significant differences in all categories, except for toothbrushing, among HCWs ($P < 0.01$). Higher percentages of DTs and DHs than other professionals perceived the use of interdental cleaning tools, dental examination, removal of dental plaque and calculus, and topical fluoride application to be oral health care. A higher percentage of STs than other professionals perceived speech training to be oral health care.

Table 3 shows the percentages of HCWs who performed collaborative oral health care with other types of professionals and who were willing to perform such care. There were significant differences in all items among the HCWs ($P < 0.05$). More than 80% of HCWs performed collaborative oral health care with others in their own profession. However, less than 70% performed collaborative oral health care with other types of professionals. In addition, less than 30% of HNs performed collaborative oral health care with oral health professionals.

More than 80% of HCWs were willing to perform collaborative oral health care with DHs, DTs, HNs, physicians and STs. There were significant differences in all items among HCWs ($P < 0.01$). Less than 70% of DTs and DHs were willing to perform collaborative oral health care with STs, while more than 95% of STs were willing to perform such care with DTs and DHs.

Table 4 shows the levels of collaborative oral health care performed with other types of professionals and the levels of positive willingness to collaborate. There was a significant difference in the levels of collaborative oral health care performed among HCWs ($P < 0.001$). The level of collaborative health care performed among HNs was likely to be lower than for other HCWs. Comparison of pairs of HCWs showed significant differences in collaborative health care between DTs and CCWs, DHs and STs, DHs and CCWs, and HNs and the other HCWs ($P < 0.05$).

There was a significant difference in the level of positive willingness among HCWs ($P < 0.001$). The level of positive willingness among HNs was likely to be lower than those among the other HCWs. In the pairs of HCWs, there were significant differences in positive willingness between DHs and HNs and between HNs and STs.

DISCUSSION

The present study represents the first attempt to explore the perceptions, attitudes and performance regarding collaborative oral health care among HCWs. This study found that approximately 80% of HCWs perceived that swallowing training was included in oral health care. However, previous studies in Japan reported that

Table 1 Distribution of characteristics of health-care workers (HCWs)

Characteristics	HCWs						*P*-value*
	Total (n = 679)	DTs (n = 119)	DHs (n = 91)	HNs (n = 229)	STs (n = 119)	CCWs (n = 121)	
Sex							
Male	24.7	79.8	0.0	8.7	22.7	21.5	<0.001
Female	75.3	20.2	100.0	91.3	77.3	78.5	
Age (years)							
<40	47.7	5.0	57.1	68.1	68.1	24.0	<0.001
≥40	52.3	95.0	42.9	31.9	31.9	76.0	
Length of work experience (years)							
<15	54.8	10.9	53.8	68.6	71.4	56.2	<0.001
≥15	43.3	84.9	45.1	29.7	27.7	42.1	
Missing values	1.9	4.2	1.1	1.7	0.8	1.7	
Workplace							
Private dental clinic	30.9	100.0	100.0	0.0	0.0	0.0	<0.001
Hospital	50.1	0.0	0.0	100.0	73.9	22.3	
Elderly care facility	13.1	0.0	0.0	0.0	10.1	62.0	
Other	5.3	0.0	0.0	0.0	16.0	14.0	
Missing value	0.6	0.0	0.0	0.0	0.0	1.7	

Results are given as percentage values.
CCWs, certified care workers; DHs, dental hygienists; DTs, dentists; HNs, hospital nurses; STs, speech–language–hearing therapists.
*Chi-square test.

Table 2 Distribution of health-care workers' (HCWs) perception of the procedures that should be performed in oral health care

Procedure	HCWs						*P*-value*
	Total (n = 654)	DTs (n = 118)	DHs (n = 91)	HNs (n = 219)	STs (n = 115)	CCWs (n = 111)	
Toothbrushing	97.9	97.5	98.9	99.6	95.0	97.5	0.064
Cleaning of the tongue and buccal mucosa with a cotton swab, gauze or sponge brush	96.2	89.8	96.7	99.1	99.2	93.4	<0.001
Denture cleaning	95.1	95.8	96.7	98.3	89.1	93.4	0.004
Xerostomia prevention	94.1	91.5	94.5	97.8	95.8	87.5	0.002
Strength training for the masticatory, perioral and tongue muscles	84.9	92.4	90.1	80.8	89.1	77.5	0.002
Gingival and buccal massage	83.1	87.4	95.6	81.7	89.9	65.3	<0.001
Elimination of halitosis	82.0	90.8	94.4	83.8	77.3	65.0	<0.001
Training in swallowing function	79.6	81.4	83.5	83.0	81.5	66.9	0.005
Training in eating function	79.0	83.1	79.1	82.5	84.0	63.3	<0.001
Use of interdental brush	79.0	95.0	100.0	70.6	71.2	70.8	<0.001
Use of dental floss	76.0	94.9	98.9	68.1	67.2	63.9	<0.001
Speech training for rehabilitation	66.2	67.2	67.8	68.6	78.0	47.5	<0.001
Dental examination	57.7	92.4	92.3	44.5	40.7	39.2	<0.001
Removal of dental plaque and calculus	56.3	98.3	98.9	41.7	33.6	32.5	<0.001
Topical fluoride application	48.9	89.9	95.6	35.0	21.8	25.4	<0.001

Results are given as percentage values.
CCWs, certified care workers; DHs, dental hygienists; DTs, dentists; HNs, hospital nurses; STs, speech–language–hearing therapists.
*Chi-square test.

only 53.2% of nursing faculty members and 71.3% of dental faculty members perceived swallowing training to be oral health care[10,11]. In addition, 66.2% of the HCWs in this study perceived speech training for rehabilitation to be oral health care, but fewer than half of faculty members in previous studies perceived it to be oral health care[10,11]. These differences indicate discrepancies in perceptions of oral health care between HCWs in the community and health professionals in educational institutions.

There were also significantly different perceptions of oral health care among HCWs. Perceptions of dental examination, removal of dental plaque and calculus, and topical fluoride application as oral health care were higher among the oral health professionals than among the other groups. In addition, perceptions of speech training as oral health care were higher among STs than among the other professionals. In Japan, dental examination, removal of dental calculus with dental scaling instruments and the use of topical

Table 3 Percentages* of health-care workers (HCWs) who performed and were willing to perform collaborative oral health care with professionals

Item	HCWs						*P*-value†
	Total (n = 654)	DTs (n = 118)	DHs (n = 91)	HNs (n = 219)	STs (n = 115)	CCWs (n = 111)	
How often do you perform collaborative oral health care with professionals?							
Hospital nurse	60.4	32.8	17.6	86.6	76.7	55.4	<0.001
Dental hygienist	57.6	90.8	91.2	25.5	50.8	65.5	<0.001
Dentist	52.2	83.5	98.9	15.9	50.0	55.7	<0.001
Speech–language–hearing therapist	45.2	10.3	3.3	60.6	89.2	40.9	<0.001
Physician	41.3	53.8	37.8	37.1	38.1	42.9	0.035
Certified care worker	32.3	21.0	23.1	7.3	37.6	94.7	<0.001
Visiting nurse	20.3	22.7	17.6	10.0	19.1	40.9	<0.001
How often would you be willing to perform collaborative oral health care with professionals?							
Dental hygienist	94.5	96.6	98.9	89.7	96.6	95.8	0.004
Dentist	93.9	93.0	100.0	89.8	95.8	95.8	0.007
Hospital nurse	91.7	94.9	85.6	97.3	94.9	79.3	<0.001
Physician	90.5	98.3	89.0	92.0	85.3	86.0	0.003
Speech–language–hearing therapist	81.4	69.7	63.3	84.1	100.0	84.6	<0.001
Visiting nurse	77.9	87.4	83.5	75.4	77.8	68.6	0.006
Certified care worker	76.8	82.4	83.5	59.2	80.0	96.6	<0.001

Results are given as percentage values.
CCWs, certified care workers; DTs, dentists; DHs, dental hygienists; HNs, hospital nurses; STs, speech–language–hearing therapists.
*Total percentage of selections of 'Very often' and 'Sometimes'.
†Chi-square test.

Table 4 Levels of performance of collaborative oral health care with other types of professionals and levels of positive willingness

Item	HCWs DTs (n = 110)	DHs (n = 88)	HNs (n = 215)	STs (n = 109)	CCWs (n = 105)	*P*-value†
Level of performance of collaborative oral health care with other types of professionals						
Median	12.0	11.0	10.0	14.0	15.0	<0.001
Level of willingness to perform collaborative oral health care with other types of professionals						
Median	22.0	20.5	19.0	22.0	21.0	<0.001

CCWs, certified care workers; DHs, dental hygienists; DTs, dentists; HCWs, health-care workers; HNs, hospital nurses; STs, speech–language–hearing therapists.
***Dunn's pairwise test, adjusted P <0.001.
**Dunn's pairwise test, adjusted P <0.01.
*Dunn's pairwise test, adjusted P <0.05.
†Kruskal–Wallis test.

fluoride application for patients are professional treatments provided by oral health professionals under the national health insurance[15]. Speech training is one of STs' professional skills[16]. Therefore, it seems that HCWs might tend to perceive skills or treatments that they usually perform as ones which should be performed as part of oral health care.

Perceptions of the use of interdental cleaning tools to be oral health care were low among the HCWs, except for oral health professionals; however, such

tools are not professional instruments for oral health professionals. A previous study in Japanese hospitals reported that only 2% of nurses used interdental cleaning tools when performing oral health care for their patients[17]. Using floss or interdental brushes in addition to toothbrushing reduces gingivitis, plaque, or both, more than toothbrushing alone[18]. Therefore, it is suggested that oral health professionals should support other HCWs in using interdental cleaning tools when providing oral health care for patients in hospitals or residents in elderly care facilities.

Our study revealed significant differences in perceptions of oral health care among HCWs. In addition, our study and a previous study revealed differences in perceptions of oral care between HCWs in the community and health professionals in educational institutions. These different perceptions might negatively affect interprofessional collaborative oral health care. Therefore, it is suggested that oral professionals should develop a definition of oral health care among HCWs so that HCWs can perform collaborative oral health care based on a common understanding.

Less than 30% of HNs performed collaborative oral health care with oral health professionals, and their levels of collaboration with the other professionals were lowest among all the groups of HCWs. Medical insurance for perioperative oral function management, which was introduced in 2012, is applied for inpatients during the perioperative period when they receive oral function management, such as dental treatments and oral health care, by oral health professionals. The availability of insurance has promoted cooperation between medical and dental departments in university hospitals regarding oral health care[19,20]. However, all HNs in this study worked in hospitals without dental departments. If they performed collaborative oral health care with oral health professionals, they needed support from outside the hospital. This barrier might explain the low level of collaborative oral health care between HNs and the other types of professionals. A previous study reported that only 26.8% of 1,952 hospitals have dental departments[21]. Oral health care is important to prevent pneumonia, such as aspiration pneumonia and ventilator-associated pneumonia[22]. The best intervention to reduce the incidence of aspiration pneumonia is the combination of daily oral health care and professional oral health care by oral health professionals once a week[23]. Professional oral health care reduced oral mucositis pain in patients treated by chemotherapy concurrent with radiotherapy for oral cancer[24]. Therefore, a system to promote interprofessional collaborative oral health care in hospitals without dental departments should be developed to prevent not only dental diseases but also systematic complications such as pneumonia.

More than half of STs performed collaborative oral health care with oral health professionals, and most were willing to perform such care with oral health professionals. STs are professionals in the treatment of communication disorders and swallowing problems[16]. Speaking and swallowing function are associated with oral health-related quality of life[25,26]. Therefore, oral health professionals should perform collaborative oral health care with STs to improve function.

Several limitations associated with this study are notable. 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 response rates were affected by self-motivation to participate. Because of the use of mail surveys in this study, the overall response rate achieved, of 20.4%, was low. One study on mail survey response rates found that response rates were higher when the survey's topic was interesting to the respondents[27]. The people interested in the topic were more likely to respond than those who were not interested. Therefore, this study's respondents might have been more interested in oral health care than the non-respondents. As a result, the perceptions, attitudes and performance regarding collaborative oral health care of the HCWs in the current study might have been more positive than among all HCWs. Selection bias might have occurred because only five general hospitals were selected from 28 hospitals in the prefecture, and DTs were the only members in the prefectural capital of the prefecture. This study covered only one prefecture, Kyushu Island. Therefore, further studies are needed to understand HCWs' perceptions, attitudes and performance regarding collaborative oral health care in Japan.

CONCLUSION

Our study showed that there were significant differences in perceptions of oral health care among HCWs. In addition, less than 30% of HNs who worked in hospitals without dental departments performed collaborative oral health care with oral health professionals, and their levels of performance and positive willingness to perform such care with the other types of professional were the lowest among all the groups of HCWs studied. Therefore, it is suggested that oral health professionals should recognise the differences in the perceptions, attitudes and performance among HCWs and try to improve these to promote interprofessional collaboration for oral health care in hospitals. In addition, a system for promoting collaborative oral health care between nurses and other health professionals, such as oral health professionals and STs, should be developed to prevent not only dental

diseases but also systematic diseases. Those problems, which were identified in this study, may occur in other countries with aging societies; thus, this study may serve as a reference for those countries.

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Conflicts of interest

The authors declare no conflicts of interest.

Author contributions

S.H and H.A searched and reviewed the literature, analysed the data, and wrote the manuscript; M.M, M.M, K.M, and F.N assisted in finding documents, issuing questionnaires, analysing data, and examining the manuscript; K.K and N.T negotiated with the hospitals and the associations to conduct this study, critically reviewed the manuscript, and supervised the entire study process. All authors read and approved the final manuscript.

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