

## Original Article

# A cross-sectional survey on the status of oral health administration for students in Japanese universities

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### Abstract

**Purpose:** A rapid deterioration of oral health after high school age is an issue to be addressed in Japan. Although this problem may relate to the weakness of oral health promotion for university students, the investigation of oral health-promoting activities, including annual dental checkups (DCs), undertaken by universities has never been conducted. Therefore, a questionnaire survey among health administration departments (HADs) was conducted to clarify the status of oral health-promoting activities for students.

**Methods:** Self-administered questionnaire was voluntarily answered by HAD's staff in 2015-2016. The major questions were on information concerning the university, HAD's staff, implementation of DCs, and oral health-promoting activities for students.

**Results:** Of 295 universities, 130 valid responses (response rate 44.1%) were analyzed. DCs were implemented in 10.9% of the universities. The main reasons for not implementing DCs were the large

budgetary burden and low needs of students. The dental clinic introductory service was undertaken by 62.3%, whereas provision of oral health information was undertaken by only 23.8%.

**Conclusion:** A low ratio of universities implemented DCs and provided oral health information. Further expansion of DC implementation is considered difficult because of the budgetary burden. Promoting the provision of oral health information from universities is required to improve students' oral health.

**Keywords:** Annual health checkups, Dental checkups, Oral health promotion, Health administration department, Japanese university students

### Introduction

It is now widely accepted that oral health is a significant factor for systemic health, based on studies revealing associations between oral diseases and systemic diseases<sup>1-3</sup>. Epidemiological studies have shown a mutual relationship between periodontitis and diabetes, where chronic inflammation by periodontal diseases negatively affects glycemic control, probably through increasing insulin resistance, and diabetes impacts on susceptibility and severity of periodontitis<sup>4, 5</sup>. Furthermore, inflammatory mediators generated by periodontitis diffuse systemically and cause systemic inflammation and endothelial dysfunction, which may relate to cardiovascular diseases<sup>6, 7</sup>. More recent studies have reported the possibility that cognitive decline due to Alzheimer's disease

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is worsened by periodontitis<sup>8-10</sup>. Although the prevalence of these systemic diseases increases in relatively older people than university students, the deterioration of oral health during young age may link to risks of future systemic diseases.

Therefore, the prevention of oral diseases from a young age is important for preventing lifelong systemic diseases. The survey of dental diseases in Japan 2016\* showed that the prevalence of dental caries and periodontal diseases turns in an upward trend during the early 20s of age, and that the prevalence rate of dental caries reaches 99.5% in their late 30s and severe periodontitis gradually increases from this age onward. This situation suggests that oral health promotion at this life stage has special significance for lifelong oral health. However, oral health promotion among people from late adolescence to young adults has been left behind, although the "Act concerning the Promotion of Dental and Oral Health"<sup>\*\*\*</sup> was enacted in 2011 in Japan, and measures for enhancing awareness of oral health knowledge and promoting regular dental checkups across all ages have been conducted by national and local governments to facilitate the oral health of the nation.

An important issue of oral health at this age stage is that a considerably low proportion of people attend dental clinics for regular checkups. The surveys among students aged 18-19 years in a university reported that the proportion of students who underwent regular dental checkups (DCs) in the past year was 16.7% in 2016<sup>11</sup> and 29.6% in 2020<sup>12</sup>. Another web survey on regular DCs reported a prevalence rate of 29.1% in 2012 among those in their 20s<sup>13</sup>. Recent National Health and Nutrition Survey Japan demonstrated gradual improvement of regular DCs with the times as a whole, however still lower rate in their 20s compared to older age groups.<sup>\*\*\*</sup>

The above-mentioned oral health problems at this age stage in Japan might be caused by several factors. One of these factors may be the beginning of irregular diet and poor oral hygiene habits associated with living alone after graduation from high school. Another possible factor is decreased opportunities of receiving DCs after high school because the provision of annual DCs is mandatory up to high school by the regulation of the

School Health and Safety Act<sup>\*\*\*\*</sup>, but it is not required in a university or college setting. Since the provision of annual DCs for university students is not mandatory, many universities are assumed to omit DC from annual health checkups. However, the status of the provision of annual DCs for students among Japanese universities has never been investigated. Therefore, a questionnaire survey among health administration departments (HADs) was conducted in 2015-2016 to clarify the implementation status of annual DCs and attitudes toward them. Since enhancing oral health awareness is important to prevent oral diseases, the status and the content of oral health-promoting activities other than DCs undertaken by HADs were also investigated to discuss the dental professionals' role in improving oral health of university students.

## Materials and Methods

### Study design and settings

This cross-sectional study was conducted from December 2015 to February 2016. A self-administered questionnaire was sent through an e-mail to the member universities of the Kanto-Koshinetsu regional committee of the Japan University Health Association. Additionally, the questionnaire was sent by postal mail to all national or public universities and private medical universities located outside of Kanto-Koshinetsu area to collect information covering all areas of Japan. The staff of the HADs of the universities voluntarily responded to the questionnaire, and filled questionnaires were sent back by e-mail or postal mail.

### Survey items

The questionnaire consisted of the items:

1. Basic information on the university: the number of students enrolled and the number of faculties
2. Information on the HAD: existence and number of health care professionals employed at the HAD including dentists
3. The need for a full-time dentist at the HAD and reasons
4. Implementation of optional examination items in annual health checkups other than mandatory examination items (height, weight, nutritional status, diseases and abnormalities of the eyes, heart, and others, otorhinolaryngological disease, skin disease, and tuberculosis)

\* <https://www.mhlw.go.jp/toukei/list/62-17c.html> (accessed on January 23, 2022)

\*\* [https://elaws.e-gov.go.jp/document?lawid=423AC010000095\\_20150801\\_0000000000000000](https://elaws.e-gov.go.jp/document?lawid=423AC010000095_20150801_0000000000000000) (in Japanese, accessed on January 20, 2022)

\*\*\* <https://www.mhlw.go.jp/stf/houdou/0000177189.html> (in Japanese, accessed on May 30, 2022)

\*\*\*\* <https://elaws.e-gov.go.jp/document?lawid=333M50000080018> (in Japanese, accessed on January 20, 2022)

Table 1. Association of implementation of DCs with properties of universities, professionals in HADs, implementation of oral health-promoting activities, and attitudes toward necessity of DCs

Variables	Total	DCs		p-value
		Implementing (n = 14)	Not implementing (n = 116)	
	median (IQR)	median (IQR)	median (IQR)	
<b>Number of faculties<sup>a</sup></b>	2 (1-5)	4.5 (2.8-11.3)	2 (1-5)	0.018*
<b>Number of students enrolled<sup>a</sup></b>	2556 (1026.3-6098.3)	5202.5 (2820.0-11020.8)	2104 (1006.0-5460.0)	0.019*
<b>Total number of professional types in HADs<sup>a</sup></b>	2 (1-4)	4 (2-5)	2 (1-3)	0.013*
	n (%)	n (%)	n (%)	
<b>Professionals in HADs<sup>†b</sup></b>				
Nurse	88 (67.7)	13 (92.9)	75 (64.7)	0.036*
Public health nurse	73 (56.2)	8 (57.1)	65 (56.0)	1.000
Physician	61 (46.9)	8 (57.1)	53 (45.7)	0.572
Clinical psychologist	41 (31.5)	9 (64.3)	32(27.6)	0.012*
Dentist	2 (1.5)	1 (7.1)	1 (0.9)	0.205
Clerk	42 (32.3)	8 (57.1)	34 (29.3)	0.065
Others	23 (17.7)	3 (21.4)	20 (17.2)	0.713
<b>Implementation of oral health-promoting activities<sup>b</sup></b>				
Dental clinic introductory service	81 (62.3)	10 (71.4)	71 (61.2)	0.567
Providing oral health information	31 (23.8)	9 (64.3)	22 (19.0)	0.001**
Lecture on oral health	7 (5.4)	5 (35.7)	2 (1.7)	<0.001***
Equipping sinks for tooth brushing	3 (2.3)	2 (14.3)	1 (0.9)	0.031*
Others	17 (13.1)	2 (14.3)	15 (12.9)	1.000
<b>Attitude toward necessity of DCs<sup>a</sup></b>				
Agree	11 (8.5)	6 (42.9)	5 (4.3)	<0.001***
Somewhat agree	40 (30.8)	7 (50.0)	33 (28.4)	
Somewhat disagree	61 (46.9)	1 (7.1)	60 (51.7)	
Disagree	18 (13.8)	0	18 (15.5)	

<sup>†</sup> Including part-timer, responses with a multiple choice

<sup>a</sup> Mann-Whitney *U*-test, <sup>b</sup> Fisher's exact test, \*\*\**p* < 0.001, \*\**p* < 0.01, \**p* < 0.05

IQR: interquartile range, HADs: health administration departments, DCs: dental checkups

Asked contents: diseases and abnormalities of the spine and thorax, eyesight, hearing, and urine, as well as diseases and abnormalities of the teeth and oral cavity (DCs)

5. Reasons for not implementing DCs
6. Oral health-promoting activities except DCs undertaken by the university
7. Attitude toward the necessity of DCs at university annual health checkups

### Statistical analyses

The collected responses were tabulated, and descriptive statistics were conducted to calculate the proportion and percentage of the data or the median and interquartile range (IQR). The universities were classified into two groups based on the implementation status of DCs in annual health checkups, which were implementing university (IU) and non-implementing university (NU) groups. The differences in university properties, employed health care professionals, oral health-promoting activities, and attitude toward the necessity of DCs between the two

Table 2. Reasons for not implementing DCs and necessity of annual DCs

Response options	n (%)
<b>Reasons for not implementing DCs (n = 116)</b>	
Budgetary problems	67 (57.8)
No dentists	56 (48.3)
No needs	41 (35.3)
Staff shortage	34 (29.3)
Little effect for the burden	7 (6.0)
Others	27 (23.3)
<b>Necessity of annual DCs (n = 130)</b>	
<b>Reasons for agreement (n = 51)</b>	
Important for general health	22 (43.1)
To enhance oral health awareness	17 (33.3)
Early detection and early treatment	11 (21.6)
To promote dental visits	1 (2.0)
<b>Reasons for disagreement (n = 79)</b>	
Large budgetary burden	26 (32.9)
Students should visit dentists on their own needs	20 (25.3)
Dental prevention is a matter of self-management	15 (19.0)
Large burden due to shortage of staff	6 (7.6)
Small benefit relative to burden	4 (5.1)
Others	8 (10.1)

† Responses with a multiple choice, DCs: dental checkups

groups were analyzed using Fisher's exact test and Mann-Whitney *U*-test, and a *p*-value of <0.05 was considered statistically significant. Statistical analyses were performed using SPSS version 25 (IBM Japan, Tokyo, Japan).

Additionally, quantitative text-mining analysis was performed for free text answers described in the optional comment field asking why a full-time dentist is not needed at the HAD. The response texts were first classified into groups using the Jiro Kawakita (KJ) method<sup>14</sup>. Prior to further analysis using KH Coder (ver. 3.0, available from <http://khc.sourceforge.net/>) developed by Koichi Higuchi<sup>15, 16</sup>, automatic part-of-speech classification was conducted using the morphological analysis software ChaSen. Then, a coding rule was created to standardize notation variability and classify words as concepts. After these procedures, the frequency of occurrence and the co-occurrence networks after encoding were charted.

Table 3. Appearance frequency of encoded words in each group analyzed by text mining of reasons for unnecessary of full-time dentist at the HAD (n = 76)

Groups (included words in descending order of appearance frequency)	Appearance frequency of encoded words n (%)
<b>#A need</b> (need, no/negative, stationed, low/little, dentist, enough, part-time, impossible, urgency, outsourcing)	54 (71.1)
<b>#B self-health management</b> (student, raise awareness, health management, primary care)	14 (18.4)
<b>#C off-campus support</b> (dental clinic, nearby/off campus, introductory service, many)	32 (42.1)
<b>#D on-campus support</b> (campus facilities, affiliated hospital)	11 (14.5)
<b>#E budget problem</b> (budget, burden/problem, large)	11 (14.5)
<b>#F priority to physicians</b> (physician, priority, high)	7 (9.2)
<b>#G status of the university</b> (small scale, equipment, structure)	5 (6.6)

HAD: health administration department

### Ethical considerations

Information on the study concept and purpose was provided with the questionnaire, and responding to the questionnaire was considered providing informed consent for the study from the universities.

This study was approved by the Ethics Committee of Faculty of Dentistry, Tokyo Medical and Dental University (approval number: D2015-638).

### Results

The questionnaires were sent to 295 universities (Kanto-Koshinetsu and other areas), and 162 responses were sent back (response rate of 54.9%). After excluding the responses with missing fields, 130 valid responses (44.1%) were used for the analyses.

All 130 universities had facilities in charge of health administration in their campuses with a variety of sizes. Among optional examination items which can be omitted from the annual health checkups according to the School Health and Safety Law, DCs were implemented in only 14 universities (10.8%), and all of them provided the service for only applicants or a limited grade. In annual DCs, almost all IUs examined the number of present teeth, decayed teeth, filled teeth, missing teeth, periodontal disease, oral hygiene status, temporomandibular joint

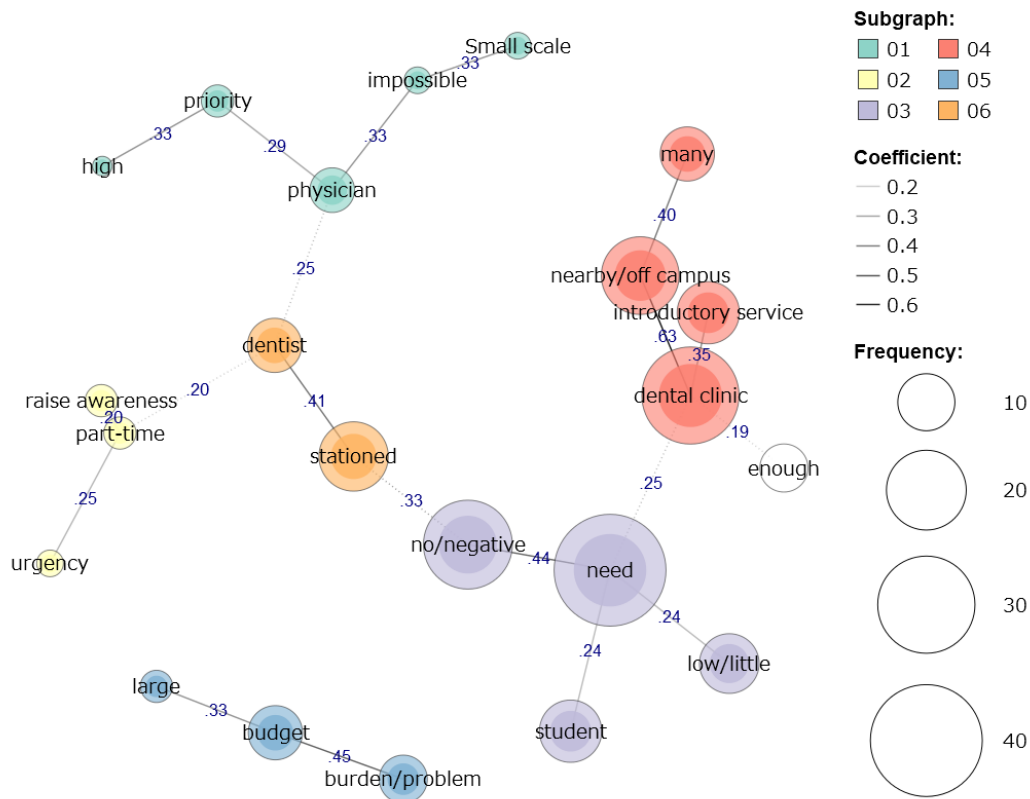


Figure 1. Co-occurrence network diagram obtained from text-mining analysis of reasons for the unnecessary of full-time dentist at health care administration departments

The size of circle corresponds to the appearance frequency of the encoded words. The subgraphs sorted by the same color indicate a relatively strong relationship with each other. The densities of solid lines connecting circles indicate the strength of co-occurrence of words based on the Jaccard index.

disorders, and dental occlusion status. Implementation rates of other optional examination items were higher than DCs; the highest was urine (93.8%), followed by eyesight (84.6%), hearing (38.5%), and spine and thorax (35.4%).

Associations of implementation of DCs with university properties, health administration staff, oral health-promoting activities, and attitudes toward the necessity of DCs are summarized in Table 1. The IU had a significantly larger number of faculties and students than the NU. Additionally, a significantly larger number of professional types and higher percentages of nurses and clinical psychologists were assigned to the HADs in IUs. Regarding the implementation of oral health-promoting activities other than DCs, the provision of information and lecture on oral health were more implemented at the IU; however, the ratio of dental clinic introductory service, which was conducted most commonly, did not significantly differ between the two groups. Furthermore, almost all IUs had a positive attitude toward the necessity of annual DCs,

whereas 32.7% of NUs had a positive attitude, showing a significant difference between the two groups.

Additionally, the NU group was asked reasons for not implementing DCs, and their responses are listed in Table 2. Budgetary problem was the most chosen (57.8%), followed by no dentist (48.3%), no needs (35.3%), and staff shortage (29.3%). Other reasons were chosen by 23.3% of the university and included comments such as lack of time and space (6.9%) and matter of self-management (3.4%).

In response to the question “Do you think DCs should be included in routine health checkups?,” 39.3% of universities demonstrated positive responses, while the rest showed negative responses (Table 1). The positive and negative reasons for the necessity of DCs are listed in Table 2. As the positive reason, “important for general health” was the most chosen (43.1%), followed by “to enhance oral health awareness” (33.3%), and “early detection and treatment” (21.6%). On the other hand, as major negative reasons, “large budgetary burden”

(32.9%), "students should visit dentists on their own needs" (25.3%), and "dental prevention is a matter of self-management" (19.0%) were chosen.

The necessity of employing dentists at HADs was further asked, and only eight of 128 universities (6.3%) answered necessary. Among 120 universities that answered unnecessary, 76 filled the reasons in the optional field, and all comments were included for quantitative text-mining analysis. The groups classified using the KJ method and encoded words in each group are shown in Table 3. The relationships between encoded words are demonstrated as a minimum spanning tree of the co-occurrence network diagram (Figure 1). The most frequently appeared word "need" connected to "no/negative" with a relatively high score (Jaccard index = 0.44), representing few or no needs in students. The word "need" is also connected to "dental clinic" (0.25), which in turn is connected to "introductory service" (0.35) and "nearby/off campus" (0.63) linking to "many" (0.40). These relationships indicated that employing dentists at HADs was considered unnecessary because many dental clinics located near the campus are accessible to students on introduction from university. Subgraph 05 included encoded words regarding budgetary problems independent of other subgraphs.

## Discussion

Although there have been several reports on the oral health status of Japanese students<sup>17, 18</sup>, the status of oral health-promoting activities, including annual DCs as part of university health management, has not been investigated. Therefore, a questionnaire survey among the HADs in Japanese universities was conducted to clarify the status of implementation of annual checkups and other activities relevant to oral health, as well as the attitude toward the necessity of DCs at the university.

Only 10.8% of the universities were implementing DCs, which is the lowest implementation rate among the examination items that can be excluded in the annual health checkups of universities according to the regulation of the School Health and Safety Law. The comparison between IUs and NUs demonstrated that the number of faculties, students and professional types in HADs were significantly higher in IUs. Higher percentages of nurses and clinical psychologists were assigned to the HADs in IUs, however, only two universities had dentists in HADs showing no difference between the two university groups. Furthermore, when asked about reasons for not implementing DCs to NUs, the budgetary burden was selected most by 57.8% of them and staff shortage by

29.3%. Collectively, these findings suggest that the size of the university, which also relates to budgetary scale and the number of staffs, is associated with the implementation of DCs. These factors may have more influence on the implementation of DCs, because dental examination requires more examiners and time compared to other examination items such as urine and eyesight, which have shown high implementation rates. Based on these reasons, it is considered difficult to expand implementation of DCs among NUs.

Another major reason for the non-implementation of DCs was the lack of needs in students. In response to the question about the necessity of DCs in routine health checkups, 67.2% of NUs responded negatively, which is much higher than that of IUs (7.1%), suggesting that annual DCs may also serve to raise awareness among HAD staffs. As reasons for not requiring annual DCs, 44.3% of them selected the reason "students themselves should have DCs when necessary" or "dental prevention should be self-managed," which was a comparable selection ratio with the reasons of budgetary or human burden (40.5%). These results suggest that a large part of HAD staff particularly in NUs recognize that oral health care is the matter for individual students and that there is little need for the university to implement DCs as a part of students' health management.

The perception of low needs for oral health administration is consistent with the result that 94% of universities answered "no need of having a dentist as permanent staff at their HADs." A text-mining analysis of the reasons for the unnecessary of a dentist indicated that this low need is based on the fact that many dental clinics are located in the vicinity of the university and that students can easily be guided to the clinics through the university. In fact, 62% of universities provided information on dental clinics, which was the major practice as the oral health-promoting activity by the HAD. However, when the students visit the HAD, they usually have some oral health problems and need dental treatments. Previous study on the oral health status among first-year dental students suggested that dental visits before subjective symptoms develop are needed for maintenance and improvement of oral health, which is based on the result that a high percentage of students had decayed teeth or gingivitis without any subjective symptoms<sup>19</sup>. Although the habit of regular DCs is particularly important for improving students' oral health status, the rate of undergoing regular DCs among university students is quite low<sup>11, 12, 20</sup>. To encourage students to regularly visit dental clinics, the role of HAD in enhancing students' oral health awareness and leading them to improve oral

health behavior is important. However, information on oral health to enhance awareness was provided in only 19.0% of NUs, showing a significantly lower ratio than IUs. This may reflect the fact that the HAD staff especially in the NU assess students' needs from the perspective of dental treatments but not prevention and hence have low awareness of the importance of oral health education.

Alternatively, it is important to note that the universities having a positive attitude toward the implementation of DCs recognized the reasons for the necessity as "to raise awareness of oral health," "important for overall health," and "for early detection and early treatment." Since the expansion of implementation of DCs among universities is considered difficult due to the large budgetary and personnel burdens, further promotion of these perceptions for DCs among HAD staff notably in NUs is essential to improve students' oral health. To achieve this, dental professionals should actively provide effective information to the HAD staff to raise their awareness of oral health and to enhance their cooperation with local dental clinics or dental associations.

Because this survey does not cover all universities in Japan and the number of surveyed universities is small, this result cannot be generalized to all Japanese universities. Further, the surveyed universities outside the Kanto-Koshinetsu area included limited types of universities such as private medical schools and national or public universities which largely had large scales and medical schools. Hence, there is a possibility that the present outcome may be better than the general Japanese situation. Moreover, the questionnaire did not include information about school types constituting the university. Thus, it was unable to analyze the association between the presence of dental or medical schools and the implementation of DCs. Another limitation is that this result may not accurately reflect the current status of oral health administration in Japanese universities, since this survey was conducted in 2015-2016 and the COVID-19 pandemic after the survey may have changed the status. To understand the more accurate and recent status of oral health administration for university students, further investigation among a larger number of universities throughout Japan and a questionnaire survey including more information such as school types are required.

Despite the aforementioned limitation, this study is the first report to clarify the implementation status of DCs and oral health-promoting activities at the HADs of Japanese universities. Although all students up to high schools annually receive DCs, only 10.8% of universities

were implementing DCs and 23.8% of universities were providing oral health information in this study. These results suggest that enhancing the HAD activities of raising students' awareness of oral health and encouraging students to visit local dental clinics for regular checkups is needed to improve the oral health status of students, taking into account that the implementation of DCs at universities may be difficult to further expand due to large budgetary and human burden. Collectively, further studies on how dental professionals support the HAD staff in raising their awareness of oral health maintenance and the cooperation between community dental clinics and universities are required.

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